






# Cities, Suburbs and Country Living



*In short, twenty centuries of “progress” have brought the average citizen a vote, a national anthem, a Ford, a bank account, and a high opinion of himself, but not the capacity to live in high density without befouling and denuding his environment...*

- Aldo Leopold

## Why Care?

-  Proper land use is critical to protecting the health of rivers, lakes, and the communities associated with them.
-  Construction site soil run-off negatively impacts streams and lakes and is very costly to clean up. It can take up to 20 years for sediment to leave the system.
-  Air pollution has an impact on water quality. Preventing pollutant release is less expensive than trying to clean up.
-  Studies of streams show significant bacterial, petro-chemical, pesticide and heavy metal loading.
-  Fish advisories only notify consumers of mercury contamination, but not other potential contaminants. Other pollutants can accumulate in organisms and build up to toxic levels.

Urban sprawl is becoming perhaps the most critical issue for protecting the Basin’s natural resources. More people are aware of their impact, as individuals and collectively as a society, to the state of the land, water, air and wildlife. More people also are changing their life-style to better protect the earth. However, to adequately protect our land, water, and air for today and tomorrow everyone needs to join in, demand better land use planning and put a personal and community priority on protecting our natural resources.

## Development and Its Major Effects

Today, the Basin is much transformed from the past. Initially, people settled along Basin rivers and lakes because waterways were the main roads for commerce, power and transportation. Some who located on rivers also used them as a convenient place to discharge wastes. As highways and railroads were constructed, more people settled away from the rivers. As the transportation network improved, urbanization slowly spread into the countryside.

Besides the movement of people into the rural landscape, the population in the Basin has significantly increased. Population growth is a critical part of the pressure on Basin natural resources. Much of the

population growth has been in suburban areas surrounding cities and towns and paralleling major roadways. Growth and economic development has brought many benefits to the Basin citizens. The price has been significant in terms of the ecological health of the Basin's environment.

Most of the urban growth is at the cost of the Basin's agricultural production and wildlife habitat. The Rock River Basin contains some of the most productive agricultural soil in Wisconsin. These irreplaceable lands are being converted to areas for housing and businesses. Map 13 shows sales of agriculture land in our Basin that was sold for other uses - mostly development. The magnitude of the loss and the pattern points out the vulnerability of the Basin's agricultural base - and the vulnerability of habitat for many wildlife species whose habitat is rurally dependent. The graphic also shows areas where concentrated efforts and programs can protect remaining valuable agricultural areas. Most land lost to agriculture and wildlife habitat is irreplaceable because land developed for homes, businesses, or transportation will unlikely ever return to food production or to support wildlife.

In 1995, the DNR, recognizing that land use is the critical issue for protecting the natural resources in Wisconsin, developed a report *Common Ground*, outlining a strategic direction for the DNR in land use planning. The report focuses on DNR programs and policies. The goal was to help improve both DNR's land use decision-making and its assistance to local governments and private landowners on land use and natural resource issues. The report was the DNR's initial contribution to the work of the Interagency Land Uses Council and Wisconsin Strategic Growth Task Force, which were established by former Governor Tommy Thompson in 1994. As a result of these initiatives, land use and its relationship to natural resources and other important issues has become as important part of policy and planning at many different levels of government across Wisconsin.

## Impacts on Water Quality

Development increases runoff. The runoff delivers large quantities of pollutants into rivers and lakes. Impervious surfaces like streets, parking lots, driveways and roofs, rapidly direct stormwater and its urban pollutants directly into rivers and lakes. The pollutants often include significant quantities of sediment, nutrients, heavy metals and petroleum-related products associated with vehicle traffic and also high bacteria

loads (sources include livestock and pet waste and sometimes wildlife). Urban stormwater runoff can have greater impact on local rivers and lakes than pollutants from agriculture or other nonpoint source runoff.

One unsuspected source of polluted urban runoff is lawns. To many people's surprise, lawns, while better than pavement, do not infiltrate water very well. In addition, from a chemical use perspective, lawns are becoming our number one "agricultural crop". More fertilizer and pesticides are used per acre on lawns than on farm crops. Unfortunately many lawn owners share a belief that - if a little is good, a lot is better. Fertilizer and pesticides applied in excess of plant needs - whether on lawns or farm fields, can simply wash off into rivers and lakes or filter into the groundwater. A soil test taken by the landowner will indicate if nutrients are lacking in lawn or garden soil.

☆ For more information on toxics in waterways:  
<http://toxics.usgs.gov/regional/emc.html>

Sediment from construction sites is a major source of pollutants in urban areas. Information gathered in the Lake Mendota Nonpoint Priority Watershed project showed that on average only about 450 acres of land in the 148,751 acre (232 square miles) watershed is bare at one time because of construction. However, this small land area contributes about 20% of the total phosphorus and sediment entering Lake Mendota every year (respectively 72,275 pounds and 9,613 tons). Other priority watershed project have also found that uncontrolled construction sites give off large volumes of sediment during storms.

DNR and the Department of Commerce (DOC) regulate many construction activities in the state. However, local government ordinances are needed to cover certain activities not covered by state regulations. Local governmental programs are also important to ensure on-site compliance with environmental rules.

Other potential sources of urban runoff pollution include industrial sites, where outside activities and storage of materials can contaminate stormwater runoff. Some of these industrial facilities are regulated by the DNR through industrial stormwater permits. Where state regulations do not apply, local government programs may be necessary to control industrial pollution sources.

## **Map 13: Agricultural Land Sold out of Ag Production in the Rock River Basin**

Please refer to the State of the Rock River  
Basin Report web page to view this map

# Rain Gardens





## Improving water quality at home!

Runoff from house rooftops, lawns, and driveways carry pollutants. These pollutants reach rivers and lakes and cause excessive weeds, turbid water, a build-up of sediment and sometimes, beach closures. With a rain garden you can reduce runoff and pollutants, provide wildlife habitat, and beautify your home at the same time.

A rain garden is a relatively small area planted near the drain spout of a house or building or near a paved area (such as a driveway). The water from a rain storm or from snowmelt is routed to the rain garden and is filtered naturally by the garden's plants and soils. This filtration process removes nutrients and pollutants. It also helps restore natural infiltration into groundwater.

Rain gardens use the concept of bioretention, a practice in which plants and soils help remove pollutants from stormwater. Rain gardens can utilize a wide range of plants (preferably native species), as well as trees and shrubs. Each rain garden plot covers about 200 square feet and is designed so water will not pond in the garden for more than 24 hours. Some yards can use two or more rain gardens!

The benefits of rain gardens are they:

-  Require only occasional weeding and reduce the amount of lawn you need to mow so you'll spend more time relaxing and enjoying your property.
-  Slow the flow of water off property, which can deter flash flooding.
-  Attract birds and butterflies.
-  Help recharge and renew neighborhood groundwater.

Rain gardens beautify your property and helps ensure that we have clean water now and in the future. To learn more about rain gardens write to the address listed below and ask for publication number PUB-WT-702-00.

WI DNR  
Runoff Management, WT/2  
PO Box 7921  
Madison, WI 53707-7921

In the early 1990s, the U.S. Environmental Protection Agency (EPA), recognizing that pollutants carried by urban runoff are a major source of water quality contamination, developed federal regulations requiring the largest municipalities in the U.S. (those greater than 100,000 population) to control urban runoff pollution. The authority to implement a water permitting program is delegated to the DNR. Under the state's municipal stormwater water program, the City of Madison and the UW-Madison received a municipal stormwater water discharge permit. Because other municipalities are connected to Madison's storm sewer system or have similar urban impacts on nearby waterways, 17 adjacent cities, villages, towns, and Dane County are also required to obtain a municipal stormwater discharge permit.

In October 1999, the EPA passed new regulations requiring smaller municipalities to obtain stormwater discharge permits. The new Basin areas covered under the municipal stormwater program include the Beloit and Janesville Urbanized Areas. The U.S. Census Bureau's definition of these Urbanized Areas includes a number of townships or parts of townships adjacent to Beloit and Janesville. Other cities in the Basin that have a population of 10,000 or greater will need to be evaluated by the DNR to determine if they should receive stormwater discharge permits. These include the Cities of Beaver Dam, Fort Atkinson, Watertown and Whitewater. Additional cities may need evaluation based on the 2000 census updated by the U.S. Bureau of Census.

The EPA leaves it up to the state to evaluate a municipality with a population less than 10,000 to determine if it should receive a stormwater discharge permit. As the regulations are implemented in Wisconsin in the next few years, many additional Basin communities will be intensifying their efforts to control urban runoff.

☆ For information on Urban Stormwater Program:  
[www.epa.nsw.gov/au/stormwater/usp.htm](http://www.epa.nsw.gov/au/stormwater/usp.htm)

Besides the direct environmental impact of urban sprawl, it also significantly increases the demand for transportation infrastructure, solid and wastewater disposal, recreation and it results in loss and fragmentation of wildlife habitat. These less visible demands of sprawl - many of them the result of homes being built away from city services - place pressure on our natural resources. These pressures must be considered in order to insure a healthy environment for people today and in the future.

Typically costs for public services are higher for developments in rural areas. Because of the increased distance between each subdivisions, rural development can result in higher costs for providing roads, garbage pick up, law enforcement and fire protection than for the same services in cities. Public sewer and water services are often too costly to provide in rural subdivisions or industrial parks.

The greater cost incurred by developers for construction of rural subdivisions are passed on to the home buyers through the cost of the lots. The full cost of the services often times are not just borne by the new homeowner, other area residents also help pay for public services provided to new rural development. The increased cost of services such as law enforcement, garbage pickup, snow removal, fire protection, road maintenance and schools usually result in increased town or county taxes to the current residents in the tax district. These costs can play a significant role in changing the revenue and costs relationship for townships and county governments and tax paying residents.






A Cost of Community Services (COCS) study, conducted by the Wisconsin Land Use Research Program, University of Wisconsin-Madison in May 2000, attempted to show how different types of land use affect a community's budget of costs and revenues. The Township of Dunn, located in Dane County in the Basin, was one of communities studied.

The study showed that the cost of town and school services slightly exceeded the revenue produced by the new residences. The study concluded that, while the data was generated from specific communities, the general trends may be applicable to a broad range of Wisconsin communities. It also emphasized that not any one type of land use is better or worse, but that the long-term fiscal health of any community needs a balance of land uses. The study showed the importance of townships and counties assessing both the revenues and costs of all development along with other social changes and impacts to the environment.

## Flooding and Erosion Impacts

Increased runoff from development plays an important role in flooding and erosion problems in streams and lakes. The Rock River Basin has numerous low-lying areas prone to flooding. Growing populations located along or near rivers and lakes result in more problems associated with flooding. Accompanying the flooding are calls to local and state officials “What are you going to do to help me get the water off my land?”

Several factors play a role in why parts of our Basin repeatedly flood:

-  The Basin has lost over 50% of its wetlands.
-  Increasing urbanization is bringing increased impervious acres and storm sewers, which more rapidly deliver water to streams.
-  The low gradient of many Basin rivers results in large flood events needing more time to leave the Basin - meanwhile water backs up on low-lying lands.
-  Many rural, suburban, and urban landowners live on or near lands that historically were wetlands and floodplains.
-  More people are building near water bodies.

Historically flooding in rural areas has been fairly consistent in area and scope. However, urban flooding is increasing. In recent years the Basin has experienced more or larger storms. Increased impervious area have caused higher water levels. Streams have become more flashy (flooding faster and deeper). Increased water energy attacks shorelines with heightened intensity. Homes, businesses, parks and productive farmland are threatened and irreplaceable shoreland is lost - which also means tons of sediment entering streams and lakes along with more nutrients to feed algae growth.

To help control urban and rural flood damage, flood plain zoning is administrated through county or city government agencies. Many areas in the Basin have Federal Flood Boundary and Floodway maps available. These maps are produced by the Federal Emergency Management Agency (FEMA) and are available through FEMA or your local zoning agency.

In 1993, the Basin experienced more serious wide-scale flooding. In Jefferson County near the City of Fort Atkinson and Lake Koshkonong, a large Rock River flood resulted in over 50 homes with flood damage. Many people were unable to access their homes and lands for up to 6 weeks. The total land-owner flood costs was estimated to be over \$500,000. Besides the direct costs to landowners, Jefferson County had other significant flood-related costs. More recently in 2000, many areas in Waukesha County, Dane County, and the Cities of Madison, Monona and Middleton experienced considerable flooding due to a series of extreme storm events.

In Jefferson County, to comply with the requirements of receiving 1993 federal disaster relief funding, the county was required to develop a County Flood Mitigation Plan. The plan helps control floodwater impacts to some of the most flood prone areas in the county. Through the plan and with federal and state funding the county purchased a number of very flood prone properties near Blackhawk Island on Lake Koshkonong. These properties from the perspective of flood potential and societal costs should not have been developed in the first place and are a warning to others trying to build in low areas.

## Dams

Currently, there are about 194 dams of varying sizes in the Basin. Many dams were initially built to power local industries, which typically included grinding wheat or cutting logs. Dams were also constructed to control water levels in natural lakes. Some dams were constructed to control floods or to provide habitat for wildlife, such as the Horicon Marsh and Theresa Marsh dams. Many rivers in the Basin, especially the main stem of the Rock River, have a series of dams and lake impoundments.

Some of the larger dams in the Basin were converted to hydroelectric generation. Today, seven dams produce electricity. Four are regulated by the Federal Energy Regulation Commission (FERC). The DNR regulates the remaining three dams. Four hydro dams may be renovated to again produce power and if they are, they will be FERC regulated. As time passed, many of the dams in the Basin became used primarily for recreation, wildlife, and aesthetic and scenic benefit to area residents.

Dams have significant environment impacts. Often the negative effects may be greater than the beneficial effects of a dam. Dams transform a river ecosystem into a lake ecosystem with the change affecting all the species living in the water and along the shorelines. Eventually the reservoirs behind dams fill up with soil washing down the river and settling behind the dam, affecting water quality and reducing the impoundment's water holding capacity. Dams prevent fish migration to their spawning areas and wintering habitat.

Water level control at a dam often involves conflicting needs and desires from the public, especially during high water. The agricultural sector wants dams lowered to allow water to drain farm fields, especially during floods. People who live on impoundments lose recreational lake usage when water levels are low and frequently want dams raised to increase water levels. The fishing and hunting community and industries have equally valid reasons for wanting water levels that meet their particular needs.






Water level management in impoundments is particularly challenging in our Basin due to very shallow water depths and sediment acculations.


Dams, like all human built structures, deteriorate over time and must be maintained. The DNR monitors the structural integrity of dams whose size and amount of impoundment puts the most citizens at risk of dam breaches. These dams are scheduled for inspection every 10 years. When dams are inspected and determined to need repairs, DNR staff works with the dam owners and area residents to assess the maintenance, environmental and social costs and benefits of the two common options - dam repair or removal. This challenge faces every community with a dam because all dams eventually need repairs; often a very costly proposition.

This situation has been facing the citizens living around the Indianford Dam on the Rock River. Lake Koshkonong, an impoundment of the Rock River is large enough and so sited that while the dam is located

## Potential Environmental Impacts from Dams

Although many dams provide recreation and scenic benefits which are highly valued by local residents, dams are detrimental to the environmental health of a river. Impacts from dams typically include:

-  Increased water temperatures and reduced dissolved oxygen levels.
-  Sediment buildup and accumulation of contaminants in the sediment.
-  Excessive algae and aquatic plant problems: which can result in low oxygen levels and the release of nutrients from sediments.
-  Highly variable stream water levels and simplified aquatic habitats caused by the loss of important riffles and rapids and resulting in reduced species diversity, including rare fresh water mussels.
-  Disruption of human navigation, fish migration, and movement of woody debris downstream. The woody debris creates in-stream habitat for many aquatic organisms.

 To learn more about Wisconsin dams and view an interactive map:  
[www.dnr.state.wi.us](http://www.dnr.state.wi.us)

- >select Environmental Protection (sidebar) > select Water (sidebar)
- >select Dam Safety ... (main body) >select Dam Safety Map (main body)
- >select Interactive Map >select Dam Safety Database - Basic functionality

in Rock County, riparian ownership is in several counties. When inspected a few years ago, the dam was found to need significant repairs.

The dam, constructed sometime after 1851, raised the water level in Lake Koshkonong two to three feet. The dam is important to many diverse interests. Shoreland residents and regional citizens prize the Lake Koshkonong impoundment for a wide variety of recreational activities.

The Koshkonong area along the Rock River originally consisted mainly of a very large and valuable wetland complex containing many springs. The area was regionally renowned for its wildlife and fishery production and provided outstanding hunting and fishing opportunities. Removal of the Indianford Dam would restore many of these original environmental benefits including enhanced water quality protection. Based on historical environmental benefits and water quality benefits to the river system, a strong case can be made to remove the dam.

On the other hand, repairing the Indianford Dam would retain the current recreational activities, which also includes fishing and hunting opportunities, and supports the property investment by local lakeshore residents and businesses. The Indianford Dam repair or remove dilemma, presents the full array of the environmental, recreational, economic, and social value conflicts facing every community associated with a dam.

Today, as at the Indianford Dam, when dams need significant repairs or improvements, the public is generally more deeply involved in the decision-making process. The DNR often participates in many public meetings held to look at the whole picture - the total costs and benefits (environment, economic and social) of keeping a dam or removing it. This approach helps communities appreciate all aspects of dam removal or retention and the benefits and impacts to the environment.

While most Basin dams have been repaired, since 1992 eight dams have been removed: Fulton Dam on the Yahara River and the Shopiere Dam on Turtle Creek, Rockdale Dam on Koshkonong Creek and the Token Creek Dam on Token Creek, Slabtown Dam and

Hebron Dam on the Bark River and the Upper Waterloo Dam on the Maunsha River and the Funks Dam on the Oconomowoc River.

After dam removal, free flowing restored rivers provide improved habitat for many aquatic species. For example, very soon after breaching the Shopiere Dam, nine fish species were found upstream of the former dam that were previously only found downstream. This is good news for the fish, the river's health, and potentially, the anglers!

☆ For more information on dam removal see:  
[www.wisconsinrivers.org](http://www.wisconsinrivers.org) (select Small Dams)

## Sewage Waste and the Environment

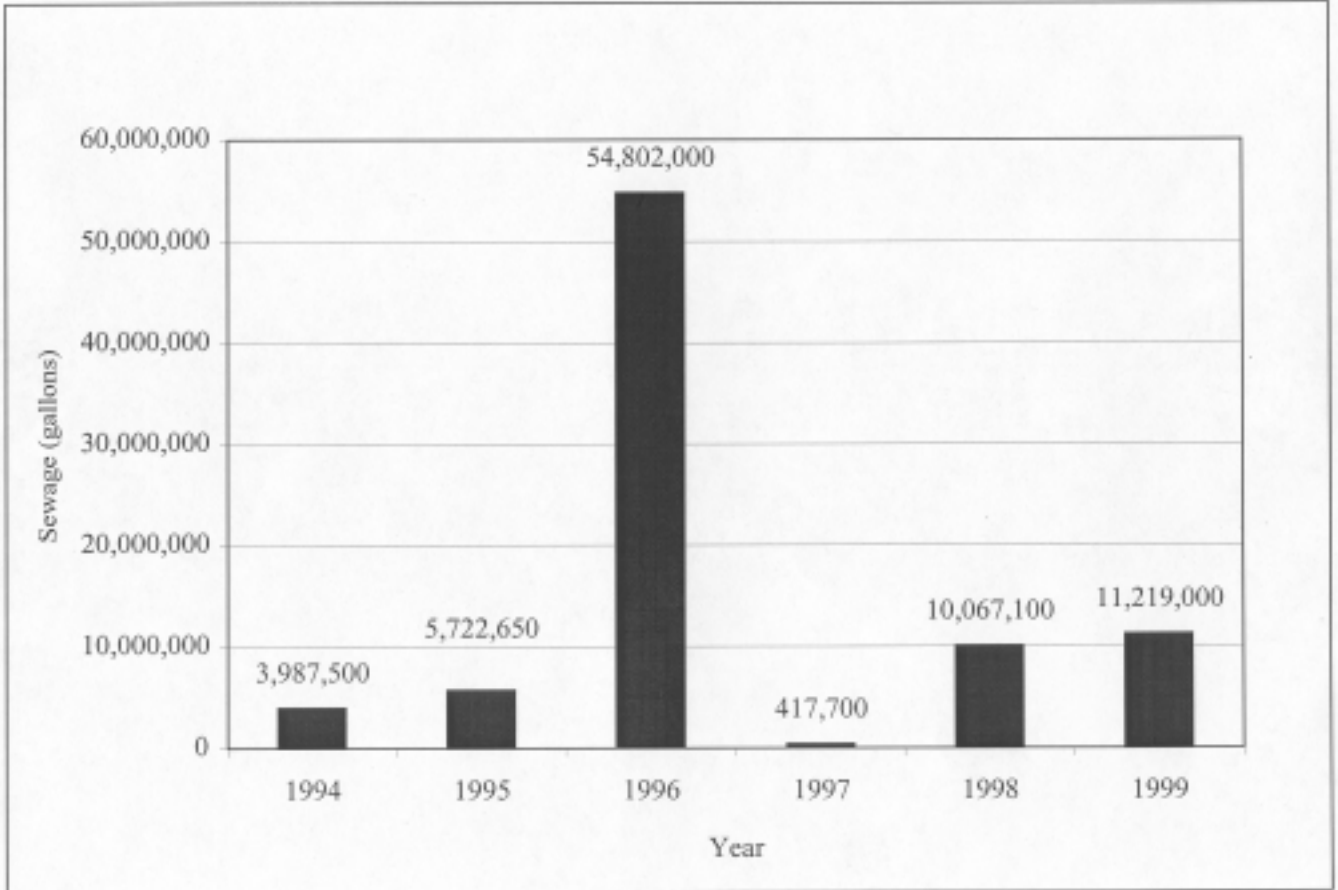
Sixty-eight municipal and industrial wastewater treatment plants discharge treated waste to surface water systems in the Rock River Basin. Since passage of the federal Clean Water Act in 1972, Basin wastewater treatment plants have significantly reduced pollutant loading to rivers. Today, over 90% of the treatment plants routinely meet their wastewater permit standards. However, even when effluent permit standards are met, significant amounts of nutrients and other chemicals discharges to river systems because of the large population served. Controlling the total quantity of nutrients released from each plant remains a social and technological challenge.

No mechanical system, including wastewater treatment plants, works perfectly. Every technical system can be overwhelmed at times. Extreme storm events sometimes accompanied by equipment failures, can result in large quantities of untreated or partially treated sewage with potentially high bacteria and chemical loads entering our rivers every year. In 1999, over 11 million gallons of raw municipal sewage entered the Rock River Basin waterways through sewer system bypassing, mainly during large storm events. The accompanying Graphic shows the trend in raw sewage releases from 1994 to 1999. In the Reference Section of this report in detailed information about sewage bypassing.

As mentioned in the Surface Water section, in 1966 the Rock River Watershed Partnership (RRP) formed in the Basin. The partnership was organized as a stakeholder group committed to addressing nutrient and other water quality management issues within the Rock River Basin using watershed-based planning and decision-making. The RRP is an alliance of wastewater treatment plants, industries, counties, Farm Bureaus, DNR,



# Wastewater Treatment Plant Sewage Bypassing in the Rock River Basin 1994-1999



Sewage bypassing into rivers or streams at wastewater plants occurs mostly during severe storm events. During these storms, large volumes of clear water (rainwater) enter the sewer system through leaks in the underground sewage pipes. Sewage and rainwater is bypassed around the wastewater plant to prevent treatment plant overload. Typically clear water inflow occurs in the older parts of the sewage collection system. Another source of clear water is when homeowners illegally direct sump pump water into the sewage system. Wastewater plants are required to eliminate clear water inflow into their sewage system. The DNR works with treatment plants to correct clear water inflow problems. (See Reference Materials section in the Report for details)



For more information on sewage bypassing in the Rock River Basin, contact the DNR wastewater engineer at (608)275-3267.

NRCS, and several organizations, and individuals. During its first four years, the RRP invested more than \$680,000 in assessing the potential of nutrient trading in the Basin. The assessment included an extensive, two-year water quality study in the Basin.

The primary goal of RRP was to investigate the use of watershed-based trading (also known as nutrient or pollutant trading). Nutrient trading allows wastewater treatment plants and industries to reduce nutrients, like phosphorus, by paying for nonpoint source pollution controls instead of controlling phosphorus at the plant. For example, a point source discharger would pay farmers to control nonpoint phosphorus sources, rather than remove additional phosphorus in the wastewater treatment plant's own discharge.

An important factor that motivated this interest in nutrient trading, was a new state rule which required phosphorus removal be reduced to 1 part per million (ppm) in the wastewater effluent. Meeting the new effluent limit would require significant changes to wastewater treatment plant operations. As a result, local taxpayers would be faced with large financial costs to make these changes. Another factor was that data today showed that overall, nonpoint pollution is the most significant source of pollutants impacting rivers and lakes in the Basin. With these two factors, many believed that more phosphorus could be removed, at a lower cost to taxpayers, by controlling agricultural sources of phosphorus rather than by increasing its removal at wastewater treatment plants.

The water quality study assessed several possible Basin-wide phosphorus control scenarios. They ranged from making no changes from current operations by treatment plants or in farm practices, to complete treatment plan compliance with stricter phosphorus standards and all farms in the Basin using conservation land management practices. Although it was believed that removing phosphorus at agricultural sources would be the most cost-effective approach, the data indicated that it's more cost effective to modify or change plant operations to meet the new phosphorus removal limits. By early 2002, only two wastewater treatment plant was considering controlling phosphorus at other sources.

In May 2000, the Rock River Partnership joined the RRC as part of the Water Quality Issue Team.

☆ For more information on the RRP studies see:  
<http://clean-water.uwex.edu/rockriver>

Sewage waste from rural developments are usually disposed by private, on-site septic systems and a leach field. On-site septic systems treat a large component of household waste. These systems, when installed and maintained properly, can provide reliable, economical, and environmentally sound wastewater disposal for rural residents.

System competency and failure rates vary depending on soil types, system use, and maintenance. However, even when properly maintained, these systems emit nitrates, salts, and other components to the soil and even groundwater. Many chemicals used in daily life enter the septic systems and receive little or no treatment by the system. These chemicals can impact groundwater. These potential problems are compounded when septic systems are poorly maintained. Current septic system codes require maintenance and visual inspection of the system at least once every three years.

Besides liquid effluent, municipal and industrial wastewater treatment plants and septic systems produce a biological residue, called sludge. The biosolids, along with household septic tank sludge, are spread onto fields permitted by the DNR. Spread correctly, wastewater treatment and septic sludge provide essential nutrients for agricultural crops. Municipal landspreading regulations control the application rate of sludge based on nitrogen, heavy metals and chemicals. Regulations also set distance requirements from wells, rivers, lakes, and steep slopes. However, the regulations do not directly address the rate of phosphorus application.

Large acreages of land are required to provide for sludge disposal. For example, twenty-three municipalities, 15 industries, and 11 septic pumpers in Dodge county were permitted for landspreading in 2001. Many of these facilities have land approved for spreading in other counties. Approximately 48,374 acres were permitted to be used in the county for landspreading. However, not every approved acre is spread regularly with biosolids.

## Solid and Hazardous Waste

Solid and Hazardous waste can impact natural resources and contaminate water (surface or groundwater, air, land, or wildlife).

We in Wisconsin can be proud of our efforts to reduce waste going to landfills and our recycling record. A 1998 survey found that 97% of Wisconsin's households recycle. Approximately 36% of household and com-

mercial waste is recycled or composted. In 1997 the national average was 28%. In the Basin, there are 17 permitted operating landfills. On average, each resident contributes four pounds of trash per day to a landfill.

Today approximately 86 businesses in the Basin generate significant quantities (more than 2,200 pounds/month) of hazardous waste. This qualifies them, under state regulations, as large quantity generators. Compared to years past, industries are generating less hazardous waste. Most of these industries understand that by properly managing hazardous waste, they are protecting the health and safety of their employees, the community, and the environment.

Many local governments conduct annual Clean Sweep Programs. During these events local residents can bring noxious and hazardous waste in for disposal. Jefferson county is the state leader in the Clean Sweep Programs. From 1997-2000, approximately 222,000 pounds of hazardous materials were brought into the county for proper disposal from homes, agriculture, and businesses.

☆ For information on Health and Environmental Pollutant studies: [www.cdc.gov/nceh/dls/report/](http://www.cdc.gov/nceh/dls/report/)

Some sites in the Basin have been significantly impacted by industrial or municipal activities. Many of these sites still need remediation. The DNR has programs to help clean up contaminated sites. One DNR program that has received national recognition, focuses on cleaning up and restoring brownfields. Brownfields are usually contaminated sites found in older urban areas. The clean-up and redevelopment of these properties help the communities re-invest their urban areas, expand their tax base, reduce urban sprawl, and promote the health of their citizens.

Some of the more seriously contaminated sites in the state are listed on the EPA Superfund National Priority list (NPL). In the Basin there are nine sites on the NPL list. Some of these sites have been remediated and are listed as closed for further action. In Dane County the sites are: the City Disposal Corp. Landfill, Madison Metropolitan Sewage District Sludge Lagoons, Refuse Hiway Landfill, and the Stoughton City Landfill. In Dodge County there are two sites; the Hechimovich Sanitary Landfill and Oconomowoc Electroplating. In Rock County there are the Janesville Ash Beds, Janesville Old Landfill, and the Wheeler Pit. The DNR and the EPA are working together to complete remediation activities at these sites.

☆ For more information on the status of Wisconsin's National Priority List sites:  
[www.epa.gov/R5Super?npl/wisconsin](http://www.epa.gov/R5Super?npl/wisconsin)

## Air Emissions

Land use can directly affect the quality of air that humans and other living organisms breathe. Poor air quality, through airborne deposition of pollutants, can contaminate our land and water resources. Pollutants transported by air can impact wildlife health and can enter the food chain.

Air quality starts with each of us! Cars and trucks are a primary source of volatile and particulate contaminants in the air. People are driving more miles and frequently driving larger vehicles - which get lower gasoline mileage. Vehicles that run on diesel fuel emit pollutants known to be particularly carcinogenic.

However, other significant pollutant sources contribute to atmospheric contamination. Industries are a major source of airborne pollutants. In the ten counties of our Basin approximately 598 primary industrial facilities report annual pollutant emissions. Together these industries emit approximately 475,000 pounds/day of criteria pollutants into the atmosphere. These pollutants include particulate matter, sulfur dioxide, nitrogen oxides, hydrocarbons, carbon monoxide, and lead.

The DNR collects information on toxic material released to air, land, and water through its Toxic Release Inventory (TRI). In the 1998 Toxic Release Inventory, based on the total pounds of air emissions, two of the top ten facilities in the state are located in the Basin. Together these industries contributed over 1 million pounds of emissions to the air that year.

TRI information is compiled to support environmental awareness and management decisions. Basin businesses reporting TRIs have done an excellent job in reducing toxic releases, particularly when compared to their previous reported levels. However, more needs to be done. Not all businesses are reporting their emissions. DNR has designated regional staff to help various business sectors report emissions and proactively reduce pollutants to the environment. Many times, the reductions also save the industries money. The UWEX is involved in working with businesses and communities to increase business compliance with the reporting regulations.

☆ For more information about TRI see:  
[www.epa.gov/tri/](http://www.epa.gov/tri/)

The Wisconsin Air Emission Inventory in 1999, showed that dischargers in 10 Basin counties annually released over 9,850 tons of Volatile Organic Compounds (VOCs) into the atmosphere. Over the past five years, VOCs releases have been reduced by about 7%. The level in 1995 was 10,540 tons. VOCs react with nitrogen oxides in sunlight to form ozone. Ozone formed in this way stays relatively close to the ground. When there's too much ozone near the earth's surface urban smog develops. High levels of ozone can make breathing difficult for young children, elderly, and many people with asthma and other respiratory problems. Studies also show ozone can affect the growth and health of specific plants.

Ground-level ozone comes from many sources; automobile use, power plants, and solvent vapors from industrial and individual usage. The small spills that occur when filling gas tanks at service stations and the escaped gasoline vapors also contribute to ground-level ozone. In our Basin urban smog has not yet reached the level where industries face additional regulations where counties could be designated as "nonattainment areas" due to high ozone concentrations. Counties under nonattainment status have additional restrictions on industrial development. Rock and Jefferson counties are very close to achieving nonattainment status under the new proposed EPA 8-hour ozone standard.

Ozone can also contribute to environmental problems in the upper atmosphere. Too little ozone in the upper atmosphere causes the Ozone Hole over Antarctica to expand. This high altitude ozone acts as a filter to reduce the amount of ultraviolet (UV) light reaching the earth. Excessive UV light promotes skin cancer and cataracts. Chlorofluorocarbons contribute to the destruction of the upper ozone layer. Use of this chemical has been restricted because of its effects on the ozone.

Air deposition of mercury is the primary source of mercury contamination in lakes and streams. Most airborne mercury comes from electricity generated by coal-burning power plants. In the Rock River Basin there are 19 coal-burning plants. However, air deposited mercury may also come from power plants located hundreds of miles from our Basin.

Mercury enters the food chain by incorporation into lower organisms like tiny plants and animals. It is then transferred by consumption to amphibians, fish, reptiles, birds, and mammals. People at a greatest risk of mercury poisoning include women of childbearing years, nursing mothers, and children under the age of fifteen.

In 1999, Wisconsin issued mercury fish advisories for 321 of the 1,000 waterbodies tested. In our Basin only seven lakes were on the Fish Consumption Advisory List: Rock, Oconomowoc, Monona, Waubesa, Upper and Lower Nemadji and Pretty Lakes. In February 2001, the NRB directed the DNR to broaden the Fish Advisory to include nearly all Wisconsin's inland waters. The changes mean that most waterbodies in the state and the Basin carry the same general state-wide advice for how many meals of certain species people can safely eat. The NRB recognized that mercury is a bigger problem than previously thought, particularly for developing fetuses and young children.

The NRB has now charged the DNR Air Program to propose rules to reduce mercury emissions in Wisconsin. A system of pollution credit trading is being developed. Phased mercury reductions will be proposed in 2002. The Air Program firmly believes national mercury reductions are needed, since elemental deposition can occur over many, many miles.

☆ For more information on DNR air quality monitoring sites and mercury deposition see:  
[www.dnr.state.wi.us/org/aw/air/monitor/sites.htm](http://www.dnr.state.wi.us/org/aw/air/monitor/sites.htm)  
[www.dnr.state.wi.us/org/caer/ce/mercury/fish.htm](http://www.dnr.state.wi.us/org/caer/ce/mercury/fish.htm)

Another pollution source receiving increased recognition is backyard burn barrels. Burn barrels result in many DNR complaints each spring. Smoke from the devices often contains cancer-causing compounds, such as dioxin, as well as some heavy metals. The State prohibits the burning of wet garbage, tires, plastics, railroad ties and furniture. Many outdoor barrel burns are illegal.

☆ For information on many human health hazards:  
[www.dhfs.state.wi.us/dph\\_beh/Env\\_Health\\_Resources/Human\\_Health\\_Hazards](http://www.dhfs.state.wi.us/dph_beh/Env_Health_Resources/Human_Health_Hazards)

## The Good News - in Land Use!

Many Basin cities, villages, counties and townships are working to meet the challenge of protecting both their natural environment, economy, and quality of life. Some of the tools they employ include natural resource assessments, used together with good land use and zoning plans. The Table on page 78 shows the status of resource assessments and land use planning by county.

In 1999, the RRC Basin Stormwater Issue Team sent a survey to all the Basin's municipalities (except Dane County, which had been surveyed earlier by the LCD). The questions covered a range of stormwater runoff

*(continued on page 79)*

# Smart Growth in the Rock River Basin

In 2000, the Wisconsin State legislature passed new statewide Smart Growth legislation. This legislation assists local communities by providing state financial and technical support for land use planning. The 2001/2002 state budget provides funding to help support wise local land use planning.

Some Basin communities are already putting Smart Growth into action. Cottage Grove, a small village located just east of Madison, adopted a comprehensive plan that complies with all the Smart Growth requirements. Their plan will guide community growth in a way that limits unplanned sprawl, enhances a sense of place and works in harmony with nearby communities. Their plan calls for strong cooperation with nearby governments to ensure a permanent open space area between Cottage Grove and Madison. Coordinated land use planning helps support ecological diversity on a landscape scale.

As of June 2001, a number of Basin counties, cities, villages and townships completed or were starting the process of developing a comprehensive land use plan following the Smart Growth guidelines. These plans address the required nine planning elements: issues and opportunities; housing; transportation; utilities and community facilities; agriculture, natural and cultural resources; economic development; intergovernmental cooperation; land use and implementation. The following are the Basin communities starting the planning process in early 2002.

## **Townships:**

Dane County -

Berry  
Dane  
Roxbury  
Springfield  
Sun Prairie  
Verona  
Westport

Dodge County -

Beaver Dam  
Emmet  
Hustisford  
Lebanon  
Leroy

Jefferson County -

Aztalan  
Sumner  
Watertown

## **Counties:**

Dane                      Jefferson  
Dodge                    Rock

\* In some county plans most  
or all of the townships are covered.

## **Cities and Villages:**

Beaver Dam              Janesville  
Beloit                      Lake Mills  
Black Earth              Madison  
Columbus                Marshll  
Fort Atkinson            Middleton  
Fox Lake                  Monona



For information on Smart Growth in Wisconsin see:

[www.csd.uwm.edu/Org/wapa/SmartGrowth](http://www.csd.uwm.edu/Org/wapa/SmartGrowth)

[www.smartgrowth.org](http://www.smartgrowth.org)

[www.dnr.state.wi.us/org/es/science/landuse/data\\_maps/index](http://www.dnr.state.wi.us/org/es/science/landuse/data_maps/index)

## County Resource Related Management Plans and Ordinances

Please refer to the State of the Rock River  
Basin Report web page to view this Table

related questions. Of the 165 surveys sent out, 120 were returned - an excellent number of responses. However, the responses indicated that there is a lack of stormwater runoff awareness. Approximately half of the municipalities surveyed have a stormwater ordinance or related regulations. But the other municipalities had no regulations or plans to deal with their stormwater runoff. Communities need to do more to prevent and control stormwater runoff in order to protect themselves and their neighbors downstream.

One very useful municipal planning tool is a Sewer Service Area Plan. This plan, which is required for cities over 10,000 population, helps growing cities guide sewer development away from sensitive natural features. The plan also helps control the cost of providing municipal services to growth areas. In the latest example, the City of Beaver Dam received a DNR grant to develop their Sewer Service Area Plan. The plan was approved in 2001. The City of Watertown also began its sewer service plan development process in 2001. Other municipalities that meet the population requirement for developing this sewer planning tool include the cities of Fort Atkinson and Whitewater.

Another good planning model for providing flood protection to landowners is the Jefferson County Flood Mitigation Plan. The plan helps the county pro-actively work to protect residents from large-scale floods. Federal grants and programs are available to help cities and counties develop flood control or prevention strategies.

In spring 2001, the Token Creek Watershed Association, the City of Sun Prairie, the RRC Basin Stormwater Issue Team, DNR and UWEX locally developed and hosted a half-day seminar in Sun Prairie on conservation minded subdivision design called "Conservation-Minded Land Developments." Over 50 people attended including private consultants and developers, local citizens and community government officials. An all-day workshop held previously in Madison was attended by 180 people. A goal is to take this locally led land development seminar out to other interested municipalities in the Basin.

Two new related DNR Programs are under development and scheduled to start in late 2001/2002. One program will provide funding to cities, towns, and sanitary districts to help control urban flood waters and support riparian restoration. Funds will be available for flood-proofing structures, purchasing conservation and flooding easements, restoring streams, or constructing

flood control structures. The other program will provide funding for small dam removal and river restoration to remove dams and restore the former reservoir shoreland area to a natural healthy conditions.








However, many areas in the Basin are already controlling shoreland erosion and protecting our rivers. Officials and staff of the cities of Delavan, Hartland, and Walworth County worked with the RRC Shoreland/Wetland Basin Issue Team to install natural shoreland vegetation demonstration sites in spring 2001. The demonstration sites are located in Delavan's Terrace Park, Hartland's downtown park on the Bark River and Natureland Park in Walworth County. A DNR grant helped fund some aspects of the demonstration projects. In addition, the City of Watertown and Lake Mills are installing large natural shoreland vegetation and erosion control projects.

A major pollutant, coming under increasing local regulation, is soil washing off construction sites. Dane, Waukesha, Washington and Walworth counties have been particularly active in locally controlling construction site erosion and stormwater runoff. In addition, many cities in the Basin are developing stormwater management plans and passing local regulations to curb construction site erosion from new development. The counties and cities are also providing citizen educational programs to help reduce urban pollution into rivers and lakes. These programs include storm drain stenciling and proper lawn care programs. Many communities are seeking various state or federal runoff control grants to help fund storm water control practices.

Today many rivers are beginning to benefit from watershed based clean up activities by agriculture, businesses and citizens. All these efforts together, individual and community level changes are helping create a better, more resource protective future for everyone. As rivers clean up, river-front festivals, business and residential developments increase - bringing good quality of life, fun and economic benefits to citizens in communities living near the water!

Urban developments, whether it be individual houses, subdivisions or cities, have a wide spread and significant impact on the natural resources. We'll continue developing as more people are drawn to the Basin's beauty and natural resources. It's the way that we grow that will determine how well we protect our land and water resources. Many tools, such as programs and regulations, exist to help us 'grow well'. The vital ingredient to resource protection is personal and public commitment to do so.

## WHAT YOU CAN DO . . .









-  Support land use planning and zoning in your community. Get your community to pass and enforce construction site erosion control and stormwater management ordinances.
-  Test your soil and check for insects before applying fertilizers or pesticides.
-  Remember - Everything that goes into a storm drain goes into local rivers or lake, not the wastewater treatment plant!
-  Keep your vehicles maintained. Do all your shopping and errands in one trip. You will use less fuel and emit less pollution.
-  Urge your gas stations to install gasoline hose emission control devices. Watch your gasoline spills at the station and at home.
-  Limit the use of electrical devices: don't use electrical handicap doors unnecessarily and turn off unused lights.
-  Reduce, Reuse, and Recycle!



*Natureland Park shoreland erosion control with native vegetation.*



## TO LEARN MORE ...

-  Ecosystem evaluation and economics:  
[www.ecosystemevaluation.org/links.htm](http://www.ecosystemevaluation.org/links.htm)
-  Potential contamination sites or problems near your community:  
[www.scorecard.org](http://www.scorecard.org)
-  Land use issues and Smart Growth in WI  
[www.1kfriends.org](http://www.1kfriends.org)
-  Smart Growth and communities:  
[www.epa.gov/livability](http://www.epa.gov/livability)
-  Stormwater runoff and watershed issues:  
Free newsletter - Nonpoint Source News  
[www.epa.gov/owow/](http://www.epa.gov/owow/)
-  Contamination sites and clean up progress:  
WI DNR Bureau of Remediation & Redevelopment (608)266-2111
-  Landfills, recycling, mining and hazardous waste management:  
WI DNR Bureau of Waste Management (608)266-2111
-  Land use, pollution sources, and related topics, Contact your UW-Extension office:
 

Columbia Co.	(608)742-9683
Dane Co.	(608)224-3719
Dodge Co.	(920)386-3790
Fond du Lac Co.	(920)929-3173
Green Lake Co.	(920)294-4032
Jefferson Co.	(920)674-7295
Rock Co.	(608)757-5696
Walworth Co.	(262)741-3186
Washington Co.	(262)335-4480
Waukesha Co.	(262)548-7786