

Stormwater Basics

Prepared by the City of Fitchburg Stormwater Utility



What is stormwater?

Stormwater is water from rain or melting snow that doesn't soak into the ground but runs off into waterways. It flows from rooftops, over paved areas and bare soil, and through sloped lawns while picking up a variety of materials on its way. As it flows, stormwater runoff collects and transports soil, animal waste, salt, pesticides, fertilizers, oil and grease, debris and other potential pollutants. The quality of runoff is affected by a variety of factors and depends on the season, local meteorology, geography and upon activities which lie in the path of the flow.

What's the problem?

Stormwater gathers a variety of pollutants that are mobilized during runoff events. Polluted runoff degrades our lakes, rivers, wetlands and other waterways. Transported soil clouds the waterways and interferes with the habitat of fish and plant life.

Nutrients such as phosphorus and nitrogen can promote the overgrowth of algae, deplete oxygen in the waterway and be harmful to other aquatic life. Toxic chemicals from automobiles, sediment from construction activities and careless application of pesticides, herbicides and fertilizers threaten the health of the receiving waterway and can kill fish and other aquatic life. Bacteria from animal wastes and illicit connections to sewerage systems can make nearby lakes, and creeks unsafe for wading, swimming and the propagation of fish and other aquatic life. According to an inventory conducted by the United States Environmental Protection Agency (EPA), half of the impaired waterways are affected by urban/suburban and construction sources of stormwater runoff.

When construction projects and urban / suburban development alter the surface of the landscape by replacing natural vegetation with compacted and impervious surfaces (such as pavement and rooftops), the quantity and speed of runoff also increases because less water can soak into the ground. This change has multiple impacts, such as increased flooding, increased transport of pollutants into water bodies, increased streambank erosion, reduced groundwater recharge, and degraded aquatic ecosystems.

What's being done?

Significant improvements have been achieved in controlling pollutants that are discharged from wastewater treatment plants and industrial facilities. Across the nation, attention is being shifted to other sources of pollution such as stormwater runoff. Stormwater management, especially in urban and suburban areas, is becoming a necessary step in seeking further reductions in pollution in our waterways and presents new challenges.

Stormwater runoff normally is not treated by sewage and wastewater treatment plants. More often than not, end-of-pipe controls are not the best, nor the cheapest answer for removing pollutants from stormwater runoff. Pollutants in runoff enter our waterways in numerous ways and the best way of control is usually at the pollutant's source. Sometimes, significant improvements can be made by employing best management practices, or "BMPs". Better design and construction practices, proper storage of chemicals, good outdoor housekeeping and just plain paying attention to what's happening during runoff events can lead to relatively

inexpensive ways of preventing pollutants from getting into the runoff in the first place and then our waterways. Stormwater BMPs have two purposes – both to improve the *quality*, and decrease the *quantity* of stormwater runoff.

The United States Environmental Protection Agency (EPA) and Wisconsin Department of Natural Resources (WisDNR) are increasing their attention in several ways. A federal regulation, commonly known as Stormwater Phase II, requires permits for stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s) in urbanized areas and for construction activities disturbing one or more acres. The permits are part of the Wisconsin Pollutant Discharge Elimination System (WPDES).

So What Does Fitchburg Have to Do?

The urbanized portion of the City of Fitchburg is regulated under Phase II Stormwater rules. This means that Fitchburg is required to implement Six Minimum Measures for stormwater control for this urban area:

1. Public education and outreach
2. Public involvement and participation
3. Illicit discharge detection and elimination
4. Construction site runoff control
5. Post-construction stormwater management
6. Pollution prevention & good housekeeping for municipal operations

Further details on each of these items can be viewed at:

http://www.city.fitchburg.wi.us/public_works/documents/wpdes_permit.pdf

Common Stormwater & Groundwater Terminology and Definitions:

There's a great deal of complicated terminology used in both stormwater and groundwater science. Below is a listing of some of these key terms along with general and specific definitions. *Note: Where possible, definitions from applicable local, state, and federal regulations have been included.*

303d List - WisDNR's list of impaired water bodies, with details on the specific pollutants causing the impairment. Nine Springs Creek is currently listed as impaired for phosphorus and sediment loads. A complete list of Wisconsin impaired water bodies may be found at: <http://dnr.wi.gov/org/water/wm/wqs/303d/303d.html>.

Algal Bloom – Rapidly occurring growth and accumulation of algae (phytoplankton) within a body of water, which usually results from excessive nutrients or sluggish circulation within a waterbody. Persistent and frequent blooms can result in low oxygen conditions which is hazardous to aquatic life. Phosphorus and nitrogen are generally the nutrients of greatest affect on algal blooms.

Aquifer - A geologic stratum containing groundwater that can be withdrawn and used for human purposes.

Average Annual Rainfall – A calendar year of precipitation, excluding snow, which is considered typical (*from NR 151*). The measured precipitation in Madison, Wisconsin between

March 12 and December 2, 1981 (*from Dane County Chap. 14 and Fitchburg Chap. 27*).

Baseflow – The flow in a stream, creek, or river supplied by groundwater. This is generally easiest to see and measure between storm events.

Best Management Practice (BMP) - structural or non-structural measure, practice, technique or device employed to avoid or minimize soil, sediment or pollutants carried in runoff to waters of the state (*from NR 151 & NR 216*). A practice, technique, or measure that is an effective, practical means of preventing or reducing soil erosion or water pollution, or both, from runoff both during and after land development activities. These can include structural, vegetative or operational practices (*from Dane County Chap. 14 and Fitchburg Chap. 27*).

Biofiltration swale or Bioswale - A long, gently sloped, vegetated ditch designed to filter pollutants from stormwater. Grass is the most common vegetation, but wetland vegetation can be used if the soil is saturated.

Bioretention – A water quality practice that utilizes landscaping and soils to treat stormwater by collecting it in shallow depressions and then filtering it through a planting soil media.

Biological Oxygen Demand (BOD) – is the measure of the quantity of oxygen used by microorganisms in the oxidation of organic matter.

Buffer - A designated area with trees, shrubs, and plants adjacent to a waterbody that helps to protect the receiving waterbody from sediments and pollutants contained in stormwater runoff. Buffers also function as habitat for migratory birds and aquatic and terrestrial wildlife.

Chemical Oxygen Demand (COD) – In environmental chemistry, the COD test is commonly used to indirectly measure the amount of organic compounds in water. Most applications of COD determine the amount of organic pollutants found in surface waters, making COD a useful measure of water quality. It is expressed in milligrams per liter (mg/L), which indicates the mass of oxygen consumed per liter of solution. Older references may express the units as parts per million (ppm).

Department of Agriculture, Trade, and Consumer Protection (DATCP) – State of Wisconsin agency responsible for food safety, animal and plant health, protecting water and soil and monitoring fair and safe business practices.

Design Storm – A hypothetical discrete rainstorm characterized by a specific duration, temporal distribution, rainfall intensity, return frequency and total depth of rainfall (*from NR 151*). The precipitation amounts that occur over a 24-hour period that have a specified recurrence interval for Dane County, Wisconsin. For example, one-year, two-year, 10-year and 100-year storm events mean the precipitation amounts that occur over a 24-hour period that have a recurrence interval of one, two, 10 and 100 years, respectively (*from Dane County Chap. 14 and Fitchburg Chap. 27*).

Dissolved Oxygen (DO) – is the amount of oxygen that is dissolved in water. It also refers to a measure of the amount of oxygen available for biochemical activity in a waterbody and as an indicator of the quality of that water.

Ecosystem – An interactive system that includes the organisms of a natural community together with their abiotic, physical, chemical, and geochemical environment.

Environmental Protection Agency (EPA) - Federal agency responsible for administering stormwater permits and water quality criteria on a national level.

Erosion – The detachment and movement of soil or rock fragments by water, wind, ice, or gravity (*from Dane County Chap. 14 and Fitchburg Chap. 27*).

Erosion Control and Stormwater Management (ECSWM) Program - Terminology used by the Dane County Land Conservation Division and Fitchburg Stormwater Utility to represent the combination of permits, reviews and inspections for construction site erosion, and stormwater facilities required for new development and redevelopment projects.

Eutrophic - A condition of a water body in which excess nutrients, particularly phosphorous, stimulates the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen. Low dissolved oxygen levels can lead to a decline in quality and quantity of aquatic life.

Exceptional Resource Waters – Surface waters which provide valuable fisheries, hydrologically or geologically unique features, outstanding recreational opportunities, unique environmental settings, and which are not significantly impacted by human activities (*from NR 102.11*). Story Creek (Tipperary) originating in T5N R8E S36 is the nearest “Exceptional Resource Water” to the City of Fitchburg.

Groundwater - Water below the earth’s surface, usually between saturated soil and rock. Groundwater usually originates from the recharge component of infiltration. In some instances groundwater may discharge to springs at the ground surface or directly into streams, creeks, and rivers. Municipal and private wells tap the groundwater for water supply uses.

Groundwater Protection Area - wellhead protection area restricted zones as identified in Subchapter III of Chapter 22 of the General Code of Ordinances, areas within 100 feet of a private well, and areas where seasonal high groundwater is less than 5 feet below ground surface (*from Fitchburg Chap. 27*).

Habitat – The specific area or environment where a plant or animal lives. Good habitat provides all of the basic requirements for life (food, water, shelter) and is free of harmful contaminants and pollution.

Hydrologic cycle - The circuit of water movement from the atmosphere to the earth and return to the atmosphere through various stages or processes such as precipitation, interception, runoff, infiltration, percolation, storage, evaporation, and transpiration.

Hydrologic soil group (HSG) - has the meaning used in the runoff calculation methodology promulgated by the United States Natural Resources Conservation Service Engineering Field Manual for Conservation Practices.

Illicit connection - Any drain or conveyance, whether on the surface or subsurface, which allows the discharge of sanitary waste to the public stormwater system and any connections to the public stormwater system from indoor drains (*from Fitchburg Chap. 27*).

Illicit discharge – Any discharge to a MS4 that is not composed entirely of runoff, except discharges authorized by a WPDES permit or any other discharge not requiring a WPDES permit such as water line flushing, landscape irrigation, individual residential car washing, fire fighting and similar discharges. Examples of illicit discharge are discharges from internal floor drains,

appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges should be going to the sanitary sewer system, a holding tank, an on-site process water treatment system, or a septic system (*from NR 151 & NR 216*). Any discharge to the public stormwater system that is not composed entirely of stormwater runoff except discharges with a Wisconsin Pollutant Discharge Elimination System permit or other discharges permitted by the City (*from Fitchburg Chap. 27*).

Illicit Discharge Detection and Elimination (IDDE) - A program required as part of the NR216 stormwater permit to search for and eliminate any illicit discharges.

Impaired water - A waterbody impaired in whole or in part and listed by the department pursuant to 33 USC 1313 (d) (1) (A) and 40 CFR 130.7, for not meeting a water quality standard, including a water quality standard for a specific substance or the waterbody's designated use (*from NR 151 & NR 216*).

Impervious surface – An area that releases as runoff all or a large portion of the precipitation that falls on it, except for frozen soil. Rooftops, sidewalks, driveways, parking lots and streets are examples of surfaces that typically are impervious (*from NR 151*). Any land cover that prevents rain or melting snow from soaking into the ground, such as roofs (including overhangs), roads, sidewalks, patios, driveways and parking lots. For purposes of this chapter, all road, driveway or parking surfaces including gravel surfaces, shall be considered impervious, unless specifically designed to encourage infiltration and approved by the City Engineer (*from Fitchburg Chap. 27*).

Infiltration – The entry and movement of precipitation or runoff into or through soil (*from NR 151*). Any precipitation that does not leave the site as surface runoff (*from Dane County Chap. 14 and Fitchburg Chap. 27*).

Infiltration System – A device or practice such as a basin, trench, rain garden or swale designed specifically to encourage infiltration, but does not include natural infiltration in pervious surfaces such as lawns, redirecting of rooftop downspouts onto lawns or minimal infiltration from practices, such as swales or road side channels designed for conveyance and pollutant removal only (*from NR 151, NR 216, Dane County Chap. 14, and Fitchburg Chap. 27*).

Maximum Extent Practicable (MEP) - A level of implementing best management practices in order to achieve a performance standard specified in this chapter which takes into account the best available technology, cost effectiveness and other competing issues such as human safety and welfare, endangered and threatened resources, historic properties and geographic features. MEP allows flexibility in the way to meet the performance standards and may vary based on the performance standard and site conditions (*from NR 151, Dane County Chap. 14 and Fitchburg Chap. 27*).

Municipal Separate Storm Sewer System (MS4) – A conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, constructed channels or storm drains, which meets all the following criteria: (a) Owned or operated by a municipality, (b) Designed or used for collecting or conveying storm water, (c) Which is not a combined sewer conveying both sanitary and storm water, or (d) which is not part of a publicly owned wastewater treatment works that provides secondary or more stringent treatment (*from NR 216*).

Native Vegetation – Vegetation that naturally occurred in an area before disturbance by humans. Native vegetation is generally well-adapted to the weather, temperature and soil conditions of this region and usually requires little (if any) fertilizers, pesticides, and/or irrigation.

Navigable Waterway – Any body of water which is navigable under the laws of this state (*from s. 30.01 (4m), Wis. Stats.*) Waters with a bed differentiated from adjacent uplands and enough water to allow navigation by a recreational craft of the shallowest draft on an annually recurring basis. A stream is navigable if it has a bed and banks and you can float a canoe or other small craft in the stream at some time of the year, even if only during spring floods (*from <http://dnr.wi.gov/org/water/fhp/waterway/glossary.html> accessed 12-17-07*)

Natural Resources Conservation Service (NRCS) – A division of the United States Department of Agriculture, formerly known as the Soil Conservation Service (SCS)

Non-Point Source (NPS) – Nonpoint source pollution (NPS) represents the most significant source of pollution overall in the country. According to states' 305(b) and 303(d) reports, more miles of rivers and acres of lakes are impaired by overland runoff from rowcrop farming, livestock pasturing, and other types of nonpoint sources than by industrial facilities, municipal sewage plants, and point source runoff from municipal storm sewer systems and storm water associated with industrial activity. The most recent set of 303(d) reports indicated that more than 40 percent of all impaired waters were affected solely by nonpoint sources, while only 10 percent of impairments were caused by point source discharges alone.

The Clean Water Act (CWA) does not provide a detailed definition of nonpoint sources. Rather, they are defined by exclusion -- anything not considered a "point source" according to the Act and EPA regulations. All nonpoint sources of pollution are caused by runoff of precipitation (rain and/or snow) over or through the ground. However, as noted previously numerous types of precipitation-induced runoff are treated as point sources rather than as nonpoint sources under the CWA - including stormwater associated with industrial activity, construction-related runoff, and discharges from municipal separate storm sewer systems (MS4s) (*from <http://www.epa.gov/watertrain/cwa/cwa52.htm> accessed 12-17-07*).

Notice of Intent (NOI) - A form that must be submitted to WisDNR prior to beginning construction activity on a site greater than 1 acre.

Notice of Termination (NOT) - A form that must be submitted to WisDNR at the completion of construction activity on a site with an NOI submitted.

Ordinary High Water Mark (OHWM) – The point on the bank or shore up to which the presence and action of surface water is so continuous as to leave a distinctive mark such as by erosion, destruction or prevention of terrestrial vegetation, predominance of aquatic vegetation, or other easily recognized characteristic. Where the bank or shore at any particular place is of such character that it is difficult or impossible to ascertain where the point of ordinary high-water mark is, recourse may be had to the opposite bank of a stream or to other places on the shore of a lake or flowage to determine whether a given stage of water is above or below the ordinary high-water mark. (*from s. NR115.03(6)*)

Outstanding Resource Waters – (a) All rivers designated under the national wild and scenic Rivers Act, as amended, 16 USC 1271 to 1287, except those portions flowing through Indian

reservations; (b) all state wild and scenic rivers designated under s. 30.26, Stats.; (c) Wolf river upstream of the northern Menominee county line; (d) Class 1 Trout waters as indicated in s. NR 102.10; (e) Class II Trout waters as indicated in s. NR 102.10; (f) cold or warm water streams and rivers or portions thereof as indicated in s. NR 102.10. Mount Vernon Creek in Dane County is the nearest “Outstanding Resource Water” to the City of Fitchburg.

Performance standard - A narrative or measurable number specifying the minimum acceptable outcome for a facility or practice (from NR 151).

Peak Flow – The maximum rate of flow of water at a given point in a channel, watercourse, or conduit resulting from the predetermined storm or flood (*from Fitchburg Chap. 27*).

Pervious surface – An area that releases as runoff a small portion of the precipitation that falls on it. Lawns, gardens, parks, forests or similar vegetated areas are examples of surfaces that typically are pervious (from NR 151). Any land cover that permits rain or melting snow to soak into the ground (*from Fitchburg Chap. 27*).

Point Source – A discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation or vessel or other floating craft from which pollutants may be discharged either into the waters of the state or into a publicly owned treatment works except for a conveyance that conveys only storm water (*from s. 283.01(12)(a)*). A discernible, confined and discrete conveyance of storm water for which a permit is required under s. 283.33, Stats. (*from NR 216 & s. 283.01(12)(b)*).

Pollutant - Any dredged spoil, solid waste, incinerator residue, sewage, garbage, refuse, oil, sewage sludge, munitions, chemical wastes, biological materials, radioactive substance, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water. (*from s. 283.01(13), Wis. Stats.*)

Pollution - Man-made or man-induced alteration of the chemical, physical, biological or radiological integrity of water. (*from s. 283.01(14), Wis. Stats.*)

Recharge - The portion of the average annual rainfall that infiltrates the soil and becomes groundwater. Recharge does not include evaporation, transpiration, or runoff from the site (*from Dane County Chap. 14 and Fitchburg Chap. 27*).

Runoff - Storm water or precipitation including rain, snow, ice melt or similar water that moves on the land surface via sheet or channelized flow (*from NR 151*). The waters derived from rains falling or snowmelt or icemelt occurring within a drainage area, flowing over the surface of the ground and collected in channels, watercourses or conduits (*from Dane County Chap. 14 and Fitchburg Chap. 27*).

Runoff Coefficient - The percentage of rainfall volume that will become runoff.

Runoff Curve Number (RCN) – has the meaning used in the runoff calculation methodology promulgated by the United States Natural Resources Conservation Service Engineering Field Manual for Conservation Practices (*from Fitchburg Chap. 27*).

Sediment - Settleable solid material that is transported by runoff, suspended within runoff or deposited by runoff away from its original location (from NR 151 & NR 216). Solid earth material, both mineral and organic, that is in suspension, is being transported, or has been moved

from its site of origin by air, water, gravity or ice, and has come to rest on the earth's surface at a different site (*from Fitchburg Chap. 27*).

Storm Sewer - A sewer pipe carrying only runoff from storm events.

Stormwater – Runoff from precipitation including rain, snow, ice melt or similar water that moves on the land surface via sheet or channelized flow (from NR 216). The flow of water which results from, and which occurs during and immediately following, a rainfall, snow- or ice-melt event (*from Fitchburg Chap. 27*).

Stormwater Facility - Facilities that control the quantity and/or quality of stormwater discharge. Stormwater facilities included storage facilities (ponds, vaults, underground tanks, and infiltration systems); water quality facilities (wet ponds, biofiltration swales, constructed wetlands, sand filters, and oil/water separators); and conveyance systems (ditches, pipes, and catchbasins).

Once constructed, stormwater facilities require on-going maintenance to ensure they continue to perform as intended. Maintenance of storage facilities typically includes the removal of accumulated sediment and debris, routine mowing, and minor repairs to mechanical appurtenances. Management of water quality facilities is more complex, requiring intensive vegetation management, inspection and maintenance of flow control features, and restoration or replacement of filter media.

Stormwater Management - Any measures taken to permanently reduce or minimize the negative impacts of stormwater runoff quantity and quality after land development activities (*from Fitchburg Chap. 27*).

Swale - A shallow drainage conveyance with relatively gentle side slopes, generally with flow depths less than one foot.

Time of Concentration (Tc) - The amount of time it takes a drop of water falling in the hydraulically most distant point in the watershed to reach the discharge location.

Total Maximum Daily Load (TMDL) - The amount of pollutants specified as a function of one or more water quality parameters, that can be discharged per day into a water quality limited segment and still insure attainment of the applicable water quality standard. There are 4 components to the total maximum daily load: point source allocation, non-point source allocation, reserve capacity and margin of safety (*from NR 151*). Currently Wisconsin TMDLs in can be viewed at: http://dnr.wi.gov/org/water/wm/wqs/303d/Approved_TMDLs.html (*see also 40 CFR 130.2(i)*)

Total Suspended Solids (TSS) - means the solids incapable of passing through a glass fiber filter and dried to constant weight at 103-105°C via American Public Health Association Standard Method 2540D (18th, 19th, and 20th Edition). Also referred to as Total Non-filterable Residue.

TR-55 - Technical Release 55, June 1986, Urban Hydrology for Small Watersheds, Second Edition, prepared by the United States Department of Agriculture, Natural Resources Conservation Service (previously Soil Conservation Service) (*from NR 151*).

Tributary – A stream that flows into a larger stream or waterbody.

Type II distribution - A rainfall type curve as established in the “United States Department of

Agriculture, Soil Conservation Service, Technical Paper 149, published 1973”, which is incorporated by reference for this chapter. The Type II curve is applicable to all of Wisconsin and represents the most intense storm pattern (*from NR 151*).

Urbanized Area – A place and the adjacent densely settled surrounding territory that together have a minimum population of 50,000 people as determined by the U.S. Bureau of the Census based on the latest decennial federal census (*from NR 216*). The area designated as subject to the Phase II stormwater regulations, based upon census data on population density. Note, however, that the new construction requirements apply everywhere, while the requirements for municipal action are within the Urbanized Area. This is sometimes also referred to as the MS4 area.

Urban Stormwater Planning Area – The boundary defined by a municipality that serves as the appropriate planning area for the abatement of stormwater runoff pollution into waters of the state (*from NR 216*).

Water Quality Criteria - Specific levels of water quality that, if achieved, are expected to render a body of water suitable for its designated use. The criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes.

Water Quality Standards - State-adopted and EPA-approved ambient standards for waterbodies. The standards cover the use of the waterbody and the water quality criteria that must be met to protect the designated use or uses.

Waters of the State – Those portions of Lake Michigan and Lake Superior within the boundaries of Wisconsin, all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, water courses, drainage systems and other surface water or groundwater, natural or artificial, public or private within the state or under its jurisdiction, except those waters which are entirely confined and retained completely upon the property of a person. (*from s. 283.01(20), Stats.*)

Watershed - A geographic area in which water, sediments, and dissolved materials drain to a common outlet, typically a point on a larger stream, a lake, an underlying aquifer, an estuary, or an ocean. A watershed is also sometimes referred to as the "drainage basin" of the receiving waterbody.

Wetland - An area inundated or saturated by ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (U.S. Army Corps of Engineers Regulation 33 CFR 328.3 (1988)).

Wisconsin Pollutant Discharge Elimination System (WPDES) - The name for the stormwater permit program administered by the WisDNR as established by NR216.

Wisconsin Department of Natural Resources (WisDNR, WDNR, or DNR) – The state agency responsible for enforcing stormwater runoff regulations and permits.

History of Stormwater Regulations

- Nov. 16, 1990 – EPA Phase 1 Final Rule

- Dec. 8, 1999 – EPA Phase 2 Final Rule
- Oct. 1, 2002 – NR 151 (Runoff Management) – set TSS removal efficiency requirements, set infiltration requirements
- Oct. 1, 2002 – NR 216 (Stormwater Discharge Permits) – set WPDES permit criteria for MS4's

History of Groundwater Regulations

- 1903 – Wis. Supreme Court Case (*Huber vs. Merkel*) – established overlying property ownership of GW
- 1936 – Wis. Created 1st Well Code in Nation
- 1974 – Wis. Supreme Court Case (*Wis. vs. Michels Pipeline*)
- 1984 – Wisconsin GW Law – (*1983 Wisconsin Act 410*) – created Groundwater Coordinating Council (GCC)
- 1985 – Water Resources and Conservation Law (Act 60) – committed Wis. to Great Lakes Charter to reduce diversion of water – created Wis. Water Quantity Plan
- 1993 – EPA approved Wis. Wellhead Protection Plan (WHP)
- 1999 – EPA approved Wis. Source Water Assessment Program (SWAP)
- 2004 - Wisconsin GW Law – (*2003 Wisconsin Act 310*)
 - Tracking for new well const. & water use
 - Expanded regulation of Hi-Cap Wells
 - Designation of GW Management Areas
 - Created GW Advisory Committee (GAC)

Web Links to Learn More about Stormwater and Groundwater

EPA's Stormwater Program: http://cfpub1.epa.gov/npdes/home.cfm?program_id=6

WisDNR's Runoff Management Program: <http://dnr.wi.gov/runoff/>

<http://dnr.wi.gov/runoff/pdf/StormwaterEO.pdf>

http://www.glwi.uwm.edu/ourwaters/documents/WIWaterLawC_000.pdf

Dane County Office of Lakes and Watershed's Erosion Control and Stormwater Management Program: <http://danewaters.com/resource/stormwater.aspx>

Dane County Land Conservation Division Program: <http://www.countyofdane.com/landconservation/>

Madison Area Municipal Stormwater Partnership (MAMSWaP) Web Page: <http://www.myfairlakes.com/>

City of Fitchburg's Erosion Control and Stormwater Management Program: http://www.city.fitchburg.wi.us/public_works/stormwater.php

<http://www.danewaters.com/pdf/stormWaterVocab.pdf>