Ground Water & Stormwater Management

Key Message

Contaminated stormwater is a major source of ground water and surface water degradation. Furthermore, land-development practices often create impervious surfaces that increase stormwater runoff and inhibit ground water recharge. A combination of approaches is needed to improve runoff quality and maximize quality recharge to ground water. These approaches include preventing the contamination of stormwater, minimizing impervious surfaces, segregating clean and contaminated stormwater, and applying best management practices (BMPs) that promote natural aquifer recharge and treat stormwater sufficiently before it is discharged to ground water.

why stormwater matters to ground water…

In natural, undeveloped areas, a large percentage of relatively uncontaminated precipitation infiltrates the ground, thus recharging the ground water; the remaining runoff flows to nearby water bodies or evaporates. Natural physical, chemical, and biologic processes cleanse the water as it moves through vegetation and soil and into ground water. Development alters natural systems as vegetation and open spaces are replaced with new areas of impervious surfaces such as roads, parking lots, roofs, and turf, which greatly reduce infiltration and thus ground water recharge. Uncontrolled stormwater runoff collects pollutants such as sediments, pathogens, fertilizers/nutrients, hydrocarbons, and metals, which ultimately contaminate and degrade surface and ground water.

Top: Construction of buildings, streets, and parking lots prevents rainfall from recharging soil and ground water. It also increases the rate of runoff and contributes to water pollution. This is an aerial view of San Francisco, California.

Left: An unknown number of stormwater drainage wells (UIC Class V) such as this can be found throughout the country, discharging stormwater directly into ground water.

Photo Credits. Top: Copyright © Bruce Molnia, Terra
Photographics:Image source: Earth Science World Image Bank
http://www.earthscienceworld.org/images
Left: Oregon DEQ

Photo: Stormwater magazine www.StormH2o.com

A redevelopment project in Seattle, Washington, includes a natural drainage system and a site-design strategy to treat and promote onsite stormwater infiltration. Such proactive approaches save communities and property owners money while reducing overall environmental impact.

• USEPA and some states have embraced low impact development (LID), which emphasizes reducing impervious areas, disconnecting impervious areas from one another, and treating stormwater so it can infiltrate the ground near the source. However, even LID techniques, which are designed to decrease environmental impact of development, sometimes promote stormwater infiltration without addressing aquifer sensitivity, the quality of the stormwater, and stormwater's potential impact on ground water. Ultimately, our challenge will be to put these approaches into practice at the local level and to ensure that they are designed and maintained properly so that ground water is not degraded.

Recommended Actions

To USEPA:

- **Establish better coordination among federal stormwater management, ground water protection, underground injection control (UIC), and water-quality monitoring programs so that programmatic overlaps can be elimnated and opportunities for collaboration in protecting surface and ground waters can be identified and initiated.**
- **Accord the protection and recharge of ground water and protection of surface water equal importance when regulating and providing guidance to state stormwater programs. For example:**
  - Develop and field-test BMPs specifically designed to manage stormwater in a manner protective of ground water in different hydrogeological settings (e.g., karst, sand and gravel).
  - Ensure that states may utilize §319 funds to conduct research and demonstration projects, and to develop and field-test BMPs specifically designed to manage stormwater in a manner that is protective of ground water.

To State Agencies:

- **Establish better coordination among stormwater management, ground water protection, underground injection control (UIC), and water quality monitoring programs so that programmatic overlaps can be elimnated and opportunities for collaboration in protecting surface and ground waters can be identified and initiated.**
- **Review stormwater management plans and total maximum daily load (TMDL) determinations from a ground water program perspective to ensure protection and conservation of the resource.**

To Local Governments:

- **Protect all water resources through local stormwater management activities, and require the use of stormwater BMPs (including ongoing maintenance and monitoring), stormwater utilities, and stormwater management plans that are designed to conserve and protect both surface water and ground water and promote natural ground water recharge.**

Infiltration basins can be a very effective technique for controlling urban runoff quality and quantity problems. However, because of the potential for some types of urban runoff to contaminate ground water through infiltration, some restrictions are needed, including site-specific designs that consider soil characteristics.

Photo: Dakota County Soil and Water Conservation District, Farmington, MN

This summary sheet is taken from the "Stormwater Management" chapter of the Ground Water Protection Council's (GWPC) *Ground Water Report to the Nation: A Call to Action*. Contact GWPC for the full report.

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