INITIATIVE 4:

Regional Cooperation

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ENGAGE IN REGIONAL COOPERATION TO SUPPORT STORMWATER MANAGEMENT AND INFRASTRUCTURE

A recently enacted state law, Iowa Code 466B.22, established WMAs in Iowa. This now allows stormwater runoff to be managed at a watershed level. Working through a WMA, cooperating municipalities can assess conditions, diagnose problems, and propose solutions for places upstream and downstream of their own boundaries. Municipalities can opt out of a WMA, but, by doing so, they miss the opportunity to influence the management of stormwater runoff upstream of them and to share the responsibility for stormwater management with others.

Implementation

The action steps here overlap with some actions in the greenways section. This is expected. Greenways often contain green infrastructure, such as storage areas in the form of wetlands and floodplains, constructed stormwater treatment drains to manage runoff from streets and buildings, and vegetated open space that reduces the need for stormwater management at that location.

1. Establish Watershed Management Authorities

Fourmile Creek became the first WMA in Greater Des Moines when the Polk County Board of Supervisors, with the agreement of municipalities in that watershed, approved its creation. Additionally, a watershed alliance is taking steps to form a WMA along the Raccoon River. Although just west of the region, a Middle-South Raccoon WMA would be a boon to the region's water quality. Within Greater Des Moines, the Calhoun, Beaver, and Walnut Creeks, as well as the North and Middle Rivers, are potential areas around which WMAs would likely form.

Once created, a WMA can assess flood risks and water quality issues and can propose options for addressing those issues. They can also engage in education, the monitoring of federal flood risk planning, and the distribution of money and contracts.

Perhaps the most influential role a WMA can play is developing and implementing a comprehensive watershed management plan. This type of plan takes a long-term, comprehensive approach to water management at a watershed scale. The development of a watershed management plan promotes:

- Collaboration between municipalities and other organizations;
- Data collection and analysis;
- A greater understanding of the watershed's issues and opportunities;
- Identification of solutions;
- Prioritization of initiatives; and,
- Cooperation during implementation.

Participation in watershed planning by public and private landowners and by other stakeholders leads to holistic and sustainable solutions and creates a sense of plan ownership and watershed stewardship. This approach to watershed planning and management provides fertile ground for establishing greenways and making plans for green infrastructure.

2. Create natural stormwater utilities throughout the region.

Creating natural stormwater utilities will be achieved in part by establishing the region's greenways system. Municipalities can implement the system through their planning and zoning commission, with ordinances and overlay districts approved by municipal boards. Beyond this framework, there are other areas where natural stormwater utilities can be protected, restored, or created. For example, plowed and drained wetlands make excellent sites for restoring the storage and filtration functions of natural systems. When a new development is planned, the developer can identify and build around such areas so that they can manage the site's stormwater runoff and provide open space.

The region needs stormwater utilities to fund stormwater management programs, many of which the Clean Water Act mandates. The City of Des Moines is the only community in the region that is covered under Phase I of the US EPA's National Pollutant Discharge Elimination System (NPDES) permit program because it operates a municipal separate storm sewer system (MS4) for a population over 100,000. The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters in the US. Point sources are discrete conveyances such as pipes or manmade ditches. The Phase II NPDES program requires smaller MS4s not covered in Phase I, and it also requires developments that disturb 1 to 5 acres of land to implement programs and practices to control polluted stormwater runoff and obtain an NPDES permit. Many communities around Greater Des Moines are small MS4s. Phase II requires small MS4s to follow six minimum control measures:

- Public education and outreach;
- Public participation/involvement;
- Illicit discharge detection and elimination;
- Construction site runoff control;
- Post-construction runoff control; and,
- Pollution prevention and good housekeeping.

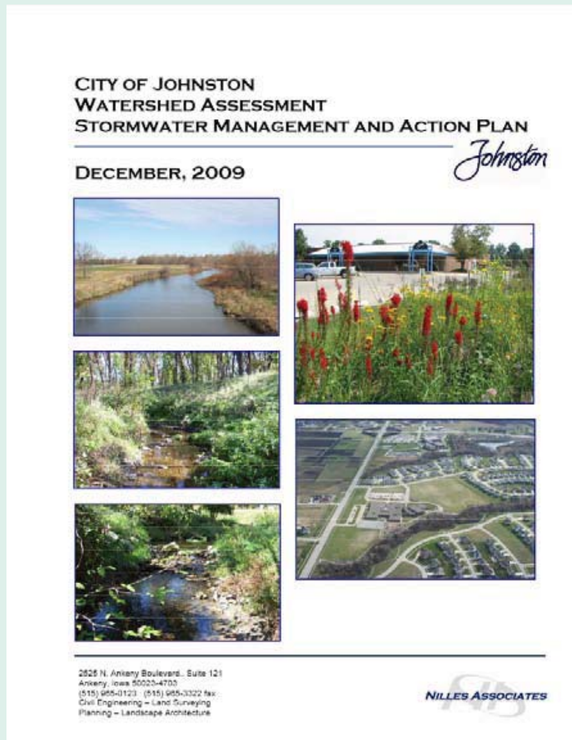
Development and implementation of these programs requires funding, which is typically provided by stormwater utilities. Many municipalities in the planning area already have stormwater utilities. The City of Ankeny's stormwater utility, established in 2009, explicitly addresses green infrastructure. This acknowledgement of the role of green infrastructure in stormwater management is a growing trend that will help expand the understanding and benefits of natural stormwater utilities. As a point of reference regarding the financial implications of such a utility, Ankeny's stormwater utility fees are typically around $4/month for residences and around $15/month for commercial properties that have more impervious cover. These fees vary widely across the region and state, however.

3. Promote ordinances for best stormwater practices in new developments, redevelopment areas, and existing developments.

A variety of ordinances have been developed for Greater Des Moines communities addressing stormwater before, during, and after construction projects. Before any dirt is moved, effective stormwater management requires planning and often requires quantitative modeling to ensure that stormwater will be managed effectively. During construction, erosion and sediment control is a priority due to the presence of disturbed or bare ground. Most Greater Des Moines municipalities already have ordinances that address construction-related erosion and sediment control.

A MODEL PLAN FOR THE REGION

In 2009, the City of Johnston published its Watershed Assessment Stormwater Management and Action Plan.[13] The plan provides insight into the existing conditions of watersheds in Johnston that could have an impact on flooding, stream bank stability, water quality, and habitat for fish and wildlife. The City of Johnston is using this knowledge to guide its stormwater mitigation efforts.



Following construction and redevelopment projects and after a site has been stabilized, ordinances often require that runoff is retained during different types of storms.

The region should explore the development of a uniform standard across the region and of a single agency to perform all stormwater management inspections. It is difficult for smaller communities to have that specific expertise on staff.

The City of Ankeny's ordinances serve as good examples of holistic stormwater management. Ankeny has a post-construction site runoff control policy ordinance. It promotes the use of stormwater detention and retention, grass swales, bioretention swales, riparian buffers, and proper operation and maintenance of these facilities. Ankeny also conducts a site plan review of post-construction runoff controls and inspects runoff control devices to ensure compliance. This combination of regionally-appropriate standards, thoughtful planning and design, proper implementation, and monitoring makes it a successful stormwater management program.

- **Construction Erosion and Sediment Control Standard.** Most Greater Des Moines municipalities have construction requirements for erosion and sediment control. What is sometimes lacking is adequate inspection of installed Best Management Practices (BMPs), ongoing monitoring for the duration of the project, and prompt corrective action when warranted. Ensuring compliance with existing ordinances produces significant stormwater improvements. Some communities have found that a third to half of the sediment entering water bodies comes from uncontrolled runoff during construction.

- **Post-Construction Stormwater Volume Control Standard.** Volume controls are a relatively simple and effective means of achieving flood reduction, the protection of water bodies, and water quality improvement. The power of this approach is its focus on performance and outcomes, rather than on prescribing specific practices for specific situations. Consequently, a broad range of techniques and design flexibility are possible. The size of best stormwater practices are often determined in order to achieve volume control for what is termed a water quality design storm. The Iowa Stormwater Management Manual defines the water quality design storm as a rainfall amount that would include 90 percent of all rainfall events. These events recur every three to four months and drop less than 1.25 inches of rain. Multiple communities in Greater Des Moines have stormwater ordinances that require that the 1.25-inch water quality event be fully treated. This requirement is appropriate for the remainder of Greater Des Moines as well.

EXAMPLE OF A STORMWATER TREATMENT TRAIN

Source: University of Wisconsin, Milwaukee http://www4.uwm.edu/pps/Sustainability/CampusInit/storm-water.cfm

- **Post-Construction Water Quality Control.** Volume control by itself is not enough to fully improve water quality to desired levels, but it goes a long way. In addition, a well-designed stormwater treatment train (STT) can receive runoff and can produce very high quality water. STTs use a variety of BMPs to manage water flowing across and though a site. The individual treatment elements are selected to work best for the site and to address specific pollutants. STT elements can include constructed features that mimic natural structures, such as vegetated swales, treatment wetlands, wet prairies, upland prairies, and rain gardens. Other hard structural components, such as level spreaders or subsurface infiltration galleries, are useful where space is limited. Dense urban areas may require even more highly engineered and structured solutions, such as tree planters and subterranean or rooftop storage and treatment systems, including green roofs. Hybrid systems of natural and hard elements are often best because they take advantage of a site's specific conditions.

- **Water Quality and Stream Buffers.** Buffers provide a variety of services. Historically, buffers focused primarily on stream protection and consisted mostly of vegetated filter strips. Filter strips of 10 to 20 meters prevent surface runoff from washing directly into streams and other water bodies. Habitat buffers are generally wider, at 400 meters or more.[14] They provide corridors for wildlife movement, walking trails, erosion control, and stormwater management projects. Buffers, in combination with greenways, make it possible to achieve multiple objectives in the same area, often with single sources of funding. Among those benefits are the addition of wildlife habitat, recreational greenways, stormwater treatment trains, and stream buffers.

Green Infrastructure Tools for Municipalities

Green infrastructure is an integral part of a municipal stormwater management system. These examples of green infrastructure are adapted from the Iowa Stormwater Management Manual:

- **Infiltration systems.** These capture a certain amount of runoff and let the water infiltrate it into the ground. They can be engineered sand/gravel beds, underground cells, or vegetated surface features, such as rain gardens and bioswales. Infiltration systems are often the most effective way to manage stormwater, as they simultaneously address runoff volume, help with water quality, and replenish aquifers.

- **Detention systems.** These capture a certain amount of runoff and temporarily hold it back for release at a later time. They reduce discharge rates to downstream receiving waters, thus reducing erosion, pollutant loadings, and habitat degradation. Historically, detention systems were often used for flood control.

- **Wet-detention systems (stormwater ponds).** These capture a certain amount of runoff and hold it until it is displaced by the next storm's runoff. Water is lost to evaporation, infiltrates into soil and the water table, or is withdrawn for non-potable use. These systems also play a significant role in nutrient removal, especially nitrogen. They were an early, and for many years the only, BMP used in conventional sewer and pipe systems.

- **Constructed wetlands (stormwater wetlands).** These are similar to detention systems, except that much of the area is wetland vegetation, with channels or swales to move water. They have many of the same benefits as wet-detention systems but also create habitat and are more attractive.

- **Filtration systems.** These use some combination of a granular filtration media (sand, soil, organic material, carbon) or a membrane to remove runoff pollutants. They focus on water quality. Their effectiveness is often affected by flow rates, with lower flows generally being easier to manage.

- **Vegetated systems (bioswales, biofilters).** Typically installed as swales and filter strips, these are designed to convey and treat runoff as either shallow flow in swales or sheet flow in filter strips. Deep-rooted, perennial, native species are often used because they create soil and vegetation conditions that, in many cases, remove more pollutants than turf does.

- **Minimizing connected impervious cover (CIC).** Also called directly connected impervious area (DCIA), CIC is the source of most pollutants in developed areas. Rooftops, pavement, and other hard surfaces collect pollutants and then shed them during rainstorms. CIC is a pollution delivery train, with rooftops and parking lots draining to drives, which drain to street gutters, which then flow into storm sewer pipes flowing to streams, ponds, and wetlands. There are a variety of ways to reduce the amount of CIC. Above all, minimizing or eliminating traditional curbs and gutters can make the difference. Design breaks, such as curb cuts, ribbon curbs, street planters, parking lot islands, and so forth can break the connections among these surfaces. Simply redirecting rooftop downspouts to lawns goes a long way in breaking up connected impervious cover, reducing the volume of runoff and improving water quality.

- **Miscellaneous and vendor-supplied systems.** These include a variety of proprietary and miscellaneous systems. One example is the SAFL Baffle, developed by the University of Minnesota.[15]

Green Infrastructure Tools for Municipalities

Natural Stormwater Utilities

- WMAs are established across the entire planning area by 2016

- By 2018, municipalities have post-construction ordinances requiring 90 percent of annual precipitation in new developments be infiltrated on site

- By 2018, municipalities have plans to improve stormwater management on existing developments

- Stream volatility at 13 existing stations is reduced by 25 percent in 2025 and 50 percent in 2040

- Sediment levels at 13 existing stations in spring and summer are reduced by 90 percent in 2025