CHAPTER 9

KEY CONCEPTS

1. Policies supported by observations
   This plan has identified the key pollutants of concern and their most probable sources. The policies outlined within this chapter are intended to support the water quality objectives required to meet the overall goals of this plan.

2. Urban policy recommendations
   To support implementation of this plan, local ordinances, policies and enforcement procedures should be reviewed. Existing rules may need to be modified or new ordinances created to address these key areas:
   
   a. **Stormwater Management**—Adopt the Iowa Stormwater Management Manual as a design resource using its Unified Sizing Criteria to establish requirements to manage runoff from storm events, large and small.
   
   b. **Flood Plain Protection**—Develop policies that limit construction of new structures or placement of fill within flood prone areas.
   
   c. **Stream Buffer Protection**—Provide adequate open space near streams to convey storm events as well as allow for access for maintenance, repairs, public use and environmental improvements.
   
   d. **Construction Site Pollution Prevention**—Refer to highlighted “points of emphasis” so that current rules, regulations and best management practices are being effectively implemented and enforced.
   
   e. **Topsoil management and restoration**—Consider how topsoil is to be managed during the design process with the goal of providing healthy topsoil to the greatest degree possible across open space areas after development has been completed.

3. Rural policy recommendations
   This plan identifies the need for connecting land owners and producers with financial and educational resources to more broadly implement conservation practices. Benefits of some practices related to soil health and subsurface water management have benefits beyond water quality.

HOW DO THESE CONCEPTS INFLUENCE DEVELOPMENT OF THE PLAN?
Implementation of these policies would not only improve water quality but could reduce damages or costs related to streambank erosion, sediment excavation and dredging, private property losses and damage to public infrastructure (roads, bridges, utilities).
<table>
<thead>
<tr>
<th><strong>Concerns</strong></th>
<th><strong>Policies</strong></th>
<th><strong>Outcomes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Elevated pollutant concentrations</td>
<td>• Use new stormwater management guidelines in developing areas</td>
<td>• Where implemented, runoff is captured, filtered and reduced for more than 90% of all storm events</td>
</tr>
<tr>
<td>• Long-term cost to repair eroded stream corridors ($2-3 million/mile)</td>
<td>• Reserve open spaces for flood plains and stream buffers</td>
<td>• Reduction in rapid bounce in water levels in small tributaries</td>
</tr>
<tr>
<td>• 25% of sediment load to Walnut Creek may be attributed to construction site runoff</td>
<td>• Make improvements on points of emphasis for sediment and erosion control practices</td>
<td>• Establish a more natural pattern of flow in developing areas</td>
</tr>
<tr>
<td>• Flood damage to buildings and structures</td>
<td>• Protect or restore healthy topsoil layers on open spaces in developing areas</td>
<td>• Lower the potential for costly stream bank and channel erosion</td>
</tr>
<tr>
<td>• Lack of access for maintenance or repairs</td>
<td>• Rural management strategies</td>
<td>• Sediment loading related to construction sites and streambank erosion minimized</td>
</tr>
<tr>
<td>• Damage to habitat and loss of resources</td>
<td></td>
<td>• Reserved spaces for access and improvements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Limit placement of new structures or restrictions within the flood plain</td>
</tr>
</tbody>
</table>
Draft Recommendations—Policy

1. Stormwater Management
   Adopt policies such as the Unified Sizing Criteria with the Iowa Stormwater Management Manual which call for management of both small and large storm events:
   • Water Quality Volume: Capture and treat runoff expected to be generated by a 24-hour, 1.25” event. Over 90% of all precipitation in Central Iowa can be attributed to these types of events.
   • Channel Protection Volume: Provide extended detention of the 1-year storm, with slow release over a period of between 24 and 48 hours.
   • For larger storm events: Release runoff at rates similar to what would have existed prior to pioneer settlement.

2. Flood Plain Protection
   Local policies and ordinances should be adopted or amended to protect flood plains in the following ways:
   • Reduce property losses during major flood events by preventing construction of new privately owned building structures within the limits of the 100-year flood plain.
   • Maintain flood storage capacity by limiting grading or placement of fill materials within the flood plain.
   • Identify areas of active stream movement and reserve areas as open space where future stream movement or flood plain inundation is expected.
   • Consider higher rainfall rates from NOAA Atlas 14 data when establishing flood protection elevations.

3. Stream Buffer Protection
   Stream buffers should be established—either by public land acquisition or through preservation as permanent easements—as public or private open space. Local policies and ordinances should be adopted or amended to establish protected stream buffers. Stream buffers should be wide enough to serve the following functions:
   • Include the entirety of the regulatory 100-year flood plain or areas expected to be inundated by a 24-hour, 100-year storm event.
   • Allow for expected stream migration, based on recent movement patterns or historic stream channel locations.
   • Provide enough width for future streambank improvements.
   • Include room for reserved paths for maintenance or permanent multipurpose trails that can be used for access.
   • Include a minimum building setback standard from all streambanks, trails and access paths.

4. Construction Site Pollution Prevention
   Construction site runoff has been identified as one of the largest sources of sediment loading within the urban environment. Key improvements to address this include:
   • Consider stormwater management early in the site design process, look for ways to minimize the footprint of disturbed areas, lessen grading volumes and reduce impervious surfaces.
   • Develop and implement a Soil Management Plan (SMP), with the goal of providing healthy soils across all open-space areas on developed landscapes before construction has been completed.
   • Increase the use of temporary seeding, mulches, rolled erosion control products (RECPs) and turf reinforcement mats (TRMs).
   • Prior to commencing land-disturbing activities, install perimeter site controls.
   • Don’t overload controls. Refer to design guidelines for sizing and design.
   • Check all site controls on a weekly basis and before rainfall is expected to make sure they are in good working order.
   • Routinely check sites to assure that construction sites are in compliance with state and local standards.
   • Inspection personnel should respond promptly when polluted site runoff or off-site tracking is observed, or citizen complaints are received.
   • When necessary, “stop-work orders” or other methods should be used to force sites back into compliance before work on other construction items can proceed.

Policy recommendations shared at October 2015 open house event.
**Introduction—Urban Areas**

To address concerns highlighted within this plan, changes are necessary to methods of stormwater management, flood plain and stream buffer protection, construction site pollution prevention and soil quality management / restoration. Within developing areas, it is unlikely that required changes can be fully implemented on a voluntary basis. This chapter outlines policies and ordinances which are recommended to be adopted by municipalities within this watershed and enforced in order to achieve the desired results.

**Policies for Urban Areas**

**Stormwater Management**

Analysis in Chapter 8 of this plan has demonstrated that traditional stormwater detention practices have limited ability to control runoff for the most commonly occurring, small storm events. Rainfalls of 2.5” or less make up more than 98% of the precipitation volume in Central Iowa. Most streambank erosion occurs during the rapid rise and fall of streams during these types of events. To stabilize flowrates in urban tributaries, adopting policies that address these events is critical. Therefore, this plan recommends all communities within the watershed adopt the Unified Sizing Criteria, as described within the Iowa Stormwater Management Manual (ISWMM).

This standard would provide for the following:

- Water Quality Volume: Capture and treat runoff expected to be generated by a 24-hour, 1.25” event. Over 90% of all precipitation in Central Iowa can be attributed to these types of events.
- Channel Protection Volume: Provide extended detention of the 1-year return period storm, with slow release over a period of between 24 and 48 hours.
- Overbank Flood Protection: Limit peak runoff rates for the 2-, 5- and 10-year return period events to pre-settlement levels. Pre-settlement levels should be determined by calculating the time of concentration (use the NRCS lag equation based on pre-settlement conditions) and selecting Curve Numbers (use a CN of 58 based on meadow in good condition) in order to model such conditions. Refer to the ISWMM manual for additional information.

- Extreme Flood Protection: Limit peak runoff rates for the 25-, 50- and 100-year return period events to the lesser of pre-settlement values for the same storm event OR the values calculated for the 5-year return period event under existing (agricultural) conditions.

**Application**

This plan recommends ordinance and policies be implemented to apply these standards to all new developments. Each community should identify how these standards will be applied to redevelopment sites. This may involve allowing past calculation methods to be amended to reflect proposed changes where new impervious areas are below a set threshold (perhaps 10,000 SF of new impervious area). Above such a threshold, stormwater management practices would be required to meet the new recommended standards.

**Expected Impacts (Where Applied)**

- Little or no direct surface runoff during rainfall events that are equal to or less than 1.25” in depth.
- Over 95% reduction in peak flow rates for the 1-year return period storm event (less flashy streams).
- Approximately 70% reduction in peak flow rates for the 10-year return period storm event.
- Approximately 20% reduction in peak flow rates for the 100-year return period storm event.
- If topsoil or soil quality restoration policies are not implemented, total area devoted to stormwater detention features may increase approximately 1.8 acres per 100 acres developed.
- Measurable reductions in nutrient, pathogen and sediment pollution are expected.
- Streambank and gully erosion rates should be reduced due to lower stream flow rates and velocities.
- Potential long-term costs for stream repairs should be reduced.
- Reduced risk to infrastructure/streambank erosion.
- Implementation either regionally or within each individual development. However, regional basins may require less total area dedication and provide for more certain execution of long-term maintenance, Public-private partnerships to dedicate land and build such regional infrastructure will be necessary. Site by site implementation will likely better reduce sizes of downstream storm infrastructure.
Levels of Stormwater Management Using ISWMM’s Unified Sizing Criteria

Example of a multi-stage outlet

1. 1st Stage: Small Diameter Inlet - Low Flow Control (Below Surface)
2. Water Level Control Structure
3. Main Outlet Structure
4. 2nd Stage: Notch Weir or Medium Size Opening (Controls 2-25 Year Storms)
5. 3rd Stage: Longer Overflow Weir (50-100 Year Storms)
6. Pipe Outlet ( Likely Controls 50-100 Year Storms)
7. 4th Stage: Emergency Spillway (For Storms Larger Than 100-Year)

Traditional basin does little to slow runoff from small storms
ISWMM basin has much lower peak flow, drawn out over longer period

Source: Results from runoff analysis completed as part of Developing Case Study completed by RDG as part of this plan (see appendix resources).

Larger-scale multi-stage outlet structure in Ankeny, Iowa

Source: RDG

Source: Greg Pierce

Source: Results from runoff analysis completed as part of Developing Case Study completed by RDG as part of this plan (see appendix resources).
**Flood Plain Protection**

Local policies and ordinances should be adopted or amended to protect flood plains in the following ways:

- Reduce structural and property losses during major flood events by preventing construction of new structures within the limits of the 100-year flood plain (1% annual exceedance probability).
- Maintain **flood storage capacity** by limiting grading or placement of fill materials within the 100-year flood plain.
- To the greatest extent possible, locate public infrastructure outside of the limits of the 100-year floodplain. When it can’t be avoided, provide additional flood plain storage nearby through excavation or make other improvements to maintain projected highwater elevations.
- Identify areas of active stream movement and reserve areas as open space where future stream movement or flood inundation is expected.
- When establishing **flood protection elevations**, provide three feet of vertical separation between regulatory 100-year flood elevations and required building protection elevations to account for flow increases predicted by use of **NOAA Atlas 14** data.

**Application**

This plan recommends implementing ordinances and policies to apply these standards to all new developments and where new **land subdivisions** are planned to occur adjacent to streams where flood risk has been defined by FEMA Flood Insurance Rate Maps. Redevelopment within existing built parcels within the floodplain should be done in a manner to cause no net increase in flood elevations. The potential for recurring losses on such properties or need for flood protection techniques should be evaluated by local jurisdictions when site plans for redevelopment are considered. Existing structures which fall within these protection zones should be identified. Past known damages to such structures may be reason to pursue opportunities to acquire and remove such structures to avoid recurrent damages.

**Expected Impacts (Where Applied)**

- Reduced potential for damages to buildings, property and other infrastructure during flood events.
- Maximized capacity for storage and conveyance of large flood events.
- Reduced risk of higher velocity flows or reduced **travel times** being caused by narrowing of the flood plain.
- Larger factor of safety above projected flood elevations.
**Stream Buffer Protection**

Stream buffers should be established, either by public land acquisition or through reservation as permanent easements as public or private open space. These buffers should be created along all first, second and third order streams, as well as any existing or created open drainage course with a drainage area that is larger than 40 acres. Local policies and ordinances should be adopted or amended to establish protected stream buffers.

Stream buffers should be wide enough to serve the following functions:

- Include the entirety of the regulatory 100-year (1% exceedance probability) flood plain OR where regulatory flood plains do not exist, include areas expected to be inundated by a 24-hour, 100-year return period storm event (flows calculated using the NRCS TR-55 method for fully developed conditions). Consider inclusion of the regulatory 500-year (0.2% exceedance probability) flood plain within the protected buffer.
- Allow for expected stream migration, based on recent movement patterns or historic stream channel locations.
- Provide enough width for future streambank improvements. This plan recommends setting a line based on the existing streambank toe locations, or a line that accounts for expected future movement of the streambank toe. From that line, the buffer should include all land which falls between the stream and a projected slope line from the established toe baseline to the surface of the surrounding area. The slope line should not be steeper than a rate of 4 (horizontal) to 1 (vertical).
- Allow width within the stream buffer for a minimum 15’ cleared maintenance path on at least one side of the stream, with a cross slope not to exceed 5%, to allow for access by trucks, tractors and other maintenance equipment. Along streams of first order or higher, these maintenance paths should be provided on both sides of the stream. These paths may be either undeveloped paths (kept clear of trees and brush by annual mowing) or paths which are surfaced with pavement or gravel.
- Provide a minimum five-foot setback outside of the maintenance path to the edge of the reserved buffer, on the side opposite the stream from the path.
- For engineered channels in developing areas, construct channels as bioswales where feasible to improved volume reduction and water quality treatment. Refer to the ISWMM for feasibility review and design procedures.

- Program annual maintenance to remove invasive species and improve establishment of erosion resistant surface vegetation within protected buffer zones.
- In all cases, provide a minimum 50 foot building setback from the existing top of bank for a first order stream. Provide a minimum 100 foot building setback from the existing top of bank for second and third order streams.

**Application**

This plan recommends applying these standards to all new developments and where land subdivisions are planned to occur adjacent to streams subject to these provisions. Existing structures which fall within these protection zones should be identified. Past known damages to such structures may be reason to pursue opportunities to acquire and remove such structures to avoid recurrent damages.

**Expected Impacts (Where Applied)**

- Reduced potential for damages to buildings, property and other infrastructure during flood events
- Maximized capacity for storage and conveyance of large flood events
- Improved access for maintenance and ability to complete any necessary repairs
- Improved filtration of stormwater runoff through properly designed channels
- Opportunities for trails and other park features to be located along streams for public use

Stream buffer with trail access in Ankeny, Iowa

Source: Greg Pierce
Stream Buffer Width Guidance

Buffer widths need to vary in width from location to location. The width of the buffer to be acquired or protected by easement should include considerations for items 1 through 7 below. Recommended building setbacks may extend beyond the limit of the reserved buffer.

The orientation of these features within the buffer will vary based on local conditions. In some areas the width of the flood plain may include nearly all of these elements. In others, the projection of a stable slope, or provision for access, may extend beyond the limits of the flood plain. Ordinances can describe these features, which can then be applied to each location on a case-by-case basis.

1. Stream
2. Expected stream movement
3. 4-to-1 (horizontal to vertical) projection from lowest creek elevation to surface
4. Past stream location (oxbow)
5. Trail of reserved access path (location within buffer may vary)
6. Area inundated by 100-year (or 500-year) storm
7. 5-foot setback zone
8. Recommended buffer width
9. Recommended minimum building setback

Source: RDG
Construction Site Pollution Prevention

Construction site runoff has been identified as a significant source of sediment loading within the urban environment. Many strides have been made over the past two decades in the development and implementation of stormwater pollution prevention plans (SWPPPs). While most sites are applying for required permits and preparing SWPPPs, there appears to be room for improvement in installation and maintenance of adequate erosion and sediment best management practices (BMPs).

The following are generally not new requirements. Rather, they are points of emphasis to increase compliance with existing regulations. Improvements are recommended in implementation of erosion control practices:

• Consider stormwater management early in the site design process. Look for ways to minimize the footprint of disturbed areas, lessen grading volumes and reduce impervious surfaces.

• Develop and implement a Soil Management Plan (SMP), with the goal of providing healthy soils across all open space areas on developed landscapes before construction has been completed.

• Where upstream areas drain through a construction site, stage construction to avoid disturbance to the flow path or provide stabilized methods to divert stormwater around or through site construction.

• Increase the use of temporary seeding and mulches. Use of adequate temporary mulch has been shown to reduce surface erosion by up to 98% compared to sites with no erosion controls. State law currently requires that disturbed areas where grading activities cease for a period of longer than

What is the Difference Between Erosion and Sediment Control?

Erosion control practices protect the surface of the ground from being displaced by the force of falling precipitation or flowing water. Sediment control practices are intended to collect polluted runoff for a period of time, allowing suspended pollutants to settle out of runoff before it is allowed to leave a construction site.
days shall have temporary stabilization (such as mulch with seed) applied within
14 days after the last grading activity. Many sites are currently not providing
adequate temporary stabilization measures to comply with this requirement.

- On steeper slope areas or in areas of concentrated flow, increase the use of
  rolled erosion control products (RECPs) and turf reinforcement mats (TRMs)
  where temporary mulch may be insufficient to prevent erosion.

Recommended improvements for sediment control practices:

- Prior to commencing land disturbing activities, install perimeter site controls
  (such as silt fences, filter socks, wattles and sediment basins), stabilized
  construction entrances, trash collection areas and temporary sanitary facilities
  for site workers
- Install interior site controls as soon as allowed by grading or utility construction
- Don’t overload controls. Refer to design guidelines for sizing and design. For
  example, where silt fence is installed, provide at least 100 feet of silt fence length
  for each quarter acre drained.
- Silt fences should feature “J-hooks” or other methods to increase their storage
  capacity and prevent concentrated flow from larger areas being directed to a
  single low point in a long fence. Silt fences often fail when they “blow out” from
  collecting too much runoff or sediment, because the area they collect runoff
  from is too large. Silt fences should have these features placed at intervals of no
  greater than 200 feet.
- Use soil logs or wattles to break up the length of steeper slopes. Reducing the
  flow length along steep slopes can significantly reduce surface erosion.
- State law requires sediment basins to be installed where attainable, when
  runoff from more than 10 disturbed acres is routed to a common outlet. These
  basins are to be designed with floating outlets or devices that collect water from
  the surface of ponded water. As pollutants settle out by gravity, the surface
  of the ponded water tends to be less polluted than that discharged from the
  bottom of the basin. Few of these types of outlets are being utilized currently.
  Also, as properly sized basins are often most effective at removal of suspended
  sediment from constructed runoff, it is recommended that new local policies be
  implemented to require their use in smaller disturbed areas.

Why is Pollution from Construction Sites a Problem?

Construction activities create new development from farmland or other open spaces. These
activities strip off any vegetation that is reducing the potential for surface erosion. Once
this vegetation is gone, the surface of the soil is easily washed away by rainfall and flowing
water. Soil can also be tracked onto roads and highways or dumped into waterways. All of
these actions make it likely that soil will be carried off site and washed into downstream
storm sewers, creeks and rivers. This eroded soil (sediment) can plug up storm sewers and
fill in waterways, affecting their ability to convey runoff. Other impacts of sediment are
listed in detail in Chapter 6 of this plan.

Without effective controls, sediment discharge from construction sites often will range
between 35–45 tons per acre.(1) Compare this with farmland areas which usually have
loading rates of less than two tons per acre. Lawns and other stabilized areas have far lower
erosion rates.

Construction sites can also be sources of other pollutants such as fuels, oils, paints, concrete
washout, construction debris and human waste (collected in temporary toilet facilities from
workers).

\[
\begin{align*}
\text{Typical erosion rates for} & \quad \text{land-based activities} \\
\text{land areas, in tons per acre per year} &
\end{align*}
\]

Source: Dunne, T. and L. Leopold, 1978; NRCS, 2000; NRCS, 2006; ASCE and WEF, 1992

Source:
• All site controls should be checked on a weekly basis and before rainfall is expected to make sure they are in good working order. Controls should be maintained and repaired promptly as needed. Trash and sanitary collection facilities need to be emptied routinely and collected materials disposed of properly. Stabilized entrances may need new surface aggregate provided is they are failing to prevent off-site tracking from occurring.

• When dewatering excavations, divert discharge to a sediment basin or other collection area on-site. Do not directly discharge such water to the storm sewer system without treatment or filtration. Avoid releasing concentrated flows at the top of steep slopes where gully erosion may be caused.

• Immediately following full establishment of permanent vegetation, all temporary controls such as silt fences, soil logs, inlet protection devices should be removed. Accumulated sediment should be properly disposed.

**Recommended improvements to SWPPPs:**

• The plan should be a “living document.” The plan should be amended in some fashion so that the site map reflects current site conditions. Inspection records and changes to the sequence of construction events should be made part of the SWPPP document.

• The SWPPP and all site controls are to be maintained as necessary until full establishment of vegetation across all disturbed areas. Site inspections and maintenance of controls should continue until all areas are stabilized with permanent vegetation and the **Notice of Discontinuation** (NOD) has been filed with the Iowa Department of Natural Resources.
Recommended improvements to municipal inspections:

- Routinely check sites to assure that construction sites are in compliance with state and local standards.
- Respond promptly when polluted site runoff or off-site tracking is observed, or citizen complaints are received.
- When necessary, use "stop work orders" and other methods to bring sites back into compliance before work on other construction items can proceed.

Application

The plan recommends ordinances and internal policies be implemented and enforced that would apply these standards to all sites requiring either a local grading permit or authorization under the State of Iowa's NPDES General Permit No.2 (construction sites or common plans of development which will disturb at least one acre).

Expected Impacts:

- Successful implementation of these policies would significantly reduce sediment loadings from construction sites and annual sediment loadings within the Walnut Creek watershed.
- Reduced sediment loading will slow the rate of deposition within the flood plain. This maintains the flood plain's ability to convey and store runoff. This reduces the potential for increases in flood elevations and flow velocities.
- Reduced deposition also lowers the potential for streambank erosion due to deposited soil pushing flows toward the outside bends of streams.
Soil Quality Management and Restoration

Recently, requirements within the State of Iowa’s NPDES General Permit #2 for construction sites were amended. These changes removed a requirement to restore four inches of topsoil across disturbed open spaces. The permit now requires that topsoil be preserved on site where feasible, but does not specify where and how that topsoil is to be placed or preserved. During the discussions leading up to these changes, many concerns were raised by development and real estate interests about the cost and timing of restoring topsoil, especially on finished lawn spaces within single-family land developments. Conceivably, the changes in permit language allow topsoil to be preserved within berms or other confined areas and may not be placed uniformly across the landscape. This means that many open spaces may lack the healthy soil material needed to support the growth of lawns and landscaping. Should this occur, the soil will have limited ability to absorb runoff during rainfall events (runoff volumes may be increased by more than 80% during the most commonly occurring storm events) (1). Higher levels of watering and fertilization will be necessary to support desired plant materials. All of these factors have the potential to increase stormwater runoff volume and pollutant loads.

For this reason, it is recommended that communities implement local ordinances to protect or restore healthy soils in open space areas within new development sites. The Iowa Stormwater Management Manual has an entire chapter devoted to the topic of maintaining and restoring healthy soil profiles. Options include limiting the footprint of land disturbance, topsoil stripping/replacing or using soil amendments like compost and sand to rebuild a healthy surface topsoil layer.

To fully realize the benefits of soil quality restoration, the methods within ISWMM manual list various ways to maintain or create eight inches of a healthy soil profile across the surface. Requirements to achieve this standard can be incorporated into other ordinances, or implemented as a stand-alone ordinance.

Such requirements should include the following elements:

- All construction sites which are subject to local grading permit or State NPDES permit requirements should develop and maintain a Soil Management Plan (SMP) which becomes a part of the SWPPP document when one is created for a given site.
- The SMP shall review soils information from county maps, geotechnical studies or other sources to identify where higher quality soils may exist. When possible, the organic content of onsite topsoil material should be determined by testing.
- To the extent possible, site improvements should be oriented to minimize disturbance of high quality soils. Site grading should be planned to avoid compacting, filling or tilling under the drip line of trees which are identified as being intended to be preserved through construction.
- Identify where topsoil will be stripped, stockpiled and replaced. The quantity of stockpiled material should be estimated.
- Where grading is necessary, show the location and type of method of Soil Quality Restoration (SQR) to be applied (reference ISWMM chapter to see the available methods and how they are achieved).
- In some locations, it is possible to use SQR techniques to partially or totally address the Water Quality Volume. If this is proposed, identify locations where SQR techniques are intended to be used to meet such requirements. Include relevant calculations to demonstrate compliance with requirements listed in the ISWMM manual within a stormwater management report submitted to the local jurisdiction for review.
- If SQR techniques are not proposed, or not applied, appropriate adjustments to runoff coefficients and curve numbers within stormwater design calculations should be made to account for the effects of soil compaction and poor establishment of vegetation. The ISWMM manual includes recommendations on how to account for these effects.

Application

It is recommended that ordinance and policies be implemented that would apply these standards to all sites requiring either a local grading permit or authorization under the State of Iowa’s NPDES General Permit No.2 (construction sites or common plans of development which will disturb at least one acre).

Note:
1. Refer to analysis in Chapter 8.
Historic topsoil depth and organic matter levels have been reduced in agricultural areas. The remaining topsoil is often stripped off or compacted during grading and construction of new land developments.

The Iowa Stormwater Management Manual contains a section on Soil Management and Restoration. It designates eight different methods that can be used to protect or restore a healthy topsoil layer during the construction process. Designers can use this information to develop a Soil Management Plan, which outlines how developers or contractors can use one or more of these eight methods to leave lawn and landscaping areas with adequate topsoil to support vegetation and reduce stormwater runoff.
Expected Impacts (Where Applied)

- It is expected that successful implementation of these policies could reduce runoff volumes from suburban development areas by approximately 45% during a 1-year return period storm event (2.67” in 24 hours). This would be a volume reduction of 17,600 gallons per acre drained for that event.
- Runoff reduction from areas developed using these policies during the 100-year return period storm event (7.12” in 24-hours) would be expected to be approximately 20%, compared to sites without soil quality restoration. This would be a volume reduction of 33,400 gallons per acre drained for that event.
- Total pollutant loading would be expected to be reduced by at least an amount similar to runoff volume reductions.
- Reduced need for irrigation and fertilization could lead to additional reductions.
- Stormwater detention areas and other management practices can be reduced in storage volume and footprint area. Modeling results from the developing case study area indicate that stormwater management areas in areas without soil quality restoration would need to have 48% more volume and be 40% larger in area to limit runoff rates to desired levels.

Policies for Developed Areas

While many of the policies in urban areas are focused on new or redeveloping areas, it is important to look for opportunities to make improvements within the 43% of the watershed that is already developed. Cities can require updated stormwater practices to be installed on properties where site improvements or re-development is proposed to a level where a new site plan must be approved. Other than these situations, cities usually do not have the ability to force private property owners to make improvements to their sites. For this reason, communities may decide to provide incentives (such as cost share programs, grants, utility fee reductions) to promote installation of new stormwater practices. Cities may also look to identify critical areas where stormwater retrofits could lessen the potential for flash flooding or streambank erosion along small urban tributaries. Education and outreach efforts can also broaden use of practices such as rainbarrels and raingardens in residential areas.

Policies for Rural Areas

Rural Policy Recommendations

Over the next decade, it is expected that most water quality improvements will rely on voluntary actions taken by individual farmers and landowners. To support and accelerate the implementation of this plan, a series of policies and action items has been identified.

1. New sources of financial support are needed to support water quality improvements in rural areas. Many practices known to be effective at reducing pollutant loads and/or runoff volumes, but several of these have costs associated with their installation or the lost potential for agricultural production. There are many economic factors which may make it more difficult for farmers and land owners to commit to investing in these practices. Low crop prices may leave little room above the “bottom line” to devote to water quality initiatives. With higher prices, there is incentive to maximize productive land, potentially reducing available for buffers and other practices. Federal, state and local resources can be used to bridge this gap and provide water quality and quantity benefits that are important to the entire watershed.

Some alternatives for funding are listed below:

- Iowa Department of Agriculture and Land Stewardship provides grant opportunities for practices that support the Water Quality Initiative (WQI) Nutrient Reduction Strategy Practice Implementation and Demonstration Program. At the time of this plan’s writing, Polk Soil and Water Conservation District received a grant from this source of nearly $200,000 to help implement best practices within the watershed.
- The Iowa Soybean Association has recently proposed a series of tax credits for farmers who install selected best management practices. Within the last year, these credits were included in House Study Bill 251 which would place emphasis on practices that are expected to provide multiple benefits and yield the highest levels of nutrient reduction.
- The Natural Resources and Outdoor Recreation Trust Fund (which was authorized by voters in 2010, but has not been funded as of this date) could be used to fund a variety of urban and rural water quality improvement. By law, money placed in the fund must be spent on a variety of conservation practices and improvements, many of which would have a direct benefit to water quality.
• The Iowa League of Cities has been working on a water quality offset exchange which would allow public water utilities or other municipalities to develop water quality projects in upstream areas that would have quantifiable nutrient reduction benefits. This or some other nutrient trading system could be used in the Walnut Creek watershed to develop rural-urban partnerships to creatively fund practices which address water quality and/or quantity.

• There are several other grants and cost sharing programs that are in place, some of which have funds targeted for use in the Walnut Creek watershed. However, with the projected cost to implement improvements broadly within this area, there is a need for additional programs to be implemented.

2. Develop private and public partnerships to develop precision business planning for agricultural areas, targeting those areas which currently farmed on an annual basis, but are routinely not profitable to the producer. These lands could potentially be set aside for water quality practices such as conservation easements, wetlands, buffers, etc.

3. Additional educational materials are needed that better explain the best management practices that are included in the nutrient reduction strategy: what they are, where they are best applied, how they work, their benefits and liabilities, and where interested groups can seek out more information for funding or constructing such practices. The need for such materials extends beyond the boundaries of this watershed.

4. More information on existing research needs to be accessible to explain to producers and landowners what would be considered “natural” levels of nutrient loadings and how current agricultural practices have been shown to impact these levels.

5. Develop a stream buffer policy for voluntary implementation of stream buffers and grass waterway improvements throughout the watershed. It would be recommended to provide a buffer of native vegetation, which protects areas expected to be inundated by a five-year flood event. Also, it is recommended that grass waterways or other buffers be provided along “zero order” streams so that they are protected for a width of one rod (16.5 feet) on either side of the stream.

6. Practices that improve soil health and address water management have benefits beyond water quality and quantity improvements that should be pursued.

• Maintaining and improving the structure and organic material within the upper soil profile is key to sustaining agricultural production into the foreseeable future. Practices such as extended crop rotations may cause short term reductions in yield when fields are used for alfalfa production, but long-term benefits in soil depth and quality are likely to be realized.

• Methods of subsurface water control also can offer reduce risk of crop losses. It has been identified that over the past sixty years, significant crop losses can be attributed to either excess or insufficient moisture. In the past, field moisture management has often been focused on drying fields out during wet years. The importance of having the ability to retain moisture during drought conditions should not be overlooked. Drought has historically been a larger cause of crop losses than either excess moisture or flooding.

<table>
<thead>
<tr>
<th>Portion of All Crop Losses Reported that are Related to Drought, Excess Moisture or Flooding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cause of Crop Loss</strong></td>
</tr>
<tr>
<td>Drought</td>
</tr>
<tr>
<td>Excess Moisture</td>
</tr>
<tr>
<td>Flooding</td>
</tr>
</tbody>
</table>

Source: “Managing Risk in Agriculture;” Chad Hart; Presented at Ag Credit School; Ames, Iowa; June 2013.

Future Considerations

This plan focuses on voluntary efforts to implement measures to improve water quality. A wider establishment of adequate stream buffers and grass waterways is an essential component of this plan. Even if there was a desire to make stream buffer protection a requirement in rural areas, there is not currently a means at the city or county level to execute and enforce such requirements. Therefore, at this time it is essential that landowners, farmers, conservation and advocacy organizations work together to more broadly adopt these practices.

This plan includes a 10-year implementation period for its first phase. If at the end of this period there has been little progress adopting stream buffer improvements on a voluntary basis, then there may be a need to advocate for stronger regulatory policies that could be enforced on the state level. Recently, the State of Minnesota implemented a mandatory stream buffer protection and re-establishment policy which will be implemented over the next few years. Should that program be successful, it could serve as a model which could be tailored to address conditions in Iowa.