3.5 FECAL COLIFORM CRITICAL AREAS ANALYSIS

The preceding discussion has provided an overall characterization of water quality issues in Ferson-Otter Creek Watershed. The following discussion now focuses on critical areas and modeling results at a subwatershed level in the Ferson-Otter Creek Watershed to inform localized plan implementation activities. Critical areas are defined as those subwaters within the watershed for which a source of contamination for a given impairment is present at a concentration relatively higher than that found in the watershed in general.[127] Prioritizing recommended projects and policies for implementation is generally performed according to the financial ability and political will of the implementer, as well as the impact that a given recommendation will have on the ground, likely in that order. By helping to identify areas within a watershed which are thought to generate a disproportionately high pollutant load (critical areas) stakeholders have another tool for prioritizing recommended projects and policies based on the relative need for mitigation throughout the watershed.

While pollutant load reductions demonstrate the mitigation capacity of a particular project or policy, critical areas on the other hand demonstrate those locations within the watershed which are likely most in need of attention. A project or policy could potentially have a large pollutant load reduction, signaling a large impairment mitigation capacity, but might be implemented in an area within the watershed which is relatively unimpaired compared with other subwatersheds. If, however, stakeholders must choose among a larger set of possible project or policy options due to realistic financial or planning constraints, such a scenario might not result in the efficient use of time, money and energy in implementing plan recommendations on the ground. This fecal coliform critical areas analysis is therefore presented as an additional decision-making tool which stakeholders may use to further prioritize projects and policies aimed at mitigating fecal coliform contamination, following those most likely to be successfully implemented in the short term (i.e., within 5 years).

The Fecal Coliform Critical Areas Analysis was performed for Ferson-Otter Creek Watershed given the stakeholder need/choice to establish target load reductions for this impairment. Four potential sources of fecal coliform were considered in this analysis: the amount of urban stormwater runoff, the amount of pet waste, the number of failing septic systems and the presence of manure from livestock agriculture. Unfortunately, specific fecal coliform contamination data related to these sources do not exist at a subwatershed or even watershed level. Therefore, this analysis instead quantifies metrics for proxies that indicate relative levels of likely sources of fecal coliform contamination.

These proxies, quantified at the subwatershed level, include the percent impervious area (a proxy for urban runoff); population density (a proxy for number of pets and therefore amount of pet waste); the number of septic systems (a proxy for number of failing septic systems); and the percent agricultural area (a proxy for fecal coliform from livestock manure). Because this analysis focuses on proxies rather than on observed fecal coliform data, the high, medium and low subwatershed groups for each proxy indicating likely fecal coliform contribution should be taken as a relative rather than an absolute measure. Municipalities in watersheds identified as priorities for fecal coliform through this analysis will be targeted for broader-based policy or ordinance amendments and for public education efforts related to stormwater management and pet waste best practices. In addition, private agricultural landowners who raise

[127] CMAP and IEPA. *Guidance for Developing Watershed Action Plans in Illinois*. Chicago, IL: CMAP, 2007. http://www.epa.state.il.us/water/watershed/publications/watershed-guidance.pdf (accessed August 15, 2011).

livestock can be encouraged to develop comprehensive manure management plans.

Current imperviousness in each subwatershed was determined from the National Land Cover Dataset, which includes an imperviousness component.[128] Cell values in this layer represent the fraction of imperviousness for that cell. This layer was converted to actual impervious area per grid cell by multiplying the fraction of imperviousness of the cell by the area of the cell. The impervious area grid cells were then summed within each subwatershed. Finally, the impervious area in each subwatershed was divided by that subwatershed's total area to calculate percent impervious area. Figure 33 displays the results of this analysis. The Chesapeake Stormwater Network[129] has developed an Impervious Cover Model which correlates impervious cover in a watershed with stream quality in that watershed. As the percent impervious area in a watershed increases, stream quality tends to decrease. Specific thresholds for percent impervious area in each subwatershed area displayed according to this model. The associated recommendations are summarized in Figure 33.

Within Ferson-Otter Creek, three subwatersheds have been identified as nonsupporting watersheds and 8 subwatersheds have been identified has impacted subwatersheds given the relationship established between percentage of impervious cover and water quality (Figure 33). Table 20 identifies the subwatersheds that are nonsupporting or impacted and the municipality that is primarily present within each subwatershed. This analysis leads stakeholders to approach municipalities, Kane County, and other appropriate groups with policy and education and outreach recommendations that focus on these critical areas. These recommendations are reflected in the both the policy and education and outreach section in Chapter 5.

Figure 32. **Impervious cover model guidelines, percent impervious cover**

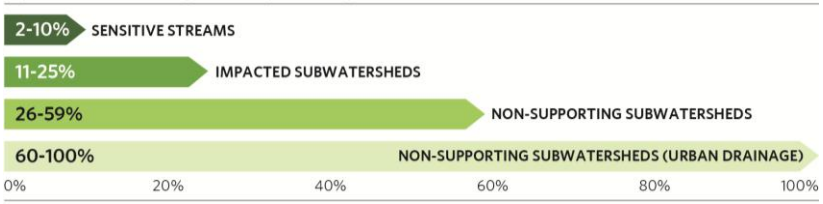
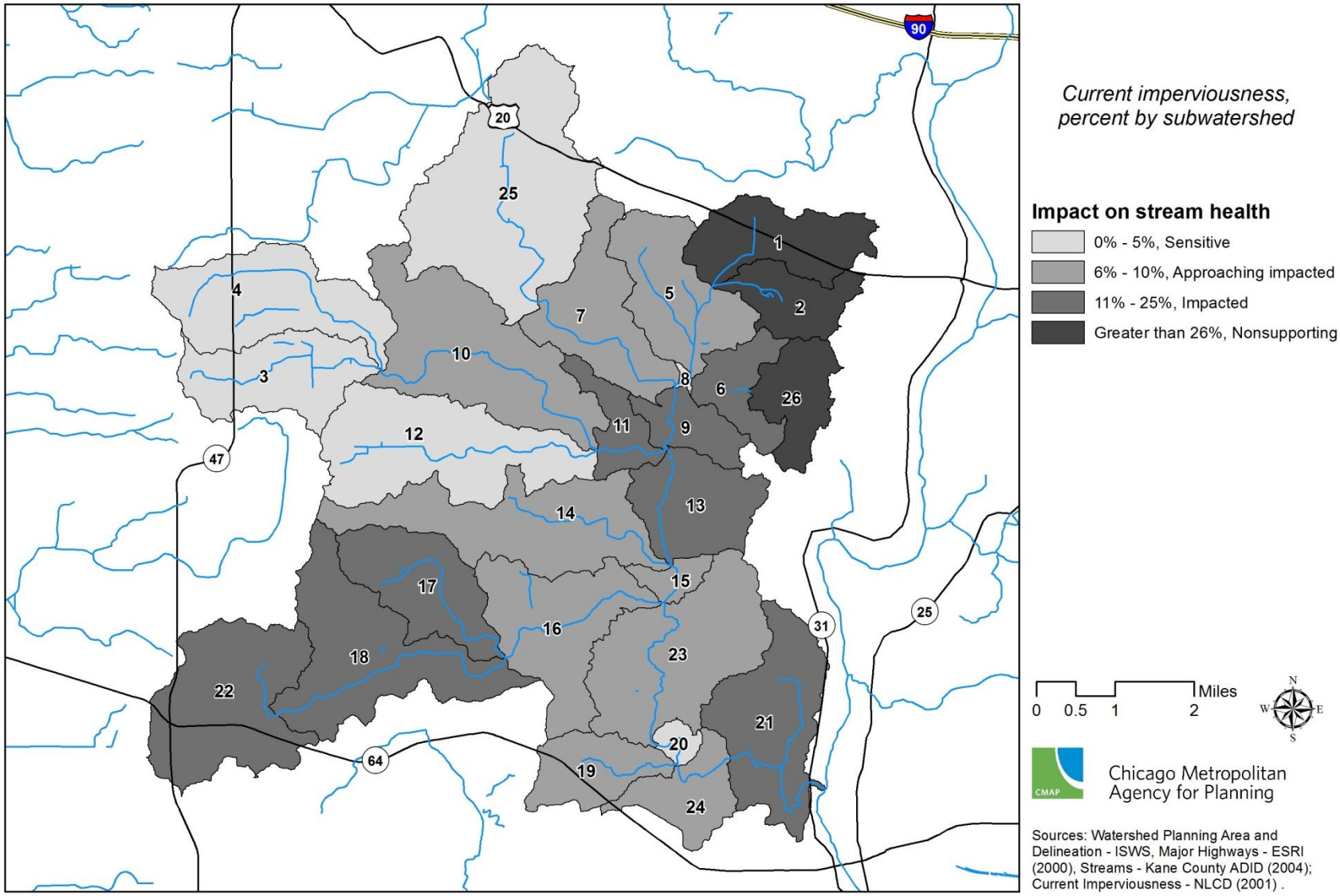


Table 20. Results of impervious cover model for Ferson-Otter Creek Watershed

SUBWATERSHED NUMBER	DESCRIPTION	MUNICIPALITY
1	Nonsupporting Subwatershed	City of Elgin
2	Nonsupporting Subwatershed	City of Elgin
6	Impacted Subwatershed	City of Elgin
9	Impacted Subwatershed	Unincorporated Kane County
11	Impacted Subwatershed	UnincorporatedKane County
13	Impacted Subwatershed	Village of South Elgin
17	Impacted Subwatershed	Village of Campton Hills
18	Impacted Subwatershed	Village of Campton Hills/ Unincorporated Kane County
21	Impacted Subwatershed	City of St. Charles/ Unincorporated Kane County
22	Impacted Subwatershed	Village of Lily Lake/ Unincorporated Kane County
26	Nonsupporting Subwatershed	City of Elgin

[128] USGS Multi-Resolution Land Characteristics Consortium (MRLC). *National Land Cover Dataset*. Sioux Falls, SD: USGS MRLC, 2001. http://www.mrlc.gov/index.php (accessed August 15, 2011).
[129] Chesapeake Stormwater Network. *The Reformulated Impervious Cover Model: Implications for Stream Classification, Subwatershed Management and Permitting, Version 1.0.* Technical Bulletin No. 3. CSN, 2008. http://www.chesapeakestormwater.net/all-things-stormwater/tag/technical-bulletin (accessed September 15, 2011).

Figure 33. **Current imperviousness percent by subwatershed in Ferson-Otter Creek Watershed**



Future projected imperviousness was also estimated at a subwatershed level using future land use specified in municipal and county comprehensive planning maps. Comparing current and projected future imperviousness indicated areas within the watershed that might be most vulnerable to water quality impacts from increasing impervious surface area and urban runoff. Municipal and county comprehensive planning maps were georeferenced in ArcGIS (Geographic Information System) to enable digitizing. Comprehensive plans used in this analysis include those from Campton Hills, Elgin, South Elgin, St. Charles and Kane County.[130] All developed land uses—those excluding open space, agriculture, agricultural residential and water bodies—were digitized and assigned to one of seven simplified land use categories for this analysis. These land use categories were then associated with a fraction of impervious surface area.[131] See Table 21 for land use categories and impervious runoff coefficients used in this analysis. Given ambiguity among comprehensive plans regarding precise definitions of low and medium density residential housing, the average of the coefficients for low and medium density residential land uses was calculated and applied to both of these land use types.

The digitized future land use features were then clipped to the watershed boundary and intersected with the watershed's subwatersheds. Once intersected, the fraction of impervious land cover could be multiplied by the area for each of the digitized future land use features within each subwatershed to give the actual impervious land cover for that future land use feature. The areas of impervious land cover for each of these features was then summed within each subwatershed and divided by that subwatershed's total area to give the percent. Figure 34 displays the results of the projected imperviousness analysis.

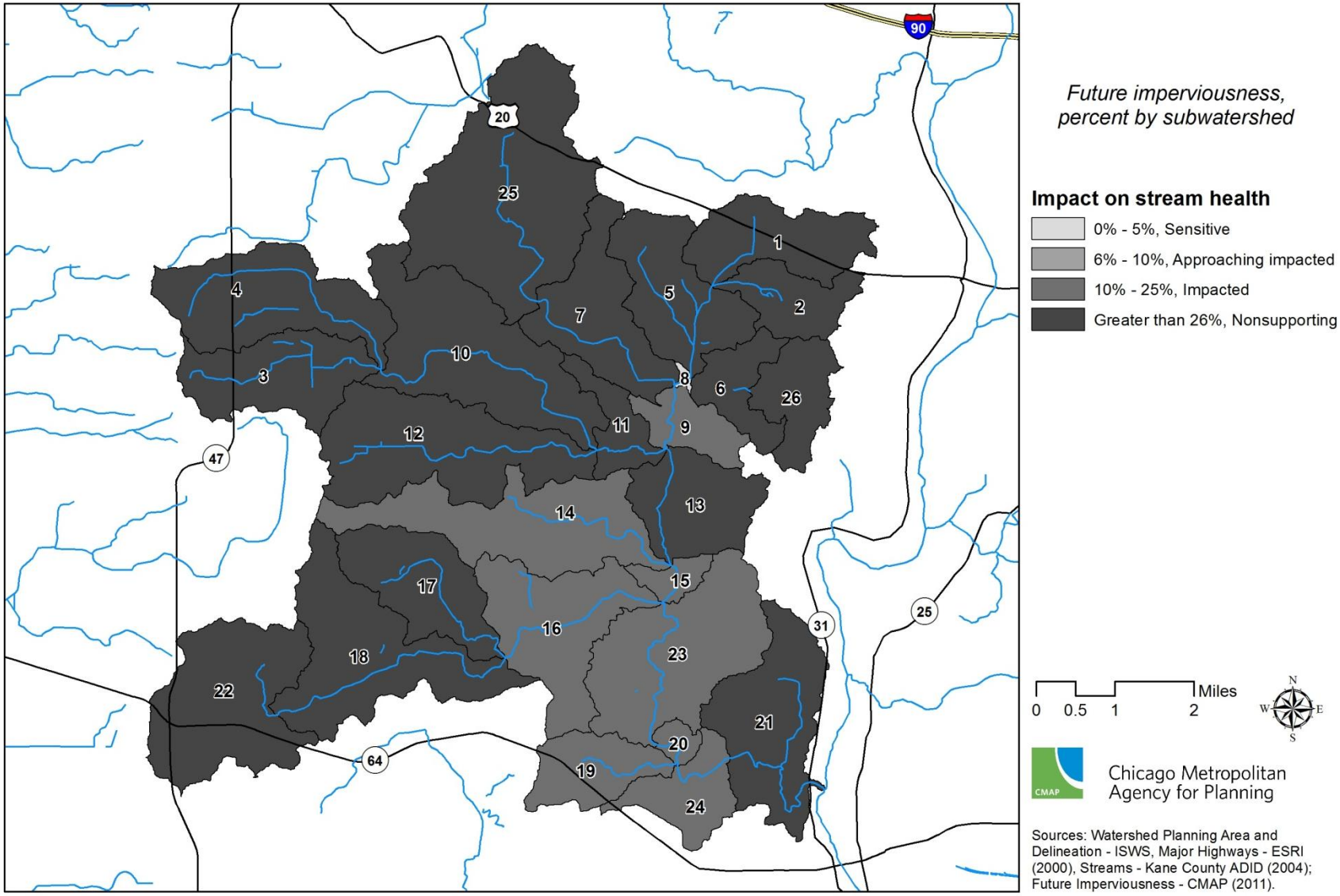
Table 21. Land use categories and associated fraction of impervious cover used in plan analysis

LAND USE	FRACTION IMPERVIOUS LAND COVER
Low density residential	0.285
Medium density residential	0.285
High density residential	0.514
Commercial	0.562
Office/industrial park	0.659
Institutional	0.280
Industrial	0.759

[130] It should be noted that the anticipated maximum buildout areas for each comprehensive plan were not adjusted for the varying planning horizons. Additionally many of the comprehensive plan land areas overlapped boundaries with other neighboring comprehensive plans.

[131] Wayne County, MI, Rouge Program Office. *Determination of Impervious Area and Directly Connected Impervious Area*, by Ed Kluitenberg. Wayne County, MI: Rouge Program Office, 1994. www.rougeriver.com/pdfs/modeling/RPO-MOD-SR35.pdf (accessed August 9, 2011).

Figure 34. **Future imperviousness, percent by subwatershed in Ferson-Otter Creek Watershed**



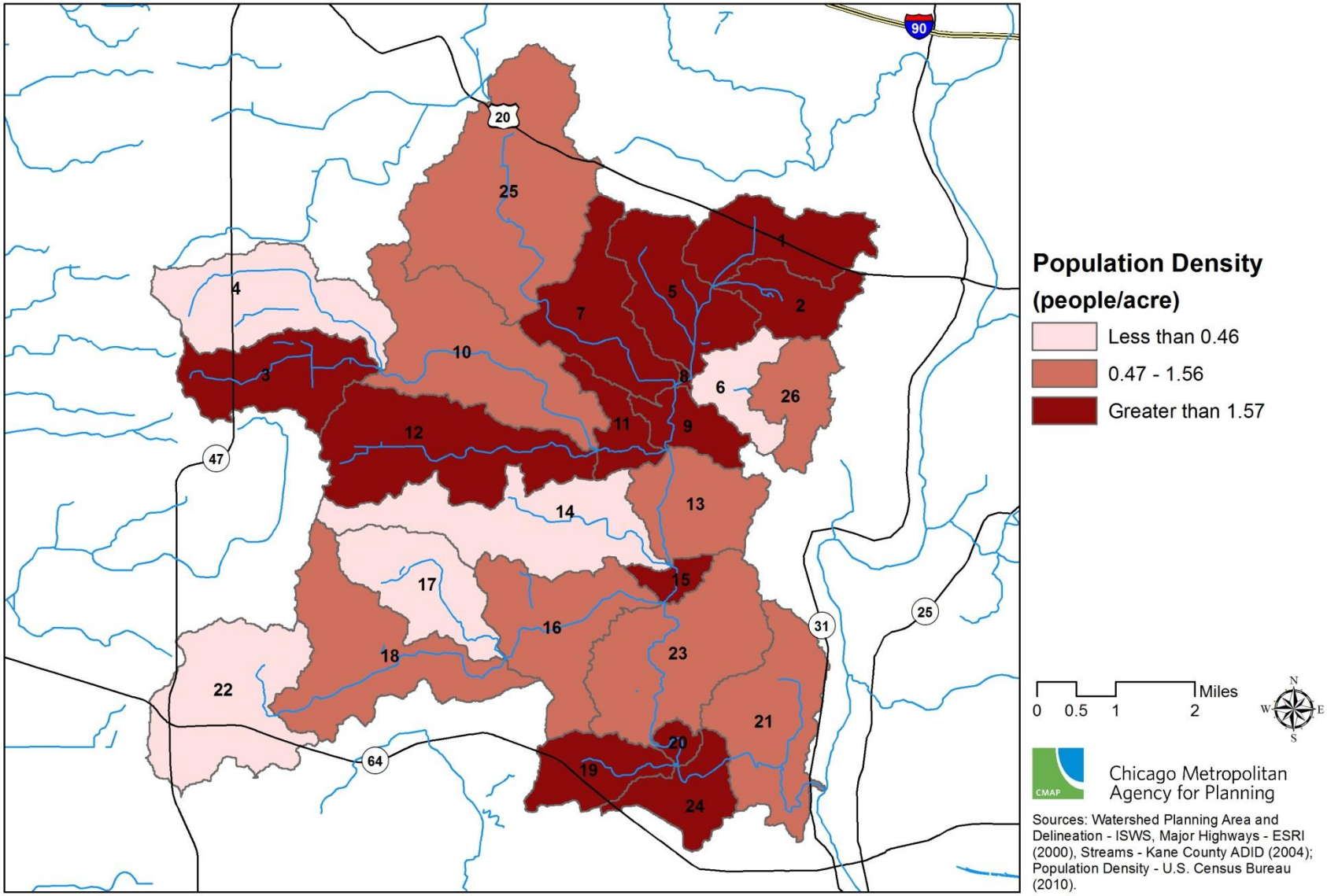
From this figure, it is clear that imperviousness is projected to increase by some amount in all subwatersheds. As previously stated, the analysis of current imperviousness leads stakeholders to approach municipalities, Kane County, and other appropriate groups with policy and education and outreach recommendations that focus on impacts to water quality from imperviousness, as well as stormwater management. Adoption of these recommendations would not only improve management of these impacts in the present, but would also better position Kane County and these municipalities for managing impacts to water quality from imperviousness that will emerge as urbanization increases in the watershed planning area.

As noted, pet waste was also considered as a potential source of fecal coliform. While there is a national pet ownership dataset for the United States, there are no subwatershed, watershed, county or state level datasets on pet populations.[132] Population data for 2010 from the U.S. Census Bureau were used to calculate human population density in each subwatershed, based on the assumption that pet population density scales proportionally with human population density.[133] The importance of urbanization to stream health has been investigated previously, and broadly supports the assumption for this analysis that urban areas contribute a significant amount of fecal coliform to water bodies receiving urban runoff. In addition to impacts from the amount of impervious area, higher population densities are correlated to the potentially lower quality of stream aquatic health, of which fecal coliform concentrations are one determinant. For example, one study found lower values for the Index of Biotic Integrity (IBI) in urban areas when compared with rural areas, indicating that urban areas tend to be associated more often with lower stream aquatic health, an impact caused in part by fecal coliform contamination.[134,135]

Figure 35 displays the results of this analysis. Dreher defines population density thresholds for rural (fewer than 0.46 people/acre), urbanizing (0.46 to 1.56 people/acre) and urban (more than 1.56 people/acre) watersheds.[136] Adopting Dreher's thresholds, there are 12 urban subwatersheds within Ferson-Otter Creek Watershed with the highest population densities. These subwatersheds likely have relatively higher pet populations given our assumption that pet population scales with human population. Beyond this assumption, these population density thresholds do not allow us any definitive conclusions about fecal coliform contamination directly, but rather suggest that the urban watersheds contribute more pollution to runoff from all sources, possibly including fecal coliform. Subwatersheds showing the highest population densities encompass primarily the City of Elgin and unincorporated areas, and to a lesser extent, parts of the Village of Campton Hills.

[132] "U.S. Pet Ownership & Demographics Sourcebook," AVMA, accessed September 15, 2011, http://www.avma.org/reference/marketstats/sourcebook.asp.
[133] Bureau of the Census. "2010 Census Summary File 1." *2010 Census*, Kane and Kendall Counties, Illinois. Washington, D.C.: Bureau of the Census, 2011. http://www2.census.gov/census_2010/04-Summary_File_1 (accessed November 3, 2011).
[134] Dreher, Dennis W. "Watershed Urbanization Impacts on Stream Quality in Northeastern Illinois." In *Assessing the Cumulative Impacts of Watershed Development on Aquatic Ecosystems and Water Quality*. Chicago, IL: Northeastern Illinois Planning Commission, 1996.
[135] Fitzpatrick, F.A., M.A. Harris , T.L. Arnold , and K.D. Richards. "Urbanization Influences on Aquatic Communities in Northeastern Illinois Streams." *Journal of the American Water Resources Association (JAWRA)*, Vol. 40, No. 2 (2000): 461-475.
[136] Ibid. 134.

Figure 35. **Population density critical areas.**



A septic system analysis was also completed on the subwatershed level. Kane County staff provided an estimate of the number of parcels serviced by septic systems.[137] This estimate was calculated from a Kane County Health Department inventory of subdivisions that are on septic within the watershed. In addition, all land parcels that fell within a sanitary district were assumed to be sewered rather than on septic. Likewise, all land parcels that fall within municipal boundaries that provide sewer service were assumed to be sewered rather than on septic. All remaining parcels were assumed to be on septic. These statistics were then summarized at a subwatershed level to identify areas with high septic system density. While only failing septic systems are a possible source of fecal coliform contamination, we assume a uniform system failure rate throughout the watershed. Therefore, areas with a higher density of septic systems overall are also likely to have a higher density of failing septic systems as well. As Figure 36 shows, the majority of the watershed is determined by this analysis to use septic systems rather than municipal sewers. The subwatersheds that are identified as high priority encompass primarily unincorporated areas, the Village of Campton Hills and the Village of Lily Lake. See Chapter 5 for associated policy recommendations.

Finally, agricultural runoff from livestock and horse manure was considered as a possible source of fecal coliform. Agricultural areas used for livestock and equestrian purposes were identified from the 2005 CMAP Land Use Inventory.[138] (See Resource Inventory for the location of all agricultural land use in Ferson-Otter Creek Watershed.) These areas were summed within each subwatershed and then divided by the total subwatershed area to calculate the percent of livestock and equestrian agricultural area. Figure 37 shows the percent agricultural land use for livestock and equestrian purposes. Two subwatersheds were identified to have more than 5% livestock and equestrian agricultural land use. These subwatersheds encompass primarily unincorporated areas and the Village of Campton Hills. See Chapter 5 for associated policy recommendations.

[137] Sean Glowacz, Land Use Planner for Kane County, email message to CMAP, April 29, 2011.
[138] NIPC. *Land Use Inventory*. Chicago, IL: CMAP, 2005. http://www.cmap.illinois.gov/land-use-inventory (accessed September 14, 2011).

Figure 36. **Septic System Critical Areas**

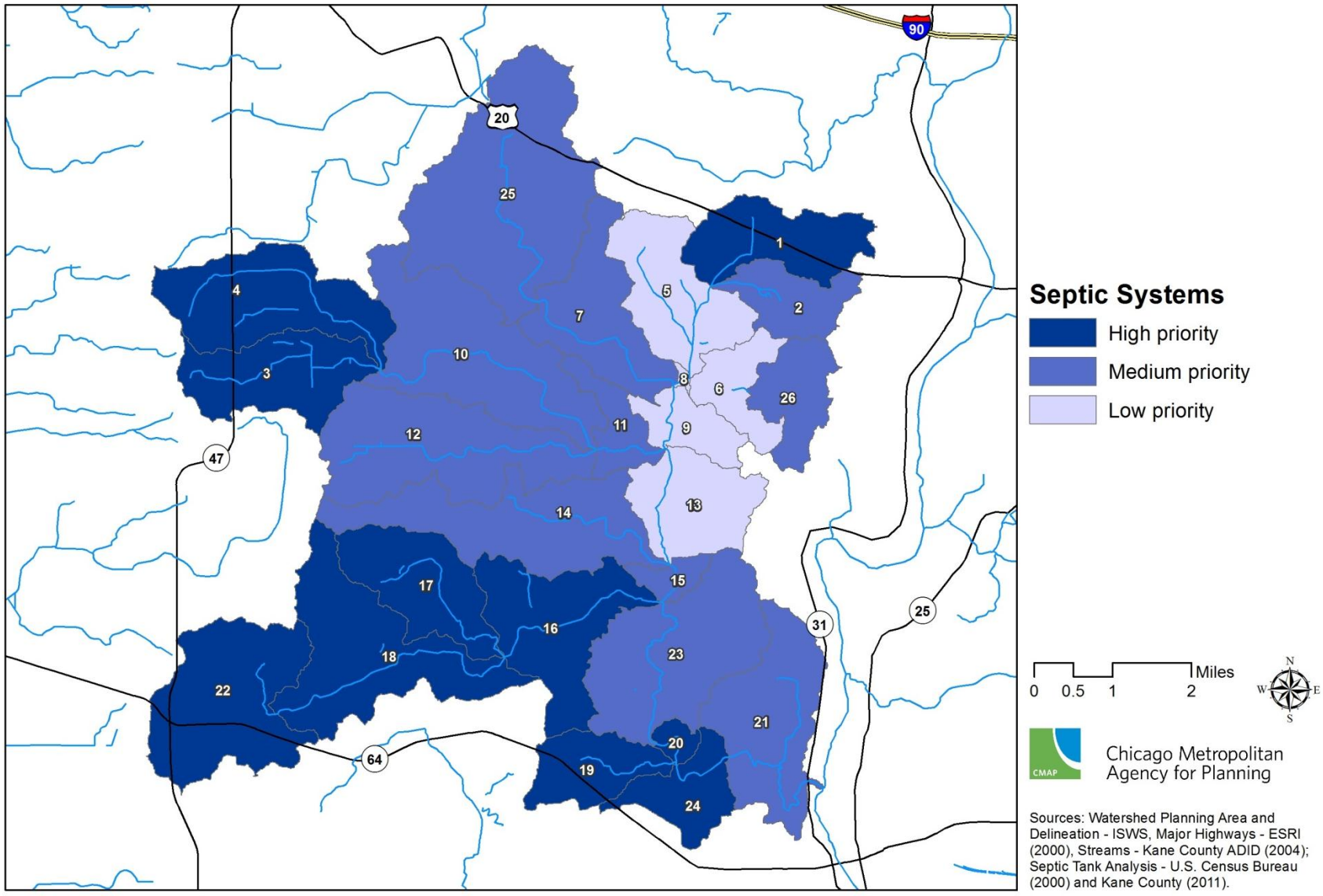
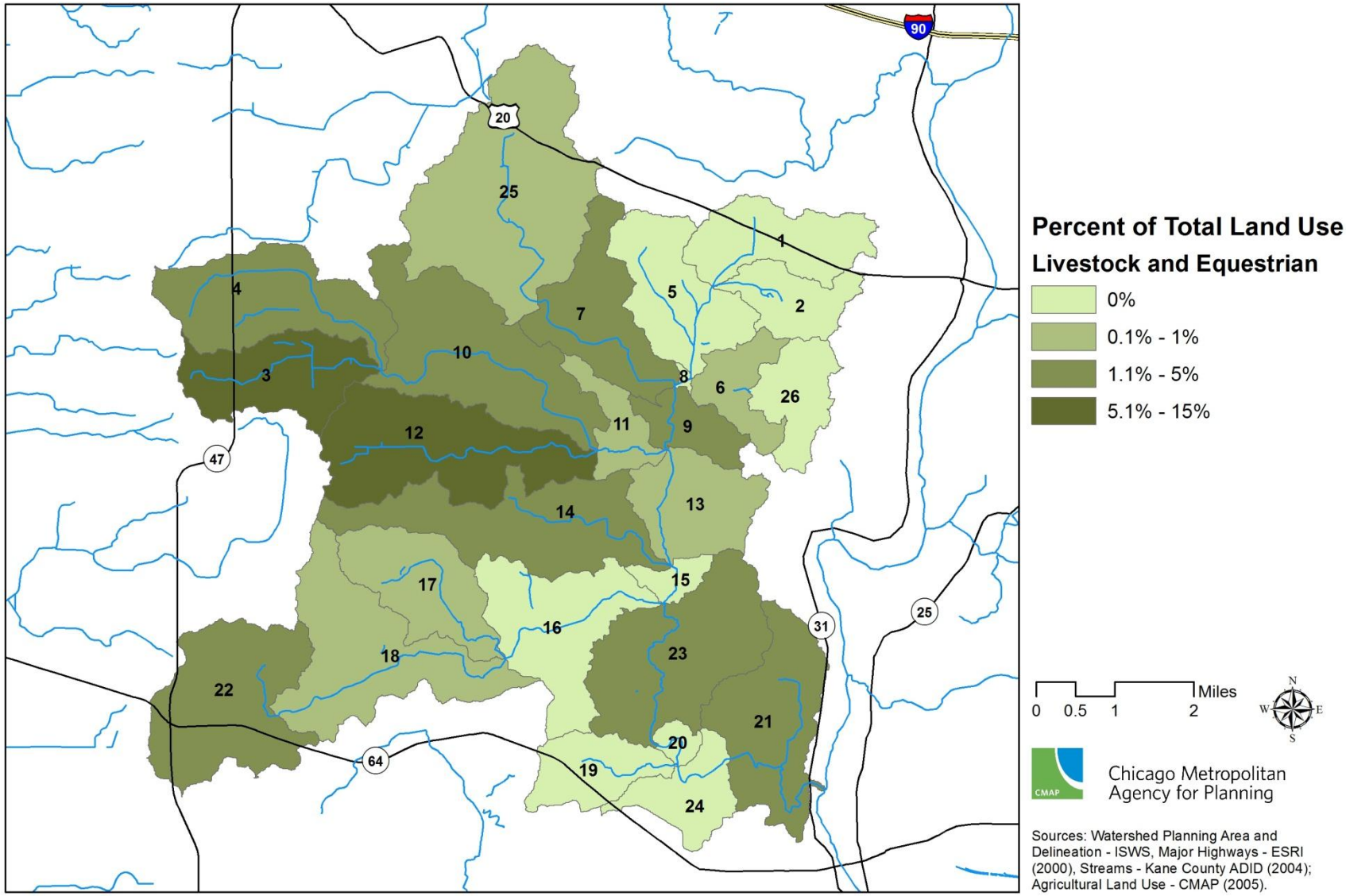


Figure 37. **Percent of Total Land use-livestock and equestrian critical areas**



Modeling Results

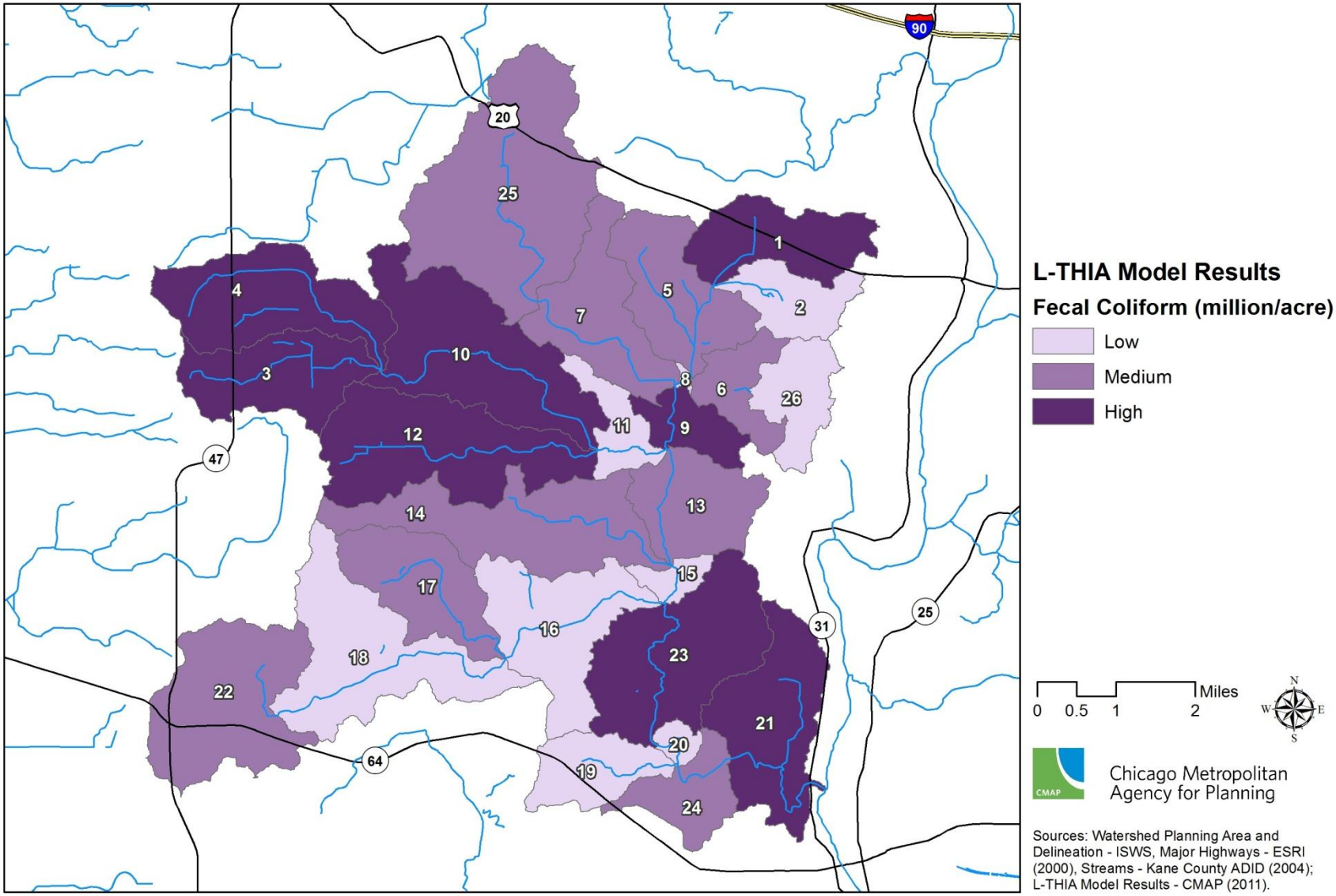
A Long-Term Hydrologic Impact Analysis (L-THIA) model was run at a subwatershed level for Ferson-Otter Creek Watershed. L-THIA predicts runoff volume, runoff depth, and nonpoint-source pollutant loadings based on the land use and the hydrologic soil group on which this land use is occurring. L-THIA uses observed, long-term climate data at a county level to model precipitation events. Nonpoint-source pollutants modeled by L-THIA include Total Nitrogen (TN), Total Phosphorus (TP), Total Suspended Solids (TSS) and Fecal Coliform. L-THIA estimates runoff volume and nonpoint-source pollutant loadings based on Event Mean Concentrations (EMC) specific to unique combinations of land uses and pollutant types.[139] EMC values are determined by taking water quality measurements at various points in time during a runoff event, and averaging these measurements by the flow rates corresponding to the sample concentrations. The default EMC values used in the L-THIA model are based on a study by the Texas Natural Resource Conservation Commission.[140] L-THIA uses EMC values to calculate total annual pollutant loadings by multiplying the total annual runoff depth for a land use by the area of that land use, as well as by the appropriate EMC value and converting units when necessary.[141]

Model results are useful because they can help to identify potential sources of impairments. L-THIA results for fecal coliform concentrations among the subwatersheds in Ferson-Otter Creek might provide insight when compared with the results of the fecal coliform critical areas analysis, for example, if an area modeled to have high fecal coliform is also identified as a fecal coliform critical area based on the proxies investigated. Although nutrient and sediment concentrations in Ferson Creek were found to be below the respective Illinois guideline concentrations for streams, the L-THIA results similarly help to present a comprehensive view of water quality issues throughout the Ferson-Otter Creek Watershed. Nutrient and sediment concentrations were collected at a point in Ferson Creek that captures runoff from the entire (combined) watershed(s). Otter Creek was not similarly sampled as an isolated tributary to Ferson Creek. While water quality conditions are potentially similar in Otter Creek, model results offer one way to investigate this premise.

To assess relative contributions of pollutants among the 26 subwatersheds in Ferson-Otter Creek, average annual loadings from L-THIA are converted to unit-area loads, meaning that the total load for each pollutant is divided by the subwatershed area to calculate pounds of pollutant per acre. Unit area loads provide a more meaningful point of comparison than average annual loads because they account for varying area size among subwatersheds. Larger subwatersheds are expected to contribute more pollutants overall as a function of their greater area, but if the unit area load for a subwatershed is still larger than others after dividing by its area, then that subwatershed's pollutant contribution is assumed to be disproportionately large. Figure 38 shows unit area loads for fecal coliform by subwatershed within Ferson-Otter Creek.

[139] "How L-THIA Estimate[s] NPS Pollutant Loadings using Event Mean Concentration," Purdue University, accessed November 7, 2011, https://engineering.purdue.edu/mapserve/LTHIA7/lthianew/documnt/how_lthia_estimate_nps_using_emc.htm.
[140] Texas Natural Resource Conservation Commission. *Characterization of Nonpoint Sources and Loadings to the Corpus Christi Bay National Estuary Program Study Area*, by Charles Baird and Marshall Jennings. Report No. CCBNEP-05. Corpus Christi, TX: Texas Natural Resource Conservation Commission, 1996. http://www.cbbep.org/publications/virtuallibrary/ccbnep05.pdf (accessed August 15, 2011).
[141] Ibid.

Figure 38. **L-Thia Model Results**



This figure can be compared qualitatively with the critical areas identified through the previous analysis to assess which sources of fecal coliform contamination might be most likely in this watershed-based on the geographic overlap of likely sources (critical areas) with likely high unit area loads (L-THIA results). While some fecal coliform likely does originate from all sources discussed in this plan, the subwatersheds in this map with the highest unit area loads reflect the critical areas for the pet waste, agricultural waste and septic system leakage proxies to a greater extent than for the urban runoff proxy, suggesting that pet waste, agricultural waste and failing septic systems might contribute more to fecal coliform contamination in this watershed than urban runoff.

The results for fecal coliform are conservative, since the L-THIA model likely underestimates fecal coliform loading. Fecal coliform loading is calculated using an EMC, as are loadings of the other non-point source compounds; that is, a constant in units of bacteria per volume is multiplied by the total volume of water passing over a particular land use. As such, the loadings modeled by L-THIA constitute only nonpoint sources of contamination, including those for fecal coliform. The L-THIA model employed here uses minimum EMC values for fecal coliform that are derived from the existing literature. Therefore, model outputs will be low compared to other forms of estimation that use maximums or averages.[142] For purposes of this plan, the nonpoint source component of fecal coliform contamination is more relevant, since wastewater treatment plant point sources must disinfect effluent during the period when sample counts determine a stream's use attainment or impairment status.

Nitrogen, phosphorus or sediment pollutants are displayed spatially in the aggregate. Bundling these pollutants is intuitive because they likely share a common source. For example, agricultural land uses, and nonnative turf-grass lawns in urban areas, can lead to disproportionately large loadings of all three of these pollutants. If a subwatershed has a high nitrogen unit area load, it likely also has high phosphorus and sediment unit area loads. Therefore only one map is displayed rather than three. The method for aggregating these metrics is detailed below and is similar to the general process employed in identifying critical areas above. This method has been applied to bundle factors contributing to water quality in other watershed planning documents as well.[143,144]

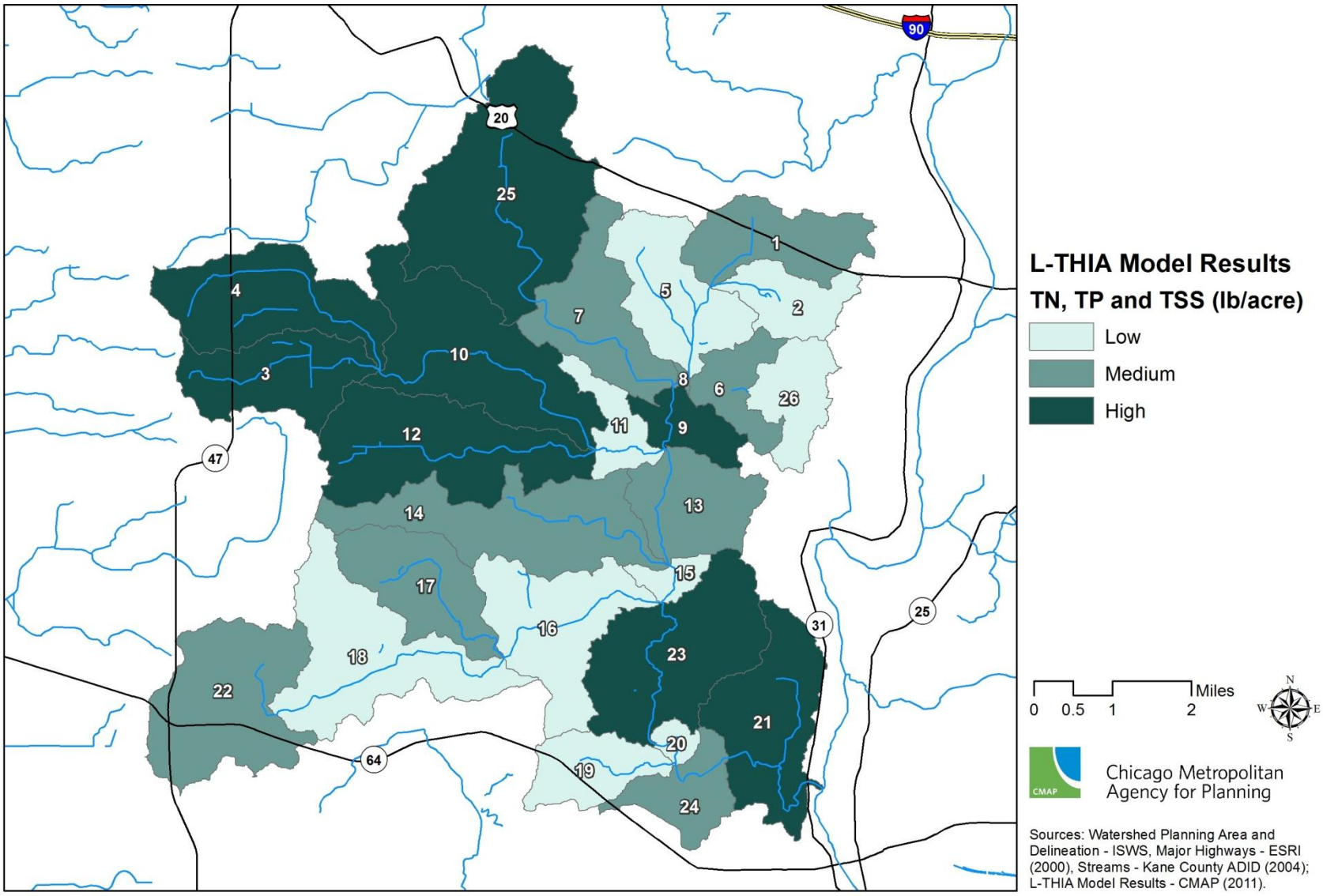
To view TN, TP and TSS in the aggregate, each subwatershed receives three scores, one for each pollutant's unit-area load. Scores are based on ranking the subwatersheds from the lowest unit area pollutant load to the highest. A score of one for each pollutant corresponds to the subwatershed with the lowest unit-area load, while a score of 25 corresponds to the subwatershed with the highest unit area load. The aggregated total rank for each subwatershed is calculated by summing the three ranks for each individual pollutant. Subwatersheds with the highest total rankings are then recognized to have disproportionately high unit area loads across several pollutants. Here, as in the critical areas analysis, the scores delineating the subwatersheds into high, medium and low unit area load groups should be taken as a relative rather than an absolute measure. Figure 39 shows the overall scores for nutrients and sediment among subwatersheds based on unit-area loads within Ferson-Otter Creek.

[142] Larry Theller, GIS specialist, Purdue University Department of Agricultural and Biological Engineering, email to author(s), September 21, 2011.

[143] Mill Creek Subwatershed Stakeholder Advisory Group. *Mill Creek Subwatershed Management Plan*, by Elizabeth Riggs. Ann Arbor, MI: Huron River Watershed Council, 2006. http://www.michigan.gov/documents/deq/ess-nps-wmp-mill-creek_209206_7.pdf (accessed August 18, 2011).

[144] White River Resource Conservation & Design, Inc. *Defining Critical Areas: Hogan Creek Watershed Project, Upper Anderson River Watershed Project and Tanners Creek Watershed Project*, by Kris Vance. PowerPoint presentation. Salem, IN: White River Resource Conservation & Design, Inc., 2011. https://engineering.purdue.edu/watersheds/webinars/IWLA2011/CriticalAreas/DefiningCriticalAreasVance.pdf (accessed August 18, 2011).

Figure 39. **L-Thia model results for TN, TP, and TSS, pounds per acre.**



The L-THIA model results for TN, TP and TSS when viewed in the aggregate show subwatersheds 3, 4, 9, 10, 12, 21, 23 and 25 to generate the highest unit-area loads. These subwatersheds overlap in large part with the subwatersheds that have the highest percentages of agricultural land by area (see the top two percentages classes Figure 37), with the exception of subwatersheds 21 and 23. Agricultural activities in this watershed are therefore implicated for generating a disproportionately large contribution of the nutrient and sediment loads in Ferson-Otter Creeks as predicted by L-THIA. However, more investigation into the sources of nutrient and sediment runoff is warranted, particularly into the dynamics of subwatersheds 21 and 23. These two subwatersheds possess some degree of agricultural land use, but agriculture is by no means dominant. If these subwatersheds do demonstrate high unit area loads as suggested by L-THIA, there might be factors in addition to agriculture contributing to these disproportionately high loads. Ideally, monitoring data should be collected with greater spatial resolution throughout the watershed. Such data can be used in conjunction with model results to inform identification of pollutant sources at a subwatershed level to guide nutrient and sediment runoff mitigation efforts. In the meantime, L-THIA model results are instructive in terms of where emphasis should be placed to reduce sediment and nutrient runoff.

4. NONPOINT-SOURCE PROJECT RECOMMENDATIONS

4.1 PROCESS OF SOLICITING PROJECTS

Stakeholders were encouraged to submit project recommendations for inclusion in the plan. Electronic and paper submissions were welcome. A few stakeholders utilized Google Earth software and ArcGIS to submit exact locations along with detailed project descriptions. A project submission sheet was also sent to all stakeholders on the watershed outreach list several times throughout the planning process. Utilizing the local knowledge of all the stakeholders, the planning process produced an abundance of project ideas. A total of 87 projects were submitted covering a wide variety of best management practices. As requested by IEPA, all submitted projects were organized into 5 categories: Urban, Hydrologic, Agriculture, Livestock, and Other.

4.2 SHORT TERM PROJECTS

After project solicitation, the stakeholders began discussion on selection criteria for short term projects, a subset of all submitted projects expected to be implemented within 5 years. Stakeholders settled on the following project selection criteria:

- Ability to address the Primary Contact use impairment in Ferson Creek,[145]
- Ability to address Aquatic Life and fish consumption impairments in downstream segment of the Fox River,
- Ability to support Ferson-Otter Creek Watershed Goals, and
- Lead implementer, local, and municipal support.

Given the uncertainty regarding sources of fecal coliform, there was much discussion on how these short-term projects might affect fecal coliform reductions. Outside of the pollutant load reductions calculated for each short-term project, additional recommendations that address the fecal coliform are discussed in Chapters 5 and 6. Water quality benefits can also be achieved by addressing related impairments in the Fox River. The downstream segment of the Fox River was assessed and determined to be in nonsupport for Aquatic Life and fish consumption. The causes of impairment are dissolved oxygen, mercury, polychlorinated biphenyls, alterations in stream-side or littoral vegetative covers and other flow regime alterations. The sources of impairment were identified as streambank modifications/destabilization, impacts from hydrostructure flow regulation/modification, atmospheric deposition-toxics and unknown sources.

As previously noted, the Ferson-Otter Creek Watershed is within the Lower Fox River Basin. The watershed-based plan will need to specifically address the fecal coliform impairment. In addition, the plan can potentially positively impact some of the Fox River water quality concerns given that the Ferson-Otter Creek is a major tributary. The concerns include nutrients (phosphorus and nitrogen) and sediment or total suspended solids. Sources of these pollutants include both agricultural and urban runoff. Many of these sources of impairment are addressed in the plan's short-term projects.

Obtaining lead implementer, local, and municipal support for a project helps ensure successful implementation. Support can include grant match funds and partnerships. Local support can include non-profits, homeowners associations, individual private homeowners, etc. This criterion was added because stakeholders realized without support, project implementation is unlikely.

[145] The limited data and knowledge about exact locations and sources of impairment was understood and taken into consideration.

A total of 21 short-term projects were selected for the Ferson-Otter Creek Watershed Plan. Table 22 provides a summary of those 21 projects organized by IEPA categories. More detailed short-term project descriptions are provided in the remainder of this chapter.

Table 22. Ferson-Otter Creek Watershed short-term projects, organized by IEPA project categories

IEPA CATEGORY	NUMBER OF PROJECTS	GENERAL DESCRIPTION
Hydrologic	15	Stream channel and stream corridor restoration projects to stabilize banks from erosion.
Other	2	Various improved management practices to reduce nutrient runoff and accumulation and improve habitat foraquatic life.
Urban	4	Retrofits to existing stormwater management infrastructure to address pollutant loading and increased runoff volume in developed areas.
Total	**21**	

Additionally Figure 40 displays the location of each short-term project within the watershed. The projects are mainly located in the eastern half of the watershed.

After the short-term projects were selected, CMAP contracted with Hey and Associates to calculate pollutant load reduction and cost estimates for each project. Sediment, total suspended solids, phosphorus, fecal coliform, and nitrogen reductions were considered in the estimates. Table 23 summarizes expected pollutant load reductions organized by IEPA project categories.

Lastly, costs for each short-term project were calculated and are also displayed in Table 23. Cost estimates include construction, contingency, and design and permitting. **However it should be noted that some lead implementers will need to further develop project proposals. This will likely affect and potentially increase the estimated project costs due to a number of reasons including unforeseen variables such as site conditions, implementation timelines, etc.** Funding for these short-term projects will likely come from state and federal grants and local sources.

Figure 40. **Short-term project recommendation locations**

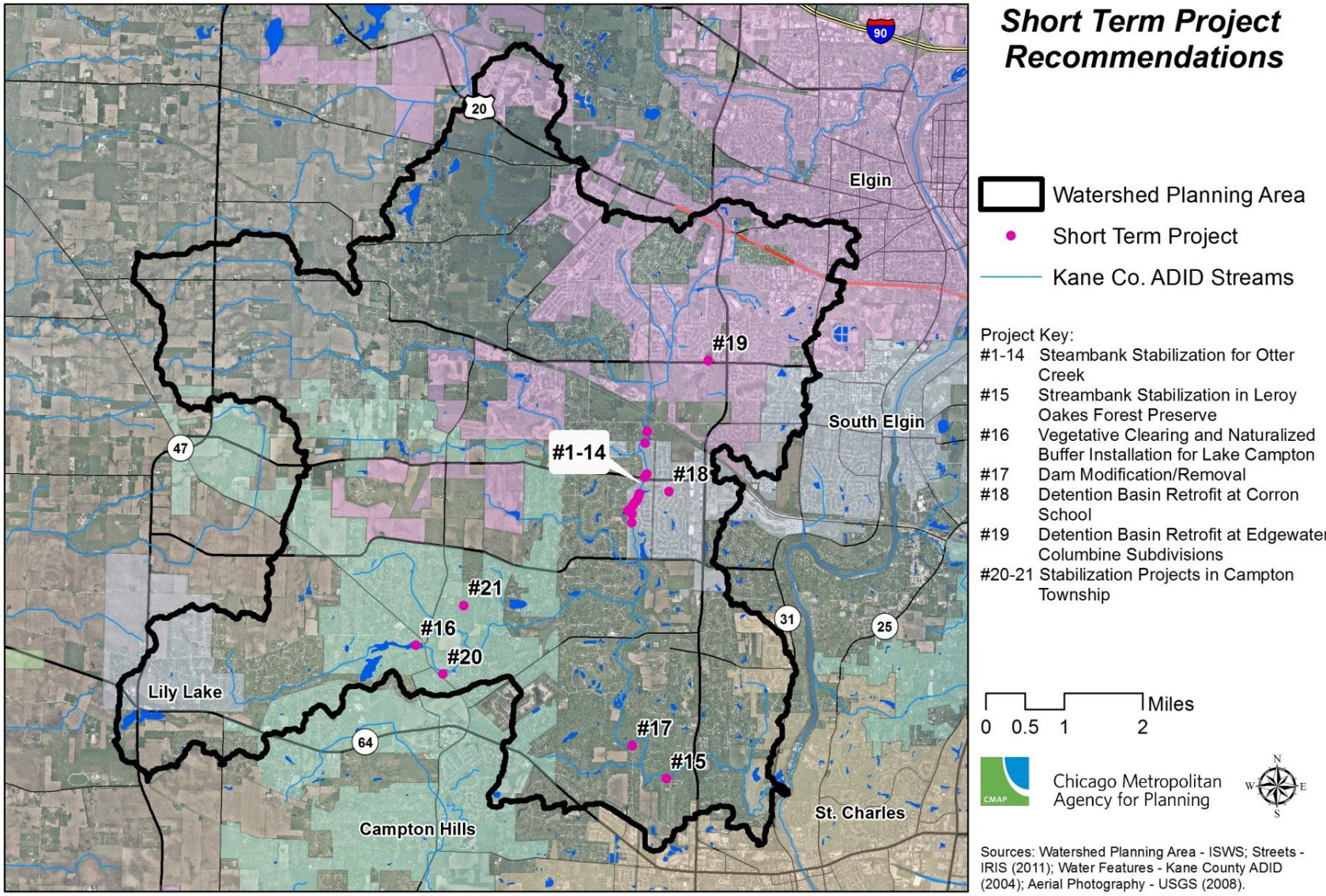


Table 23. Summary of short-term projects

PROJECT #	IEPA CATEGORY	BEST MANAGEMENT PRACTICE	LEAD IMPLIMENTER	UNIT	AMOUNT	COST	SEDIMENT (TONS/YR)	TSS (LBS/YR)	PHOSPHORUS (LBS/YR)	FECAL COLIFORM (COUNTS)	NITROGEN (LBS/YR)
1	Hydrologic	Regrade and Gabion, Station 7870-7990	South Elgin	feet	120	$69,120	3.82	—	6.12	—	15.29
2	Hydrologic	Stream bank armoring, Station 1860-2000	South Elgin	feet	140	$45,360	3.72	—	5.95	—	14.86
3	Hydrologic	Regrade w/Stone Toe and Gabion, Station 4920-5170	South Elgin	feet	250	$144,000	7.96	—	12.74	—	31.85
4	Hydrologic	Regrade with Stone Toe, Station 5280-5350	South Elgin	feet	70	$17,640	1.11	—	1.78	—	4.46
5	Hydrologic	Vegetative Maintenance, Station 7140-7290	South Elgin	feet	150	$27,000	4.78	—	7.64	—	19.11
6	Hydrologic	Gabion, Station 7380-7470	South Elgin	feet	90	$38,880	2.87	—	4.59	—	11.47
7	Hydrologic	Regrade and Gabion, Station 8150-8570	South Elgin	feet	420	$136,080	13.37	—	21.41	—	53.51
8	Hydrologic	Gabion, Station 8670-8980	South Elgin	feet	310	$133,920	8.23	—	13.17	—	32.91
9	Hydrologic	Regrade with Stone Toe, Station 6350-6490	South Elgin	feet	140	$35,280	2.23	—	3.57	—	8.92
10	Hydrologic	Regrade with Stone Toe, Gabion, and Vegetative Maintenance, Station 6620-6740	South Elgin	feet	120	$90,720	2.55	—	4.08	—	10.19
11	Hydrologic	Regrade with Stone Toe and Gabion, Station 6820-6870	South Elgin	feet	50	$28,800	1.59	—	2.55	—	6.37
12	Hydrologic	Gabion, Station 6960-7120	South Elgin	feet	160	$69,120	6.79	—	10.87	—	27.18
13	Hydrologic	Regrade with Stone Toe, Station 1190-1290	South Elgin	feet	100	$25,200	1.59	—	2.55	—	6.37
14	Hydrologic	Gabion, Station 7570-7720	South Elgin	feet	150	$64,800	4.78	—	7.64	—	19.11
15	Hydrologic	Streambank Stabilization Project; Leroy Oakes FP; Severe Erosion (> 15 FT). Major bank stabilization to address sediment/TSS release into the stream. Channel stabilization also to be included.	Kane County Forest Preserve District	feet	450	$339,109	42.99	—	68.80	—	172.00
16	Other	Clearing of woody tree and brush species for installation of lake shoreline buffer around Lake Campton, 20 foot buffer approximates to +/- 3.5 acres.	Lake Campton Property Owners Assocation	feet	7,700	$60,663	—	421	3.29	250,000,000,000	5.33
17	Other	Working with private landowner to remove or modify existing dam north end of Knoll Creek West Subdivision, St. Charles Township, unincorporated Kane County.	Kane County	feet	n/a	$244,058	---------- No reductions in sediment or nutrient loading ----------				
18	Urban	Retrofit existing dry-bottom detention basin with native vegetation for increased filtering/pollutant removal, Corron School.	South Elgin	acre	3.11	$16,286	—	—	—	—	—
19	Urban	Edgewater/Columbine Subdivision naturalized basin with combined drainage.	Elgin	acre	4.7	$76,542	—	1,473.71	5.79	1,220,000,000,000	1,123.01
20	Urban	Stabilize eroded storm drainage channel which drains directly into Ferson Creek (banks > 5 ft); Drains Burlington Rd runoff onto Campton Township Gray Willows open space property.	Campton Township	feet	200	$50,000	5.34	—	8.86	—	2.21
21	Urban	Stabilize eroded swale on Campton Township Gray Willows Property. Erosion > 4 feet in places; drains runoff from Fair Oaks Drive.	Campton Township	feet	450	$79,000	8.49	—	13.59	—	33.97
	TOTALS					$1,791,578	122.00	1,895	205.00	1,470,000,000,000	1,598.00

4.2.1 Hydrologic Projects

#1-14 Steambank Stabilization for Otter Creek

This streambank stabilization project consists of 15 separate project sites within South Elgin.[146] As the lead implementer, South Elgin finds it appropriate to list each project site separately. Collectively these sites improve the stability of 3,360 feet of Otter Creek streambank. The project sites vary in both slope and severity of erosion. Of particular concern is the village's trailway infrastructure (bike path) that is threatened by stream erosion seen in Figure 41. The main water quality benefit associated with the implementation of these projects is the reduction of nonpoint-source pollutants including sediment generated from erosion and in-stream sediment movement.

Figure 41. **Station 1860-2000**

[146] One of these projects lists a private landowner as the lead implementer; however the land is located within South Elgin. South Elgin will work with the local landowner to establish a partnership for implementation.

#15 Streambank Stabilization in Leroy Oakes Forest Preserve

This project site is located in the Leroy Oakes Forest Preserve. The site has severe erosion (> 15 feet) issues as seen below in Figure 42. Major bank stabilization best management practices are needed to address and reduce sediment and total suspended solids release into the stream. This reduction is the main water quality benefit associated with the project. Channel stabilization is also needed. The site also contains a substantial public safety concern due to drop offs in certain locations that reach about 24 feet in height. Kane County Forest Preserve District has been identified as the lead implementer for this project.

Figure 42. **Streambank in Leroy Oakes Forest Preserve**

4.2.2 Other Projects

#16 Vegetative Clearing and Naturalized Buffer Installation for Lake Campton

This project would entail the removal of existing woody tree and brush species from the shoreline of Lake Campton, followed by the establishment of a naturalized buffer. Both the clearing and the buffer installation (20 feet) are needed for 7,700 linear feet of shoreline shown in Figure 43. Lake Campton is privately owned and the Lake Campton Property Owners Association (LCPOA) has been identified as the lead implementer. The main water quality benefit of this project is the improvement in the quality and the reduction in quantity of stormwater that enters Lake Campton. Concentrations of phosphorus and nitrogen are the main concern to LCPOA. As part of the project, the LCPOA would also like to include an educational component in which the Association or another appropriate partner would provide educational materials to homeowners on the importance of naturalized buffers, proper working septic systems and proper use of lawn fertilizers with phosphorus.

Figure 43. **Lake Campton**

#17 Dam Modification/Removal

As lead implementer, Kane County will work with the private landowner to remove or modify the existing dam at the north end of the Knoll Creek West Subdivision located in St. Charles Township (unincorporated Kane County). The main water quality benefits associated with this project's implementation include: decreased water temperature, increased dissolved oxygen, and minimized sedimentation behind the dam (if the dam were removed). Additional benefits would be increased fish and other invertebrates' passage as well as increased connection of the Ferson-Otter Creek Watershed with the Fox River.

4.2.3 Urban Projects

#18 Detention Basin Retrofit at Corron School

This project entails the retrofit of a dry-bottom detention basin to native vegetation. South Elgin is the lead implementer for this project. Partnerships with the school district should be established and utilized. The main water quality benefit for this project is increased filtration of stormwater and pollutant removal.

#19 Detention Basin Retrofit at Edgewater/Columbine Subdivisions

Within the City of Elgin, separate detention/retention facilities of two subdivisions abut land within a third subdivision over which any collected but non-absorbed water then conveys (Figure 44). The City is responsible for the maintenance of one of the detention/retention facilities (North Columbine), and two different homeowners associations are responsible for the other detention/retention facility (Woodbridge) and the water conveyance area (Edgewater). Currently, the city is providing technical assistance to the Woodbridge Homeowner's Association (HOA) as that HOA seeks funding to naturalize their facility and generally implement other best management practices versus the original design. Their specific area consists of approximately 2.6 acres. Long term and depending upon funding, the city would like to naturalize the facility for which it is responsible, and the intent of such an effort would be that the plantings of all three areas make them appear as one larger area. The area for which the city is responsible consists of approximately 2.1 acres. The immediate area within the Edgewater subdivision (over which water conveys) is approximately 1.8 acres, but it is already naturalized. Long term plans could include a bike trail through the areas and educational opportunities, such as trail markers that explain the benefits of the larger, more-unified ecosystem, with before and after photographs. Elgin has been identified as the lead implementer for this project and will work in partnership with the appropriate homeowners associations on implementation.

The main water quality benefits of this project would result from the replacement of the basin's turf grass with native plants. Native plantings are a more sustainable alternative because they are drought resistant, promote infiltration and biodiversity, and require little maintenance. Native plantings help slow down flows which allow some of the pollutants in the water to settle out and be absorbed by the plants and microorganisms in the soil of the basin floor. With dense root systems making up two thirds of their biomass, native plantings enrich the soil with their organic matter. They also have high water-holding capacities and draw water deep into the earth, replenishing the shallow aquifer, because of the great depths their roots reach. Native plants support biodiversity by providing food and habitats for native birds and insects.

Figure 44. **Edgewater/Columbine Subdivisions**

#20-21 Stabilization Projects in Campton Township

Two separate but related stabilization locations have been identified as short-term projects. The first project entails the stabilization of an eroded storm drainage channel that not only drains directly into Ferson Creek but also drains Burlington Road runoff onto Campton Township Gray Willows Farm open space property (Figure 45). The second project entails the stabilization of an eroded swale that drains runoff from Fair Oaks Drive onto Campton Township Gray Willows Farm property located at 5N949 Corron Road, St. Charles, Illinois (Figure 46). Campton Township has been identified as the lead implementer for both of these projects. The main water quality benefit is the reduction in the amount of stormwater runoff and associated pollutants on the Gray Willows Farm property.

Figure 45. **Burlington Road Gully**

Figure 46. **Fair Oaks Drive Gully**

4.3 LONG-TERM AND ADDITIONAL PROJECTS

After the short-term projects were identified from all of the submissions, the remaining projects were classified as long-term, expecting implementation in 5-10 years from plan completion. These projects are located in Appendix A. Please note that the long- and short-term projects outlined in the plan do not represent all the opportunities for water quality improvement projects in the Ferson-Otter Creek Watershed. As more data and resources become available, additional projects that are not currently listed in the watershed plan may be considered by the Ferson-Otter Creek Watershed Coalition. It will be important that these additional projects directly correspond and reflect the plan's goals as stated in Chapter 1 of this plan.

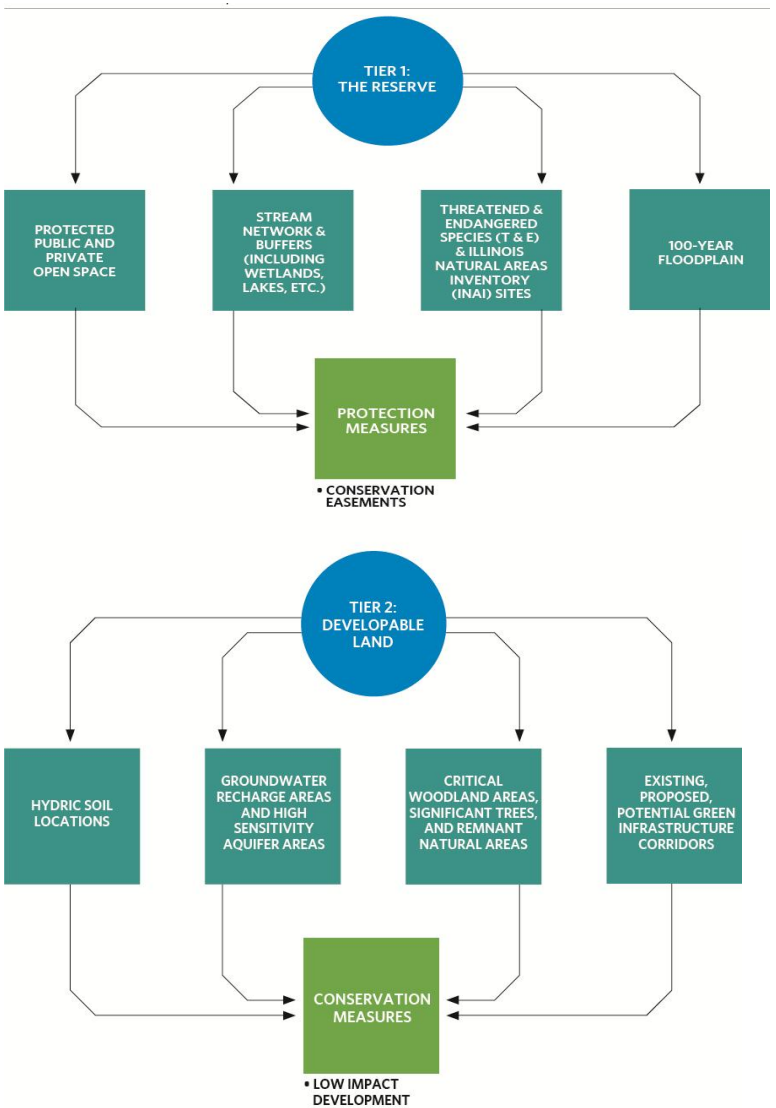
5. WATER RESOURCE POLICY RECOMMENDATIONS

In addition to on-the-ground project recommendations, water quality improvements in the watershed can also be made through policy recommendations. This chapter outlines various policy considerations including a green infrastructure framework, groundwater protection policies, agricultural best management practices, updates to codes and ordinances, fecal coliform related policies, and more.

5.1 GREEN INFRASTRUCTURE

Green infrastructure can be described as an interconnected system of open space and natural areas that provides habitat for wildlife, flood protection, recreational opportunities, and water quality protection including groundwater recharge.[147] Green infrastructure functions much like gray infrastructure except instead of connecting roadways and streets, green infrastructure connects open space and natural areas. Open space and natural areas include publicly owned land such as park district property and forest preserves, privately owned land maintained by homeowners associations (HOAs), floodplains, and other areas. The components of green infrastructure can be organized in many ways. For this plan the components are organized into two tiers to create the Green Infrastructure Framework shown in Figure 47. The purpose of these tiers is not to prioritize open space and natural areas, but rather to group certain characteristics, functions, and areas together so that similar policy recommendations can be applied. Figure 48 displays Tier 1 and Tier 2 land areas within the Ferson-Otter Creek Watershed.

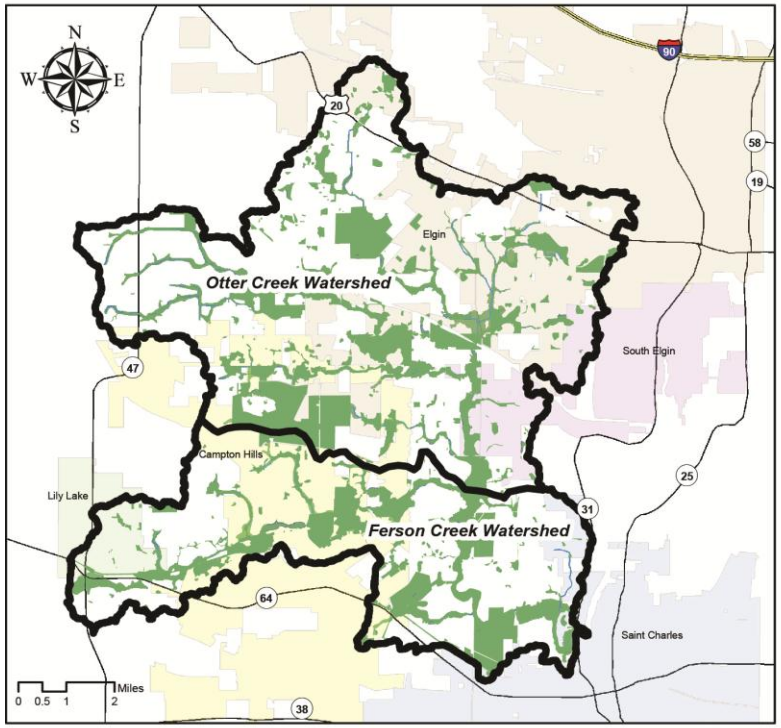
Figure 47. **Green infrastructure Framework**



[147] "Managing Wet Weather with Green Infrastructure," U.S. EPA, last modified January 4, 2011, accessed November 9, 2011, http://cfpub.epa.gov/npdes/home.cfm?program_id=298.

Figure 48. **Tier 1 and Tier 2 land areas**

Tier 1: The Reserve



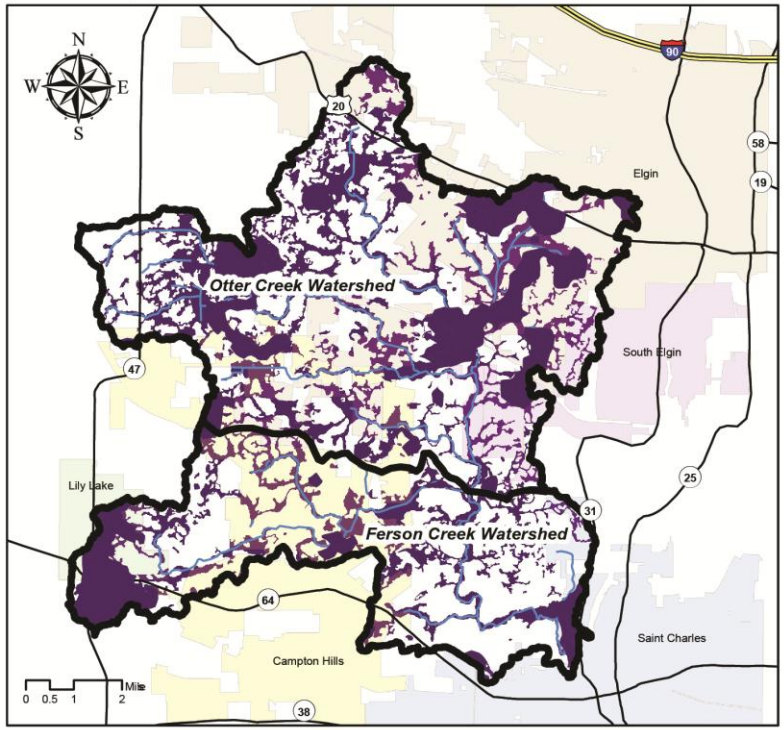
Legend

- Watershed Planning Area
- Tier 1
- Campton Hills
- Elgin
- Lily Lake
- Saint Charles
- South Elgin
- ADID Streams
- Interstate
- US/State Hwy

Chicago Metropolitan Agency for Planning

Kane County Forest Preserve - FPDKC (2009); Campton Township, Other Public Open Space, Private Open Space, South Elgin Open Space and St. Charles Park District - Campton Township Green Infrastructure Plan (2010), Elgin Open Space (2011), Watershed Planning Area, Illinois State Water Survey (2005), Kane County, I Advanced Identification Study (ADID) (2004), Major Roads, ESRI (2000), Municipal Boundaries, CMAP (2010).

Tier 2: Developable Land



Legend

- Watershed Planning Area
- Tier 2
- Campton Hills
- Elgin
- Lily Lake
- Saint Charles
- South Elgin
- ADID Streams
- Interstate
- US/State Hwy

Chicago Metropolitan Agency for Planning

Watershed Planning Area, Illinois State Water Survey (2005), Kane County Advanced Identification Study (ADID)(2004); Major Roads, ESRI (2000); Municipal Boundaries, CMAP (2010); USGS Campton Township GroundwaterStudy (2006); Kane County, Aquifer Sensitivity (2007); Soil Survey GeographicDatabase-National Resource Conservation Service (2010).

5.2.1 Tier 1: The Reserve

Tier 1 or the Reserve includes protected public and private open space, stream network and buffers, threatened and endangered species sites, Illinois Natural Areas Inventory Sites (INAI) and the 100-year floodplain (Figure 48).[148] Land identified in the Reserve either is currently protected or should be protected now and in the future.

Recommendation: All Tier 1 landowners should apply or maintain protective measures including conservation easements (purchased or donated).

Protected means either no land use change or limited land use change/activity depending on the particular component. Conservation of these areas will help to protect water quality and wetlands and protect against flooding. Other benefits include wildlife habitat protection including habitat connectedness and connectivity.

Protected Public and Private Open Space

This component includes current and future park district and forest preserve land, privately owned land maintained by homeowners associations (HOAs), and other open space/natural areas. The Tier 1 maps shows protected land from Campton Township, Kane County, St. Charles Park District, South Elgin, Elgin, and multiple homeowners associations. Open space provides flood storage, protects wetlands, provides habitat and connectivity for wildlife, and minimizes runoff that in turn reduces nonpoint source pollution.

[148] The floodplain includes all floodways.

Stream Network and Buffers

The stream network component includes the streams themselves, high habitat value and high functional value wetlands[149] and lakes. This plan recommends 100 foot buffers around the stream network with the first 60 feet closest to the network utilizing native plantings and the remaining 40 reserved for lower impact use, such as passive recreation (e.g., biking, jogging, etc.) and uninhabitable structures such as toolsheds.[150] This recommendation is beyond what Kane County requires, a buffer between 15-50 feet depending on the circumstances.[151] Protecting the stream network through buffers, especially with native planting, prevents pollutants from reaching the stream network in the first place. Additionally, buffers slow down the movement of water flowing into the stream network to help decrease erosion and sediment transport. Furthermore it is recommended that remaining wetlands within the watershed be restored where appropriate.

[149] As defined in NIPC, U.S. Fish and Wildlife Service and U.S. EPA. *Advanced Identification (ADID) Study, Kane County, Illinois Final Report*. Chicago, IL: USACE Chicago District, August 2004. http://www.lrc.usace.army.mil/co-r/pdf/KaneADIDReport.pdf (accessed November 7, 2011).

[150] Buffer recommendations support previous planning efforts (i.e. Village of Campton Hills Comprehensive Plan and Code Assessment) as well as CMAP's Model Stream and Wetland Protection Ordinance, October 1999 (http://www.cmap.illinois.gov/water-quality/about-fpa-requests). Furthermore, it should be noted that ideal buffer width can vary depending on the specific site conditions, desired buffer function, and the landowner's objectives. In the case where the site is also part of the 100-year floodplain, buffer width should reflect the larger of the two widths. For more information on buffer widths see: USDA NRCS. *Where the Land and Water Meet, A Guide for Protection and Restoration of Riparian areas*. Tolland, CT: USDA, September, 2003.

[151] *Protection of Special Management Areas*. *Kane County*, *Illinois*, *County Code*, Chapter 9, Article IV (2001). http://www.sterlingcodifiers.com/IL/Kane%20County/index.htm (accessed November 9, 2011).

Threatened and Endangered Species (T & E sites)

There are 53 species in Kane County that are either classified as state threatened or endangered.[152] "Threatened" is defined as an animal or plant likely to become endangered within the foreseeable future throughout all or a significant portion of its range. "Endangered" is defined as an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range.[153] Within the watershed, there are several areas identified by IDNR that possibly contain threatened or endangered species.[154] Within these areas, 11 species have been identified and are summarized in Table 24. These areas are not mapped in the plan.

Table 24. Status of threatened and endangered species

COMMON NAME	SCIENTIFIC NAME	NAME CATEGORY	STATE PROTECTION STATUS
White Lady's Slipper	*Cypripedium candidum*	Vascular Plant	**Threatened**
Spike	*Elliptio dilatata*	Vascular Animal	**Threatened**
Least Bittern	*Ixobrychus exilis*	Vascular Animal	**Threatened**
Kittentails	*Besseya bullii*	Vascular Plant	**Threatened**
American Burreed	*Sparganium americanum*	Vascular Plant	**Endangered**
Spotted Pondweed	*Potamogeton pulcher*	Vascular Plant	**Endangered**
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	Vascular Animal	**Endangered**
Common Moorhen	*Gallinula chloropus*	Vascular Animal	**Endangered**
Royal Catchfly	*Silene regia*	Vascular Plant	**Endangered**
Blanding's Turtle	*Emydoidea blandingii*	Vascular Animal	**Endangered**
Prairie Moonwort	*Botrychium campestre*	Vascular Plant	**Endangered**
Speckled Alder	*Alnus incana ssp. Rugosa*	Vascular Plant	**Endangered**

[152] IDNR. *Illinois Natural Heritage Database: Illinois Threatened and Endangered Species*. Springfield, IL: IDNR, September 12, 2011. http://www.dnr.state.il.us/conservation/naturalheritage/pdfs/et_by_county.pdf (accessed November 8, 2011).
[153] "Endangered Species Glossary," U.S. Fish & Wildlife Service, last modified October 12, 2011, accessed November 8, 2011, http://www.fws.gov/midwest/endangered/glossary/index.html.
[154] Exact location information is not available for this watershed planning document.

Illinois Natural Areas Inventory (INAI) Sites

The first Illinois Natural Areas Inventory was conducted from 1975-1978 by the University of Illinois. Since then IDNR has maintained and updated the inventory. The INAI includes sites that contain high quality natural areas, habitats of endangered species, and other significant natural features. INAI information is used to "guide and support land acquisition and protection programs by all levels of government as well as by private landowners and conservation organizations."[155] There are 5 INAI sites within the Ferson-Otter Creek Watershed area: Burr Woods Marsh, Lily Lake Marsh, Horlock Hill (previously Murray Prairie), Meissner Prairie (previously Russell Prairie), and Ferson Creek's Sedge Meadow. Together these sites cover 191 acres of the watershed.

100-year Floodplain

The 100-year floodplain was discussed earlier in the resource inventory chapter and is included as a Tier 1 Green Infrastructure Framework component because of the beneficial functions floodplains provide to a watershed.[156] An undeveloped floodplain helps contain flooding, aids in the absorption and filtration of water, and helps to minimize erosion and siltation in the waterway. Native plants can also increase the functionality of the floodplain.[157]

[155] "Illinois Natural Areas Inventory," Illinois Natural History Survey, accessed November 8, 2011, http://www.inhs.illinois.edu/research/inai/.
[156] *Stormwater Management. Kane County, Illinois, County Code*, Chapter 9. http://www.sterlingcodifiers.com/IL/Kane%20County/index.htm (accessed December 19, 2011). It should be noted that Kane County's Stormwater Ordinance addresses floodplain requirements that are applicable to all of the county's municipalities.
[157] NIPC and Chicago Wilderness. *Conservation Design Resource Manual*, by Lori Heringa, Sarah Nerenburg, and Kathleen Odell. Chicago, IL: NIPC and Chicago Wilderness, 2003.

5.2.2 Tier 2: Developable Land

Tier 2 includes developable land that falls in one or more of the following components: hydric soil locations, groundwater recharge areas, high sensitivity aquifer areas, critical woodland areas, significant trees, remnant natural areas, and existing, proposed, and potential greenways and trails (green infrastructure corridors; Figure 48). Currently, land in Tier 2 is not formally protected but contains characteristics that are valuable to maintaining and protecting water quality.

Recommendation: All Tier 2 landowners should incorporate low impact development (LID) best management practices when and if the land is developed.

LID is a land development approach to managing stormwater that includes such practices as permeable pavement, native landscaping, and rain water harvesting to reduce runoff and pollutant loadings by managing stormwater as close to the source as possible. As stated earlier in the plan, urban runoff/storm sewers is an identified source of the fecal coliform impairment facing Ferson Creek. Recommending LID practices on developable land in Tier 2 is a proactive measure that reduces the future impact of built areas while maintaining the natural movement of water throughout the watershed.

Perhaps the most distinct difference between LID practices and traditional stormwater systems (sewers, pipes, gutters, etc.) is the view of stormwater as a resource rather than a waste product. LID practices can be used throughout the watershed from high density urban settings to low density areas and across a variety of land uses. Even though this section focuses on developable land, LID can also be used to retrofit existing sites as well as complete redevelopment sites.[158]

It should be noted that there are other similar development/stormwater approaches with similar goals of LID that could also be applied to land within Tier 2 such as Conservation Design and Light Imprint design. Conservation Design is a density neutral design strategy that incorporates similar stormwater treatments as LID while focusing on physical site design in which development is "clustered" to allow for a larger contiguous common open space.[159] Light Imprint is a design approach that focuses on creating compact, walkable, and mixed-use neighborhoods while incorporating stormwater management and natural drainage.[160]

Hydric Soil Locations

As stated in the resource inventory, hydric soils cover nearly 30% of the watershed. Hydric soils were developed under sufficiently wet conditions and this condition should be considered when planning for development and land use change. These soils provide habitat for hydrophytic vegetation and other plant and animal species. For this reason, hydric soils are included in Tier 2.

[158] "Low Impact Development," U.S. EPA, last modified March 18, 2011, accessed November 9, 2011, http://www.epa.gov/owow/NPS/lid/. For more information, see also "Stormwater Management," Center for Watershed Protection, accessed November 9, 2011, http://www.cwp.org/your-watershed-101/stormwater-management.html.

[159] CMAP. *Conservation Design Strategy Report*. Chicago, IL: CMAP, August 2008. http://www.cmap.illinois.gov/strategy-papers/conservation-design (accessed November 8, 2011).

[160] "Light Imprint New Urbanism," Congress for New Urbanism, accessed November 9, 2011, http://www.cnu.org/node/1209.

Groundwater Recharge Areas and High Sensitivity Aquifer Areas

Recharge areas for this component include the USGS recharge areas discussed in the Resource Inventory as well as fen recharge areas.[161] Recharge areas are important for water quality as well as water supply as they are one of the primary points where water enters the ground to replenish the aquifers.[162] As the majority of the watershed's communities rely on groundwater, Tier 2 also includes the High Sensitivity Aquifer Areas (A1-A4) to expand the recommended coverage of conservation measures in the Ferson-Otter Creek Watershed.[163]

Critical Woodland Areas, Significant Trees, and Remnant Natural Areas

The purpose of this component is to minimize the effects of development on high value natural areas. Critical woodland areas, significant trees, and remnant natural areas are considered high value natural areas in the Ferson-Otter Creek Watershed. These areas are defined in Table 25.

Table 25. Definitions

COMPONENT	DEFINITION
Critical woodland areas	Contiguous wooded areas larger than 4 acres on undeveloped parcels which contained woodlands in the same location in 1939 (verified through inspection of 1939 aerial photos in GIS.)[1]
Significant trees	Trees with 12" diameter trunks at 4' above grade except those determined to be hazardous or nuisance species and where it is agreed that the density of trees is greater than desirable for proper forest management.[2]
Remnant natural areas	Areas with a high degree of native biodiversity, i.e. native floristic quality index of 25 or greater and a native Mean C value of 3.2 or greater.[3]

Sources:
1 Trotter and Associates, Inc. Green Infrastructure in the Village of Campton Hills. Campton Hills, IL: Village of Campton Hills, August 2010. http://www.villageofcamptonhills.org/Joint%20ERMC/VCH_GreenINF_RptFINAL_all_maps.pdf (accessed November 9, 2011). Data waby Kane County GIS Technologies Department.
2 Conservation Design Forum. Comprehensive Plan and Code Assessment. Campton Hills, IL: Village of Campton Hills, April 2010.
3 Ibid.

Existing, proposed, and potential green infrastructure corridors

This component includes trails, greenways, corridors, and other areas of land that connect open space parcels. Not all of these areas were mapped for the plan, but they are included in Tier 2 because they are valuable open space that should have LID practices applied if and when these areas are developed.

5.2 ADDITIONAL BEST MANAGEMENT PRACTICES

Existing developments could benefit from retrofit opportunities. Several naturalized detention basin retrofit projects are recommended in Chapter 4. Proper maintenance of detention basins is important to ensure their functionality.

[161] Christopher B. Burke Engineering West, Ltd. *Kane County Fen Identification and Recharge Area Mapping Project Final Report*. Batavia, IL: Kane County Department of Environmental Management, September 2004. http://www.co.kane.il.us/kcstorm/fen/final_report.pdf (accessed October 15, 2011).

[162] It should be noted that other groundwater recharge datasets exist that can be also be used for planning purposes within Kane County, specifically the following study should be considered: ISGS. "Kane County Water Resources Investigations: Final Report on Geologic Investigations," by William S. Dey, Alec M. Davis, B. Brandon Curry, Donald A. Keefer and Curt C. Abert. *ISGS Open File Series,* 2007-7. Champaign, IL: ISGS, 2007. http://library.isgs.uiuc.edu/Pubs/pdfs/ofs/2007/ofs2007-07.pdf (accessed November 3, 2011).

[163] As defined in ISGS. "Kane County Water Resources Investigations: Final Report on Geologic Investigations," by William S. Dey, Alec M. Davis, B. Brandon Curry, Donald A. Keefer and Curt C. Abert. *ISGS Open File Series,* 2007-7. Champaign, IL: ISGS, 2007. http://library.isgs.uiuc.edu/Pubs/pdfs/ofs/2007/ofs2007-07.pdf (accessed November 3, 2011). It should be noted that aquifer sensitivity is classified from Map Unit A to Map Unit E in order of decreasing sensitivity to aquifers becoming contaminated. For this plan, the stakeholders agreed to include only Map Unit A category (High Potential for Aquifer Contamination) in Tier 2. However subsequent categories such as Map Unit B (Moderately High Potential for Aquifer Contamination) should be considered for planning purposes when appropriate.

The Center for Watershed Protection offers a variety of resources that articulate stormwater retrofit opportunities.[164] In addition, USEPA offers information on stormwater management best practices.[165]

Recommendation: Communities within the watershed should consult the established water quality best management practice resources such as from the Center for Watershed Protection and the USEPA before any retrofit activity.

5.3 GROUNDWATER PROTECTION

Regional water supply planning, which got underway in 2006, culminated with the publication of *Water 2050: Northeastern Illinois Water Supply/Demand Plan* in March 2010.[166] Water 2050 is informed by the most detailed water demand study ever conducted for the region.[167] Additionally, the work of the Illinois State Water Survey (ISWS) quantified the impacts of regional water demand scenarios on the deep-bedrock aquifer underlying the eleven-county planning area, shallow aquifer system beneath the Fox River Basin, and the Fox River itself.

With regional population projected to grow 38% by 2050, demand scenarios indicate growth in water use ranging from 36 – 64% under business-as-usual scenarios.[168] Given the new and enhanced understanding of regional water supply sources and their relatively finite or constrained nature, such growth in water demand is not thought to be sustainable. For example, at current withdrawal rates, the deep-bedrock aquifer is being mined. And overpumping of the shallow aquifer is beginning to capture streamflow where it has been studied in the Fox River Basin; a phenomenon that is projected to get worse as population and demand increases through time. In order to avoid supply / demand imbalances and offer some protection to other users of water (e.g., aquatic ecosystems), implementing *Water 2050* has the potential to keep water demand relatively flat – 7% growth – as compared to projected population growth.[169]

On the groundwater quality side of the resource management challenge, IEPA has concluded that the state's groundwater quality is being degraded.[170] In concert with that conclusion and as discussed in the water quality chapter, chloride concentrations are trending upwards in shallow wells throughout the six-county region. Thus, there are ample reasons for groundwater-dependent communities and private-well owners to work collaboratively and recommend that measures be implemented to improve protection (i.e., quality) and conservation (i.e., quantity) of local groundwater resources.

At the county level, the Kane County 2040 Land Resource Management Plan identified providing a sustainable water supply as one of the three major challenges facing the county through the year

[164] Most recently summarized in Center for Watershed Protection. "Urban Stormwater Retrofit Practices." *Urban Subwatershed Restoration Manual*, Manual 3. Ellicott City, MD: Center for Watershed Protection, August 2007. http://www.cwp.org/categoryblog/92-urban-subwatershed-restoration-manual-series.html (accessed November 7, 2011).

[165] "Stormwater Management Best Practices," U.S. EPA, last modified August 16, 2011, accessed November 9, 2011, http://www.epa.gov/oaintrnt/stormwater/best_practices.htm.

[166] CMAP. *Northeastern Illinois Regional Water Supply/Demand Plan*. Chicago, IL: CMAP, March 2010. http://www.cmap.illinois.gov/water-2050 (accessed November 8, 2011).

[167] Southern Illinois University, Department of Geography and Environmental Resources. *Regional Water Demand Scenarios for Northeastern Illinois: 2005-2050*, by B. Dziegielewski and F.J. Chowdhury. Chicago, IL: CMAP, 2008.

[168] Ibid.

[169] Ibid. 166, p. 90. For example, although population increased in the City of Seattle, WA from 1990 to 2004, water demand during the same period still decreased.

[170] IEPA. *Illinois Integrated Water Quality Report and Section 303(d) List DRAFT, Volume II: Groundwater*. Springfield, IL: IEPA, 2010. http://www.epa.state.il.us/water/tmdl/303d-list.html (accessed September 15, 2011).

2040. The population of Kane County is projected to increase more than 55 percent from the year 2010 population of 515,000 to over 800,000 by the year 2040. Lake Michigan water will not be available to Kane County due to legal and economic constraints. That leaves the shallow aquifer, deep aquifer and the Fox River as the future water sources for the county. Previous scientific studies offered only a qualitative understanding of the geology and hydrogeology of the county and scattered observations that were inadequate for water supply planning. Shallow aquifer withdrawals were close to exceeding sustainable yields in the eastern portions of the county and deep aquifer yields have long exceeded the sustainable supply in the region. The limitations of inland surface water supplies were also in question.

Therefore, Kane County entered into a contract in 2002 with the Illinois State Water Survey and Illinois State Geological Survey (ISGS) to conduct scientific investigations and prepare computer models and reports on the future availability of drinking water for Kane County. Preliminary results were completed by 2007, and the final reports and models were delivered in 2009.[171]

A series of surface water, geology and groundwater investigations were conducted, including streamflow analysis and modeling, mapping of groundwater levels, mapping and modeling of near-surface geology, analysis and trends in deep groundwater quality, assessment of shallow groundwater quantity, and computer modeling of groundwater flow.

The results are intended to allow the 30 municipalities and other water providers within the County to collectively plan and manage their future drinking water supplies based on a level of science unsurpassed by any other county in the State of Illinois. To that end, the County joined the five-county Northwest Water Planning Alliance (NWPA) in September 2010 to continue the process of cooperative planning for future water supplies, not only with the municipalities and water providers within the county, but also with neighboring counties and municipalities.

5.3.1 Groundwater Protection Ordinance

At the local level, the city of St. Charles has a groundwater protection ordinance that establishes regulations for land uses within Groundwater Protection Areas (GWPAs). These GWPAs are defined as portions of an aquifer within the minimum or maximum setback zones for existing and permitted water supply or within the 5- year capture zone of a well or well field.[172]

Recommendation: Communities within the watershed that have not already done so should consider adopting Groundwater Protection ordinances.

In addition to groundwater protection ordinances, Wellhead Protection Programs, sensible salting, demand-initiated water softeners, and street sweeping are other recommended plan strategies for groundwater protection.

5.3.2 Wellhead Protection Programs

Under the Safe Drinking Water Act Amendments of 1986, Wellhead Protection Program(WHPP)s are voluntary on the local level, but are a valuable supplement to existing state groundwater protection programs. A WHPP, once implemented, reduces the susceptibility of wells to contaminants.

[171] "Water Resources Investigations for Kane County, Illinois," ISWS, accessed November 8, 2011, http://www.isws.illinois.edu/gws/kaneco/kaneco.asp.

[172] *Groundwater Protection*. *City of St. Charles*, *Illinois*, *City Code*, Title 13 Chapter 18. http://stcharlesil.gov/codebook/Title-13/T13-CH18.pdf (accessed November 9, 2011).

Recommendation: Appropriate authorities within the watershed should establish voluntary local protection programs such as wellhead protection plans.

A sample process of developing a wellhead protection plan follows:

1) Organize a Local Committee
2) Map the Protection (sensitive) Areas Confined or Unconfined Aquifer
3) Conduct Contaminant Source Inventory
4) Develop Management and Protection Strategies
5) Plan for the Future – Contingency Plans, New Wells Adopt Maximum Setback Zones
   a) Additional Protection - 1,000 Ft. Radial Area
   b) Additional Siting Prohibitions - Certain Activities
   c) Extended "Compliance Point" for Remediation Sites to Meet Groundwater Quality Standards

5.3.3 Sensible Salting

Road salt can cause groundwater contamination from chlorides. Reducing the use of road salt and utilizing alternatives can help mitigate some of the negative effects on water quality. The idea of sensible salting includes the following recommendations developed for the DuPage River Salt Creek Workgroup[173] and are presented here for any entity responsible for winter highway maintenance within the watershed:

1) Provide proper training of road salt applicator staff and public education to build community awareness.
2) Conduct regular equipment maintenance and calibration.
3) Ensure proper salt storage, handling, and transport.
4) Explore greater reliance on anti-icing and deicing (e.g., prewetted road salt) practices.
5) Pursue judicious use of alternative deicing chemicals, including organic deicers such as those based on corn or beet derivatives.
6) Monitor salt use to determine program effectiveness.

A highway department can reduce both salt use and costs for winter roadway maintenance by following these measures.[174] Those with private wells can participate in groundwater protection from chloride contamination accordingly:

1) Adopt alternative water softening technologies such as electrodialysis or membrane filtration, and
2) Reconfigure plumbing to bypass the water softener for certain indoor water uses.[175]

Lastly county health departments can take the lead in making recommendations or creating new guidelines.

Recommendation: Appropriate entities should follow sensible salting measures within the watershed.

Luckily, there are already some communities within the Ferson-Otter Creek Watershed that are actively practicing these techniques. For example, South Elgin and Kane County implement pre-storm anti-icing practices. Elgin applies an in-house made Geomelt product that is 80% salt brine, 15% beet juice, and 5% calcium chloride. Elgin, Lily Lake, and Kane County use vehicles with computer or sensor

[173] CDM. *Chloride Usage Education and Reduction Program Study Final Report*. Naperville, IL: DuPage River Salt Creek Workgroup, August 16, 2007. http://www.drscw.org/chlorides/ChlorideRecomendations.Final_Report.pdf (accessed November 9, 2011).

[174] Baxter and Woodman, Inc. "Chlorides and Agricultural Chemicals: Problem Assessments and Corrective Actions." *Illinois Groundwater Resources Management Plan*, Report 5. Woodstock, IL: McHenry County, Illinois, Department of Planning and Development, November 2006.

[175] Ibid.

controlled spreaders for pre-wetted solids. Kane County also has several vehicles that are equipped with computer or sensor controlled spreaders for liquids and pretreats salt with a carbohydrate.

The Village of Campton Hills and Campton Township primarily use a mix of Magic Melt, a green alternative de-icer, and salt. Calcium chloride is only used in extreme cold weather. Additionally an in-house system provides salt brine for pre-storm treatment and spreader regulators on every truck are set before each storm to ensure the appropriate amount of salt is dispersed. Together all of these practices have reduced the amount of salt used by Campton Hills and Campton Township by two-thirds.

5.3.4 Water Softeners

Communities that are dependent on groundwater often need a water softener, a device that reduces the hardness of water by replacing and/or exchanging certain elements in the water. A water softener either regenerates by a timer or a meter. The timer is set to a certain number of days and will regenerate no matter the water usage. A meter will monitor the water use and regenerate overnight when a certain amount of water has been consumed (known as demand-initiated). Maintaining that water use habits are the about same among households, it can be assumed that a timer-based water softener uses more water than a demand initiated water softener.

Recommendation: Residents within the watershed should install demand-initiated water softener in their households. For households that are currently using a timer-based water softener, when replacement is necessary, residents should replace with a demand-initiated water softener.

5.3.5 Street Cleaning

Street cleaning can help to improve water quality by reducing pollutants (sediment, trash, road salt, and trace metals) in stormwater runoff. Typically when it rains, water washes into sewers or into other stormwater management structures such as detention basin where the water is then treated to varying degrees. By removing pollutants and debris from the roadways on a regular basis before they are carried away by stormwater, water quality can be improved. The frequency of sweeping depends on weather conditions, traffic patterns, resources, and a host of other conditions. The optimal frequency should be determined for each government body. However there are suggested guidelines ranging from 9 times a year to biweekly based on the type of street.[176] Furthermore innovative sweeping practices and schedules may reduce the need for other structural stormwater controls while remaining cost effective.[177] There are several communities in the Ferson-Otter Creek Watershed that currently use best management practices in this area. South Elgin and Elgin use mechanical or vacuum sweepers while Kane County uses both.

Recommendation: Local governments should review and revise current street sweeping practices and schedules to follow current best management practices.

[176] Minnesota Department of Transportation. *Resource for Implementing a Street Sweeping Best Practice*. Report no. 2008 RIC06. St. Paul, MN: Minnesota Department of Transportation, 2008. http://www.lrrb.org/PDF/2008RIC06.pdf (accessed November 8, 2011).

[177] "Parking Lot and Street Cleaning," U.S. EPA, last modified May 24, 2006, accessed November 8, 2011, http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=99.

5.4 WATER EFFICIENCY/CONSERVATION

One approach to reducing wastewater volume is to practice water efficiency and conservation. By reducing the amount of water being used on the supply side (for toilets, showers, faucets, etc.), the amount of water being discharged is also reduced. This reduction in water volume reduces the amount of wastewater and its associated pollutants. Water efficiency and conservation strategies can be especially helpful for communities that have combined wastewater and stormwater sewers.

Efficiency and conservation are similar concepts in that they both can reduce the amount of wastewater produced. Efficiency achieves reduced wastewater flows by replacing less efficient fixtures and/or appliances with more water efficient models as when a low-flow 1.6 gallon per flush toilet is replaced with a high efficiency 1.28 gallon per flush toilet. The same service, toilet flushing, is provided but with less water. Conservation includes efficiency measures but also includes behavioral changes in which residents consciously use less water such as only watering the lawn 2 days a week instead of 3 days a week during the summer. It should be noted that both water efficiency and conservation strategies need to be coupled with an outreach and education campaign. To complement outreach and education, there are policies and ordinances that municipalities can adopt to facilitate and promote water efficiency and conservation in their communities.

5.4.1 WaterSense Promotional Partner

One of the first steps toward becoming a more water efficient municipality is to become a WaterSense Promotional Partner. WaterSense is a voluntary, nationally recognized program sponsored by USEPA that promotes water conservation and efficiency.[178]

[178] "Water Sense," U.S. EPA, last modified November 2, 2011, accessed November 7, 2011, http://www.epa.gov/WaterSense/index.html.

Similar to the ENERGYSTAR program, there are two main branches of the WaterSense Program. First, is product labeling in which products such as toilets, faucets and showerheads are rated for compliance with WaterSense standards. If compliant, the fixture is then labeled as a WaterSense product. This typically means that the product uses approximately 20% less water than its conventional product. Table 26 contains all the current WaterSense products.

Table 26. WaterSense products, Fall 2011

CURRENT PRODUCTS	FUTURE PRODUCTS
Toilets	Water softeners
Bathroom sink faucets and accessories	Pre-rinse spray valves
Showerheads	
Urinals	
Landscape irrigation controllers	

The second branch offers a variety of voluntary partnerships. The promotional partnership is most appropriate for utilities, municipalities, and local units of government.[179] As the name infers, a promotional partner promotes the use of WaterSense products and water conservation and efficiency in general. The degree to which a utility or municipality "promotes" WaterSense is entirely up to partner and their available resources. The only requirement is that a partner provides an annual report (1 page form) of activities. Typical promotion activities include displaying a WaterSense logo on a municipal website, requiring WaterSense products for any rebate program, participation in Fix-a-Leak Week (March 11-19), or using public information materials provided to partners to

[179] "Water Sense Promotional Partners," U.S. EPA, last modified November 2, 2011, accessed November 7, 2011, http://www.epa.gov/WaterSense/partners/promotional.html.

communicate water conservation messages to residents.

The WaterSense Program is free and easy to sign up and participate in. The benefits include providing a starting point to launch a public information campaign by providing access to promotional materials such as bill inserts, magnet designs, press releases, public service announcements, etc. The program gives municipalities and utilities national attention on the WaterSense website and provides a WaterSense logo for outreach materials. WaterSense partners are part of a network with other communities/utilities where they can learn what others are doing in this region and the rest of the country. Additionally the partnership can provide a unified message for the watershed's residents about the importance of water conservation and efficiency if all represented municipalities were to join.

Recommendation: All communities within the watershed should become WaterSense Promotional Partners.

5.4.2 CMAP Model Water Use Conservation Ordinance

Beyond becoming a WaterSense Partner, municipalities can formally promote water efficiency and conservation practices through the adoption of all or a portion of CMAP's Model Water Use Conservation Ordinance. The 2010 ordinance is an update of the 1980 Model Water Use Conservation Ordinance completed by the Northeastern Illinois Planning Commission (NIPC) and provides draft language that may be directly incorporated into local ordinances and codes. The ordinance addresses conservation measures by sectors, including Residential and Commercial/Industrial/Institutional (CII) as well as location: indoors and outdoors. With additional sections covering key topics such as Variances, Water Waste, Pricing, Violations, and Information and Outreach. More information about ordinance items, examples, and additional resources are provided in the "Commentary," "In Practice," and "Learn More" sections, respectively. Where possible, local examples are highlighted and calculations of water savings that demonstrate benefits are also included. Of particular importance to this watershed plan is the adoption of the following ordinance components:

- Plumbing Fixtures and Fixture Fittings
- Dishwashers and Clothes Washers
- Water Recycling Systems
- Lawn watering
- Waterwaste

The model ordinance is a direct result of a larger regional effort *Water 2050: Northeastern Illinois Regional Water Supply/Demand Plan*, as previously mentioned in the Groundwater Protection section of the plan. Water 2050 includes additional information about water conservation and efficiency measures.

Recommendation: All communities within the watershed and Kane County adopt portions or all of CMAP's Model Water Use Conservation Ordinance.

Often a water conservation and efficiency plan is developed to help guide the adoption of related ordinances.[180] Currently none of the communities within the watershed have a water conservation and efficiency plan. However most of the communities do have a lawn watering ordinance, one of the topics covered in the model water conservation ordinance. In addition, Elgin's ordinances address waterwaste.[181]

[180] "Water Conservation Plan Guidelines," U.S. EPA, last modified November 2, 2011, accessed November 9, 2011, http://www.epa.gov/WaterSense/pubs/guide.html.
[181] *Waste of Water Prohibited*. *City of Elgin, Illinois, City Code*. Title 14, Chapter 4.04.140, http://www.sterlingcodifiers.com/codebook/index.php?book_id=524 (accessed November 9, 2011).

5.5 AGRICULTURE

5.5.1 BMPs Suitable for Agricultural Areas

In addition to wetland restoration opportunities on currently farmed wetlands, there are many other best management practices (BMPs) available and appropriate for implementation in agricultural areas. The Natural Resource Conservation Service (NRCS) Field Office Technical Guides (FOTG) comprehensively document conservation practices applicable to the State of Illinois as well as standards and specifications for these practices.[182] Standards describe the conservation practice and where it applies, while the specifications describe the detailed, site-specific requirements for implementing or installing a practice. Many of the conservation practices and BMPs that are discussed in this plan are thoroughly outlined in the NRCS Illinois FOTG. The following text is a set of guidelines that briefly describes the types of practices most commonly employed for conservation-orientated efforts in an agricultural context.

Many agricultural BMPs focus on livestock management. Better management of manure in agricultural areas can help to reduce nutrient, sediment and fecal coliform runoff contributing to water resource degradation. Developing a farm-wide manure management plan might involve such practices as excluding livestock from water bodies with fencing or stream crossings, along with the construction of alternative water sources to prevent contamination from manure entering water bodies. Similarly, diverting clean water away from areas covered with manure on farms can help to reduce contamination of runoff. To address sediment runoff caused by livestock, heavy use area protection helps to prevent erosion by creating foundations to support animals and soil where animals gather for watering and feeding.

[182] USDA NRCS. *Field Office Technical Guides*. Kane County, Illinois. Washington, D.C.: USDA NRCS, 2011. http://efotg.sc.egov.usda.gov/efotg_locator.aspx?map (accessed September 13, 2011).

Recommendation: Livestock managers should implement livestock exclusion fencing to separate livestock from direct contact with streams. Developing an alternative water source could facilitate this exclusion. Heavy use area protections should also established to reduce erosion from livestock.

Likewise, nutrient management is extremely important for preventing the loss of nutrients to storm runoff during and after precipitation events. Developing a nutrient management plan coupled with soil testing can help to prevent excess nutrient application while better matching the timing and form of nutrient application to the plant's need. A nutrient management plan allows farmers to adopt integrated strategies for monitoring and controlling the form, placement, timing and amount of fertilizer applications and other soil amendments which help to reduce nutrient runoff. Similarly, integrated pest management (IPM) seeks to apply a systems approach to agricultural management to reduce dependence on synthetic inputs, possibly improving water quality through less pesticide runoff. For example, IPM relies on the close observation of the lifecycle of pests and their interaction with the ecosystem to detect crop damage. When detected, further crop damage is prevented through the use of mechanical trapping, natural predators, growth regulators, chemical mating disruptors, and possibly the judicious use of chemical pesticides.

Recommendation: Agricultural landowners should adopt integrated nutrient and/or pest management plans that help to reduce nutrient and pesticide runoff to streams in the watershed planning area.

Finally, altering cropping practices can help significantly to reduce nutrient and sediment runoff. Prescribed or rotational grazing can be used to control the location, intensity, frequency, duration, and

season of grazing, which can help to improve water quality and filtration and prevent erosion. Cover cropping, that is, maintaining a crop cover or crop residue in agricultural fields, increases nutrient retention in soil and prevents erosion. Green manure is cover cropping designed to add nutrients to soil and reduce required fertilizer application. In this case, the cover crop is grown for a specified amount of time and then plowed under. The related practice of conservation tillage (with variations including no-till and strip-till methods) leaves soil totally or partially untilled and covered with some amount of crop residue which prevents erosion and increases soil moisture. However, a higher reliance on herbicide with conservation tillage to control weeds may lead to more chemical runoff, so this practice might be best limited to those lands with the greatest risk of erosion.

Recommendation: Cropland management practices such as rotational grazing, cover cropping and/or conservation tillage should be implemented to control erosion and reduce required nutrient applications.

Additionally, many BMPs not specific to agriculture are still complementary to agricultural land use and appropriate for implementation by private landowners. The NRCS FOTG contain practice standards and specifications for many of these BMPs as well.[183] Upland erosion control relies on practices that slow and filter water prior to drainage into a water body, for example, grass waterways; terracing; buffer and filter strip creation; and installation or retrofitting of water and sediment control basins. Streambank or lake shore protection can prevent erosion using rip rap; longitudinal peaked stone toe protection; critical area seeding and bank re-shaping; tree revetments; root wad installation; stream barbs; bendway weirs; rock riffles; and grade stabilization structures to prevent streambank failure. Wetland protection, restoration or construction can improve water quality since wetlands act to filter water and can remove some particulate and dissolved contaminants such as sediment and nutrients. Finally, conservation easements are voluntary, legally enforceable land preservation agreements between landowners and a government agency. Conservation easements maintain open space and its associated environmental benefits by excluding development on protected lands. These easements along with naturalized streambanks and buffer strip plantings add to wildlife corridors and stream water quality as well.

Recommendation: Agricultural landowners should implement general best management practices like upland erosion controls, streambank or lake shore protection (e.g., filter strips), and/or wetland protection/restoration to protect water quality, in addition to agriculture-specific BMPs discussed above.

5.6 ORDINANCE REVIEW AND EXISTING POLICIES

5.6.1 Ordinance Review

Local ordinances and codes regulate and guide land use and subdivision standards for development. Among other influences, ordinances and codes dictate how stormwater runoff is stored and conveyed in, around, and through a community. For example how a community designates impervious surfaces such as sidewalks, streets, and parking has a substantial effect on the community's runoff both in terms of water quality and quantity. Research has shown a positive correlation between percentage impervious cover in a watershed and concentrations of nutrients, sediment, and trace

[183] USDA NRCS. *Field Office Technical Guides*. Kane County, Illinois. Washington, D.C.: USDA NRCS, 2011. http://efotg.sc.egov.usda.gov/efotg_locator.aspx?map (accessed September 13, 2011).

metals in surface waters.[184] Thus as impervious cover increases, surface water quality is negatively impacted.

Kane County is one of the fastest growing counties in Illinois and continued urban growth is expected in the Ferson-Otter Creek Watershed. Therefore, it is important to understand how current development regulations and ordinances help shape communities and their impact on water quality. For example, Kane County's Stormwater Ordinance (effective January 1, 2002) was developed pursuant to state legislation granting powers to certain counties to regulate the discharge of stormwater.[185] This power was granted in recognition of the fact that stormwater management problems are generally regional in nature and impacts to stormwater management systems often go across typical government boundaries.

The purpose of this ordinance is to unify the stormwater management framework throughout the county and to establish a set of minimum standards that will apply to all new development throughout the county. The ordinance defines a "developer" who must obtain a permit for development. This ordinance applies to individuals, corporations and units of local government who propose new development after the effective date of the ordinance. Development activities which affect the discharge of stormwater are regulated under this ordinance. These include addressing such requirements as detention/retention, sediment and erosion control plans, floodplains and wetlands not regulated by the Corps of Engineers (COE).

In addition to the Kane County's Stormwater Ordinance, gaining a better comprehension of local policies is critical for outlining recommendations for code and ordinance updates for inclusion in this watershed plan. To facilitate this understanding, an assessment of local policies was conducted to compare existing regulations against the Code and Ordinance Worksheet (COW) created by the Center for Watershed Protection (CWP).[186] This worksheet provides an evaluation of development rules by assigning points on how well current rules agree with model development principles. The three categories on which points are assigned are: Residential Streets and Parking Lots, Lot Development, and Conservation of Natural Areas. The 'model' score for the worksheet is 100 and points are awarded when a development rule agrees with site specific planning benchmarks that directly or indirectly relate to stormwater management. The purpose of CWP's checklist is to provide a general assessment of a community's current ordinances and codes.

Municipal and county representatives within the watershed were asked to complete the worksheet for their respective units of government. The results of the completed COWs are in Appendix B. A majority of the governmental units within the Ferson-Otter Creek Watershed completed a COW.[187] It is important to note that while CWP sets a high standard for development regulation, the intent behind this review is to seek opportunities to reduce effective impervious cover to protect stream health and reduce future flooding. Governmental representatives are encouraged to explore locally appropriate rules that are more protective of water resources, particularly in future development.

[184] The Center for Watershed Protection. *Impacts of Impervious Cover on Aquatic Systems*. Mansfield, CT: University of Connecticut, 2003. http://clear.uconn.edu/projects/TMDL/library/papers/Schueler_2003.pdf (accessed November 8, 2011).
[185] *Stormwater Management. Kane County, Illinois, County Code*, Chapter 9. http://www.sterlingcodifiers.com/IL/Kane%20County/index.htm (accessed December 19, 2011).

[186] "Better Site Design Publications," Center for Watershed Protection, accessed December 20, 2011, http://www.cwp.org/documents/cat_view/77-better-site-design-publications.html.
[187] Please note: no data was available for Lily Lake.

The total scores are summarized in Figure 49 for each community and range from 44-78 out of a 100. The Center for Watershed Protection specific recommendations for each community based on their score and are displayed in Figure 50. It should be noted that the analysis is coded (A-E) to display the results anonymously.

After reviewing the results of the assessment, a community can choose to hold a facilitated "roundtable" with officials from municipal engineering, planning, and other departments to discuss what opportunities there are for ordinance updates and revisions. Those recommended changes may then move forward for action by elected officials. It should be noted that the CWP's guidelines are not ideal for every community, however, each community has opportunities for establishing ordinances and codes that further protect water quality and manage water quantity as it pertains to stormwater.

Figure 49. **Total Code and Ordinance Worksheet (COW) scores**

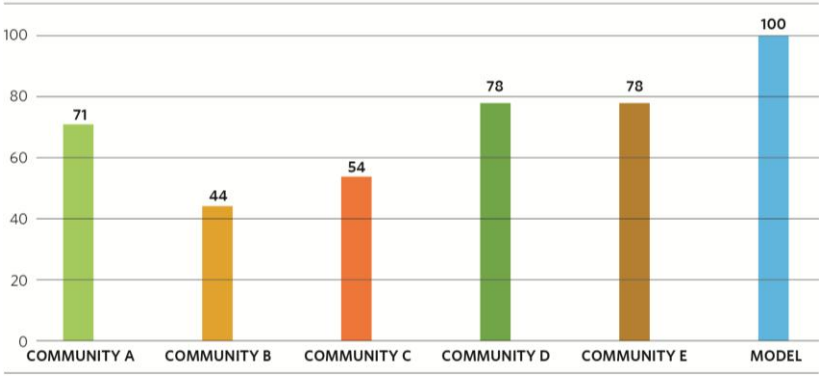


Figure 50. **Center for Watershed Protection's COW recommendations**

Center for Watershed Protection's Code and Ordinance Worksheet recommendations

90-100	Congratulations! Your community is a real leader in protecting streams, lakes, and estuaries. Keep up the good work
80 -89	Your local development rules are pretty good, but could use some tweaking in some areas.
70 -79	Significant opportunities exist to improve your development rules. Consider creating a site planning roundtable.
60 -69	Development rules are inadequate to protect your local aquatic resources. A site planning roundtable would be very useful.
Less than 60	Your development rules definitely are not environmentally friendly. Serious reform of the development rules is needed.

The following text breaks out the analysis in the three sections designated on the COW: Residential Streets and Parking Lots, Lot Development, and Conservation of Natural Areas to provide more detailed data and recommendations.

Residential Streets and Parking Lots

From an analysis of the responses, the category that contrasted the most from the model principles was Residential Streets and Parking Lots (Figure 51). Within this category, scores ranged from 14 to 27 out of 40 possible points, averaging 20 which is 20 points less than the model score. The scoring for this category focused on principles related to reduced road lengths and widths, reduced surface parking, increased use of landscaping and pervious surfaces for stormwater retention, among others. Impediments to the use of model principles within current regulations include requirements for access to emergency vehicles and the location of water/sewer lines under parkways rather than paved roadways, both of which necessitate wider streets.

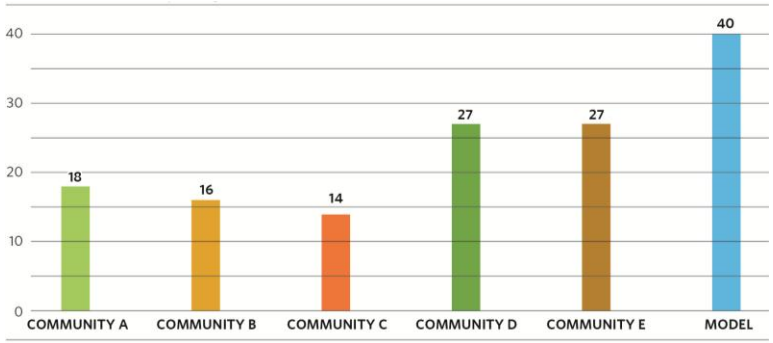
Recommendation: Local governments should adopt ordinances that incentivize:

- **shared parking;**
- **decreased dimensions in residential driveways/parking areas;**
- **use of biorention for on-site stormwater treatment;**
- **development design that minimizes road width and length;**
- **flexible arrangements to meet parking standards.**

Increasing flexibility in development design for example removing prescribed street dimensions in ordinances may allow for narrower streets and reduced impervious surfaces. Where possible, parking requirements should match level of demand,[188] allow flexible arrangements to meet parking standards, and provide flexibility to reduce parking in exchange for specific actions that reduce parking demands on site[189] through improved accessibility to transit or other alternative transportation options such as car-share.[190]

Access for emergency vehicles within narrow street designs has been successfully addressed in various parts of the country and standards for such street designs are available from sources such as the American Association of State Highway and Transportation Officials (AASHTO)191 and the Institute of Transportation Engineers (ITE).192

Figure 51. **Residential streets and parking lots results**



[188] For more information on Parking Management see "Parking Management Strategy Report Summary," CMAP, accessed December 20, 2011, http://www.cmap.illinois.gov/strategy-papers/parking.

[189] "Water Quality Scorecard: Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scale," U.S. EPA, last modified November 17, 2011, accessed December 20, 2011, http://www.epa.gov/smartgrowth/water_scorecard.htm.

[190] For more information on car-sharing, see "Car Sharing Strategy Report," CMAP, accessed December 20, 2011, http://www.cmap.illinois.gov/strategy-papers/car-sharing.

[191] AASHTO. *The Policy on Geometric Design of Streets and Highway*. Washington, D.C.: AASHTO, 2011.

[192] Lerner-Lam, Eva, Stephen P. Celniker, Gary W. Halbert, Chester Chellman and Sherry Ryan. "Traffic Engineering for Neo-Traditional Neighborhood Design." *ITE* (January 1992): 17–25.

Lot Development

The lot development category focuses on principles related to development density, lot size/shape, driveways/sidewalks, and open space management. Within this category, scores ranged from 12 to 30 out of 36 possible points, 25 being the average score, Figure 52. In general most of the existing zoning ordinances allow for flexibility in lot development and open space design whereas subdivision regulations had more specifics on setbacks, driveways, and sidewalks that may not allow the incorporation of the model principles.

As in the residential streets and parking lots category, ordinance updates that include allowances for stormwater management BMPs and reduction in impervious cover may decrease the speed and increase the filtration of runoff prior to entering waterways. Additionally, reduced setbacks, smaller lots, and cluster development designs that maximize open space are additional measures that governmental entities can encourage within existing regulations (e.g., via density bonuses, to decrease overall impervious cover).

Recommendation: Local governments should adopt ordinances that include:

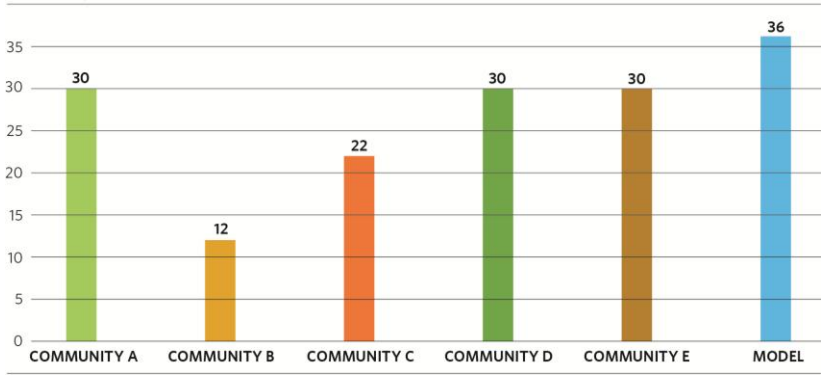
- **allowances for stormwater management BMPs and reductions in impervious cover;**
- **reduced setbacks, smaller lots, and cluster developments.**

From a regional perspective, local governments are encouraged to adopt policies and incentives to direct development to areas that have existing infrastructure such as water and sewer. This approach may reduce the overall development footprint in a watershed by maximizing use of existing sites. Additionally, compact, mixed use, and transit-oriented developments should be encouraged where possible to avoid loss of agricultural lands, increase conservation opportunities, and reduce degradation of streams and wetlands due to encroaching development and stormwater runoff.[193]

Recommendation: Local governments should adopt policies and incentives that:

- **utilize existing infrastructure such as water and sewer;**
- **encourage compact, mixed use, and transit-orientated developments.**

Figure 52. **Lot development results**



Conservation of Natural Lands

The conservation of natural areas category highlights stream buffer maintenance, tree conservation, incentives for land conservation, treatment of stormwater prior to discharge from outfalls, and limitations on development within the 100-year floodplain. Scores ranged from 16 to 23 out of 24 possible points, with an average of 20 points (Figure 53). Again, it appears as if the majority of the respondents' local codes regarding the protection of existing natural

[193] "GO TO 2040 Comprehensive Regional Plan," CMAP, accessed December 20, 2011, http://www.cmap.illinois.gov/2040/main.

areas and the incorporation of open space into new development are in line with the model principles. Potential areas of improvement may include adjustments in ordinances relating to stream buffers, stormwater outfalls, and tree conservation.

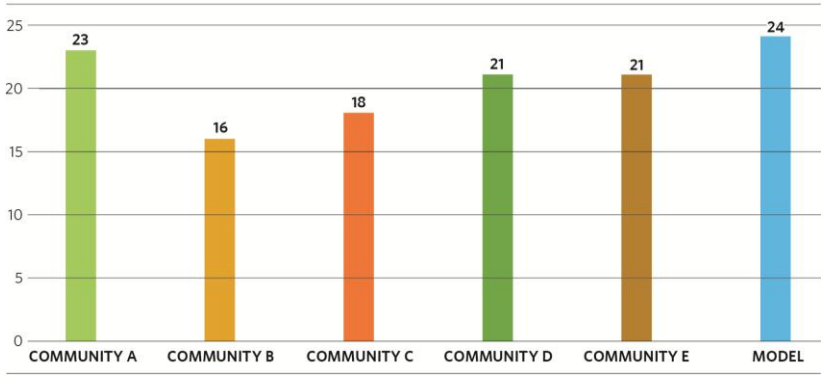
Other improvements could focus on long term protection, management, and restoration of natural areas and future habitats from future development. Local governmental units may wish to consider mandatory no-development buffer codes for critical areas such as wetlands, floodplains, lakes, streams, and rivers. Such areas may serve dual functions of providing recreational areas while reducing stormwater runoff.

Recommendation: Local governments should consider a mandatory no-development buffer codes for critical areas such as wetlands, floodplains, lakes, streams, and rivers.

To enhance the urban tree canopy, local governments are encouraged to adopt programs for tree protection and maintenance on public properties and right-of-ways, in addition to preserving trees on private property and requiring replacement when trees are removed or damaged during development. Local governments are also encouraged to increase the overall tree canopy through implementing tree planting initiatives.

Recommendation: Local governments should adopt programs for tree protection and maintenance on public properties and right-of-ways, require tree replacement for trees lost during development, and implement tree planting initiatives.

Figure 53. **Conservation of natural areas results**



5.6.2 Existing Best Management Practices

In addition to ordinances and codes, many communities in the watershed have already put some BMPs into place (Table 27).

Table 27. Community existing best management practices

COMMUNITY	RAIN GARDENS	BIO-SWALES	NATIVE PLANTINGS	PERMEABLE PAVERS	LOW-IMPACT DESIGN
Campton Hills	–	–	–	–	–
Elgin	–	Yes	Yes	Yes	–
Kane County	Yes	Yes	Yes	Yes	–
Lily Lake	–	Yes	Yes	–	–
South Elgin	Yes	Yes	Yes	Yes	–
St. Charles	Yes	Yes	Yes	–	–

Recommendation: Municipalities continue and/or begin to incorporate rain gardens, bioswales, native plantings, permeable pavers and low impact design.

5.7 FECAL COLIFORM CRITICAL AREAS ANALYSIS

The following recommendations were developed from the fecal coliform critical areas analysis in Chapter 3. Three methodologies were used to help target fecal coliform related policy recommendations. The first methodology was based on the density of pet populations. The analysis found that certain areas of the watershed were likely contributing a higher proportion of pet waste to the watershed.

Recommendation: The Village of Campton Hills and Kane County should adopt a pet waste pickup ordinance.

It should be noted that the city of Elgin was also identified in this analysis but already has a current pet waste ordinance.[194] Promoting a new policy such as this will then require an outreach and education campaign to raise awareness of benefits of pet waste pickup.

The second methodology involved estimating density of parcels that use septic systems. The analysis found that certain areas of the watershed were likely contributing a higher proportion of potential septic system failures, assuming a uniform failure rate.

Recommendation: The Village of Campton Hills, the Village of Lily Lake, and Kane County should require or at least encourage cyclical septic system maintenance.

As stated in the recommendation, cyclical septic system maintenance is at the very least encouraged. One example of such a program is found in Isle of Wight County, VA where legislation was enacted requiring regular septic tank maintenance.[195] Their septic tank pump-out initiative is a state-mandated program that requires regular septic tank pump-outs at least once every three to five years under Article 6 of the Chesapeake Bay Preservation Area Ordinance (CBPA). CBPA more broadly is legislation in the Chesapeake Bay Watershed that regulates development occurring in the watershed, promoting natural vegetative land cover to protect Chesapeake Bay water quality.

The third methodology involved estimating those areas with higher percentages of agricultural areas used for livestock and equestrian purposes. The analysis concluded that areas with more than 5% livestock and equestrian agricultural use were high priority areas.

Recommendation: Livestock and equestrian landowners in the Village of Campton Hills and Kane County should be contacted and encouraged by local authorities or agencies (e.g., county Soil and Water Conservation Districts) to adopt manure management plans and livestock exclusion (from direct access to streams) practices.

5.8. GOLF COURSES

There are 435 acres of golf courses within the Ferson-Otter Creek Watershed (Figure 55). Typically golf course landscapes consist primarily of turf grass and do not include stream buffers to help protect water quality. Furthermore, golf course management strategies such as the application of pesticides and herbicides can have an additional negative effect on water quality. The Audubon Cooperative Sanctuary Program is an award winning education and certification program that empowers golf courses to protect the

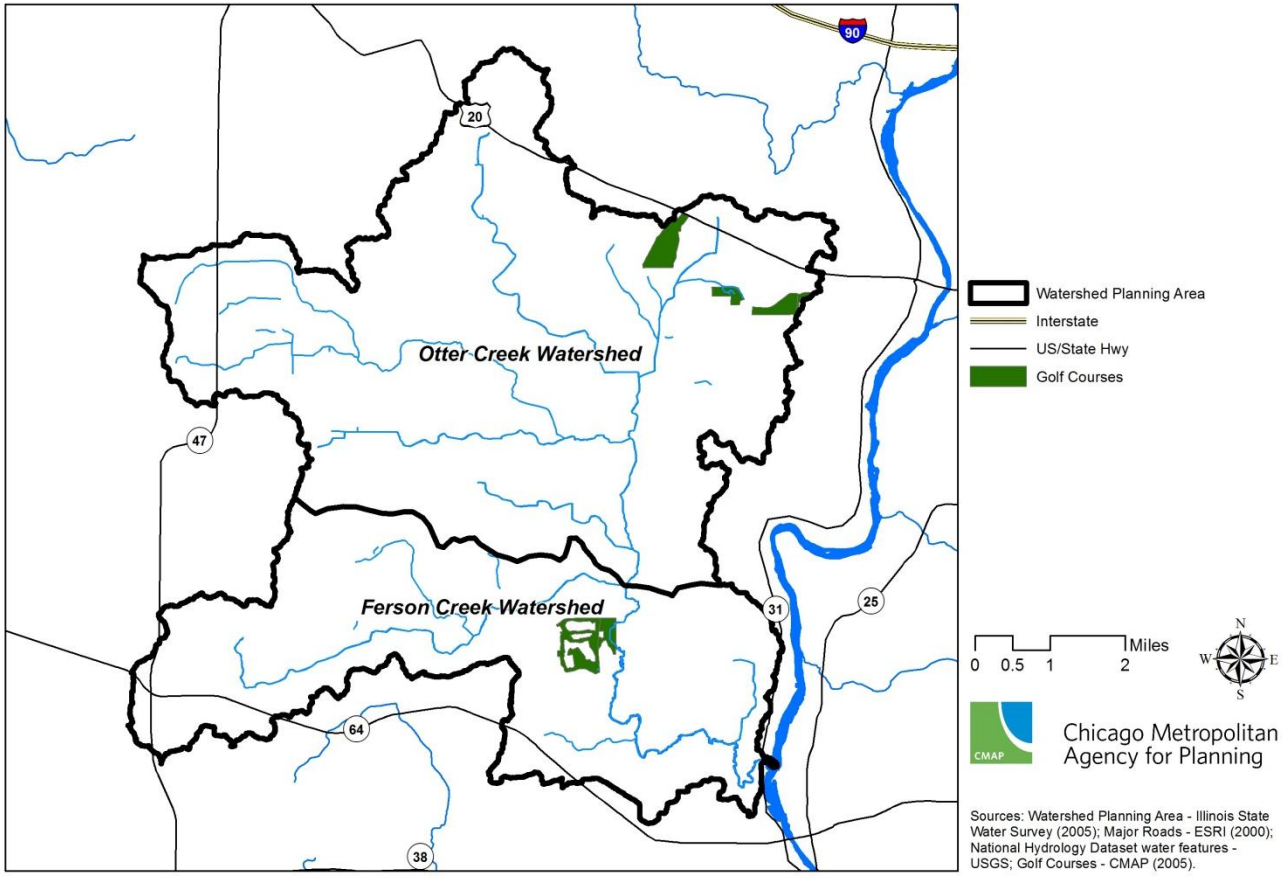
[194] *Removal Of Debris And Residue*. *City of Elgin, City Code*. Title 9, Chapter 32.IV, Section 250.C.2. http://www.sterlingcodifiers.com/codebook/index.php?book_id=524 (accessed November 30, 2011).

[195] *Septic Pump-Out Program*. *Isle of Wight County, Virginia, County Code*. Appendix B-1, Article 6. http://library.municode.com/HTML/14449/level2/APXB-1CHBAPRAROR_ART6SEPUTPR.html#TOPTITLE (accessed December 20, 2011).

natural features and heritage of the courses while improving water quality. [196]

Recommendation: The Ferson-Otter Creek Watershed Coalition as well as other interested parties will work with the local golf course management teams to move them towards becoming certified under the Audubon Cooperative Sanctuary Program.

Figure 54. **Golf course locations in Ferson-Otter Creek Watershed**



[196] "Audubon Cooperative Sanctuary Program for Golf Courses," Audubon International, accessed November 9, 2011, http://acspgolf.audubonintenational.org/.

It should be noted that a list of all policy recommendations is in Appendix E.

6. PUBLIC EDUCATION AND OUTREACH

We all have an impact on water quality. From the cars that we drive to the fertilizer we put on our lawns, pollutants from these activities and many others wash off the land and flow across the landscape, often through storm sewer systems, to our rivers and streams. These individual actions have relatively small impacts on water quality, but when looked at cumulatively they have a huge impact. This is nonpoint source pollution, so named because it does not originate from one pipe, but from many sources scattered across the landscape. Nonpoint source pollution is the nation's largest remaining water quality problem.

Education and outreach is essential to improving water quality within a watershed. If people don't understand what effects their actions have on water quality, improvements might be made through regulation and incentives, but only for a period of time. People want to do the right thing; they often just don't know what it is or how to do it. A watershed plan needs to include ways to make stakeholders aware of the issues, informing them on what needs to be done, and motivating them to take action. If stakeholders are involved in creating and implementing the plan, research shows that the watershed will have a higher level of long-term support and success.

Education of local residents must start with the basics; many studies have found that although the general public has heard the term "watershed," few are able to define it or explain how they have an impact on it. Not only will the education and outreach campaign need to define terms, but it will need to raise a general awareness of the problems in the watershed and the potential solutions. Then the campaign will need to find a way to motivate residents to act, contributing to improving water quality through their own actions, their government, and their family. The impact of not taking action must also be demonstrated.

This section of the watershed plan will lay the groundwork for creating a successful education and outreach campaign. First, it will summarize some existing literature on how to create a successful education and outreach campaign. Then it reviews some education and outreach activities that occurred during the watershed planning effort. Lastly, this section closes with a look ahead at education and outreach activities that were determined by the stakeholders to be necessary for improving water quality in the Ferson-Otter Creek Watershed.

6.1 EDUCATION AND OUTREACH CAMPAIGNS

There are many resources available to assist in developing an effective watershed education and outreach campaign. Agencies like USEPA and IEPA have many resources available including U.S. EPA's *Getting in Step: a Guide for Conducting Watershed Outreach Campaigns* (2003) and CMAP and IEPA's *Guidance for Watershed Action Plans in Illinois* (2007). Not-for-profit organizations like the Center for Watershed Protection and The Conservation Foundation are also great sources of information, often having brochures, fliers and other information applicable to watershed problems already on hand. The following information summarizes key findings from these resources.

6.1.1 Cause-Based Marketing

Research has shown that cause-based or social marketing is the most effective way to get people to change their behavior. Cause-based marketing is the practice of looking at people as consumers, but

instead of selling products or services, as a watershed group, we are selling ideas, attitudes and behaviors. The goal of cause-based marketing is not to make a profit, but to improve society and the environment. Part of this campaign should include persuading the public that there is a problem that only they can solve.

Identifying the Audience

Before any of the following education and outreach strategies are employed, the target audience must be identified. Different strategies will be used for different audiences. For example, if the goal is to reduce fecal coliform in the watershed, then targeting residents that have pets might be an effective strategy. The target audience should be broken down into the smallest segment possible to achieve the best results, then creating a message that resonates with the target audience and inspires them to act.

Understanding the Audience

Knowing some information about the target audience is essential. Campaign audiences have varied values and beliefs, and they will not necessarily be the same as those implementing the watershed plan. The following is a list of a few questions that are important to know about the target audience, before education and outreach activities begin:

1. What does the audience know already?
2. What are their existing beliefs and perceptions?
3. How does the audience receive messages and information?
4. What will make the audience change their behavior?
5. Other important factors include: education, age, culture, and religion.

The understanding of the audience can be completed at the same time or subsequent to identifying the audience. Surveys, focus groups, and even simple observations can lead to a greater understanding of the audience and a successful campaign. In order to create a successful education and outreach campaign, a manager must also consider how to most effectively convey that message to the target audience.

Barriers

Another component to establishing a successful education and outreach campaign is anticipating problems and road blocks. Barriers are just that: problems that might prevent residents from changing their behavior. Often barriers include time and/or resources. A barrier can also be that a person is simply not aware of the effect of their actions.

A common barrier is the social acceptability of the desired action. For example, rain gardens or other native vegetation is often perceived as looking weedy or unkempt. A resident might want to improve infiltration and have a low maintenance garden, but is resistant to installing a rain garden because he does not want to offend neighbors. The message needs to be conveyed to that resident and neighbors that natives can be planted in beds, can be low to the ground, and not look weedy. In this regard, barriers can be minimized or removed.

Social Norms

Related to the example just cited are social norms. Social norms are the behavioral expectations and cues within a group of people. It is a social norm that we maintain our lawns with grass species that are mowed to a certain height frequently. Through education and outreach, new examples need to be created showing the different, desired action. Then one by one, new social norms need to be established. People are more likely to change their behavior if they see someone else benefitting from the new behavior.

Creating and Formatting the Message

Messages must be clear and contain specific calls to action. They are designed to raise awareness, educate or motivate to action. Campaigns should inform and suggest acceptable behaviors.

Messages need to capture the audience's attention. What is needed to get the audience's attention will vary by different segments of the audience. Insights to this information may have been gleaned when identifying the audience, through information such as demographics or may be indicated by the message itself. Ask people to do something in response and let them know what effect this behavior will have. Be clear and concise. Consider what behavior you are trying to change and what behavior should replace it.

How the message is distributed to the audience can make or break an outreach campaign. The packaging of a message can help foster relationships and a sense of community, build understanding, and motivate people to action or it can be expensive and time consuming while producing little results. The target audience should dictate which format should be used to convey the message. Formats can change over the course of the campaign.

A campaign could start out raising general awareness with public service announcements (PSAs) and once the audience understands the problem, brochures could be distributed to further inform residents about what they can to do to contribute to the solution. According to the USEPA's *Getting in Step* guide, if the budget is small, the frequency in which your audience hears or sees the message is important. The following describes formats and messages that were used during this planning effort.

6.2 WATERSHED PLANNING PROCESS ACTIVITIES

A variety of education and outreach activities took place during the creation of this plan. They have laid the groundwork for a successful education and outreach campaign.

6.2.1 Website

Materials for the watershed planning effort are currently located at the Fox River Ecosystem Partnership website: www.foxriverecosystem.org/ferson_otter.htm. Agendas, maps, upcoming events, and the watershed plan are posted there.

6.2.2 Literature

Two brochures were developed as part of the watershed planning effort. The first brochure provides information about the watershed planning effort itself. The second brochure contains more detailed information about nonpoint source pollution and BMPs. In addition, a poster was developed for the Ferson-Otter Creek Watershed to show what can be done to reduce potential sources of fecal coliform, thereby improving water quality.

6.2.3 FREP Noon Networks

Stakeholders helped identify and coordinate a program for the (October 19, 2011) FREP Noon Network. The Ferson Creek dam removal at LeRoy Oakes Forest Preserve in St. Charles was the focus of the Noon Network in which 12 people attended. [197]

6.2.4 Stream Walks and Open House

Stakeholders and landowners visited various points of interest and concern along both Ferson and Otter Creeks. A second stream walk

[197] "Program Presentations," FREP, accessed November 9, 2011, http://foxriverecosystem.org/presentations.htm.

was held at the St. Charles Park District's Otter Creek Bend Park. Members and stakeholders toured the park and heard from Steve Belz, from Black Creek Hydrology, regarding two 319 implementation projects for bank stabilization.

6.2.5 Municipal Outreach

The Conservation Foundation created visual presentations to help keep our municipal partners informed of the watershed planning process, and to let them know we would be visiting again to ask for plan adoption. We made scheduled appearances with municipal staff, board and/or committee members at Lily Lake, South Elgin, Elgin, Campton Hills, St. Charles, Campton Township and Kane County.

6.2.6 Presence in the Community

Throughout the late summer and early fall we participated in a number of community events in each of the communities identified in the Ferson-Otter Creek Watershed. We participated and/or distributed information to stakeholders at: National Night Out, Campton Hills; Riverfest Express, South Elgin; Hawthorne Pond Walk, Elgin; Prairie Fest, Campton Township; and Scarecrow Fest, St. Charles.

6.2.7 Open House

The watershed planning process was presented to stakeholders at a public forum on March 29, 2011 from 4:30 – 6:30 PM, where people could ask questions of CMAP, TCF, and other parties involved in writing the plan.

6.3 ACTIVITIES GOING FORWARD

Throughout the watershed planning process, the stakeholders discussed education and outreach a number of times. The following recommendations and list of activities for targeted audiences were determined to be desirable. Stakeholders expressed an interest in partnering with state and regional resources with similar goals and missions. A list of state, regional, and local resources is found in Appendix C.

6.3.1 Organization

Momentum from the planning process will continue through the organization of a "coalition" to help encourage plan implementation and continue efforts towards reaching the plan's goals. The interim name for this entity is the Ferson-Otter Creek Watershed Coalition and is in direct response to watershed Goal #7 in Chapter 1.

Ideally the Coalition would meet quarterly. More frequent meetings could be warranted depending on current activities such as applying for grant funding or urgent watershed issues. The Coalition could be supported by dues collected from interested parties. The planning process reviewed and considered similar successful models from the DuPage River Salt Creek Workgroup and the Lower DuPage River Watershed Planning processes.
The Coalition will mostly likely consist of current interested parties that were active during this planning process in addition to other potential partners. A desired outreach list to continue building the Coalition is provided in Appendix D. This list is not exhaustive and was the original outreach list utilized by The Conservation Foundation at the beginning of this planning process.

In terms of staffing, the Coalition would be best served by hiring a watershed coordinator to organize and lead this effort. The watershed coordinator would provide a focused, local approach to watershed planning, taking into consideration regional activities and opportunities. The ideal candidate will be familiar with available resources, grant writing, and fostering collaborative partnerships/efforts. The coordinator would establish a presence

with each of the watershed municipal governments as well as with other partners to promote the goals and priorities in the watershed plan. Please note that grant to grant support for the watershed coordinator position is not the preferred funding option due to lack of financial stability.

Recommendations: The Ferson-Otter Creek Watershed Coalition should:

- **Hire a part-time watershed coordinator to promote and coordinate the implementation of the watershed plan's recommendations;**
- **Partner with existing organizations to provide a 319 grant writing workshop to assist lead implementers with 319 applications;**
- **Work with partnering organizations to raise awareness about all potential sources of fecal coliform bacteria and water quality;**
- **Heavily target landowners/Homeowners Associations, especially those identified in the critical areas analysis for fecal coliform, about proper septic maintenance and warning signs of a failing system;**
- **Distribute USEPA's Healthy Lawn Care Practices and Reduce Runoff: Slow it Down, Spread it Out, Soak it in! DVD to Homeowners Associations for use at meetings as an educational tool;**
- **Continuously work with municipalities to promote the use of CMAP's Model Water Use Conservation Ordinance in their respective municipalities;**
- **Hold two educational seminars per year on stormwater issues for all NPDES[198] Phase II permit holders in the watershed.**

[198] "National Pollutant Discharge Elimination System (NPDES)," U.S. EPA, last modified March 12, 2009, accessed December 20, 2011, http://cfpub.epa.gov/npdes/.

6.3.2 Public Awareness Campaign

It may be desirable to put a number of the activities listed below together into a campaign that would pool resources from, and benefit, the entire watershed. The Coalition would conduct pre-campaign research to identify and better understand the targeted audience, develop a slogan, determine the method(s) and message(s), develop a fixed timeframe, and include pre- and post-testing to gauge effectiveness.

Website

Websites are an excellent way of quickly connecting to a large audience. A mix of scientific and general information about the watershed can be located all in one place. The material can be changed and updated frequently and people can provide feedback and information quickly. A website is a relatively inexpensive education and outreach tool.

Recommendation: The Ferson-Otter Creek Watershed Coalition should investigate ways to maintain the existing website on the Fox River Ecosystem Partnership website.

Brochures

Printed material is a popular format for conducting education and outreach activities. It can be created easily and inexpensively. People can refer to printed materials again and again. The current brochures created for this planning process should continue to be distributed as long as they are useful. New brochures could be developed or adapted to cover additional topics including BMPs for homeowners, information on proper salt and fertilizer use, and information on fecal coliform.

Interpretive Signs

Interpretive signs communicate specific messages to viewers. These messages can be written to change behavior, educate, or evoke an emotion in the reader. They are mounted so they are visible to all viewers and can be constructed of many different materials. Interpretive signs can be used to educate viewers on a number of water quality issues: the purpose of detention ponds, no mow zones, establishing native plants, being a good neighbor to wetlands, etc.

Public Service Announcements

A public service announcement (PSA) can be an inexpensive way to reach a variety of people. PSAs can be broadcast on radio, television or even on websites. In addition to the USEPA's PSA on lawn care, local college students and broadcasting classes can be used to assist in the creation of a PSA. PSAs are often aired for no charge on local cable access channels or radio stations, although time slots may not be ideal.

6.3.3 Program Activities for Targeted Audiences

In order to prioritize our outreach and education activities, stakeholders identified the following targeted audiences to increase awareness of watershed issues, inform them of potential solutions, and motivate them to act.

Children/Students

Curricula and Training

The Chicago Wilderness Corporate Council's Teaching Academy is a program that provides technical assistance to teachers to help prepare localized curricula relevant to natural resources in the area. The Project WET Curriculum and Activity Guide contains 91 multidisciplinary water-related activities for students in grades K to 12. The guide features cross-reference and planning charts, a glossary and background material on activity development and field testing. Main program contacts include: Kane-DuPage Soil & Water Conservation District;[199] 630-584-7961, Ext. 3; The Chicago Wilderness Corporate Council, Teaching Academy, [200] 312-580-2137; Project WET,[201] 866-337-5486.

Recommendations: The Ferson-Otter Creek Watershed Coalition should support:

- **strategies to implement water science curriculums into classrooms and training opportunities for teachers that will increase their capacity to incorporate concepts of water science in their environmental education classrooms;**
- **growth of students' awareness of water-related employment opportunities and educational criteria.**

Watershed Quilt Project[202]

The Watershed Quilt Project is a grassroots project inspired by the Nature Quilt Project in Macomb, Illinois.[203] Our local version of the project builds on recommendations of the recent Aux Sable Creek Watershed Plan that recommends introducing the concepts of watersheds and stormwater in the classroom as well as working on programs with children such as precipitation monitoring, runoff tracing, stream monitoring and analysis, and habitat assessments.

[199] "Kane-DuPage Soil and Water Conservation District," Kane-DuPage SWCD, accessed December 20, 2011, http://www.kanedupageswcd.org/.
[200] "Chicago Wilderness," Chicago Wilderness, accessed December 20, 2011, http://www.chicagowilderness.org/.
[201] "Worldwide Water Education," Project Wet, accessed December 20, 2011, http://www.projectwet.org/.
[202] "Watershed Quilt Project," Aux Sable Creek Watershed, accessed December 20, 2011, www.auxsablecreekwatershed.org/watershedquiltproject.html.

The Project's mission is raising awareness of the assets, opportunities and challenges in our local natural areas to gain a better understanding of the interconnectedness between people and the natural world around them through children's education. This project accomplishes this through promoting outdoor environmental education, environmental literacy, the arts, cultural discovery and activism demonstrating the ability of children to make a positive difference in addressing global environmental challenges. Main program contacts include: Aux Sable Creek Watershed, Watershed Quilt Project, Joan Soltwisch, 815-690-3658.

Recommendation: The Watershed Quilt Program should be implemented in the Ferson-Otter Creek Watershed in the next five years.

Agriculture in the Classroom

USDA Agriculture in the Classroom (AITC) supports state programs by providing a network that seeks to improve agricultural literacy — awareness, knowledge, and appreciation — among PreK-12 teachers and their students. The program is carried out in each state, according to state needs and interests, by individuals representing farm organizations, agribusiness, education and government. In Illinois, the AITC program is coordinated by the Illinois Farm Bureau and County Ag Literacy Coordinators administer the program locally.

Recommendation: The AITC program should be implemented or expanded in the Ferson-Otter Creek Watershed in the next 5 years.

World Water Monitoring Day™

World Water Monitoring Day™ is an international education and outreach program that builds public awareness and involvement in protecting water resources around the world by engaging citizens to conduct basic monitoring of their local water bodies.[204] The program is coordinated by the Water Environment Federation and the International Water Association. Sponsors include the USGS, USEPA, PerkinElmer, Sinclair Knight Merz, ITT Corporation, and Smithfield Foods. Groups can purchase test kits on the World Water Monitoring Day website. Basic test kits include one set of hardware and enough reagents to conduct up to 50 rounds of testing for pH, dissolved oxygen, temperature, and turbidity. The Classroom kit includes five sets of hardware and enough reagents to conduct up to 50 rounds of testing for pH, dissolved oxygen, temperature and turbidity. Main program contacts include: Water Environment Federation,[205] 703 535 5264.

Recommendation: Ferson-Otter Creek Watershed Coalition should participate in World Water Monitoring Day in the next three-five years.

Envirothon Competition

The Envirothon is an exciting, fun way for high school students to learn about the environment. It combines in-class curriculum with hands-on field experiences, while demonstrating the role people have in important environmental issues, such as forestry and wildlife management, water quality, and soil erosion. At the completion of the year-long learning process, the Envirothon conducts a series of competitions where students are tested on five subjects: soil, aquatics, wildlife, forestry and a specific environmental issue, which changes from year to year. The Illinois Envirothon competition is co-sponsored by the Association of Illinois Soil & Water Conservation Districts (AISWCD), local Soil & Water Conservation Districts (SWCD) and cooperating conservation

[204] "World Water Monitoring Day," WEF and IWA, accessed December 20, 2011, http://www.worldwatermonitoringday.org/.
[205] Ibid.

partners. Main program contacts include: Kane-DuPage Soil & Water Conservation District,[206] 630-5[illegible]-[illegible]1, Ext. 3.

Recommendation: The Ferson-Otter Creek Watershed Coalition should encourage participation in the program by each high school in the watershed in the next three-five years.

The Mighty Acorns®

The Mighty Acorns® program incorporates classroom curriculum, hands-on restoration activities and exploration as it seeks to provide our children with multiple, meaningful, sustained interactions with the land. Students use the land as an outdoor laboratory for learning science and, at the same time, the ecosystems benefit from their restoration work. Mighty Acorns® is a stewardship-based curriculum for 4th-6th graders. Classes adopt a natural area in their community and visit it throughout the school year in order to participate in stewardship activities. Each field trip is preceded by a classroom lesson on related ecological concepts. Summer nature camps for Mighty Acorns® have also been developed through partnerships between The Conservation Foundation and local park districts. Main program contacts include: The Conservation Foundation,[207] 630-428-4500.

Recommendation: School districts and park districts within the Ferson-Otter Creek Watershed should implement the Mighty Acorns program within the next five years.

Landowners/Homeowners Associations

Conservation @Home

Conservation @ Home is a program created by The Conservation Foundation which is geared towards homeowners. The program encourages and recognizes property owners who protect and/or create yards that are environmentally friendly and conserve water. This includes planting native vegetation, creating butterfly and rain gardens, and removing invasive species. Conservation @ Home is appropriate for outreach to municipalities, park districts, homeowners and homeowner associations through seminars, workshops, one-on-one conversations and the distribution of printed materials. Main program contacts include: The Conservation Foundation,[208] 630-428-4500.

Presentations

Stakeholders believe the watershed would benefit from providing a variety of topics to present to Homeowners Associations throughout the watershed. The topics might include a series of presentations covering the following topics: soil testing/ fertilizer, benefits of native plants, establishing no mow zones, detention ponds, rain barrels/gardens, etc. A variety of agricultural and natural resource topics are available through the KDSWCD Community Assistance program and The Conservation Foundation. Main program contacts include: The Conservation Foundation,[209] 630-428-4500; Kane-DuPage Soil & Water Conservation District (KDSWCD),[210] 630-5[illegible]-[illegible]1, Ext. 3.

Partners for Conservation

Partners for Conservation provides technical and financial assistance (cost-share) to landowners to address erosion issues. The Kane-DuPage Soil and Water Conservation District administers this program with funding provided by the State of Illinois through the

[206] "Kendall County Soil and Water Conservation District," Kendall County SWCD, accessed December 20, 2011, http://www.kendallswcd.org/.
[207] "The Conservation Foundation," The Conservation Foundation, accessed December 20, 2011, http://www.theconservationfoundation.org/.
[208] Ibid.
[209] Ibid. 207.
[210] "Kane-DuPage Soil and Water Conservation District," Kane-DuPage SWCD, accessed December 20, 2011, http://www.kanedupageswcd.org/.

Illinois Department of Agriculture. Practices on agricultural land include: Grassed waterways, grade stabilization structures, water & sediment control basins, filter strips, nutrient management, etc. Practices not specific to agricultural land include: Streambank stabilization and restoration, well sealing, rain gardens, and special projects (non-traditional practices such as urban stormwater basin retro-fitting). Main program contacts include: Kane-DuPage Soil & Water Conservation District,[211] 630-5WK-XNH1, Ext. 3.

Events/Conferences

The Coalition could promote its message about improving water quality in the Ferson-Otter Creek Watershed by attending and distributing information at existing events/ conferences or by creating their own event (watershed tour, an environmental fair, or a listening session). The Coalition would benefit from the opportunities to talk to residents and gauge their understanding of water quality concerns as well as hear their concerns about the watershed. In an effort to pool resources, share ideas, and provide technical assistance, the Coalition might also pursue coordinating a session at a larger, regional conference. Professionals are encouraged to attend workshops and conferences hosted by government agencies or non-profit water-quality groups. Main program contacts include: The Conservation Foundation,[212] 630-428-4500.

River Sweep

A river sweep is a coordinated, periodic clean-up of area waterways. The purpose is to create a connection between people and the river by having volunteers remove trash and debris from the river. A community-coordinated river sweep can involve a number of stakeholders, from students to corporations. The river sweep can also help develop a stewardship program to restore natural areas by removing invasive species. A central coordination entity should be established. Funding for supplies is available through the IEPA SCALE grant program. Main program contacts include: The Conservation Foundation,[213] 630-428-4500.

Storm drain stenciling

Storm drain stenciling involves volunteers painting a stenciled message on or near a storm drain as well as distributing literature explaining what they are doing. Stenciling is a way of explaining nonpoint source pollution to the general public and connecting volunteers and residents to the environment. The program has two target audiences: the crew of volunteers who stencil and those who read the message, "Dump no Waste – Drains to River." Various groups can participate in stenciling, youth groups, homeowners associations, and businesses. Main program contacts include: The Conservation Foundation,[214] 630-428-4500; Kane-DuPage Soil & Water Conservation District,[215] 630-5WK-XNH1, Ext. 3.

Decision Makers/Municipal Officials

Policy, Codes, and Ordinance Review

By utilizing the USEPA's "Water Quality Scorecard: Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scale," and "Managing Wet Weather with Green Infrastructure," municipalities increase awareness and receive guidance about the process of removing barriers, revising and creating codes, ordinances, and incentives to better protect water quality. This process can be formally facilitated by agencies like the Chicago Metropolitan Agency for Planning (CMAP), or structured as a peer-

[211] "The Conservation Foundation," The Conservation Foundation, accessed December 20, 2011, http://www.theconservationfoundation.org/.
[212] Ibid.
[213] Ibid. 211.
[214] Ibid. 211.
[215] "Kane-DuPage Soil and Water Conservation District," Kane-DuPage SWCD, accessed December 20, 2011, http://www.kanedupageswcd.org/.

to-peer roundtable. Topics may include: restoring wetlands; maintaining natural drainage areas for water quality and water supply benefits and reduced flooding; deicing practices and products; etc. Main program contacts include: The Chicago Metropolitan Agency for Planning,[216] (CMAP) 312-454-0400.

Regional Planning

Developing a regional floodplain management plan has many potential benefits of the plan including: improvement of public safety; reduction of flood damage costs to communities; increase in resources for local flood safety programs; opportunities for reduced flood insurance rates for communities participating in FEMA's Community Rating System; improvement of riparian vegetation, wildlife habitat and water quality; preservation of historical land uses; retention of natural beauty of the area. Main program contacts include: Federal Emergency Management Agency, National Flood Insurance Program,[217] 800-611-6122.

WaterSense Program

For local governments, partnering with WaterSense provides access to tools and resources to promote and educate residents the need for water efficiency. Using water more efficiently makes sense for consumers, communities, and the environment. Water efficiency measures, as part of broader conservation efforts, can help reduce water and wastewater infrastructure costs and ensure resources for future generations.

In some areas the growing population is putting stress on water supplies and distribution systems, threatening human health and the environment. The average household uses 100+ gallons of water each day. Water supply has become a national priority. The WaterSense website states that at least 36 states are anticipating local, regional, or statewide water shortages by 2013. Using water more efficiently, will help preserve supplies for future generations and protect the environment. WaterSense makes it easier to identify water-efficient products and practices. Main program contacts include: Environmental Protection Agency, Water Sense Program,[218] 866-987-7367.

Technical Workshops

Municipal and county planners, engineering and public works staff members could participate in technical workshops. Topics would be chosen that address water quality issues, particularly fecal coliform, presented by the Kane-DuPage Soil and Water Conservation District as well as The Conservation Foundation. Main program contacts include: The Conservation Foundation,[219] 630-428-4500; .Kane-DuPage Soil & Water Conservation District,[220] 630-5[illegible]1, Ext. 3.

Natural Resource Information (NRI) Reports

The Kane-DuPage Soil and Water Conservation District provides natural resource information to officials of the local governing body and other decision makers. The Natural Resource Information (NRI) report intends to present the most current natural resource information available in an understandable format for sites that are being considered for development. It contains a description of the present conditions and resources available and their potential impact

[216] "Chicago Metropolitan Agency for Planning," CMAP, accessed December 20, 2011, http://www.cmap.illinois.gov/.
[217] "Community Rating System," FEMA, accessed December 20, 2011, http://www.fema.gov/business/nfip/crs.shtm.
[218] "Water Sense," U.S. EPA, last modified November 2, 2011, accessed November 7, 2011, http://www.epa.gov/WaterSense/index.html.
[219] "The Conservation Foundation," The Conservation Foundation, accessed December 20, 2011, http://www.theconservationfoundation.org/.
[220] "Kane-DuPage Soil and Water Conservation District," Kane-DuPage SWCD, accessed December 20, 2011, http://www.kanedupageswcd.org/.

on each other. Main program contacts include: Kane-DuPage Soil & Water Conservation District,[221] 630-5WK-XJN1, Ext. 3.

Soil Erosion & Sediment Control

Soil Erosion & Sediment Control expertise provided by the Kane-DuPage Soil and Water Conservation District to agencies (IEPA, United States Army Corps of Engineers) and local governments (County and Municipal Government) as part of a cooperative agreement. Main program contacts include: Kane-DuPage Soil & Water Conservation District,[222] 630-5WK-XJN1, Ext. 3.

Natural Resources Conservation Service (NRCS) Conservation Programs

NRCS's natural resources conservation programs help people reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damages caused by floods and other natural disasters. Public benefits include enhanced natural resources that help sustain agricultural productivity and environmental quality while supporting continued economic development, recreation, and scenic beauty. The Coalition could help encourage landowners to utilize NRCS programs, especially those that help reduce the potential for fecal coliform bacteria loadings in local steams. Main program contacts include: US Department of Agriculture, Natural Resources Conservation Service[223] and Kane-DuPage Soil & Water Conservation District, 630-584-7961, Ext. 3.

A list of all education and outreach recommendations are in Appendix E.

[221] "Kane-DuPage Soil and Water Conservation District," Kane-DuPage SWCD, accessed December 20, 2011, http://www.kanedupageswcd.org/.
[222] Ibid.
[223] "Natural Resources Conservation Service," USDA NRCS, accessed December 20, 2011, http://www.nrcs.usda.gov/.

7. PLAN IMPLEMENTATION AND MONITORING

7.1 SCHEDULE AND MILESTONES

Although there is considerable merit in producing a watershed plan, improving water quality in the watershed will be a result of implementing the plan's project, policy, and education and outreach recommendations in a meaningful way. Improving water quality will happen over time and with considerable effort by the stakeholders, partner agencies, local governments, and residents alike.

7.1.1 Project Recommendations

All short-term lead implementers estimate a 2016 project completion date. It should be noted that implementation of any of these projects is based on a variety of factors including, but not limited to, securing appropriate funding and participation from willing landowners and local governments.

The milestone for project recommendations is development of at least 10 grant applications to implement projects within the 5-year/short-term planning timeframe.

7.1.2 Policy Recommendations

In addition to project recommendations, the watershed plan also describes numerous policy recommendations. As this plan was written on the premise of a 5-year planning cycle, identified parties are encouraged to consider and implement the plan's policy recommendations by 2016. To help facilitate these efforts, CMAP or other consultants can provide assistance to communities for those recommendations that are related to comprehensive plans and ordinances, such as incorporating CMAP's Model Water Use Conservation Ordinance. Furthermore the Ferson-Otter Creek Watershed Coalition should continue to work with the watershed's communities to support this effort.

The milestone for policy recommendations is the adaptation of at least 3 of the recommended measures by each municipality within the 5-year planning timeframe.

7.1.3 Education and Outreach Recommendations

The outreach and education recommendations will be an on-going effort with partnering agencies, homeowners associations, and other relevant groups that are active within the watershed. The pace of implementation of the outreach and education recommendations would be greatly increased by the hiring of a part-time watershed coordinator.

7.2 FUNDING OPTIONS

Plan implementation is largely based on the availability of funding for projects and other plan recommendations. Table 28 describes possible funding sources that may be used to move forward with plan implementation.

Table 28. Funding sources

PROGRAM	FUNDING AGENCY	TYPE	FUNDING AMOUNT	ELIGIBILITY	ACTIVITIES FUNDED	WEBSITE
WATER QUALITY						
Capitalization Grants for Clean Water State Revolving Funds	U.S. EPA/Office of Wastewater Management	Loan revolving fund	No limit on wastewater funds; Drinking water up to 25% of available funds	Local government, Individuals, Citizen groups, Not-for-profit groups	Wastewater treatment; Nonpoint source pollution control; Watershed management; Restoration & protection of groundwater, wetlands/riparian zones, and habitat.	http://www.epa.gov/owm/cwfinance/index.htm
Non-point Source Management Program (319 grants)	Illinois EPA	Matching Grant (60% funded)	No set limit on awards	Local government, Businesses, Individuals, Citizen & environment groups	Controlling or eliminating non-point pollution sources; Stream bank restoration; Pesticide and fertilizer control.	http://www.epa.state.il.us/water/financial-assistance/non-point.html
Illinois Green Infrastructure Grant Program for Stormwater Management	Illinois EPA	Matching Grant Minimum Local MatchCSO: 15%; Retention and Infiltration: 25%; Green Infrastructure Small Projects: 25%	Up to: CSO: $3M or 85% of project costs; Retention and Infiltration: $750,000 or 75% of project costs; Green Infrastructure Small Projects: $75,000 or 75% of project costs	Any entity that has legal status to accept funds from the state of Illinois, including state and local governmental units, nonprofit organizations, citizen and environmental groups, individuals and businesses	Green infrastructure best management practices (BMPs) for stormwater management to protect or improve water quality.	http://www.epa.state.il.us/water/financial-assistance/igig.html
Sustainable Agriculture Grant Program	Illinois Department of Agriculture	Matching Grant (60% funded)	—	Organizations, governmental units, educational institutions, non-profit groups, individuals	Practices are aimed at maintaining producers' profitability while conserving soil, protecting water resources and controlling pests through means that are not harmful to natural systems, farmers or consumers.	http://www.agr.state.il.us/Environment/conserv/index.html
Streambank Stabilization and Restoration Program	Illinois Department of Agriculture	Matching grant (amount funded not specified)	—	Landowners, Citizen groups, Not-for-profit groups	Naturalized streambank stabilization in rural and urban communities, work with SWCD	http://www.agr.state.il.us/Environment/conserv/index.html
Conservation Innovation Grants	Natural Resources Conservation Service	Matching grant (50% funded)	Up to $75,000 under State Component	Landowners, Organizations	Projects targeting innovative on-the-ground conservation, including pilot projects and field demonstrations.	http://www.il.nrcs.usda.gov/programs/cig/
HABITAT						
Partners for Fish and Wildlife Habitat Restoration Program	Department of Interior, U.S. Fish and Wildlife Service	Cost-share (50% funded)	up to $25,000	Private landowners	Voluntary restoration or improvements of native habitats for fish and wildlife; Restoration of former wetlands, native prairie stream and riparian areas and other habitats.	http://www.fws.gov/policy/640fw1.html
Bring back the Natives Grant Program	National Fish and Wildlife Foundation	Matching Grant (33% funded)	Varies with project ($50,000-$75,000)	Not-for-profit groups, Universities, Local governments	Restoration of damaged or degraded riverine habitats and native aquatic species through watershed restoration and improved land management.	http://www.nfwf.org/AM/Template.cfm?Section=charter_programs_list&CONTENTID=18473&TEMPLATE=/CM/ContentDisplay.cfm
Wildlife Habitat Incentives Program	U.S. Department of Agriculture	Grant, Matching Grant (at least 75% funded)	—	Private landowners, Not-for-profit groups	Establishment and improvement of fish and wildlife habitat on private land.	http://www.nrcs.usda.gov/programs/whip/
Native Plant Conservation Initiative	National Fish and Wildlife Foundation	Matching Grant (50% funded)	$10,000-$50,000	Community and watershed groups, Nonprofit groups Educ. institutions, Conservation districts, Local governments	"On-the-Ground" projects that involve local communities and citizen volunteers in the restoration of native plant communities.	http://www.nfwf.org/programs/npci.htm
WETLANDS						
Wetlands Reserve Program	USDA NRCS	Direct contracts with landowners; Easement (100%); Cost Share and 30 year easements (75%)	No set limit on awards	Individual Citizen groups, Not-for-profit groups	Wetlands restoration or protection through easement and restoration agreement	http://www.nrcs.usda.gov/programs/wrp/states/il.html
Wetlands Program Development Grants	U.S. EPA	Matching Grant (75% funded)	No set limit on awards	Not-for-profit groups; Local government	Developing a comprehensive monitoring and assessment program; Improving the effectiveness of compensatory mitigation; Refining the protection of vulnerable wetlands and aquatic resources	http://www.epa.gov/owow/wetlands/grantguidelines
Northeastern Illinois Wetlands Conservation Account	U.S. Fish and Wildlife Service/ The Conservation Fund	Grant/Matching Grant (50% match strongly suggested)	Average of ~$38,000	A partnership of: Governmental agencies; Not-for-profit conservation groups; Private landowners	Restoration of former wetlands; Enhancement and preservation of existing wetlands; Creation of new wetlands Wetlands education and stewardship	http://www.conservationfund.org/node/133
Small Grants Program	North American Wetlands Conservation Council	Matching Grant	Up to $75,000	A partnership of: Governmental agencies, Not-for-profit conservation groups; Private landowners	Long-term acquisition, restoration, enhancement of natural wetlands	http://www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm
Wetland Restoration Fund	Openlands	Grant	$5,000-$100,000	Local government; Not-for-profit groups; Citizen groups; Other organizations	Wetlands and other aquatic ecosystem restorations within the six-county Chicago region on land under conservation easement or owned by a government agency	
Five Star Restoration Program	National Fish and Wildlife Foundation	Matching Grant (50% funded)	One-year projects: $10,000-$25,000; Two-year projects: $10,000 -$40,000	Any public or private entity that can receive grants	Seeks to develop community capacity to sustain local natural resources for future generations by providing modest financial assistance to diverse local partnerships for wetland and riparian habitat restoration	http://www.nfwf.org/AM/Template.cfm?Section=Charter_Programs_List&Template=/TaggedPage/TaggedPageDisplay.cfm&TPLID=60&ContentID=17901
PRIVATE						
Tellabs	Tellabs Foundation	Grant	At least $10,000	Not-for-profit groups	Environmental protection and improvement programs; Organizations which protect the environment	http://www.ivp.tellabs.com/about/foundation.shtml
GVF Core Program	Grand Victoria Foundation	Grant/Matching Grant	Varies with scope of project, size of organization, other funding	Not-for-profit groups	Preservation and restoration of natural lands and waterways	www.grandvictoriafdn.org

7.3 MONITORING FOR SUCCESS

7.3.1 In-stream Sampling

As stated throughout the plan, fecal coliform is the watershed's only identified impairment (specifically in Ferson Creek). Although the Illinois 303 (d) list has identified urban runoff and storm sewers, and runoff from forests, grasslands and parks as potential sources of the impairment, there is still uncertainty as to where geographically in the watershed and from what origin (sewage treatment plants, septic system, pet waste, wildlife, drain tiles, etc.) the contamination derives. Absent this information, this watershed plan covers a variety of potential sources through recommendations aimed at reducing the concentration of fecal coliform in the watershed (public outreach and education, policy, projects).

For this reason, more detailed and frequent monitoring should be implemented throughout the Ferson Creek Watershed by 2016. The Ferson-Otter Creek Watershed Coalition should partner with Fox River Study Group (FRSG) and Illinois State Water Survey (ISWS) to develop a more robust water quality monitoring scheme with a goal of achieving an improved understanding of the sources of fecal coliform within the watershed. Developing a better baseline to understand fecal coliform issues will allow for evaluation of the effectiveness of implementation efforts over time. To that end, water samples that indicate a positive change or trend towards lower fecal coliform concentrations and ultimately, compliance with the water quality standard, will provide the best criteria to measure success.

After monitoring data are collected and analyzed with conclusive results as to where and from what origin the fecal coliform contamination is coming from, the Ferson-Otter Creek Watershed Coalition can reevaluate the plan's recommendations and make appropriate adjustments to priorities at that point. Additionally there are several efforts to collect more water quality data already happening throughout the Fox River Basin. The Ferson-Otter Creek Watershed Coalition should work closely with these organizations and partner on monitoring projects as funding and resources are available.

7.3.2 Effluent Monitoring

As stated, only one NPDES permit is issued within the watershed and that is to Ferson Creek Utilities Sewage Treatment Plant (STP) to treat domestic wastewater for the majority of the Windings Subdivision in St Charles.[224] The permit does outline water quality standards for fecal coliform. It is inconclusive to date if the STP has had any fecal coliform violations. It is recommended that the Ferson-Otter Creek Watershed Coalition partner with the management at the STP to prevent any potential future violations.

7.4 NEXT STEPS

With the initial planning cycle closing at the end of 2011 with approval of the new watershed plan, attention will turn to implementation in 2012. Full plan and executive summary documents will be printed and distributed during the first quarter of 2012. Access to these documents will also be available via both CMAP and FREP websites. CMAP will approach local governments and request a resolution of support for the watershed plan. CMAP and TCF will maintain contact with the new Ferson-Otter Creek Watershed Coalition and support their implementation efforts where possible.

A list of all figures and tables is found in Appendix F and Appendix G respectfully.

[224] NPDES ID number IL0045411.

Appendix A
List of Long-term Project Recommendations for Ferson-Otter Creek Watershed Plan

Project Number	IEPA Category	Best Management Practices (BMPs)	Lead Implementer(s)
22	**AGRICULTURE**	Meissner-Corron Forest Preserve– block selected drain tiles, fill or divert overgrown farm ditches, remove tree along ditches, plant deep-rooted native species, stabilize area to ensure Nature Preserve protection.	Kane County Forest Preserve District
23	**AGRICULTURE**	Primrose Farm-stream bank stabilization, stream bottom evaluation.	St. Charles Park District
24	**HYDROLOGIC**	Install water level control structure & drain tile improvements to allow water level management of wetland to control cattails in high quality wetland. Cost estimate: $50,000.	Deer Run East HOA
25	**HYDROLOGIC**	Culvert under Empire Road, west of Boxwood Lane. Utilize green infrastructure to stabilize channel.	Kane County
26	**HYDROLOGIC**	Otter Creek Forest Preserve – support purchase of adjacent lands, remeander stream out of ditch banks, recreate wetlands across 50+ acres.	Kane County Forest Preserve District
27	**HYDROLOGIC**	Fitchie Creek Forest Preserve- remove trees along creek banks, stabilize creek banks, install small-scale engineered BMPS in creek, control reed canary grass, and plant deep-rooted native species.	Kane County Forest Preserve District
28	**HYDROLOGIC**	Hazelcrest Subdivision-severe erosion issue.	Kane County Forest Preserve District/ Lily Lake
29	**HYDROLOGIC**	Lenkaitis Farm-streambank stabilization.	Landowner
30	**HYDROLOGIC**	Work with developer/landowner to permanently protect 30+ acres of high quality wetland on 54 acre property (north of 64, west of West Mary Drive). Only 20 acres of property is buildable (not wetland or floodplain).	Landowner
31	**HYDROLOGIC**	Streambank Stabilization Project; landowner at 36W394 Wild Rose Lane; Moderate erosion (< 4 foot banks). Total feet: 375. Cost estimate: $25,000.	Landowner

32	**HYDROLOGIC**	Drainage improvements to reduce residential flooding (east of Denker Road, south of Deerhaven Trail). Cost estimate: $25,000.	Landowner
33	**HYDROLOGIC**	Work with developer/landowner to permanently protect sedge meadow wetland, which is the headwaters to Fitchie Creek.	Landowner
34	**HYDROLOGIC**	Ravine stabilization at the Windings Subdivision (near end Harvest Lane, St. Charles).	Windings HOA
35	**HYDROLOGIC**	Work with developer/landowner to restore former wetland complex that is headwaters of Ferson Creek. Wetland is also located in major aquifer recharge area (west of Anderson Road, south of 64).	Landowner/ Village of Lily Lake
36	**HYDROLOGIC**	Stream maintenance for survey stations: 430-1150, 850-1100, 10050-10270, and 10630-10850. This is 4 separate projects. Project details for each project (station, length, erosion, action, cost, and priority) in Attachment A. Total feet: 1410. Accumulative cost estimate: $84,600-$105,751.	South Elgin
37	**HYDROLOGIC**	Ferson Creek Park-naturalized buffer.	St. Charles Park District
38	**HYDROLOGIC**	Otter Creek Bend Wetland-soil deposition mitigation.	St. Charles Park District
39	**HYDROLOGIC**	Floodplain forest / stream corridor restoration to remove invasive/nuisance species on Wild Rose Springs HOA property; Wild Rose Springs owns more than 60 acres of natural area along Ferson Creek and more than 1 mile of stream. Cost estimate: $100,000.	WildRose Springs HOA
40	**HYDROLOGIC**	Ravine stabilization at the Windings Subdivision (near Eagle Court, St. Charles).	Windings HOA
41	**HYDROLOGIC**	Ravine stabilization at the Windings Subdivision (near Ravine Drive in between Forest Glen Lane and Jens Jensen Lane, St. Charles).	Windings HOA
42	**HYDROLOGIC**	Ravine stabilization at the Windings Subdivision (near Ravine Drive, northwest of Kingswood Drive St. Charles).	Windings HOA
43	**HYDROLOGIC**	Ravine stabilization at the Windings Subdivision (near west of Ravine Drive, south of Empire Road, St. Charles).	Windings HOA
44	**HYDROLOGIC**	Ravine stabilization at the Windings Subdivision (near southeast intersection of Bridle Court and Paddock Lane, St. Charles).	Windings HOA

45	**HYDROLOGIC**	Ravine Stabilization at the Windings Subdivision (near Bridle Court, south of Steeplechase Road, St. Charles)	Windings HOA
46	**HYDROLOGIC**	Ravine Stabilization at the Windings Subdivision (near end of Paddock Lane, St. Charles).	Windings HOA
47	**LIVESTOCK**	Lenkaitis Farm-vegetative filter strip, updating manure pit.	Landowner
48	**LIVESTOCK**	Encourage farmer to install animal exclusion zone from swale, which drains 32 acres through cow pasture; Cows observed defecating in small swale apparently fed by upstream drain tile that discharges to tributary to Ferson Creek(south of Willowbrook Drive, east of Corron Road). Cost estimate: $5,000.	Landowner
49	**LIVESTOCK**	Investigate what type of farming operation and the extent, if any, of agriculture feed lot runoff from animal operation; headwaters to Bowes Creek (south of Plato Road, east of Pease Road).	USDA/Farm Bureau/Landowner
50	**OTHER**	Monitor water quality of Ferson Creek at Corron Road.	Campton Hills
51	**OTHER**	Restore oak woodland/savanna on Campton Township Gray Willows property. Total acreage: 21. Cost estimate: $25,000.	Campton Township
52	**OTHER**	Restore 9+ acres of farmed wetland on Campton Township Gray Willows Property. Total acreage: 9. Cost estimate: $25,000.	Campton Township
53	**OTHER**	Install water level control structure on existing tile to facilitate wetland restoration on Campton Township Gray Willows Farm property. Cost estimate: $8,000.	Campton Township
54	**OTHER**	Monitor water quality in the Otter Creek Tributary to Ferson Creek.	Homeward Glen, Campton Hills
55	**OTHER**	Remove dense stands of Phragmites from along Randall Rd - US 20 interchange swales; source of invasive seeds from farthest north end of Otter Creek. Total acreage: 0.75. Cost estimate: $7,500.	Illinois Department of Transportation (IDOT)
56	**OTHER**	Develop and implement stream corridor management program to remove debris jams, nuisance & invasive species (east of Prairie Springs Drive); Adjacent landowners have expressed willingness to help. Cost estimate: $20,000.	Kane County Forest Preserve District

57	**OTHER**	Remove invasive species (Phragmites) spreading across constructed wetland basin; develop and implement vegetative management plan to maintain wetland quality (east of Prairie Springs Drive). Adjacent landowners have expressed willingness to help Kane County Forest Preserve District. Cost estimate: $15,000.	Kane County Forest Preserve District
58	**OTHER**	Kane County wetlands adjacent to Lake Campton-investigate drainage ditch constructed under Whitney road from the wetlands to the west end of Lake Campton.	Lake Campton POA, Kane County Forest Preserve District, St. Charles School District 303
59	**OTHER**	Ferson Creek upstream from Lake Campton-Creek walk to assess potential stabilization and other improvements.	Lake Campton POA, St. Charles School District 303
60	**OTHER**	Eroded Banks, further investigation needed (southwest corner of Silver Glen Road and Burr Road)	Landowner
61	**OTHER**	Work with landowner to preserve as much of 25 acre oak woodland as possible (north of Lenz Road, east of Crawford Road).	Landowner
62	**OTHER**	Work with landowners and Girl Scout Organization to permanently protect stream corridor & oak woodlands. Site includes HHQ ADID wetland with T&E species (south of Woodgate Road, east of Burr Road).	Landowner
63	**OTHER**	Work with landowner to maintain and permanently protect oak woodland and undeveloped fen recharge area (south of Burr Road Lane, west of Burr Road).	Landowner
64	**OTHER**	Protect Fen #1272 from development and insure water quality BMPs are integrated into all development proposed within its recharge area.	Landowner
65	**OTHER**	Restore Lily Lake and pre-settlement wetlands (north and south of Route 64), total acreage 18.	Lily Lake/Developer
66	**OTHER**	Streambank erosion monitoring for survey stations: 0-12270. This is 48 separate projects. Project details for each project (station, length, erosion, action, cost, and priority) in Attachment A. Total feet: 6,805.	South Elgin
67	**OTHER**	Vegetative Maintenance for survey stations: 2990-3080, 3160-3330, 4120-4870, 5380-5580, 5760-5880, 6170-6320, 7500-7610, 9240-9420, and 10870-11370. This is 10 separate projects. Project details for each project (station, length, erosion, action, cost, and priority) in Attachment A. Total feet: 2,260. Accumulative cost estimate: $169,750-$283,750.	South Elgin

68	**URBAN**	Retrofit existing turf bottom detention basin with native plants - minimum 25,000 square feet. Cost estimate: $10,000	Burlington School District 301 -Prairie View Grade School
69	**URBAN**	Streambank and stream channel stabilization of Tucker Run along north side of Gray Willows Open Space Property; about 600 ft and 8 riffle grade control structures. Cost estimate: $96,000.	Campton Township
70	**URBAN**	Streambank and stream channel stabilization of Ferson Creek through the Gray Willows Open Space Property; about 2500 ft and 20 riffle grade control structures. Cost estimate: $250,000.	Campton Township
71	**URBAN**	Retrofit existing dry-bottom detention basins with native vegetation for increased filtering/pollutant removal. 11 projects in total along parts of Spinnaker Street, Umbdenstock Road, Mission Hills Street, Foxmoor Road, Country Water Road, Amber Street, Bowes Road, Hopps Road, Deerpath Road.	Elgin
72	**URBAN**	Detention basin retrofit to ease flooding concerns and water quality benefits (east of Tuscan View Drive, south of College Green Drive).	Landowner
73	**URBAN**	Work with landowner to establish water quality BMP basin between Stony Creek and landscape business / farm animal stalls to filter runoff (west of Crawford Road, north of McDonald Road).	Landowner / USDA-NRCS
74	**URBAN**	Install infiltration-based BMPs (pavers, bioretention basins, etc.) retrofits into strip mall development; significantly undersized detention storage and no water quality treatment before discharge to Otter Creek (west of Randall Road, north of South Street). Cost estimate: $500,000.	Landowner/Shopping Center Corporation
75	**URBAN**	Install infiltration-based BMPs (pavers, bioretention basins, etc.) retrofits into strip mall development; significantly undersized detention storage and no water quality treatment before discharge to Otter Creek (north of South Street, west of Edgewood Street). Cost estimate: $450,000.	Landowner/Shopping Center Corporation
76	**URBAN**	Detention Basin Retrofit; replant turf grass bottom basin with native plants for added pollutant removal; Otter Creek Shopping Mall east side of Randall Rd. Total acreage: 1.1. Cost estimate: $15,000.	Landowner/Shopping Center Corporation

77	**URBAN**	Retrofit existing turf bottom detention basin with native plants-mesic prairie garden (north of Bolcum Road, east of Burr Road). Total feet: 6,000. Cost estimate: $85,000.	School District 303
78	**URBAN**	Install rain garden to infiltrate/filter Ferson Creek Elementary roof runoff before uncontrolled release to Ferson Creek. Project could also serve as outdoor education classroom for students. Cost estimate: $85,000.	School District 303, Ferson Creek Elementary
79	**URBAN**	Work with strip mall owner to install retrofit water quality BMPs to reduce total runoff and/or parking lot pollutants prior to discharge into downstream storm sewer, Target, Randall Road.	South Elgin
80	**URBAN**	Work with strip mall owner to install retrofit water quality BMPs to reduce total runoff and/or parking lot pollutants prior to discharge into downstream storm sewer, Best Buy/Home Depot, Randall Road	South Elgin
81	**URBAN**	Work with strip mall owner to install retrofit water quality BMPs to reduce total runoff and/or parking lot pollutants prior to discharge into downstream storm sewer, Caputos, Randall Road.	South Elgin
82	**URBAN**	Work with strip mall owner to install retrofit water quality BMPs to reduce total runoff and/or parking lot pollutants prior to discharge into downstream storm sewer, Kohls, Randall Road.	South Elgin
83	**URBAN**	Work with strip mall owner to install retrofit water quality BMPs to reduce total runoff and/or parking lot pollutants prior to discharge into downstream storm sewer, TRU/Ross, Randall Road.	South Elgin
84	**URBAN**	Re-grade w/Stone Toe &/or Gabion at survey stations: 5450-5570, 5980-6100, 9440-9500, and 10300-10630. This is 5 separate projects. Project details for each project (station, length, erosion, action, cost, and priority) in Attachment A. Total feet: 610. Accumulative cost estimate: $91,500-$197,250.	South Elgin

Appendix B

Comparative municipal ordinance review results from Center for Watershed Protection's Codes and Ordinance Worksheet (COW).

	COMMUNITY A	SCORE	COMMUNITY B	SCORE	COMMUNITY C	SCORE	COMMUNITY D & E	SCORE	CENTER FOR WATERSHED PROTECTION COW[1]	MAX SCORE
Street width (local access)	24′	0	26′	0	N/A	0	>22	4	**18-22′**	4
Queuing	No	0	No	0	N/A	0	No	0	**Yes**	3
Street length	Yes	1	No	0	N/A	0	Yes	1	**Minimize**	1
ROW width for minor roads	66′	0	66′	0	N/A	0	66′	0	**<45′**	3
Allow utilities under paved part of ROW?	Yes	1	Yes	1	N/A	1	Yes	1	**Yes**	1
Culs-de-sac radii	60′	0	45.5′	0	N/A	0	60′	0	**<35′ or <45′**	3
Require landscaped island?	Yes	1	Yes	1	N/A	1	Yes	1	**Yes**	1
Allow alternative turn-arounds?	Yes	1	No	0	N/A	0	Yes	1	**Yes**	1
Curb and gutter required?	No	2	Yes	0	N/A	0	No	2	**No**	2
Established swale criteria?	Yes	2	Yes	2	N/A	0	Yes	2	**Yes**	2
Parking ratio, professional office	4.0	0	3.0	0	N/A	0	2.5	1	**<3**	1
Parking ratio, shopping center	5.0	0	4.0	1	N/A	1	3.3	1	**<4.5**	1
Parking ratio, single family detached	4.0	0	2.0	1	N/A	1	2.0	1	**<2**	1
Max rather than min?	No	0	No	0	N/A	0	No	0	**Yes**	2
Promote shared parking?	Yes	1	Yes	1	N/A	1	Yes	1	**Yes**	1
Provide model shared parking agreements?	No	0	No	0	N/A	0	Yes	1	**Yes**	1
Reduce parking ratios w/ shared parking?	No	0	Yes	1	N/A	1	Yes	1	**Yes**	1
Parking ratio reduced near transit?	No	0	No	0	N/A	0	Yes	1	**Yes**	1
Parking stall width	9′	1	9′	1	N/A	1	9′	1	**<9**	1
Stall length	18.0	1	18.0	1	N/A	0	18′	1	**<18**	1
Smaller dimensions for compact cars?	No	0	No	0	N/A	0	No	0	**Yes**	1
Pervious area for spillover parking?	Yes	2	Yes	2	N/A	2	Yes	2	**Yes**	2
Incentives for structured parking?	Yes	1	No	0	N/A	1	No	0	**Yes**	1
Minimum landscaping for parking lots?	Yes	2	Yes	2	N/A	2	Yes	2	**Yes**	2
Bioretention islands allowed?	Yes	2	Yes	2	N/A	2	Yes	2	**Yes**	2
Cluster development allowed?	Yes	3	No	0	N/A	3	Yes	3	**Yes**	3
Land conservation or impervious cover a major goal of open space design ordinance?	Yes	1	—	0	N/A	0	Yes	1	**Yes**	1
Additional submittal or review requirements for CD?	No	1	—	0	N/A	1	No	1	**No**	1
By-right form of development?	No	0	—	0	N/A	0	Yes	1	**Yes**	1
Flexible site design criteria?	Yes	2	—	0	N/A	2	Yes	2	**Yes**	2
Irregular lot shapes allowed?	Yes	1	No	0	N/A	1	Yes	1	**—**	1
Front setback for 0.5 acre residential lot	25.0	0	40.0	0	N/A	0	35′	0	**<20′**	1
Rear setback for 0.5 acre residential lot	30.0	0	50.0	0	N/A	0	35′	0	**<25′**	1
Min. side setback for 0.5 acre residential lot	7.5	1	10′-15′	0	N/A	0	10′	0	**<8′**	1
Frontage for 0.5 acre residential lot	75.0	2	100′-125′	0	N/A	0	125′	0	**<80′**	2
Min. sidewalk width	4.0	2	4.0	2	N/A	2	4.0	2	**<4′**	2

Required on both sides of street?	No	2	Yes	0	N/A	0	No	2	**No**	2
Sloped to drain to yard, not street?	No	0	No	0	N/A	0	No	0	**Yes**	1
Substitute alternate pedestrian networks?	Yes	1	No	0	N/A	1	Yes	1	**Yes**	1
Minimum driveway width?	18.0	2	—	?	N/A	2	18′	2	**<9′**	2
Can pervious materials be used?	Yes	2	Yes	2	N/A	2	Yes	2	**Yes**	2
Use two-track design?	No	0	Yes	1	N/A	1	Yes	1	**Yes**	1
Shared driveways permitted in residential developments?	Yes	1	Yes	1	N/A	0	Yes	1	**Yes**	1
Require association to manage common open space?	Yes	2	No	0	N/A	2	Yes	2	**Yes**	2
Require consolidation of open space?	Yes	1	No	0	N/A	0	Yes	1	**Yes**	1
Keep percentage of open space in natural condition?	No	0	No	0	N/A	0	Yes	1	**Yes**	1
Uses defined for open space?	Yes	1	Yes	1	N/A	0	Yes	1	**Yes**	1
Allow management of open space by third party?	Yes	1	Yes	1	N/A	1	Yes	1	**Yes**	1
Discharge roof runoff to yard?	Yes	2	Yes	2	N/A	2	Yes	2	**Yes**	2
Allow temporary ponding on yard or roof?	Yes	2	Yes	2	N/A	2	Yes	2	**Yes**	2
Stream buffer ordinance?	Yes	2	Yes	2	N/A	2	Yes	2	**Yes**	2
Minimum buffer width?	—	—	—	—	N/A	0	15′	—	**<75′**	1
Include wetlands, steep slope, and floodplain?	Yes	1	Yes	1	N/A	1	Yes	1	**Yes**	1
Require native vegetation in buffer?	Yes	2	Yes	2	N/A	2	Yes	2	**Yes**	2
Ordinance outline allowable uses in buffer?	Yes	1	Yes	1	N/A	1	Yes	1	**Yes**	1
Buffer ordinance specifies education and enforcement?	Yes	1	Yes	1	N/A	0	Yes	1	**Yes**	1
Preserve natural vegetation on residential lots?	Yes	2	Yes	2	N/A	2	Yes	2	**Yes**	2
Clear trees from septic field?	No	1	—	—	N/A	0	No	1	**No**	1
Require tree conservation?	Yes	2	No	0	N/A	2	Yes	2	**Yes**	2
Limits of disturbance on construction plans adequate to prevent clearing?	Yes	1	Yes	1	N/A	1	Yes	1	**Yes**	1
Incentives for conserving non-regulated land?	Yes	2	No	0	N/A	2	No	—	**Yes**	2
Flexibility to meet regulatory requirements?	Yes	2	No	0	N/A	2	Yes	2	**Yes**	2
Require water quality treatment for stormwater?	Yes	2	Yes	2	N/A	0	Yes	2	**Yes**	2
Effective design criteria for BMPs?	Yes	1	Yes	1	N/A	1	Yes	1	**Yes**	1
Discharge stormwater directly into wetland without pretreatment?	No	1	No	1	N/A	0	No	1	**No**	1
Restrict or prohibit development in 100 yr. floodplain?	Yes	2	Yes	2	N/A	2	Yes	2	**Yes**	2
Total		**71**		**44**		**54**		**78**		**100**

1 Center for Watershed Protection, Code and Ordinance Worksheet

Appendix C

Ferson-Otter Creek Watershed Plan Regional Resources

Chicago Wilderness
The Chicago Metropolitan Agency for Planning
The Conservation Foundation
The Delta Institute
Friends of the Fox
Fox River Ecosystem Partnership
Fox River Study Group
Illinois Department of Natural Resources
Illinois Environmental Protection Agency
Illinois State Water Survey
The Morton Arboretum
National Council for Public Partnerships
National Resource Conservation Service
Openlands
Peggy Notebaert Nature Museum
Pizzo & Associates
United States Department of Agriculture
United States Environmental Protection Agency
United States Fish and Wildlife Service
United States Geological Survey
University of Illinois Extension

Local Resources

Equestrian Groups
Faith-based Organizations
Homeowners Associations
Kane County Drainage District
Kane County Farm Bureau
Kane County Forest Preserve District
Kane County Health Department
Kane County Soil & Water Conservation District
Libraries
Park Districts
Parks and Recreation Departments
Property Owners Associations
Sanitary Districts/Wastewater Treatment Plants
Schools
Scouting Organizations
Municipalities
Township Offices

Appendix D

Outreach List for Potential Ferson-Otter Creek Watershed Coalition Members

Campton Township, Highway Commissioner
Campton Township, Parks and Open Space Coordinator
Campton Township, Supervisor
City of Elgin, City Engineer
City of Elgin, City Manager
City of Elgin, Director of Community Development
City of Elgin, General Services Group Director for Public Works
City of Elgin, Mayor
City of Elgin, Parks and Recreation Coordinator
City of Elgin, Parks and Recreation Director
City of Elgin, Senior Engineer
City of St. Charles, City Administrator
City of St. Charles, Mayor
City of St. Charles, President
City of St. Charles, Project Coordinator - Mapping
City of St. Charles, Public Works Director
City of St. Charles, Public Works Engineering Manager
Deer Run East Property Owners Association
Elgin Community College, Managing Director of Facilities
Elgin Township, Supervisor
Forest Preserve District Kane County, Director of Natural Resources
Forest Preserve District Kane County, Executive Director
Fox River Study Group
Geosyntec Consultants
Illinois Department of Natural Resources (IDNR)
IDNR, Ecosystem Administrator
IDNR, Stream Specialist
Illinois State Water Survey
Judson University
Kane County, Board Member
Kane County Environmental Management, Facilities, Subdivisions, and Environmental Resources
Kane County Environmental Management, Subdivision/Project Manager
Kane County Environmental Management, Watershed Engineer
Kane County Farm Bureau, Director
Kane County Forest Preserve District, Director of Planning and Development
Kane County Forest Preserve District, Nature Programs Manager
Kane County, Board Chairman
Kane County, Development
Kane County, Development and Community Services Director
Kane County, Water Resources Director
Kane-DuPage Soil and Water Conservation District, Resource Conservationist
Lake Campton Property Owners Association
Lake Campton Residents
Natural Resources Conservation Service-Kane County
Pizzo and Associates
Private Landowners
St. Charles Park District, Superintendent of Parks and Planning
St. Charles Park District, Director of Parks and Recreation
St. Charles Park District, Manager of Natural Areas
St. Charles Park District, Manager of Nature Programs and Interpretive Services
St. Charles Township, Supervisor
Stony Creek Landowner
The Conservation Foundation Advisory Council Members
The Conservation Foundation Ambassadors
The Conservation Foundation Members
The Windings Subdivision
Thornwood Homeowners Association, President
Trotter and Associates

Village of Campton Hills, Environmental Resource Management Committee
Village of Campton Hills, Plan Commission Chairperson
Village of Campton Hills, Public Works Committee Chairperson
Village of Campton Hills, Village President
Village of Lily Lake, Village Clerk
Village of Lily Lake/ Engineering Resources Association
Village of South Elgin, Community Development Director
Village of South Elgin, Parks and Recreation Director
Village of South Elgin, Planner
Village of South Elgin, President
Village of South Elgin, Public Works Director
Village of South Elgin, Village Administrator
Wild Rose Subdivision
Wills Burke Kelsey Association
Witness Tree Native Landscapes, Inc.

Appendix E

List of Policy and Education and Outreach Recommendations

Appendix F
List of Figures

Appendix G

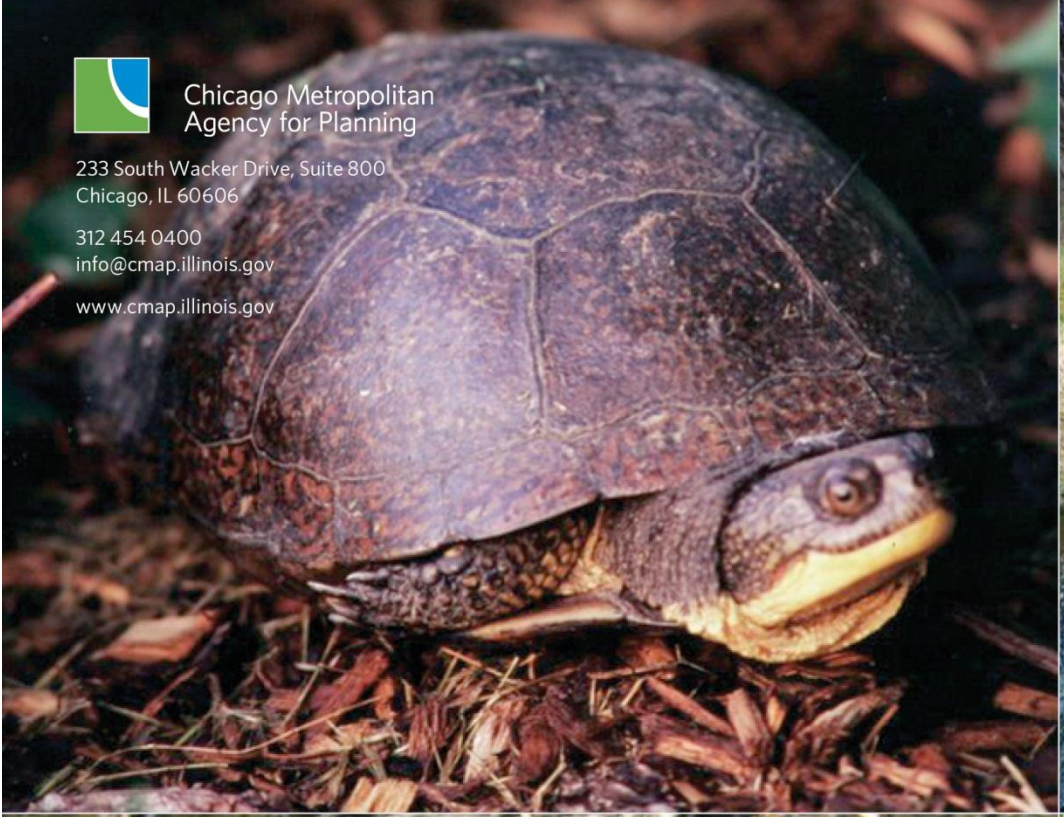
List of Tables

About CMAP

The Chicago Metropolitan Agency for Planning (CMAP) is the region's official comprehensive planning organization. Its GO TO 2040 planning campaign is helping the region's seven counties and 284 communities to implement strategies that address transportation, housing, economic development, open space, the environment, and other quality of life issues. See **www.cmap.illinois.gov** for more information.

Cover image courtesy of Holly Hudson, CMAP

Back cover images courtesy of Holly Hudson, CMAP; Amy Marie Talbot, CMAP; Jack Shouba, Campton Township, Deer Run East HOA; Rob Linke, FREP/FRSG/Deer Run Creek HOA



Chicago Metropolitan
Agency for Planning

233 South Wacker Drive, Suite 800
Chicago, IL 60606

312 454 0400
info@cmap.illinois.gov

www.cmap.illinois.gov

FY12-0059