

CMAP



Policies to Encourage the Preservation of Regional Green Infrastructure

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Introduction

Regional green infrastructure is a planned landscape of important natural areas, parks, and other open spaces linked by open space corridors.¹ The design of a regional green infrastructure network is intended to accomplish two main goals:

1. Conserve environmental quality strategically by protecting the most critical natural areas and conserving connectivity between them while accommodating growth in jobs and households, and
2. Identify areas to protect based partly on the benefits they provide to people, such as flood storage, air emissions reduction, and water quality improvements.

By guiding conservation investment and helping local officials make wise land use decisions, a green infrastructure network can help meet the needs of people and nature. This planning concept has emerged in the last decade or so, championed nationally by The Conservation Fund,² taught by the U.S. Fish and Wildlife Service,³ and developed in many areas around the country.⁴ The concept of green infrastructure draws attention to its similarity to the other infrastructure networks that undergird prosperity. It also suggests that the needed expansion of gray infrastructure networks, like roads and sewer service, should not come at the expense of the green infrastructure.

Locally the Chicago Wilderness alliance, in collaboration with CMAP, has led the effort to identify a regional green infrastructure network for the Chicago area. This effort resulted in a set of GIS data and tools – available at <http://www.cmap.illinois.gov/green-infrastructure> – for conservation organizations, municipal land use planners, developers, transportation engineers, and others in the region to use to protect portions of the regional green infrastructure network that fall within their areas of interest. The green infrastructure GIS dataset defines a minimum level of connected open space that should be planned for and maintained even with growth in the region.

¹ “Green infrastructure” has actually emerged as a term to refer to two different but related planning concepts. As opposed to regional green infrastructure, which is the focus of this paper, site-scale green infrastructure is a suite of practices to handle stormwater that emphasize using vegetation, soils, and natural processes to mimic natural hydrology. These practices are also known as best management practices (BMPs) or low-impact development (LID) techniques.

² Mark Benedict and Edward McMahon (The Conservation Fund), *Green Infrastructure: Linking Landscapes and Communities* (Washington: Island Press, 2006). Similar ideas from the same authors are online in monograph form at <http://www.sactree.org/assets/files/greenprint/toolkit/b/greenInfrastructure.pdf>.

³ <http://training.fws.gov/nctcweb/catalog/CourseDetail.aspx?CourseCodeLong=FWS-CSP3146>

⁴ See <http://greeninfrastructure.net/content/projects> for an inventory.



Green infrastructure is also an important part of GO TO 2040, the region’s comprehensive plan. The plan recommends protecting a significant amount of additional conservation land in the region using a green infrastructure approach. Moreover, the plan noted that “coordinated investment in land protection will be necessary to achieve this [goal]. Forest preserve and conservation districts, the state, and private funders should all prioritize land preservation within the green infrastructure network. Municipalities and the state should harmonize policies to promote the preservation of green infrastructure.”⁵

The purpose of this paper is to explore in more detail how this can be done. Its guiding idea is to follow an “all of the above” strategy – any agency or organization involved in conservation or urban development has a role to play in preserving green infrastructure. In what follows, a variety of policy mechanisms are proposed to preserve the green infrastructure network identified in the data at <http://www.cmap.illinois.gov/green-infrastructure>.

Policy Applications

Transportation Programming and Project Development

Transportation projects can work against the preservation of the green infrastructure network either by direct construction impacts or by encouraging spinoff development (that is, a new facility improves access to a parcel, which makes it a more attractive place to live or work). There is an extensive literature on both.⁶ These effects are probably relatively small compared to total impacts from development in the region, but they are they are important in the area of the project.

Transportation project implementers must comply with a number of environmental requirements, such as federal restrictions on filling wetlands, jeopardizing endangered species, and using parkland for right-of-way. In very broad terms, federal law requires project implementers to avoid impacts to regulated resources, minimize the impacts they do cause, and to compensate for unavoidable impacts. Since the identified regional green infrastructure network contains wetlands, endangered species habitat, and so forth, part of it already receives this protection. Approximately 60 percent is under some form of protection,⁷ but the remainder

⁵ Expand and Improve Parks and Open Space section, p. 127, <http://www.cmap.illinois.gov/2040/open-space>

⁶ For an overview of impacts from project construction and operation, see <http://www.epa.gov/compliance/resources/policies/nepa/ecological-impacts-highway-development-pg.pdf>. For an example of studies of induced development, see http://www.knowledgeplex.org/kp/text_document_summary/scholarly_article/relfiles/hpd_1203_boarnet.pdf.

⁷ This includes protection through ownership and deed restriction by a public or private organization with a conservation mission and regulatory restrictions on filling wetlands and floodplains. It also includes open water, which is part of the green infrastructure network but is considered undevelopable.



is not -- yet this remainder is critical to maintain the connectivity of the green infrastructure system. It also may be critical for watershed protection or recharge area protection, without which the regulated resource may not really be conserved. Thus something more is needed to address the remaining area. The following two recommendations for project implementers and regulatory agencies are designed to protect the green infrastructure network by adapting the process they already use to meet their obligations under federal environmental law:

1. Evaluate – Review impacts on the regional green infrastructure network as part of normal project-level environmental documentation;
2. Replace – Compensate for regional green infrastructure that is impacted by construction if doing so is not already required by law.

Additionally, the green infrastructure network could be examined earlier in the project development process. In an early phase referred to as *programming*, transportation agencies must evaluate and prioritize projects at a high level and identify funding for them. At this stage projects should be compared to determine which are likely to have relatively greater effects on the green infrastructure network than others. This is also the area where CMAP should play the largest role.

3. Prioritize – Consider relative effects on the green infrastructure network when evaluating potential transportation investments at the programming stage.

The remainder of this section focuses on these three areas of application in more detail, beginning with review at the project level and returning to the higher-level investment decisions made at the programming stage. This paper mostly discusses federal requirements, but in many cases there are additional review processes at the state level for which it may be relevant to consider green infrastructure.

Evaluate

Transportation implementers can satisfy the project-level evaluation recommendation by reviewing impacts on the green infrastructure network as part of the analysis required under the National Environmental Policy Act (NEPA) for projects using federal funding or requiring a federal permit. NEPA generally requires implementers to develop an environmental impact statement (EIS) or environmental assessment (EA).⁸ The analysis would be similar to the analyses carried out for wetland impacts, floodplain encroachments, parkland impacts, etc. with the amount of impact tabulated for each alternative.

Federal agencies should set an expectation during scoping that the green infrastructure network is to be considered as part of NEPA documentation. While all federal agencies with jurisdiction or expertise related to project impacts have a duty to comment on NEPA documents, the U.S.

⁸ For a tiered EIS process, the analysis should be carried out in Tier I given the relatively low resolution of the dataset.



Environmental Protection Agency (USEPA) has a special review responsibility.⁹ In Illinois, the office responsible is the USEPA Region 5 NEPA Implementation Section.¹⁰ By law, USEPA's reviews are to focus on whether or not a project is environmentally unsatisfactory and whether the EIS itself is of acceptable quality. Since EISs are to consider "possible conflicts between the proposed action and the objectives of ... land use plans, policies and controls for the area concerned,"¹¹ comments by Region 5 can help protect the green infrastructure network by specifically assessing (a) whether environmental documents adequately account for impacts to it in each alternative and (b) whether adequate replacement or other mitigation effort is proposed.

The intent to review these two elements in NEPA documents can be conveyed to project implementers through normal consultation and scoping. Furthermore, the regional green infrastructure dataset should be hosted on NEPAAssist,¹² a web-based tool for identifying potential project impacts. While the tool is national in scope and uses nation-wide datasets, it also generates reports based on datasets submitted by the USEPA regional offices. With very little effort, NEPAAssist could provide project implementers with a planning-level estimate of the amount of the green infrastructure network affected by a proposed project.

The U.S. Fish and Wildlife Service (USFWS) and the U.S. Army Corps of Engineers (USACE) are the other federal agencies most often involved in NEPA review on transportation projects in the Chicago region. Reviews from the USFWS typically concentrate on the protection of migratory bird habitat, evaluating impacts on aquatic life, and avoiding and minimizing damage to other natural resources. Besides this, USFWS also has the responsibility to review federally funded projects under the Endangered Species Act, and these are generally carried out during the overall NEPA process. The Army Corps, by contrast, focuses more narrowly on proposed impacts to water resources, including wetlands. Both agencies should consider the regional green infrastructure network in their NEPA reviews. The resources they regulate are generally included within the input data used to delineate the green infrastructure network.

Replace

Project implementers can satisfy the "replace" recommendation by developing and following an internal policy to compensate for disturbance to the green infrastructure network. In the case of IDOT, this would likely be either an update to its *Bureau of Design and Environment Manual*¹³ or a standalone agency policy. The Illinois Tollway, transit operators, and other agencies have

⁹ Authorized at 42 USC §7609 (i.e., Section 309 of the Clean Air Act).

¹⁰ See <http://www.epa.gov/Region5/enforcement/nepa.html> for information specific to Region 5 and a database of EISs and USEPA comments on EISs from the Chicago region.

¹¹ 40 CFR 1502.16 (<http://ceq.hss.doe.gov/nepa/regs/ceq/1502.htm#1502.16>)

¹² <http://nepassisttool.epa.gov/nepassist/entry.aspx>

¹³ <http://dot.state.il.us/desenv/bdmanual.html>

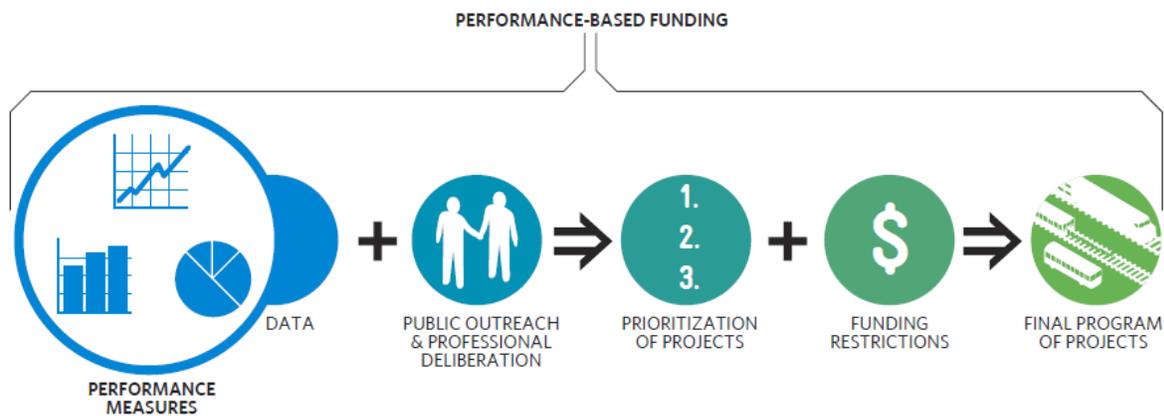


different guidance documents. A possible model is IDOT’s Preservation and Replacement of Trees¹⁴ policy. Replacing trees removed during road construction is not mandated by law, yet its importance is widely recognized. Most essentially, a regional green infrastructure preservation and replacement policy would stipulate that for each acre of regional green infrastructure impacted, an equal or greater acreage should be protected by acquisition or easement elsewhere in the identified network. The policy would describe how to go about selecting these “target” areas and would emphasize partnerships with IDNR, the forest preserve and conservation districts, and private conservation organizations. Other provisions could allow for ecological restoration to meet the policy’s goal of preserving/replacing regional green infrastructure. The policy would presumably promote “in-kind” replacement, with savannah replaced by savannah, for instance, rather than savannah by wetlands. Replacement of regional green infrastructure would be a form of environmental mitigation, which is eligible for federal funding.

Prioritize

Transportation implementers can apply the “prioritize” recommendation through a performance-based programming process, in which performance measures are used to select projects for funding. These data are used as part of a transparent, public process that also relies on the professional judgment of planners and engineers. Project scores are built from quantitative and qualitative input and then reconciled against available funds (Figure 1). The green infrastructure network could be formalized into a performance-based funding process as well. This may be implemented by various programmers -- the Councils of Mayors, counties, IDOT, transit agencies, and others – and CMAP should also play a significant role as well.

Figure 1. Performance-Based Funding



Note: This image illustrates that performance measures are a form of data, and just one component of a larger performance-based funding process.
Source: Chicago Metropolitan Agency for Planning.

¹⁴ D&E-18, September 6, 2002. Available at <http://www.dot.state.il.us/desenv/depolicy.pdf#page=40>



For a general example of performance-based funding, the North Carolina Department of Transportation (NCDOT)¹⁵ is recognized as a national leader in the area. NCDOT scores projects using transparent evaluation criteria tailored to broad programmatic categories (e.g., highway expansion, highway modernization, bicycle and pedestrian projects). NCDOT provides for local stakeholders to provide formal input into the scoring process, and places more weight on these local preferences for projects of regional and subregional scale. Final project scores are available from the NCDOT website,¹⁶ and a screenshot of the simplified highway scores is presented in Figure 2.

Figure 2. NCDOT Prioritization 2.0 Results

Description	Scoring Category	Congestion Points	Safety Points	Pavement Points	Benefit Cost Points	Econ. Comp. Points	Lane Width Points	Shoulder Width Points	Weighted Total Quantitative Point
Hayden Way to Krefeld Dr. Upgrade corridor to provide additional capacity and safety. Feasibility Study underway.	Mobility-Statewide	100.00	66.53	63.00	18.94	27.02			39.44
Krefeld Dr to Village Lake Dr. Upgrade corridor to provide additional capacity and safety. Feasibility Study underway.	Mobility-Statewide	100.00	66.53	63.00	11.28	6.34			35.84
NC 51 to Hayden Way. Upgrade corridor to provide additional capacity and safety. Feasibility Study underway.	Mobility-Statewide	100.00	66.53	35.00	13.53	24.79			35.34
SR 5544 (West Catawba Avenue) to I-40. Widen and Reconstruct Roadway. Section A: SR 5544 (West Catawba Ave) to US 21 in Iredell County).	Mobility-Statewide	100.00	77.62	0.00	31.73	70.36			41.14
Village Lake Dr to Conference Dr. Upgrade corridor to provide additional capacity and safety. Feasibility Study underway.	Mobility-Statewide	85.84	88.71	43.00	7.42	13.57			33.18

There are two main alternatives by which to take the green infrastructure network into consideration during programming. First, proposed projects could be “flagged” if they cross the green infrastructure network. This approach would not affect a project’s score, but would alert the programming agency to the potential for negative impacts. Policy-makers would then consider that information during the public deliberation process. Second, proposed projects could receive a reduction in their scores if they would potentially impact the green infrastructure network. This reduction in score could be proportional to the potential amount of impact and possibly to the quality or significance of the resource affected. It would reduce the overall assessment of a project’s performance, making a project rank lower than it otherwise would have.

This second approach figured in CMAP staff’s recent evaluation of the proposal to amend GO TO 2040 to include the Illiana Expressway (Figure 3).¹⁹ Staff estimated the acreage of green

¹⁵ NCDOT Strategic Prioritization Process, <http://www.ncdot.gov/performance/reform/prioritization/>

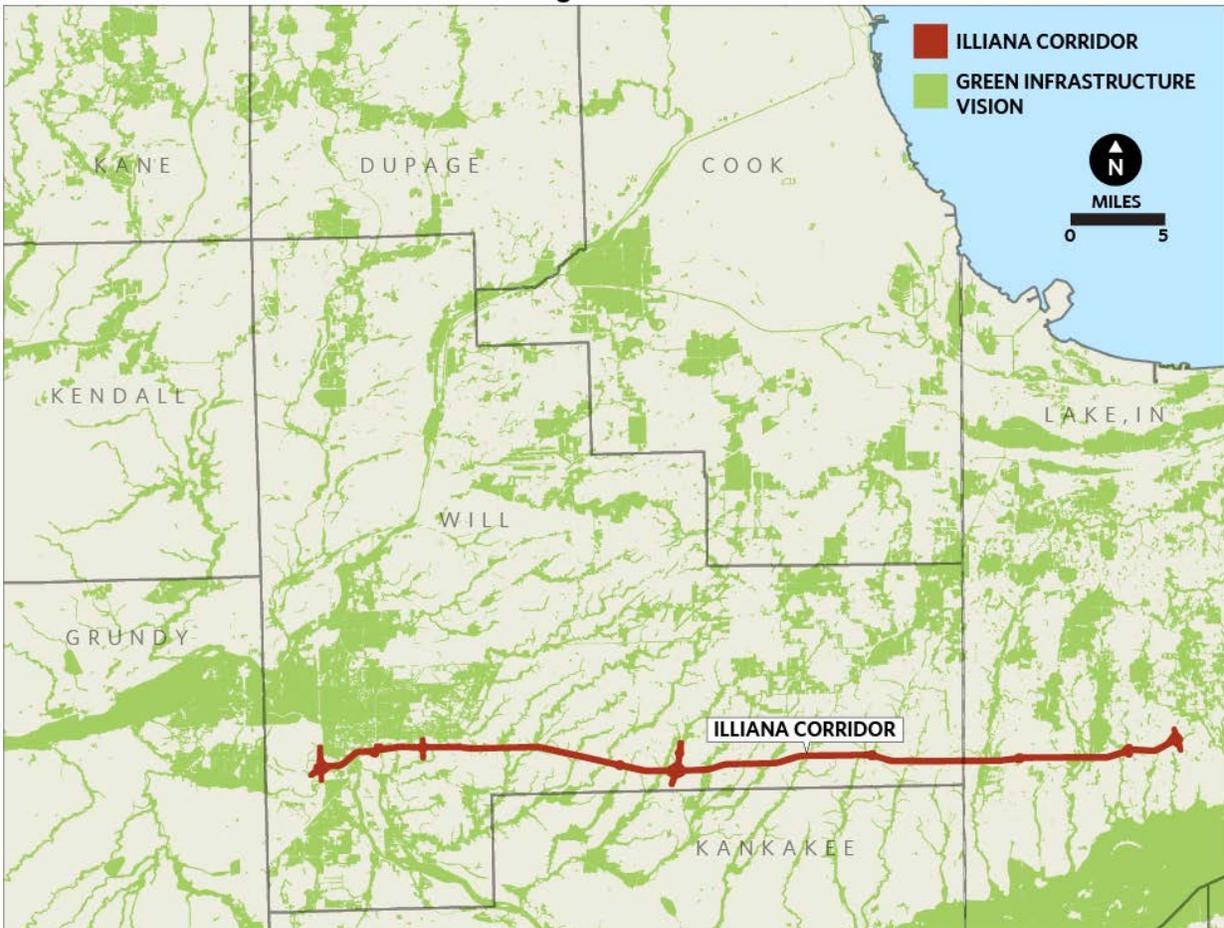
¹⁶ NCDOT, Prioritization 2.0 Results, <http://www.ncdot.gov/download/performance/P2DataFinalScores/zip>

¹⁹ [Illiana Corridor Major Capital Project Evaluation](#), July 30, 2013 memo from staff to CMAP Transportation Committee



infrastructure that could be directly affected by construction of the road and also estimated the amount of spinoff residential development that could affect the green infrastructure network. A similar evaluation could be carried out at scale, with many projects in a program ranked by their potential impact. Most projects will be much smaller than the Illiana or any other new expressway project, with correspondingly smaller impacts, but the ranking should allow decision-makers to develop a sense of environmental impacts at a glance.

Figure 3. Illiana Corridor in the Context of the Chicago Wilderness Green Infrastructure Vision



Source: Chicago Metropolitan Agency for Planning analysis.

Over the next few months CMAP will be engaged in developing a process for evaluating programs of projects according to specified performance measures, including environment and conservation criteria. This work will eventuate in a technical procedure for staff to use as well as potentially a policy for consideration by the CMAP governing boards that would guide how decision-makers should use the project scores. Such an evaluation must be nuanced and the resulting scores interpreted with caution. The reasons are as follows. First, relatively little design detail may be available at the programming stage, so the actual extent of construction disturbance will be unknown. Second, different project categories could be expected to have



different levels of impact – a road reconstruction project versus the addition of a lane. Some objective account needs to be taken of these differences, most likely by generalizing findings from the road ecology literature. Third, thoughtful design and construction practices may ameliorate many impacts.

Compensatory Wetland Mitigation

Background

Federal policy for several decades has been to ensure no net loss of wetlands. One aspect of this policy is the regulation of wetland filling²² under Section 404 of the Clean Water Act, which requires a permit from the USACE. The permits require an applicant to adhere to a “mitigation sequence” by demonstrating that wetland impacts from a project have been avoided to the extent possible, that unavoidable impacts have been minimized, and that any remaining impacts will be compensated. The application process requires submission of a mitigation plan for review by USACE. The Chicago District of the Army Corps handles permit review for northeastern Illinois.

This section explores the role that the identified green infrastructure network could play in helping to target – that is, select types and locations of -- compensatory wetland mitigation activities. Locating such projects within a larger area expected to be preserved and restored over time may improve the chances that compensatory mitigation will be successful over the long run. The regional green infrastructure data would also help meet the intent of current mitigation regulations.²³ By the same token, steering these wetland mitigation projects into the regional green infrastructure network helps “build out” the network – it is another form of conservation investment -- and can be done in such a way that other public benefits, such as recreational opportunities, are realized.

Program Details

Using the green infrastructure data in Section 404 permit reviews would have a specific regulatory rationale. Current USACE regulations for selecting compensatory mitigation sites require consideration of habitat connectivity, land use trends, and compatibility with adjacent

²² Technically, the Clean Water Act restricts the discharge of dredge or fill material into waters of the United States, including wetlands. Regulated activities include land clearing, grading, leveling, ditching, and redistribution of material such that they impact waters of the United States. For ease of discussion, this section focuses on wetlands, but other water resource impacts are relevant as well; the green infrastructure network could also help target stream mitigation activities.

²³ Compensatory Mitigation for Losses of Aquatic Resources; Final Rule. 73 Fed. Reg. 19594 (April 10, 2008). See http://water.epa.gov/lawsregs/guidance/wetlands/upload/2008_04_10_wetlands_wetlands_mitigation_final_rule_4_10_08.pdf or 33 CFR 325 and 332.



uses.²⁴ As the green infrastructure data identify actual or potential areas of connected habitat, overlaying these data on a set of potential mitigation sites would help determine which best serve the intent of the regulations. As for land use trends, the green infrastructure network defines a minimum level of connected open space that should be planned for and maintained even with urban growth. Other things being equal, then, a potential mitigation site within the identified green infrastructure network would have a better chance of seeing its surroundings remain in an undeveloped condition than one outside it.

Practically speaking, how could the green infrastructure data be used in the program? The three legal mechanisms for compensatory mitigation are for the applicant to purchase credits at a wetland mitigation bank, to contribute to an in-lieu fee to be used by another party for mitigation projects,²⁵ or for the applicant to undertake a mitigation project himself or herself (“permittee-responsible mitigation”). Thus, an important approach is for the USACE Chicago District to encourage mitigation bank developers and applicants proposing permittee-responsible mitigation to locate their compensatory mitigation projects within the green infrastructure network (in addition to complying with any other requirements). The green infrastructure dataset includes a GIS model indicating regional priority areas for wetland conservation and restoration. The USACE Chicago District should encourage the use of these data for mitigation under a watershed approach and for both onsite and offsite mitigation,²⁶ with the understanding that locating a mitigation project within the green infrastructure network may or may not be practicable depending on the size and location of the site.

To communicate the availability and recommended use of the data to permit applicants or bank developers, the USACE Chicago District should post a link to the green infrastructure data, possibly under the “Local Initiatives” section on the “Table of Contents for Projects in Illinois” section.²⁷ The green infrastructure dataset could also be provided on the RIBITS (Regulatory In lieu fee and Bank Information Tracking System) website²⁸ used to track mitigation activities. An explicit encouragement to use the data could be added to application checklists for the permit applications.

Very large development projects, such as highways or airports, are occasionally undertaken in the Chicago region that have extensive impacts and create a need for hundreds of wetland

²⁴ Other considerations include the principles that mitigation is supposed to occur within the same 8-digit watershed where the impact occurred and that mitigation is supposed to replace the lost functions and values of the specific wetlands that were impacted.

²⁵ The Chicago District has not permitted any mitigation through in-lieu fees.

²⁶ In permittee-responsible mitigation, the regulations express a ranked preference for selecting projects based on a watershed plan, for onsite mitigation, then for offsite mitigation. The regulations also express a preference for in-kind mitigation over out-of-kind mitigation (that is, for projects that specifically replace lost wetland functions rather than projects that provide some other resource, like upland restoration).

²⁷ <http://www.lrc.usace.army.mil/Missions/Regulatory/Illinois/TableofContents.aspx>

²⁸ <http://geo.usace.army.mil/ribits/index.html>



mitigation credits. In these cases, the USACE Chicago District sometimes facilitates mitigation efforts by working with partners on a call for projects to identify a set of offsite opportunities to satisfy the need for mitigation credits. The projects proposed are often on property owned by forest preserve or conservation districts or other land management organizations. Elements of the Spring Creek Greenway project discussed below were funded through a call for projects to mitigate impacts associated with the O'Hare Modernization Project. When the USACE Chicago District approaches permitting this way, it should specify that mitigation opportunity sites be located within the green infrastructure network.

Examples

A powerful example of what can be achieved is the Spring Creek Greenway, a corridor of protected and partly-restored land owned by the Forest Preserve District of Will County. A portion of the greenway was purchased, and major restoration projects were undertaken, with funding from the Illinois Tollway to meet wetland permit requirements associated with construction of the I-355 south extension, completed in 2007.²⁹ The Tollway transferred land to the Forest Preserve District for the Hadley Valley Preserve within the greenway, which includes several miles of multi-use trail and enhancements providing 40 acres of mitigation credit paid for by the Tollway.³⁰ Major stream restoration and naturalization was also undertaken elsewhere in the Greenway to meet mitigation requirements from the O'Hare Modernization Project. In the Spring Creek Greenway project, a mitigation requirement was leveraged to help protect a corridor of open space. The use of the green infrastructure data could help spur more projects like this. While this example is from the transportation sector, similar principles could apply to the mitigation projects required for private development.

In Maryland, the Maryland State Highway Administration contracted with The Conservation Fund (TCF) and others to develop a system to assess the suitability of sites for mitigation within a network of conservation lands for the US 301 highway bypass project.³¹ The basic approach in that analysis was the same as was used for the Chicago Wilderness green infrastructure network; the GIS models developed for that analysis could readily be used for regional and watershed-based suitability analyses for mitigation projects.

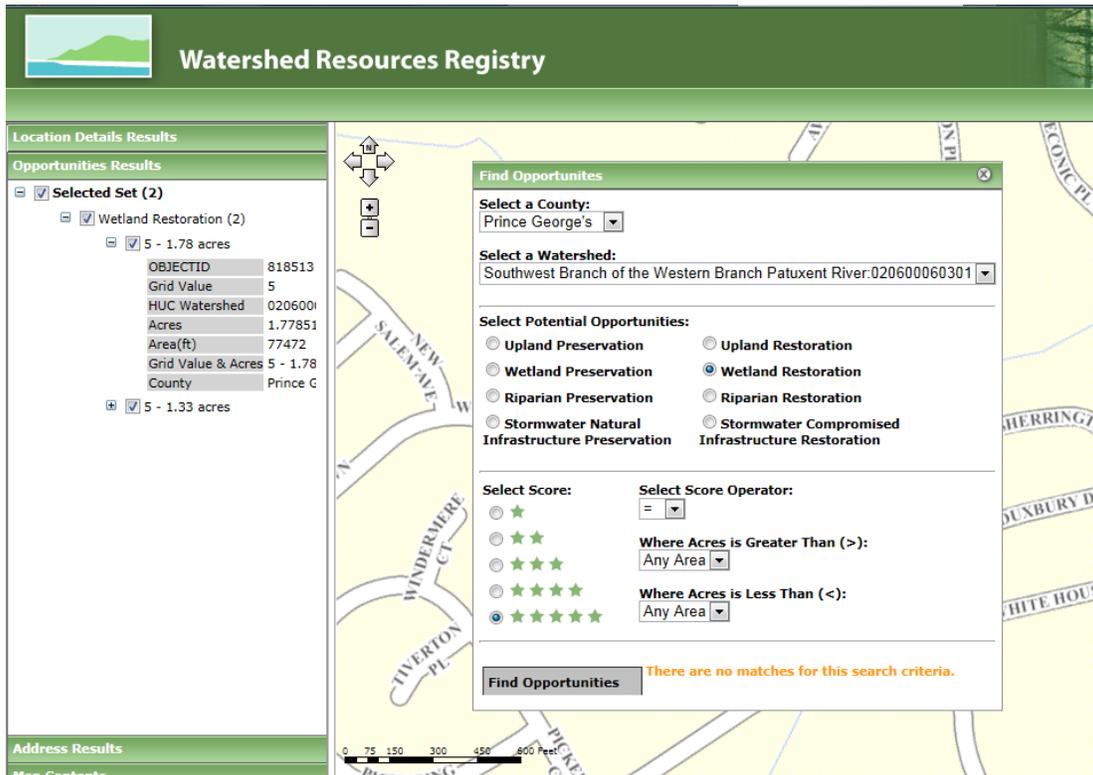
²⁹ See <http://www.reconnectwithnature.org/FileManager/HadleyValley2011.pdf>

³⁰ "Environmental Enhancements 3-6-7-12" presentation, personal communication from Illinois Tollway. Such joint projects are fairly common with the Tollway. Recently the agency struck an agreement with Lake County Forest Preserves to restore wetlands and make other improvements on Pine Dunes Preserve to obtain mitigation credits for wetland impacts from the Elgin O'Hare Western Access project. See Mick Zawislak, "Tollway need could be bonus for Lake County forest district," *Daily Herald*, January 7, 2013. Accessed January 28, 2013, <http://www.dailyherald.com/article/20130107/news/701079731/>.

³¹ Theodore Weber and William Allen. 2010. Beyond on-site mitigation: an integrated, multi-scale approach to environmental mitigation and stewardship for transportation projects. *Landscape and Urban Planning* 96:240-256.



Figure 4. Watershed Resources Registry -- Maryland



Also in Maryland, USEPA Region 3 has collaborated with USACE and other agencies to develop the Watershed Resources Registry (Figure 4). This ambitious web-based tool will identify a set of potential opportunities for restoration or preservation of wetlands, uplands, and riparian areas in watersheds across the state, ranked by acreage and by a measure of ecological value. It will find nearby opportunities based on entering an address. The purpose is for those who are seeking mitigation sites to be able find them readily and for the site selection to be based on scientifically valid, consistent regional criteria. The underlying method relies on green infrastructure analysis. The Registry seems to be a good example also of the integration of planning and regulatory programs that the present paper is exploring. The website is worth quoting at length:

“The objective of the Registry is to map natural resource areas that are a priority for preservation and to identify sites best-suited for ecosystem preservation and restoration. A major effort of the WRR process is a set of suitability analyses developed with sound science and the best professional judgment of regional experts, which will be used as a screening tool to target opportunity sites for the protection of high quality resources, restoration of impaired resources, and improvement of water resources. The analyses will specifically identify for: Upland Preservation, Upland Restoration, Wetland Preservation, Wetland Restoration, Riparian Preservation, Riparian Restoration, Natural Stormwater Infrastructure Preservation and Compromised Stormwater Infrastructure Restoration. By having both



regulatory and non-regulatory agencies base decisions from a WRR, integration and the use of the watershed approach will become implicit and 'stovepipe' processes in decision making will become obsolete. The results will streamline the regulatory and non-regulatory processes and ensure maximum environmental results."³²

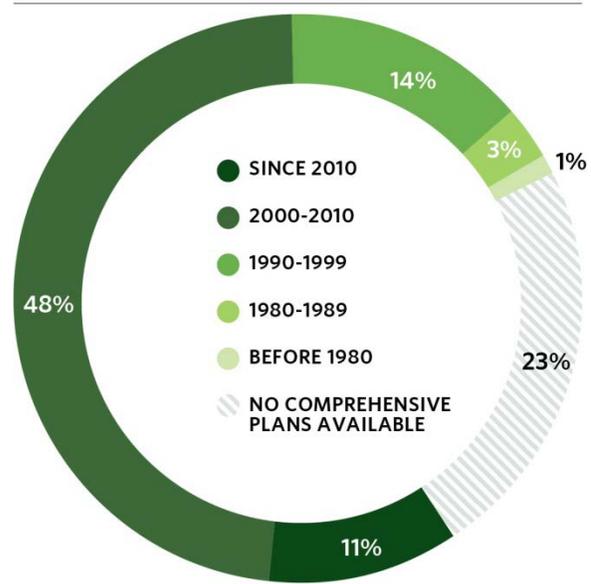
Municipal Comprehensive Plans and Other Local Planning

The chief planning tool a municipality uses to guide its future growth and development is the local comprehensive plan or general plan.³³ It typically has a horizon of 10 – 15 years and makes recommendations in the areas of land use, transportation and circulation, residential areas, community facilities, and parks and open space. Most municipalities in the Chicago area have one, although many plans are in need of an update (Figure 5). One of the most critical implementation steps for the green infrastructure network is for municipalities to incorporate it into their comprehensive plans. Given that most every plan will need to address the resources included in the green infrastructure network, the practical advantage for planners is that the green infrastructure dataset puts them all in one place for ease of use.

Ideally, all municipal comprehensive plans going forward would include an identification of the regional green infrastructure network within the 1.5-mile municipal planning area, supplemented by local natural resource data if available. Specific policy recommendations to protect the green infrastructure network should also be part of the comprehensive plan.

A number of municipalities and counties are now undertaking local green infrastructure mapping projects, usually separate from a comprehensive planning process but meant to eventually be incorporated into a comprehensive plans. They may use different definitions and different data sources that were used to develop the green infrastructure dataset, but this can be to the good, since better local data may be available in some places and local priorities may be different. At their beginnings, however, many local green infrastructure mapping projects become mired in questions about data availability, what to include, and so forth. This problem can be resolved by promoting the

Figure 5. Dates of publication for local comprehensive plans in the Chicago area



Source: Chicago Metropolitan Agency for Planning.

³² <http://watershedresourcesregistry.com/overview.html>

³³ See 65 ILCS 5/11-12-4.



regional green infrastructure data as a minimum³⁴ that can be supplemented as suitable with local data.

Recommendations for CMAP Programs

Besides its responsibilities in transportation programming, which are discussed above, CMAP also carries out several other programs in which the green infrastructure should be considered. The most important of these are discussed below.

Local Technical Assistance Program

CMAP administers a Local Technical Assistance (LTA) program³⁵ to aid local governments in the region with planning work, mostly through staff assistance. The program holds a periodic call for projects and then assigns them priority for assistance based on need, project readiness, and so forth. Comprehensive plans are typically a major part of the overall slate of projects, but sustainability plans and neighborhood plans are also proposed. For LTA projects that have an open space dimension of any kind, CMAP should treat the regional green infrastructure network as the starting point or baseline. It can and should be supplemented with local data if these are available, but the regional network should be shown on open space and land use maps in the plan and identified as the “Chicago Wilderness regional green infrastructure network,” followed by the most recent version number. Consideration should be given to recommending specific policies in the comprehensive plan, examples of which are listed in the previous section, that would tend to protect the green infrastructure network.

Regional Demographic Projections

Regional planning agencies traditionally provide demographic projections for use in local planning or as inputs for traffic forecasting. These projections can be developed in a number of ways, from simple trend-based projections to a very detailed analysis of local development patterns. A significant feature of CMAP’s forecasts is that, while they reflect well-understood growth trends, they also account for the effect of implementing the projects and policies recommended in GO TO 2040.³⁶ Since one recommendation of GO TO 2040 is to protect a significant amount of additional conservation open space by 2040, the forecasts assume a certain amount of land protection in specific places within the region, which affects the forecasted distribution of urban activity. The locations where land protection is assumed to take place were selected based on an older scoring system developed by the Northeastern Illinois Planning

³⁴ Several of the landscape types that comprise the green infrastructure network are only shown if they are 50 acres or greater in size.

³⁵ See <http://www.cmap.illinois.gov/lta/> for more details.

³⁶ See *CMAP Forecast Principles* (April 2011) at <http://tinyurl.com/apxzqgc>.



Commission in conjunction with Chicago Wilderness.³⁷ Now that the 2040 projections are being updated, CMAP is using the priorities developed in the green infrastructure data instead of the natural resource score.

Facility Planning Area Review

Under the federal Clean Water Act, CMAP has had a long-standing role in reviewing wastewater infrastructure investments in northeastern Illinois. This oversight function is referred to as the Facility Planning Area Amendment review process or simply “FPA process.” Since one purpose of this paper is to help ensure that gray infrastructure expansion -- like sewer service -- does not come at the expense of the green infrastructure network, this section outlines how CMAP should consider the green infrastructure network as part of the FPA review process.³⁸

Most wastewater systems in northeastern Illinois are the responsibility of either municipalities or sanitary districts. The primary regulator of these systems is the Illinois Environmental Protection Agency (IEPA), which issues their discharge permits, certifies their operators, and often provides them financing for construction. However, when the owners of these systems wish to construct or expand a wastewater treatment plant,³⁹ they make an application to CMAP in addition to IEPA. CMAP staff reviews the application against a set of criteria⁴⁰ and offers a recommendation to the CMAP Wastewater Committee, which considers the work of staff and submits its recommendation on the request to the IEPA. The state retains final decision authority, and CMAP’s role in this process is considered advisory to the IEPA.

If an area proposed to be served by a new or expanded plan includes part of the delineated green infrastructure network, the applicant should show CMAP what measures will be used to protect that network. Using an overlay analysis, the applicant should indicate the extent to which the regional green infrastructure network falls within the proposed amendment. The applicant should describe a credible strategy for ensuring that the regional green infrastructure

³⁷ Northeastern Illinois Planning Commission. n.d. *Natural Resource and Socio-Economic Impacts of 2030 Regional Transportation Proposals*.

³⁸ GO TO 2040 asserts that “sewer service should not be permitted in especially sensitive areas of the green infrastructure network.” See Expand and Improve Parks and Open Space section, p. 134, <http://www.cmap.illinois.gov/2040/open-space>

³⁹ Construction and expansion of treatment plants requires the formal amendment of the statewide Illinois Water Quality Management Plan, which is maintained by the Illinois Environmental Protection Agency. This statewide plan in turn incorporates elements of the Areawide Water Quality Management Plan, which the Northeastern Illinois Planning Commission developed following a Governor’s executive order made in 1975 to designate NIPC as the agency responsible for areawide planning under the Clean Water Act. There is also a continuing planning responsibility under a contract with IEPA: actions requiring amendments to the IWQMP are also reviewed by CMAP for consistency with the areawide plan.

⁴⁰ CMAP. n.d. *Review Criteria for Amendment to the Areawide Water Quality Management Plan*. <http://tinyurl.com/ak28bow>



network is legally protected from future disturbance -- which could include such protective measures as an overlay ordinance for green infrastructure protection, a local open space acquisition fund, a conservation design ordinance that permits higher densities in exchange for protecting sensitive areas, among several options – and provide a board resolution indicating its commitment to protecting the regional green infrastructure network.

Both the green infrastructure network data and a description of potential protective measures would be made available to the applicant. This new step to the FPA process should be balanced by eliminating less worthwhile parts of the review (e.g., those that duplicate a review Illinois EPA already performs).

Land Conservation

The region has made remarkable investments in setting aside land for conservation purposes. Since 1990, land holdings by the conservation and forest preserve districts have nearly doubled. Voters have approved \$1.4 billion (in 2012 dollars) in county bond issues for open space since 1999. Private conservation is a strong force, with land trusts owning or holding easements on more than 10,000 acres. Municipalities and park districts continue to add properties to the systems they manage; as more residents seek a nature experience in parks, municipalities and park districts have kept some properties in a natural state and engaged in ecological restoration.

By acreage land conservation has been very successful. However, the guiding purpose has not always been to achieve a connected network of open space. Oftentimes there are significant gaps between conservation areas. GO TO 2040 recommends alignment of their open space programs to protect a connected network of green infrastructure.

There are good examples of how this can be done using the regional green infrastructure data. The Forest Preserve District of Cook County's 2012 update to its Land Acquisition Plan⁴¹ took account of regional data and policies, including the Chicago Wilderness green infrastructure network and the state's Millennium Reserve, to identify Focus Areas for future acquisition. Another example is the effort led by The Conservation Foundation to conserve smaller parcels for open space uses in DuPage County; one of the criteria being used to prioritize sites is whether a parcel is within the regional green infrastructure network. The Grand Victoria Foundation requires land acquisition projects it supports to contribute to a connected system of natural lands (although this is not currently measured by location within the Chicago Wilderness green infrastructure network).

The numerous local, state, and federal agencies and private organizations involved in land conservation may have somewhat different priorities. However, they can all incorporate the regional green infrastructure network in their conservation investment decisions, as follows:

⁴¹ See <http://fpdcc.com/downloads/FPDCC2012LandAcquisitionPlanFinal.pdf>



- Land management agencies that directly acquire or otherwise protect land, such as forest preserve and conservation districts or land trusts, generally have an existing set of criteria used to screen properties. If an existing set of criteria is in use to screen potential properties, location within the green infrastructure network should be added to the criteria and the properties re-screened.
- For agencies or philanthropic organizations that award funding to other entities for land protection, such as the Illinois Clean Energy Community Foundation or Illinois Department of Natural Resources, location within the green infrastructure network should be added to the proposal scoring criteria. For example, on a point-based system of ranking grant applications, location within the network could be given, say, 10 points on an overall score of 100.
- In addition to its regulatory role discussed earlier, the U.S. Fish and Wildlife Service is also investing in the recently designated Hackmatack National Wildlife Refuge⁴² in northern McHenry and Lake Counties (as well as Walworth and Kenosha Counties, Wisconsin). USFWS should assign a certain level of priority to acquisitions or easements within the regional green infrastructure network.

Other State Actions

Illinois Wildlife Action Plan

Under the federal Wildlife Conservation and Restoration Program and the State Wildlife Grants Program, states are required to develop a statewide wildlife action plan to maintain funding eligibility. Some federal funding is targeted using these plans. The 2005 Illinois Wildlife Action Plan has relatively little map detail, but is required to be formally revised in 2015. The regional green infrastructure network should play a significant role in the update to the plan.

EcoCat

The Illinois Department of Natural Resources maintains the EcoCAT website⁴³ (Ecological Compliance Assessment Tool) to help fulfill consultation requirements under state wetland and endangered species protection laws. The website provides a report on natural resource types and quality in the vicinity of a proposed project that has the potential to disturb these resources.

⁴² See <http://www.fws.gov/midwest/planning/Hackmatack/> for more information about the Refuge.

⁴³ <http://dnr.state.il.us/ecocat>



The website also allows informational requests apart from any required consultation, and for these it may be beneficial to include the green infrastructure network as a resource layer.

Conclusion

This paper has examined potential policies, instituted by a variety of different organizations, which could help protect a planned landscape of important natural areas linked by open space corridors. This regional green infrastructure network was defined by Chicago Wilderness (data describing it are available at <http://www.cmap.illinois.gov/green-infrastructure>) in collaboration with CMAP. Protecting the regional green infrastructure network is a key part of implementing the region's comprehensive plan GO TO 2040. Municipalities, land conservation organizations, transportation agencies, CMAP itself, and other organizations should strongly consider adopting policies similar to the ones advocated here that protect the regional green infrastructure network.





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