

Stormwater Infrastructure Training & Maintenance Needs Assessment

Presented to:

Calumet Stormwater Collaborative

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UNIVERSITY OF ILLINOIS
EXTENSION

Sea Grant
ILLINOIS - INDIANA



SEA GRANT

Sea Grant is a federal-state partnership that turns research into action by supporting science-based, environmentally sustainable practices to ensure our coastal communities remain engines of economic growth in a rapidly changing world.

Based at universities across the country, Sea Grant works to provide research, education, and community outreach that help build and grow innovative

businesses along America's oceans and Great Lakes, protect against environmental destruction and natural disasters, and train the next generation of leaders.

The work that the Sea Grant network does earns a 854 percent return on federal investment, creating jobs and ensuring Americans can live near, vacation at, and earn a living from our oceans and Great Lakes for generations to come.

ILLINOIS-INDIANA SEA GRANT

The Illinois-Indiana Sea Grant College Program (IISG) is part of a national network of 33 university-based programs that promote better understanding, conservation, and use of coastal resources.

The program is funded through the National Oceanic and Atmospheric Administration, the University of

Illinois, and Purdue University, but IISG works in partnerships with key organizations, institutions, and agencies in the region to reach more audiences and multiply opportunities for success. We bring together scientists, educators, policy makers, community decision makers, outreach specialists, business leaders, and the general public to work towards a healthy environment and economy.



IMPACTS

ISIG is focused on the southern Lake Michigan region—104 miles of heavily urbanized and industrialized shoreline in Illinois and Indiana. One third of the population of the Great Lakes lives along the shore of Lake Michigan between Milwaukee, Wisconsin and Michigan City, Indiana.

Our work is focused on healthy coastal ecosystems, sustainable fisheries and aquaculture, resilient communities and economies, and environmental literacy and workforce development. Through our extensive and strong partnerships we have made a difference.



\$15 MILLION

In revenue is generated annually by the Indiana aquaculture industry, which supports 280 jobs and grew 5-fold in the last ten years with training and support from IISG.



11,000

Acres of water and shoreline are protected from the economic and societal impacts of invasive species thanks to IISG programs.



20

Communities plan for optimal growth every year through IISG workshops —balancing economic, societal, and environmental needs.



72.7

Tons of medicine in the last eight years were diverted from our waterways and collected for proper disposal by IISG.



38,650

Students each year are learning Great Lakes science from the 300 educators trained annually by IISG.



24,900

Pounds of pesticides will not be applied to lawns in the Great Lakes region each year thanks to IISG's natural lawn care program.



acknowledgements

- Metropolitan Planning Council (MPC), T & M workgroup members (esp. Center for Neighborhood Technology (CNT)), survey & case study participants.
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t & m workgroup

- **Purpose, Mission, and Goal:** To ensure long-term functionality/cost-effectiveness and commitment to stormwater infrastructure by aligning workforce development, training and installation & maintenance capacity within the Calumet Stormwater Collaborative region.

needs assessment - 2016

- (1) established a workgroup planning team
- (2) defined the issue and the target population
- (3) reviewed background information and other needs assessments and
- (4) identified additional data to collect.

issue and target population

- **Issue:** Lack of maintenance of stormwater infrastructure assets (green or gray) over time, and the consequence of this issue declining performance of infrastructure assets.
- Two broadly defined **target audiences**
 - green infrastructure funders and implementers (municipalities and other organizations)
 - providers of green infrastructure installation, maintenance, and training

background

- Many technical resources available
 - *Appendix 1: Example Green Infrastructure Operations and Maintenance Manuals and Checklists and*
 - *Appendix 2: Example Green Infrastructure Outreach Materials for Private Property Owners and the Public.*
 - *Appendix 3: Examples of Green Infrastructure Maintenance Activities for Selected BMPs.*
- Despite widespread availability of technical resources, the delivery of maintenance services is often uneven.

background – top 3 lessons

#1) Maintenance responsibility: Varies by project life and location

#2) Inaccurate budgeting for maintenance work.

- ***Appendix 4: Example Green Infrastructure Maintenance Cost Estimates***

#3) Best practices can be adapted from the wastewater industry (asset management systems).

data to collect

- Additional information about local experiences (Case Studies).
- Training opportunities & existing workforce
 - Ability of the region to meet maintenance demand
- Green infrastructure demand drivers -> associated maintenance demand.
 - Green infrastructure inventory
 - Estimated maintenance costs/labor hours
 - Estimated demand for maintenance labor
 - No GI Inventory available
- Document best practices used by other cities

t & m needs assessment

1. Presents local case studies of green infrastructure in the Calumet region.
2. Catalogs existing green infrastructure training and workforce opportunities
3. Documents best practices used by other cities in connecting green infrastructure to economic development that are potentially transferrable to the Calumet region.
4. Makes recommendations

1. Local case studies

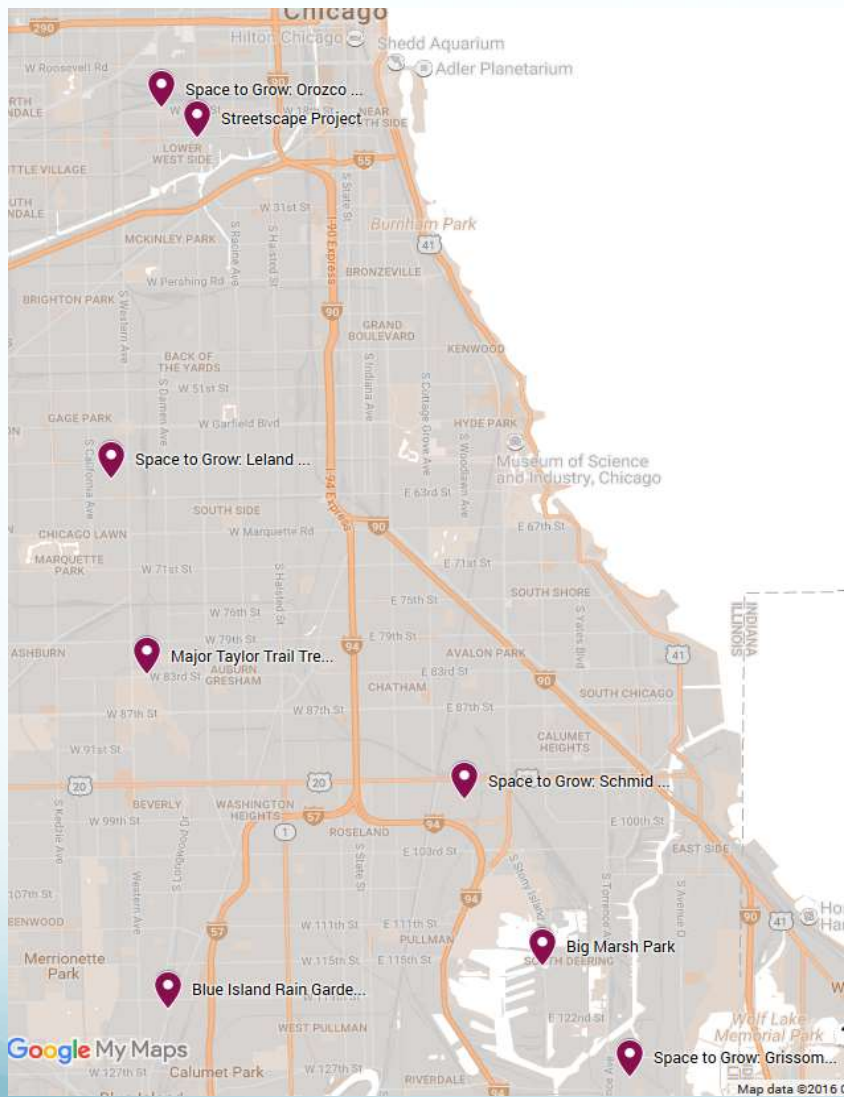
t & m survey design & administration

- Survey designed to gather information on local green infrastructure projects and on case study selection criteria that had been identified by the T&M working group.
 - Pre-tested on working group members.
 - CSC membership - sample of convenience. ~230
 - Target population: individuals involved in green infrastructure implementation within the CSC region.
 - On-line survey open for one month, and two reminders were sent to the respondents. Also paper copy. A total of 18 responses were received (online = 16, paper = 2), half of which (9) were complete. This is a response rate of about 8%, which is very low.
 - Survey data was double-entered into an Excel spreadsheet for analysis.

Appendix 5: Case Study Survey. (copy of survey and summary of results)

t & m survey results

- Respondents were asked about maintenance responsibility and training of maintenance personnel.
- Respondents were asked to think of one project illustrating maintenance successes and challenges and provide a brief description of the project.
- Six respondents indicated they would be willing to be further interviewed about their projects, and five follow-up interviews were conducted.
 - *Appendix 6: Case Study Summaries*



case study insights – top 4

- Projects include maintenance plans, with maintenance responsibility typically contracted out.
- Maintenance training is primarily being provided in-house.
- Green infrastructure case study projects have not yet entered the long-term maintenance period.
- Those providing program oversight are not familiar with the training requirements of maintenance personnel

2. green infrastructure training and workforce opportunities

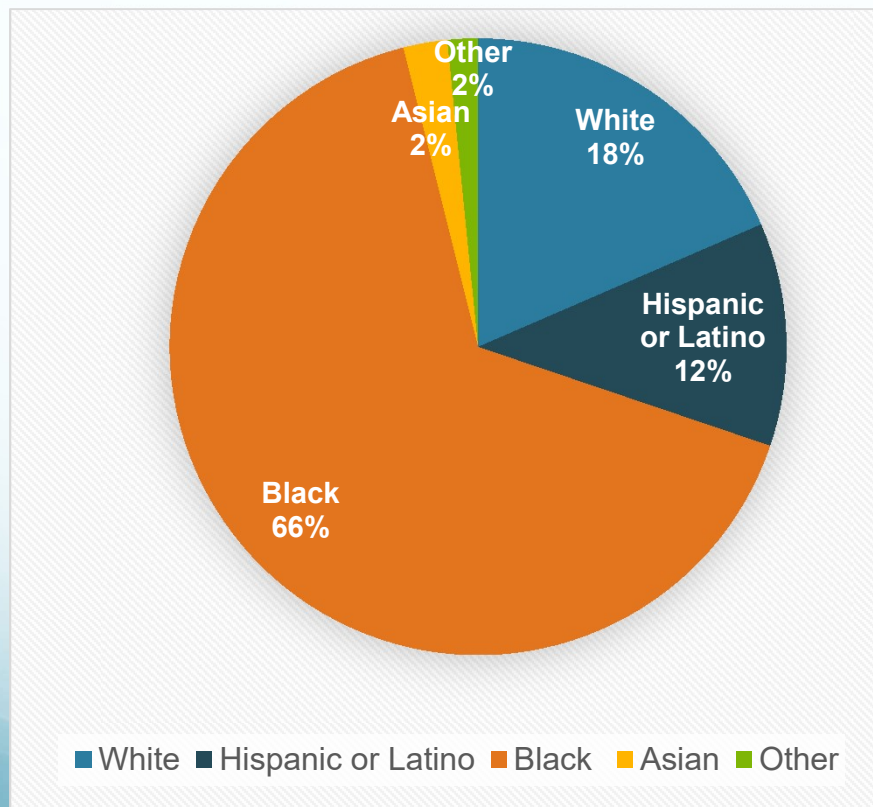
a) defining the green infrastructure industry

	CSC Region			CMAP Region		
	2010	2015	% Change	2010	2015	% Change
Total Population	1,226,071	1,161,044	-5.3%	8,450,837	8,487,546	0.4%
Total Households	444,081	430,255	-3.1%	3,024,683	3,058,278	1.1%
Average Household Size	2.72	2.66	-	2.75	2.73	-
Population in Labor Force	572,394	555,822	-2.9%	4,438,726	4,523,067	1.9%
Percent Unemployed	15.1%	19.2%	-	8.2%	10.5%	-
Median Age	-	35.9	-	-	36.2	-
Median Income	-	54,792	-	-	62,903	-

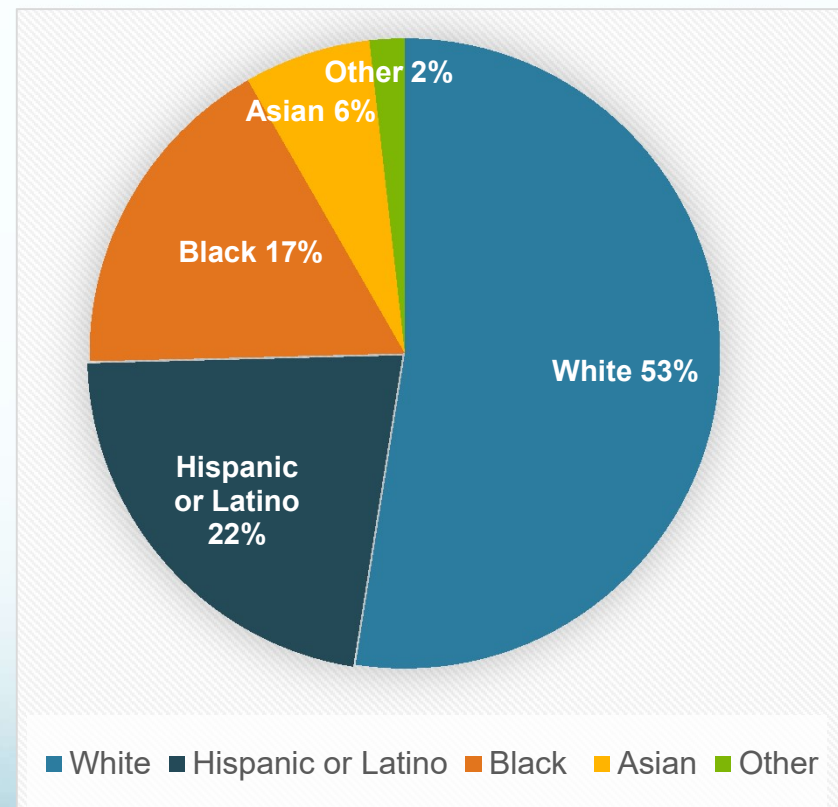
Source: American Community Survey estimates. ACS 05-09 and ACS 10-14. Regional medians calculated based on group frequency distributions. CMAP Community Snapshots.

CSC regional context

CSC Region



Greater Chicago Region (CMAP Region)



Source: 2000 and 2010 census, 2014 American Community Survey estimates. Regional medians calculated based on group frequency distributions. Universe: total population. *Includes Hispanic or Latino of any race.

CSC regional context – top 5

Industry Sector (NAICS)	Employment of Community Residents		Employment in the Community	
	Count	Percent	Count	Percent
Health Care and Social Assistance (62)	48,908	21.70%	68,875	18.90%
Educational Services (61)	33,401	14.80%	43,502	11.90%
Retail Trade (44-45)	25,765	11.40%	35,759	9.80%
Manufacturing (31-33)	23,684	10.50%	23,237	6.40%
Accommodation and Food Services (72)	18,823	8.30%	30,814	8.40%

overarching issue

There is no generally accepted definition of the green infrastructure cluster, industry, or occupations.

- green infrastructure businesses and occupations are difficult to categorize within traditional industry and occupational classification systems, due to:
 - industry fragmentation
 - emerging nature of the industry
 - hybrid nature of workforce participants.

defining the green stormwater industry

- Stormwater Cluster categories (Source: Philadelphia):
 - Green Design (architecture and engineering)
 - Green Infrastructure (permeable paving, basins, etc.)
 - Green Systems (meters, sensors and components)
 - Greenscape (landscaping, bioswales etc.)
- Within these clusters, the primary NAICS industry sectors generating the majority of economic activity include: Water Systems; Water, Sewer, and Pipeline Construction; Architectural and Engineering Services; and Environmental Consulting Services. (Source: Philadelphia)

defining green stormwater occupations

- types of green infrastructure firms
- green infrastructure skills, occupations, wages, growth
- green infrastructure operation & maintenance occupations and wages
- green infrastructure career pathways

Green Infrastructure Operations and Maintenance Occupations and Wages, 2016

Occupation	Total Employment Chicago MSA	Mean Hourly Wage Chicago MSA	Projected Growth 2014-2024 (%)	Typical Entry level Education	Typical on the job training
Supervisors, Landscaping and Groundskeeping Workers	2,380	28.76	5.3	HS diploma or equivalent	None
Landscaping and Groundskeeping Workers	17,360	15.2	6.1	No formal education	Short-term on-the-job training
Maintenance and Repair Workers, General	34,810	21.46	6.1	HS diploma or equivalent	Long-term on-the-job training
Septic Tank Servicers and Sewer Pipe Cleaners	430	24.73	16.3	No formal education	Moderate-term on-the-job training
Water and Wastewater Treatment Plant and System Operators	1,330	32.21	6.0	HS diploma or equivalent	Long-term on-the-job training

b) green infrastructure education
and training inventory

regional green infrastructure education and training capacity

- An inventory of training opportunities (professional and volunteer), workforce initiatives, and credentialing (certifications, degrees, professional associations, etc.) was undertaken to better understand the existing green infrastructure education and training capacity in the CSC region.

Appendix 7: Regional Green Infrastructure Related Education and Training

national-scale certification/credentialing

- Green infrastructure certification programs differing in content (GI BMP coverage), scale (agency, local, state, national), audiences (professional, regulators, businesses, private property owners), and administering entity (universities, trade associations, businesses).
- DC Water and Water Environment Federation (WEF) created a National Green Infrastructure Certification Program (NGICP) for construction, inspection, and maintenance (<http://ngicp.org/>)

Appendix 8: List of Green Infrastructure Certifications.

- The CSC region has higher than average unemployment, lower than average income, lower educational attainment, and a greater percentage of minorities.
- Green infrastructure related occupations in the region are projected to grow an average of 8% over the next decade. These occupations require no formal education, or a HS diploma or equivalent, with training typically occurring on the job. → Note: Industry/occupation analysis based on surveys from other regions.
- There are a large number of formal and informal green-infrastructure related education and training opportunities in the CSC region.
- There is no widely accepted professional green infrastructure certification at the time of this review (though the DC Water/WEF National Green Infrastructure Certification Program (NGICP), which is the first nation-wide green infrastructure certification program, is a step in this direction).

3. green infrastructure and economic development

Green Infrastructure and Economic Development

- to develop a better understanding of how green infrastructure investments create training and workforce development opportunities, several economic development studies conducted in other regions were reviewed, including: Philadelphia, Pennsylvania; Cleveland, Ohio; and Portland, Oregon.
- Summaries of these studies are provided in

Appendix 9: Lessons Learned from Other Regions

Lessons Learned: Philadelphia

Key Findings

- Industry Partnerships can help develop standards, connect firms with workforce and become sources of information for the public and private sector
- When designing training programs, potential employers can help determine needs
- Firms are operating independently with little awareness of other competitors and collaborators

Sustainable Business Network (SBN) of Greater Philadelphia. (2010). *Capturing the Storm: Profits, Jobs, and Training in Philadelphia's Stormwater Industry*.



Lessons Learned: Cleveland

Key Findings

- Partnerships between local agencies, workforce development programs, education professionals, and unions that result in developing recognized training and certification programs are key to building a career development pathway using green infrastructure
- Organizations believe training programs would help alleviate concerns over maintenance and address installation and budget concerns when installing green infrastructure

LAND Studio. (2013). *Seeing Green: Green Infrastructure Maintenance Training and Workforce Development Opportunities in Northeast Ohio.*

Lessons Learned: Portland

Key Findings

- Leveraging funding, coordinating with related efforts, and supporting volunteers and community groups stretches limited public funding and establishes broader ownership of the community's natural resources
- Effective operations and maintenance practices are critical to protecting watershed health and ensuring the lowest long-term cost to sewer ratepayers and taxpayers.
- Monitoring watershed health as a routine city operation allows for tracking changes and helps to inform local policy and future investments in project and programs.
- Portland Watershed Management Plan, <https://www.portlandoregon.gov/bes/38965>

- Green Infrastructure investments positively impact the economy, support jobs, and generate local tax revenues.
- Positive economic impacts can be particularly important in areas with higher than average unemployment and lower than average income.
- With such a large diversity of green infrastructure stakeholders, creating partnerships can allow for implementation of strategies addressing multiple green infrastructure benefits.
- Setting green infrastructure standards, performance monitoring, and providing credentialed training can alleviate concerns over proper green infrastructure maintenance.

t & m workgroup - 2017

1. Disseminate information from the Needs Assessment.
2. Compile, organize, and share information on “operationalizing” green infrastructure maintenance.
3. Explore opportunities to secure funding in support of initiatives.

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