GREEN INFRASTRUCTURE STRATEGIES FOR COMMUNITY RESILIENCE: Planning, Maintenance & Workforce Development

By: Phillip Rodbell, Sara Lamback, Sandra Albro, Jenifer Kaminsky, Eve Pytel
Green infrastructure encompasses the naturally occurring and human-built features that manage stormwater, remove pollutants, conserve energy, reduce erosion and provide other ecological, psychological, cost-effective and environmentally sustainable services.
TODAY’S SESSION

- Phillip Rodbell, U.S. Forest Service
- Sara Lamback, Jobs for the Future
- Sandra Albro, Cleveland Botanical Garden
- Jenifer Kaminsky, PUSH Buffalo
- Eve Pytel, Delta Institute
- Q/A and interactive exercise

* Questions for moderator should be written on notecards and will be collected.
NEW PARTNERS FOR SMART GROWTH
GREEN INFRASTRUCTURE STRATEGIES FOR COMMUNITY RESILIENCE: PLANNING, MAINTENANCE, & WORKFORCE DEVELOPMENT

Emerging Lessons from NatureWORKS: A National Urban Green Infrastructure Workforce Study
Sara Lamback | February 11, 2016
AGENDA

> Introduction to JFF
> Overview of NatureWORKS
  - The NatureWORKS Definition of Green Infrastructure
  - Goals and Actions to Date
> Characteristics of the “GI” Workforce
> City Deep Dive: Lincoln, NE
> Discussion and Questions
ABOUT JOBS FOR THE FUTURE &
THE NATUREWORKS STUDY
HOW JFF WORKS: SCALING SOLUTIONS

Develop Evidence-Based Innovations

Build Systems and Field Capacity

Advocate and Influence Policy

ALIGNMENT ACROSS SECONDARY—POSTSECONDARY—WORKFORCE
This study aims to:

> Analyze green infrastructure (GI) activities and related public and private employment in select cities.

> Analyze traditional and real-time labor market data to understand employment trends in GI industries.

> Identify wages of GI jobs and compare to related industries.

> Identify promising strategies for expanding GI employment in both the public and private sector.
NATUREWORKS “DEEP DIVE” CITIES

- Ann Arbor, MI
- Austin, TX
- Charlotte, NC
- Denver, CO
- Lincoln, NE
- Portland, OR
GREEN INFRASTRUCTURE OCCUPATIONS

FOCUS ON GI OPERATIONS AND MAINTENANCE
Top GI Hiring Regions
(MSA)

- Washington, DC
- New York City
- Los Angeles
- Seattle
- Chicago
- San Francisco
- Denver
- Philadelphia
- Portland
- Houston

Source: Burning Glass Labor/Insight. Results are based upon 50,429 total job postings in the last 12 months. Analysis conducted using GI keywords.
# SELECTED GI OPERATIONS & MAINTENANCE OCCUPATIONS (DENVER)

<table>
<thead>
<tr>
<th>Title</th>
<th>Wage Range</th>
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<tbody>
<tr>
<td>Arborist Technician I</td>
<td>$17.69 - $25.82</td>
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<tr>
<td>Arborist Technician II</td>
<td>$19.33 - $28.23</td>
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<tr>
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<tr>
<td>Arboreal Inspector</td>
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<tr>
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<td>$16.18 – $23.63</td>
</tr>
<tr>
<td>Gardening Technician</td>
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<tr>
<td>Park Seasonal Laborer</td>
<td>$10.99 - $12.31</td>
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<tr>
<td>Utility Worker</td>
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<tr>
<td>Senior Utility Worker</td>
<td>$16.18 - $23.63</td>
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<tr>
<td>Crew Supervisor</td>
<td>$23.10 - $33.73</td>
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<tr>
<td>Equipment Operator</td>
<td>$16.92 - $24.70</td>
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<tr>
<td>Equipment Operator Specialist</td>
<td>$17.69 - $25.82</td>
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<tr>
<td>Heavy Equip. Operator</td>
<td>$19.33 - $28.23</td>
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<tr>
<td>Building/Grounds Supervisor</td>
<td>$17.69 - $28.30</td>
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<tr>
<td>Facility Maintenance Technician</td>
<td>$19.33 - $28.23</td>
</tr>
<tr>
<td>Cement Finisher</td>
<td>$20.21 - $29.51</td>
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CHARACTERISTICS OF THE GREEN INFRASTRUCTURE WORKFORCE

HIGHLIGHTS FROM RESEARCH IN LINCOLN, NE
THE GI WORKFORCE: LINCOLN

- Consulting Engineers
- Landscape Architects
- Existing Contractors (Landscaping, Tree care, Excavation, Nurseries, Pavement, Horticulture, Construction, Water and Sewer)
- City Staff
  - Inspectors
  - Maintenance
  - Arborist
  - Engineers
  - Naturalists
  - Environmental Specialists
  - Planners
Design of GI projects has generally been effective.

Local contractor bids are rising.

Lincoln is considering a certification for the construction and maintenance of GI projects.

Currently, the maintenance of GI projects is the biggest concern
  - A need exists for construction and maintenance training.
> Floodplain and detention requirements.

> New growth area standards
  – No net increase in flow/elevations
  – Minimum corridor standards
  – Compensatory storage requirements.

> Stormwater Quality Requirements
  – Effective February 1, 2016
  – Maintenance plan required.
KEY TAKEAWAYS & CLOSING
The GI workforce includes public, private, and volunteer workers.

Education, certification, and training:
- GI installation and maintenance jobs require little education beyond high school.
- Many contractors and public employees need training in GI installation and maintenance.
- Some GI occupations have certifications of increasing value (e.g., green roofs).
- National and local efforts are underway to establish GI workforce and site certifications.

Tracking development of Asset Management Plans and Best Management Practice (BMP) manuals can help track changing workforce needs.

A healthy market niche for specialty GI contractors, including community-based social enterprises, and volunteer/service corps organizations already exists.
CONNECT WITH NATUREWORKS

See the NatureWORKS Website:
- http://www.jff.org/initiatives/natureworks

Find interviews, guest blogs, and other information on the GI workforce at:
- http://www.jff.org/blog

Email Sara Lamback if you would like to receive emails and other updates on NatureWORKS!
- slamback@jff.org

*We look forward to your involvement in this exciting project!*
SESSION: Green infrastructure strategies for community resilience: planning, maintenance & workforce development

VACANT to VIBRANT

stormwater management & neighborhood stabilization on vacant urban land

Sandra Albro, Research Associate, Applied Urban Ecology
Cleveland vacant land — extreme example
Cleveland vacant land – typical example
Cleveland vacant land — typical example
Cleveland vacant land – 85% - 95% is <0.5 acres &/or <3 parcels
Vacant to Vibrant – Cleveland, OH
Vacant to Vibrant — Gary, IN
Vacant to Vibrant — Buffalo, NY
Vacant to Vibrant – stormwater management + recreational use
Vacant to Vibrant: 2013-2017
VACANT to VIBRANT

• Utilizes small, discontiguous vacant parcels
• Stormwater management + neighborhood stabilization
• Replicable
LOWER MAINTENANCE
Simple design, fewer elements
Quarterly maintenance, monthly mowing
Monthly mowing, (bi)annual clean-up
fewer species
less mulch
perennials
natives
low-mow

Quarterly maintenance, monthly mowing
LOWER MAINTENANCE

• Design and build to maintenance capacity & constraints
• Simplify design as much as possible
• Involve maintenance contractor in design process
WORKFORCE DEVELOPMENT
Buffalo plant nursery

V2V Buffalo maintenance — PUSH Buffalo
V2V Cleveland maintenance — CBGarden Green Corps
V2V Gary maintenance — City of Gary Urban Conservation Team
WORKFORCE DEVELOPMENT

- Certification & specialized training:
  - Native/low-maintenance landscaping
  - Stormwater engineering
  - Plant/soil production
- Require community-based procurement/training
COMMUNICATE SUSTAINABILITY
“Triple bottom line”
Northeast Ohio Regional Sewer District

“Cost per gallon”

<$0.75 / gallon CSO

$2.00–$4.00 / gallon CSO

Northeast Ohio Regional Sewer District
COMMUNICATE SUSTAINABILITY

- Emphasize economic bottom line
- Ensure financial sustainability
- Close loop between who pays & who profits
Sandra Albro
Research Associate, Applied Urban Ecology

salbro@cbgarden.org
(216) 707-2860
PUSH began in 2005 as a community-based organization dedicated to building a base of resident leaders capable of leading public campaigns to address the lack of jobs and rapidly declining neighborhood conditions, including widespread housing abandonment.

All work starts with community organizing and leadership development.

PUSH pursues this work through a variety of program areas:
- Green affordable housing development
- Green infrastructure
- Creation of pathways to green jobs and training
- Assist families and businesses to access weatherization resources
PUSH Blue

- Address Buffalo’s Combined Sewer Overflow problem
- Add an environmental justice and community focused lens to the conversation about CSO’s
- Create a social enterprise landscaping business to ensure that multiple benefits of this work are felt in impacted communities
- Leverage the job creating power of the local drivers of green infrastructure including:
  - The Buffalo Sewer Authority’s commitment to green infrastructure and Long Term Control plan with the EPA
  - The changes to Buffalo’s zoning code – the Green Code
The Impact of CSO’s on the West Side
The Impact of CSO’s on the West Side
The Impact of CSO’s on the West Side
129-135 Chenango rain garden
527 W. Utica Green Roof
37 19th Stormwater Planter
BSA Post-Demo Green Infrastructure
PUSH Blue Green Jobs

- In 2013 PUSH Blue hired four new employees to be part of a six person crew working on storm water and green infrastructure projects.
- Two of those employees have since gone on to assume more involved and challenging roles with PUSH.
- The 2015 crew includes 5 individuals plus members of the PUSH Hiring Hall as needed
- All crew members live and were recruited from Buffalo’s West Side
- Training has included OSHA 10 and on the ground training
Creating green jobs
PUSH Blue social enterprise landscaping business

- Hire and train local individuals for green infrastructure work as well as other positions within green jobs lattice, including energy efficiency retrofit work
- Expand work to include green infrastructure, street tree planting, bioremediation, habitat restoration, and green infrastructure maintenance
- Currently negotiating contract with Buffalo Sewer Authority to do green infrastructure treatments on 232 demolition sites in 2015-2016 season
- Testing a value proposition that we can provide clients with expertise, experience, and the social benefits of high road job creation
PUSH Blue Successes

- 20 rain gardens, 3 bioswales, 5 rainwater harvesting projects, 3 living roofs, 2 permeable parking pads, 1 vegetable garden for a local charter school.
- Partnership with the Buffalo Sewer Authority and other local groups on a city-wide downspout disconnection program.
- Establishment of a strong brand identity for PUSH Blue that is currently and will continue to leverage contract work.
PUSH Blue Challenges

- Assessing what job training should look like.
  - Finding appropriate certification programs, balancing with on-the-ground training
- Staff choices
  - How to balance job creation mission with real needs, like having a driver's license
PUSH Blue lessons learned and learning

- Maintenance
  - How to budget for and pay for maintenance of sites?
- Right-sizing of work
  - Balance between initial site design and long term maintenance
  - Finding best choice of species for individual conditions and microclimates, while also surviving high traffic environments, sudden inundation of rain, and drought.
Building a Community Anchor Institution

www.pushbuffalo.org
www.greendevzone.org
Jenifer Kaminsky – jen@bnscbuffalo.org, 716-882-2672
GREEN INFRASTRUCTURE TOOLS FOR WEAK-MARKET COMMUNITIES
ABOUT DELTA INSTITUTE

Founded in 1998 to work at the nexus of environmental sustainability and economic development.

Our staff: Multidisciplinary team of 17 FTE, including urban planners, civil engineers, foresters, economists, scientists, architects, LEED APs, GIS.

What we do:
• Develop innovative programs and market-driven solutions
• Build sustainable markets
• Convene diverse stakeholders
• Inform better policy
ON THE AGENDA:

Presentation Themes
Challenge Summary
Tools and Resources
LAND
Most productive land may not be available
Public vs Private
Sourcing plant materials
Land condition

CAPITAL
Not enough $  
Too many types
Maintenance
Installation

LABOR
Expertise
Workforce
Seasonality

COMMUNITY CHALLENGES
There is a lack of technical expertise and understanding.
LOCAL GOVERNMENT

CITY MANAGER/
VILLAGE MANAGER

MAYOR
ELECTED OFFICIAL

PUBLIC WORKS DIRECTOR

COMMUNITY PLANNER
Toolkit features

1. Decision support tree, basic information on green infrastructure
2. Templates, plan sets, cross sections, and material specifications
3. Estimation tools for installation and maintenance costs
For general public

- Location: Right-of-way
- Width: At least 5’
- Length: Scalable
- Drainage Area: <5 acres

source: http://water.epa.gov/infrastructure/greeninfrastructure/gi_what.cfm

Excerpt from Bioswale/Hybrid Ditch section
For engineers

Excerpt from Rain Garden section
<table>
<thead>
<tr>
<th>GI Technique</th>
<th>Item</th>
<th>Description</th>
<th>Installed Cost</th>
<th>Unit</th>
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<tbody>
<tr>
<td>Permeable pavement</td>
<td>Bedding layer</td>
<td>2&quot; ASTM No. 8 Stone</td>
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<td>Base layer</td>
<td>4&quot; ASTM No. 57 Stone</td>
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<td></td>
<td>Subbase layer</td>
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<tr>
<td></td>
<td>Geotextile</td>
<td>Non-woven geotextile fabric</td>
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<tr>
<td></td>
<td>Curb</td>
<td>Containment curb</td>
<td>$ 35.00</td>
<td>LF²</td>
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<tr>
<td>Custom options</td>
<td>Underdrain</td>
<td>12&quot; HDPE perforated storm pipe</td>
<td>$ 32.00</td>
<td>LF²</td>
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<tr>
<td></td>
<td>Connect to existing storm structure</td>
<td>Core drill existing structure, connect overflow pipe</td>
<td>$ 1,500</td>
<td>EA²</td>
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GI design templates for:

- Bioswale/Hybrid Ditch
- Rain Garden
- Stormwater Planters
- Permeable Pavement
- Underground Storage
THE IMPACT & NEXT STEPS...

• Reverse barriers to scalable green infrastructure implementation
• Improve stormwater management
• Distribute the toolkit
• Measure impacts

View Toolkit: bit.ly/greeninfrastructuretools
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/DeltaGreatLakes @DeltaGreatLakes /delta-institute
TODAY’S SESSION

- Phillip Rodbell, U.S. Forest Service
- Sara Lambback, Jobs for the Future
- Sandra Albro, Cleveland Botanic Garden
- Jenifer Kaminsky, PUSH Buffalo
- Eve Pytel, Delta Institute
- Q/A and interactive exercise
Community resilience involves building ownership and equity in local project planning and implementation

1. Engaging residents
2. Using locally sourced materials
3. Training and employing residents. So here’s the trigger question for discussion at your table:

Q: What have you done to build equity in your green infrastructure projects, and what did you find were the greatest barriers?