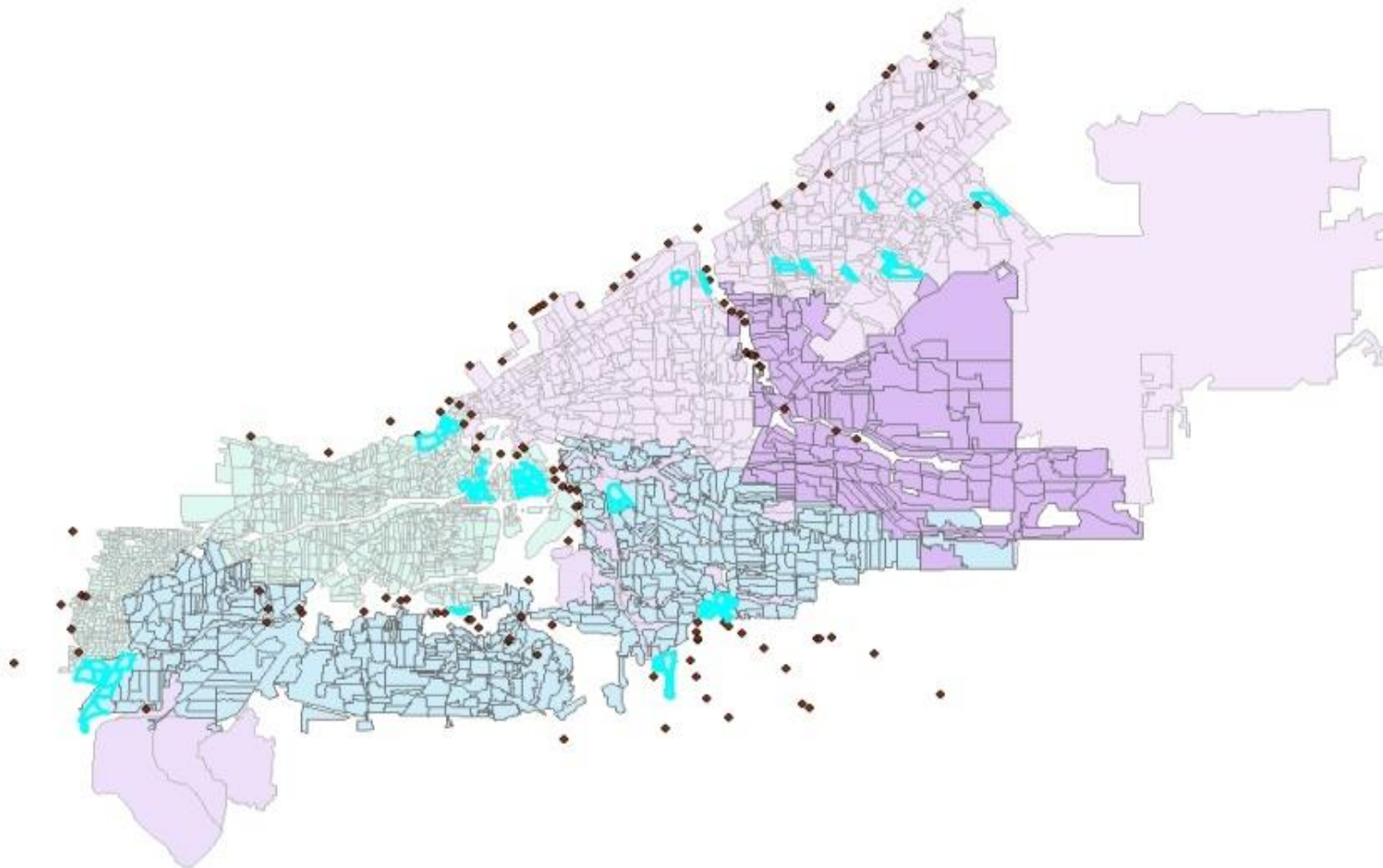


Adaptive management, urban systems, and ecosystem services

Ahjond Garmestani, Dustin L. Herrmann, David G. Angeler, Kirsten Schwarz, Dirac Twidwell
and Craig R. Allen

•The views expressed in this presentation are those of the author and do not represent the views or policies of the U.S. Environmental Protection Agency



Green Infrastructure (GI)

Direct GI benefits:

- Reduction in runoff volume
- Increased detention capacity
- Restoration of hydrologic cycle

Green Infrastructure (GI)

Co-benefits from GI:

- Aesthetics
- Recreation
- Pollination



Adaptive Management

- Integration of resilience theory into natural resources management
 - *Structured, iterative process
- Reduce uncertainty in dynamic systems (Learning)

Adaptive Management

- Alter management in response to monitoring
 - * Dependent upon spatial and temporal scale
 - * Monitoring is tailored to system of interest (i.e., context-dependent)

Adaptive Governance

1) Legislation and Accountability

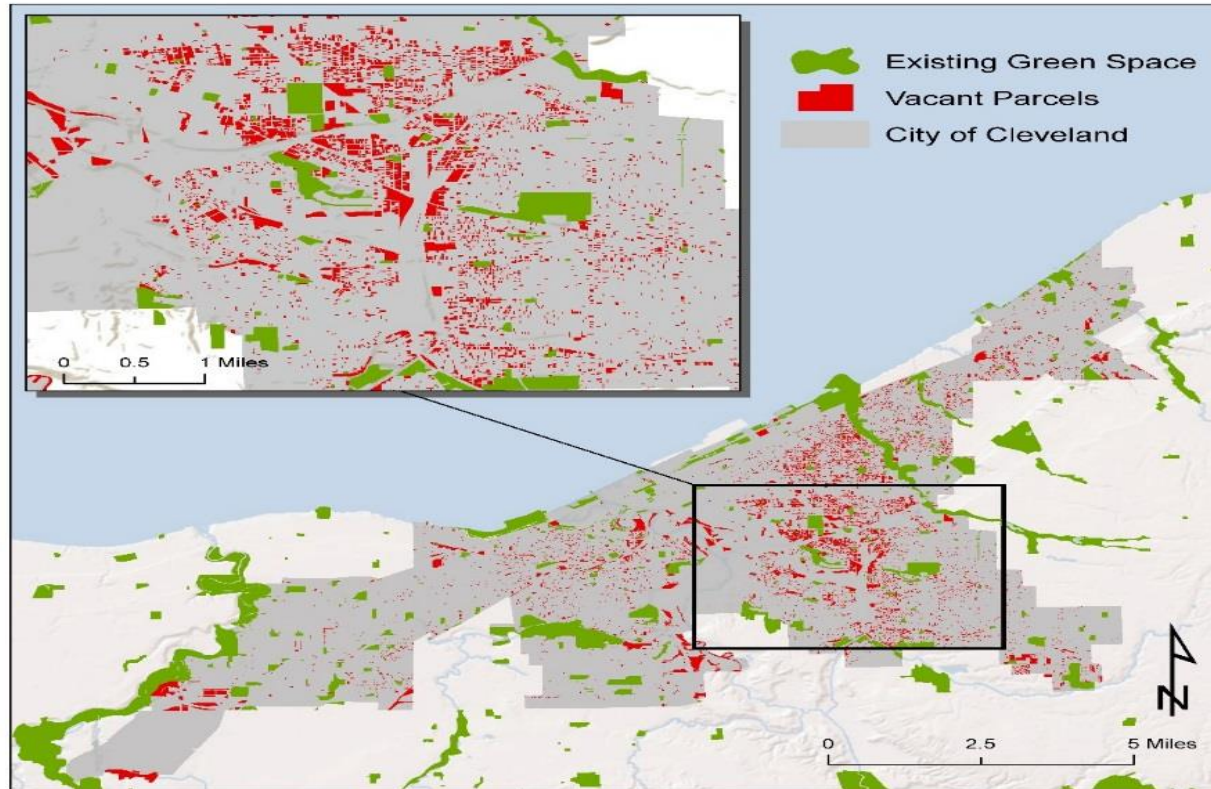
***Adaptive Management**

2) “Intermediaries”

***Bridging organizations (SVDC) and networks**

3) Matching organizations to the appropriate scale

***Panarchy**







Cleveland: Slavic Village Project

- Phase 1: Collected baseline data
 - Gathered data on soils, hydrologic and pollinators
- Phase 2: Control sites and treatment sites (i.e., implement GI in vacant lots)

Slavic Village Project

- Cleveland Botanical Garden and NEORSD key players in project
 - * 12 rain gardens into vacant lots
- Plants were selected for provisioning of ecosystem services (e.g., water, pollination)
- Ohio State University planted 30 vacant lots (“minimalist” GI)

Community engagement and input

- Trade-off between citizen preferences and best plants for pollinators
- Why? If citizens don't like what they see they will be less likely to stay engaged in work
- Worse.....might chop plants down





Positive:

Adaptive element

- **Monitoring = capacity for adaptation and transformation**

Negative:

Distance













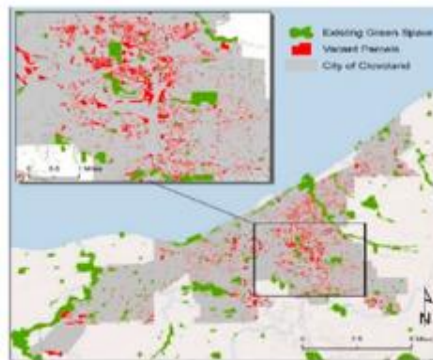






Temporal scale

City



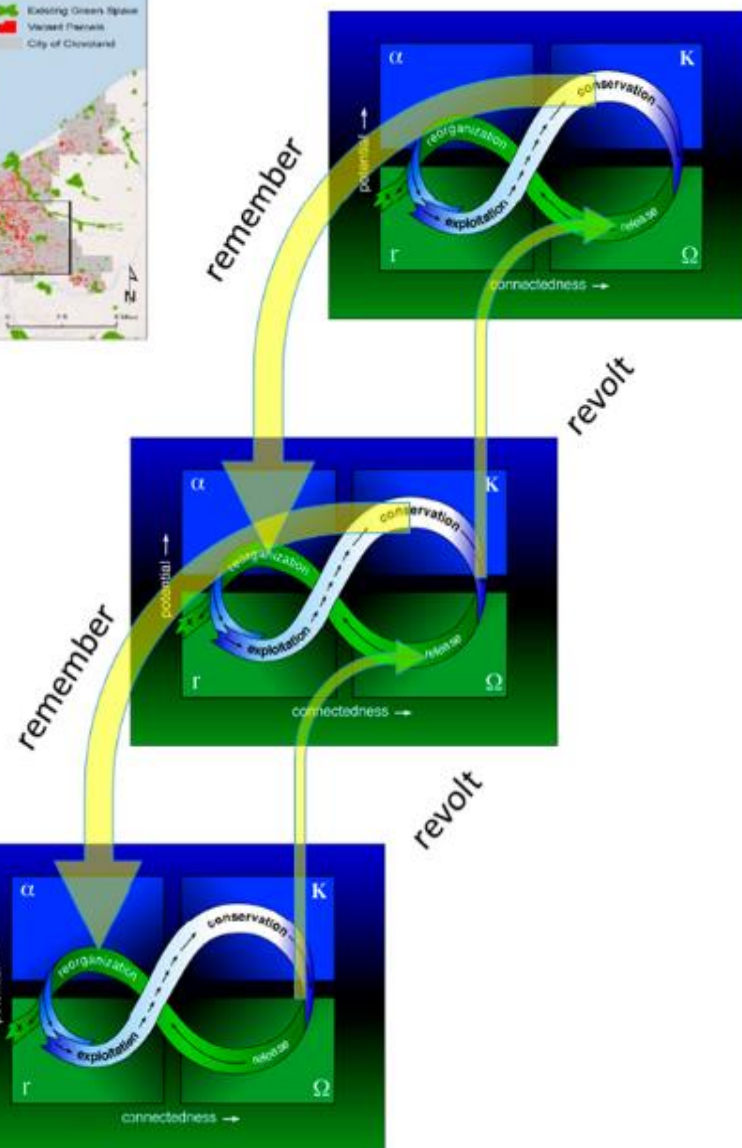
Neighborhood

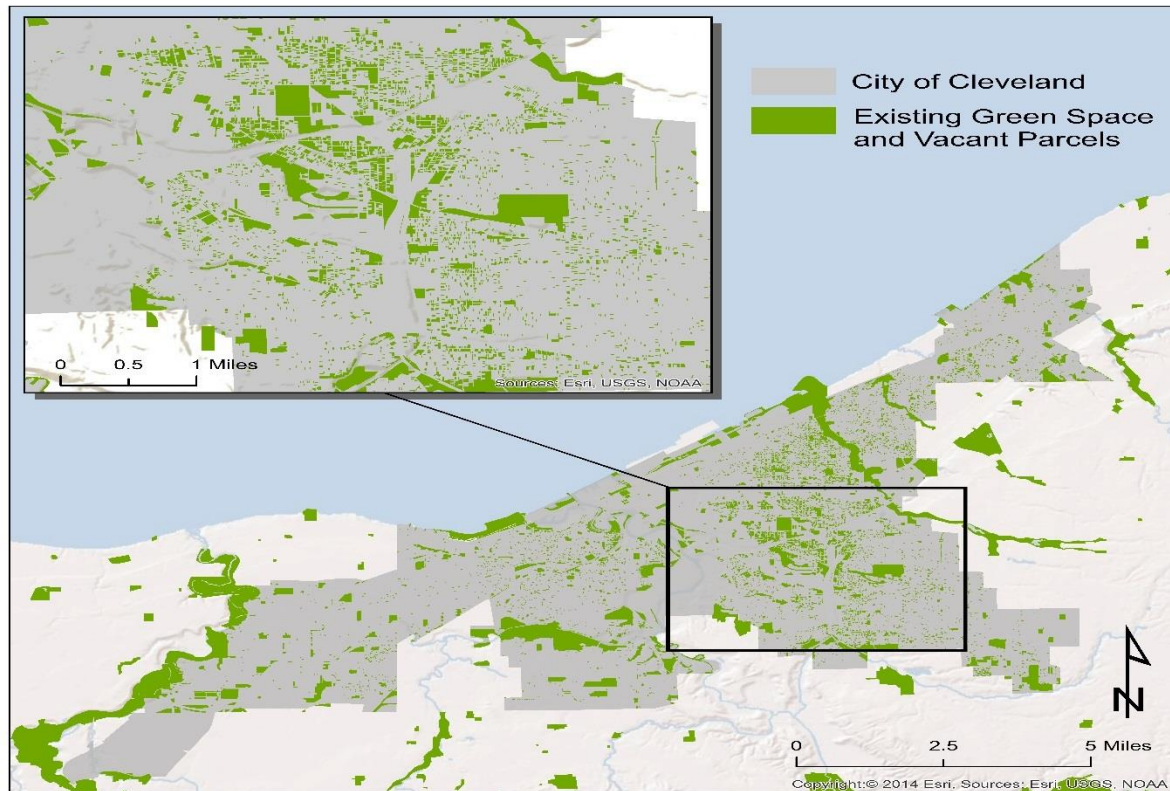


Parcel



Spatial scale





Transformation

- * Soils
 - Basis for lot and neighborhood scale transformation
- * Aesthetics
 - Lot and neighborhood scale transformation
- * Water
 - Lot scale; neighborhood scale limited by curb cuts (but models)
- * Pollinators
 - No significant difference between rain gardens and vacant lots (sampling too early after GI implementation)

Guidance

*There is no magic bullet, blueprint or recipe for success

- 1) **Network**
- 2) **Leadership (in different organizations, and at multiple scales)**
- 3) **Communication**

Acknowledgements

- Slavic Village Development Corporation (Marlane Weslian), Cleveland Botanical Garden (Sandra Albro), USGS (Rob Darner), EPA Region 5 (Brooke Furio), NEORSD, Cleveland Land Bank, Ohio State University, Emory and The Wildlife Society
- Post-docs:
 - Olivia Odom Green (Atlantic States Legal Foundation)
 - Brian Chaffin (University of Montana)
 - Dustin Herrmann (ORISE/EPA)