

# Green Infrastructure and Adaptive Management

A New Synergy



One Water  
August 27, 2014

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Imagine the result



# GREEN INFRASTRUCTURE IMPLEMENTATION

 **wef** special publication

Prepared by the **Green  
Infrastructure Implementation**  
Task Force of the **Water  
Environment Federation**

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Chapter 9 Adaptive Management

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# Green Infrastructure Implementation

1. Introduction and Overview
2. Navigating the Institutional Landscape
3. Framework of Regulations, Standards and Structures
4. Financial Strategies
5. Engaging Stakeholders and the Public
6. Developing Municipal Standards for GI
7. Valuing Green Infrastructure
8. Maintenance Programs
9. **Adaptive Management**
10. Selecting GI Stormwater Controls
11. Evaluating the Feasibility of GI
12. Implementing at the Building and Site Scale
13. GI in Rights-of-Way
14. Implementation of Linked GI on a Neighborhood Scale
15. Green Spaces to Improve Waterways and Communities
16. Implementation at the City, Basin and Regional Level

# What is Adaptive Management?

A management approach that is...

- 👍 Iterative
  - 👍 Driven by the achievement of goals
  - 👍 Continuous Improvement
  - 👍 Flexible

Consider when objectives must be met in the face of uncertainty

# Adaptive Management Process

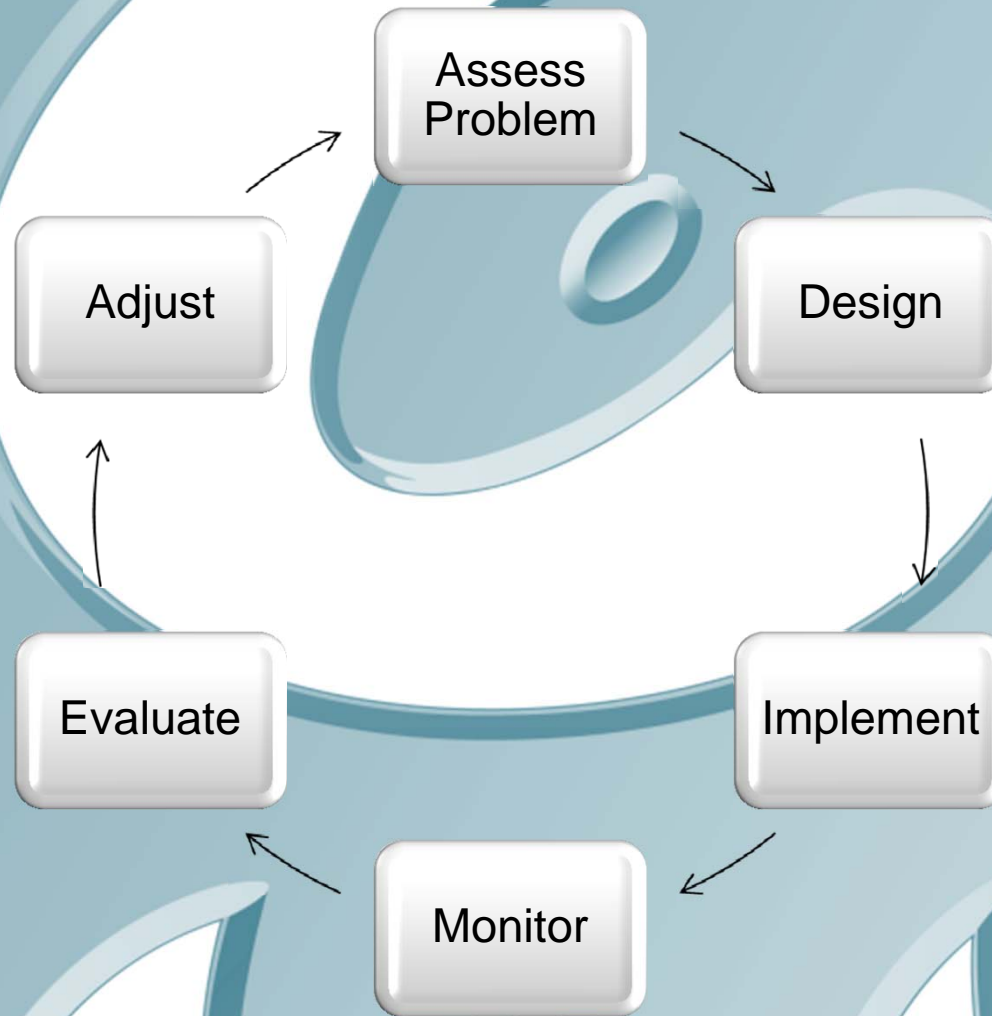


Figure 9.1



# Adaptive Management

**The U.S. Department of the Interior  
Technical Guide**

*Adaptive  
Management  
Working  
Group*

Problem-Scoping Key  
9 questions to find out if  
Adaptive Management is  
for you



Is some kind  
of  
management  
decision to  
be made?





# Can stakeholders be engaged?





Can  
management  
objectives be  
stated  
explicitly?



Is decision  
making  
confounded  
by  
uncertainty  
about  
potential  
management  
effects?



Can  
resource  
relationships  
and  
management  
effects be  
represented  
in models?



Can  
monitoring  
be designed  
to inform  
decision-  
making?





Can  
progress be  
measured in  
achieving  
management  
objectives?



Can  
management  
actions be  
adjusted in  
response to  
what has  
been  
learned?



Does the  
whole  
process fit  
within the  
appropriate  
legal  
framework?



If you can answer “YES” to all questions

# ADAPTIVE MANAGEMENT IS FOR YOU

If you answer “No” to even one question, another management style may be a better fit

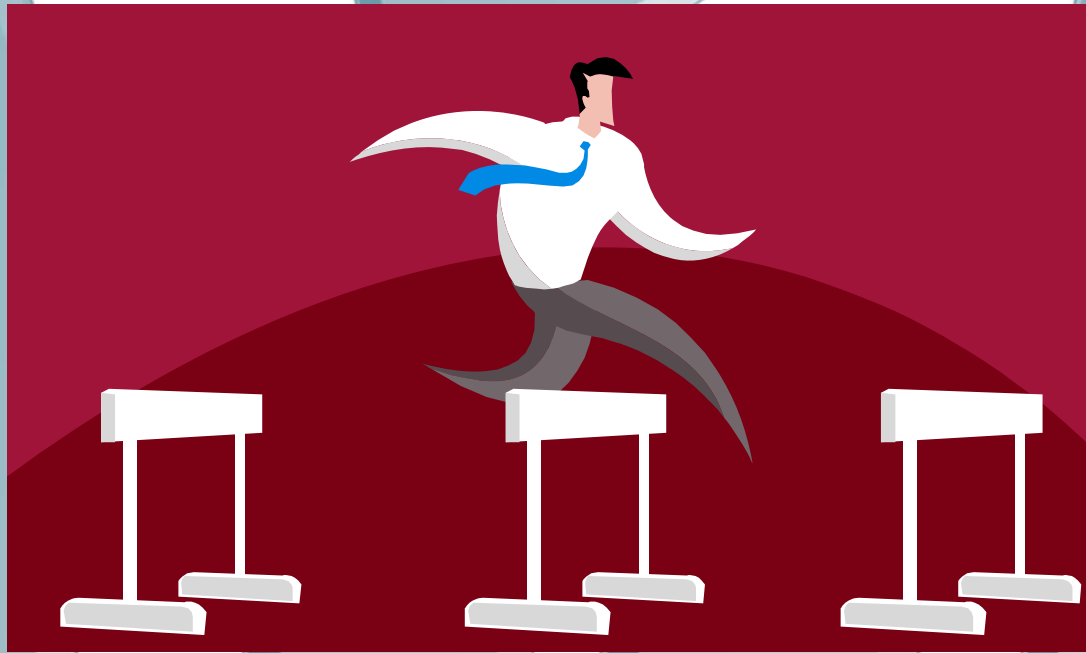


# Inherently, Adaptive Management

- Flexes as uncertainty is defined
- Is applied over longer time tables
- Includes many steps, tasks, phases, projects, etc
- Values stakeholder participation
- Uses monitoring as a basis for learning
- Produces a very efficient, effective result that attains the objectives

# Hurdles to using Adaptive Management

- ❖ We've always done it this way
- ❖ We don't need stakeholders
- ❖ It has to be right the first time



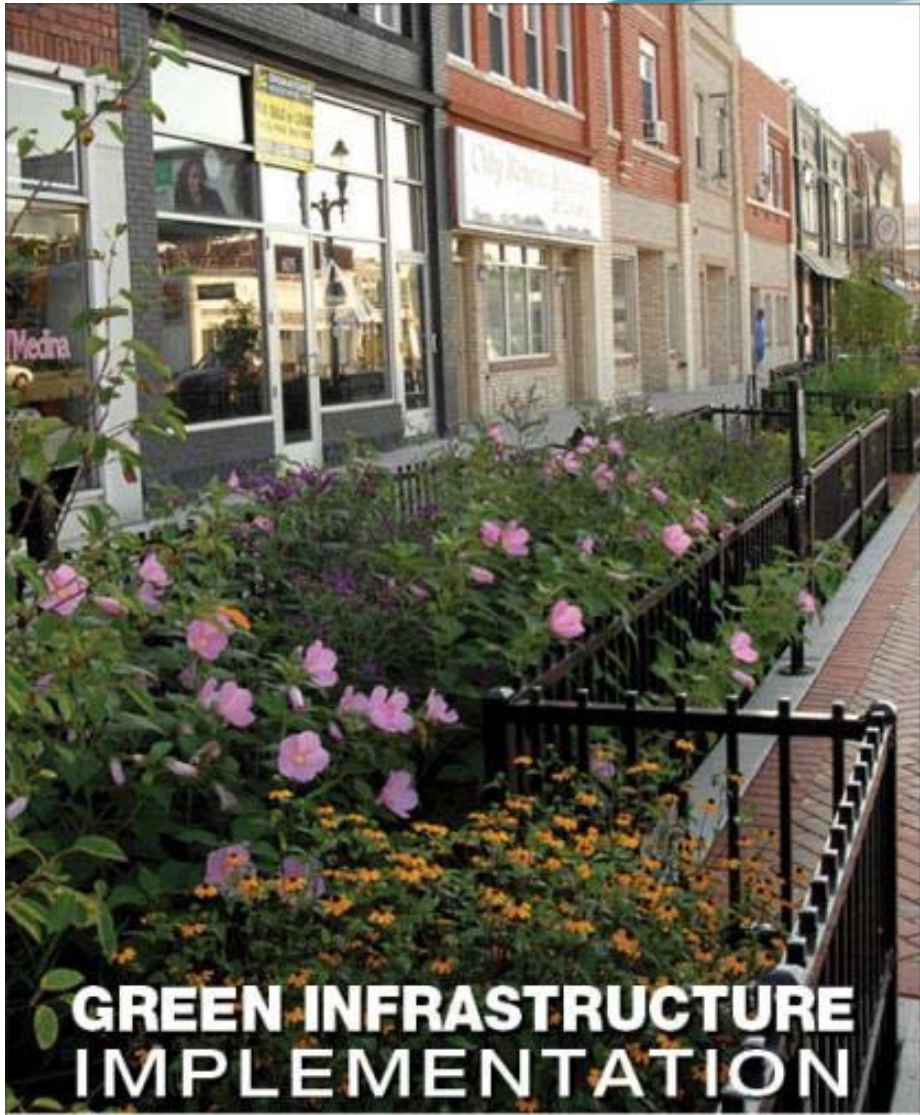
# Chapter 9: Adaptive Management

1. Adaptive Management for GI
2. Defining Adaptive Management
3. Adaptive Management Cycle
4. Using Adaptive Management for GI
5. Examples of Adaptive Management in CWA Consent Orders
6. GI Adaptive Management Readiness and Assessment Tool
7. GI Adaptive Management System Monitoring
8. Implemented Program Case Studies: Onondaga County

# Readiness and Assessment Tool

Administrative program				Operational program				Economic program			
Green infrastructure management objective:				Green infrastructure management objective:				Green infrastructure management objective:			
Program element		Plan element	Goal/criteria	Program element	Goal/criteria	Status	Adaptive action				
1.1	Policy	Policy program	Program management i	3.1	Funding	The green infrastructure program is fully supported by a sewer or stormwater service fee.					
1.2	National Pollutant Discharge Elimination System permits (CSO/MS4)	2.1 Management	forum of decision-implementing conditions.	3.2	Service fee discounts	Service fee discounts are provided to all property owners including residential for green infrastructure retrofits.					
1.3	Intergovernmental cooperation	2.2 System model	A calibrated hydrologic progress and is the backbone of infrastructure master plan	3.3	Green infrastructure incentives	Green infrastructure incentives in the form of grants are provided to qualified private property owners.					
1.4	Zoning	2.3 Green infrastructure capital improvements	Targeted to specific volume master plan schedule	3.4	Interactive data tools	Private property owners have access to an interactive GIS database that assists in the design of a green infrastructure retrofits and calculation of runoff volume reduction					
1.5	Regional planning	2.4 Runoff standards	Detention ponds are not required on properties. Volume and impact development are	3.5	Developer credits	Developers are awarded a fungible credit for exceeding runoff volume standards via green infrastructure.					
1.6	Transportation planning	2.5 O&M	A green infrastructure program with annual report	3.6	Development fees	Developers are required to meet a volumetric standard for runoff through the use of green infrastructure, pay a mitigation fee, or mitigate off-site based on a greater standard.					
1.7	Codes	2.6 Regulatory program	Supported by standard permits, and enforcement	3.7	Urban plan incentives	Reduction in runoff standards is provided for redevelopment and targeted urban areas using green infrastructure.					
1.8	Public engagement	2.7 Inventory of built green infrastructure practices	GIS database with volume	3.8	Grants	Grants are provided to qualified retrofit or redevelopment projects using green infrastructure.					
1.9	Public-private partnerships	2.8 Tools and technical support	A low impact development design guide	3.9	Tax incentives	Tax-incentive financing is provided to private developers for qualifying redevelopment projects that use green infrastructure and reduce runoff.					
1.10	Communication	2.9 Development review process	Mandatory review at code								
1.11	University partnerships	2.10 Technology	Web-based information communication								
1.12	Education	2.11 Landscaping	Performance-based with								
		2.12 Public property retrofit	Required with any roof demolition, or abandoned								
		2.13 Private property retrofit	Technical support and e								
		2.14 Public engagement	Regular district information green infrastructure design needs/preferences								





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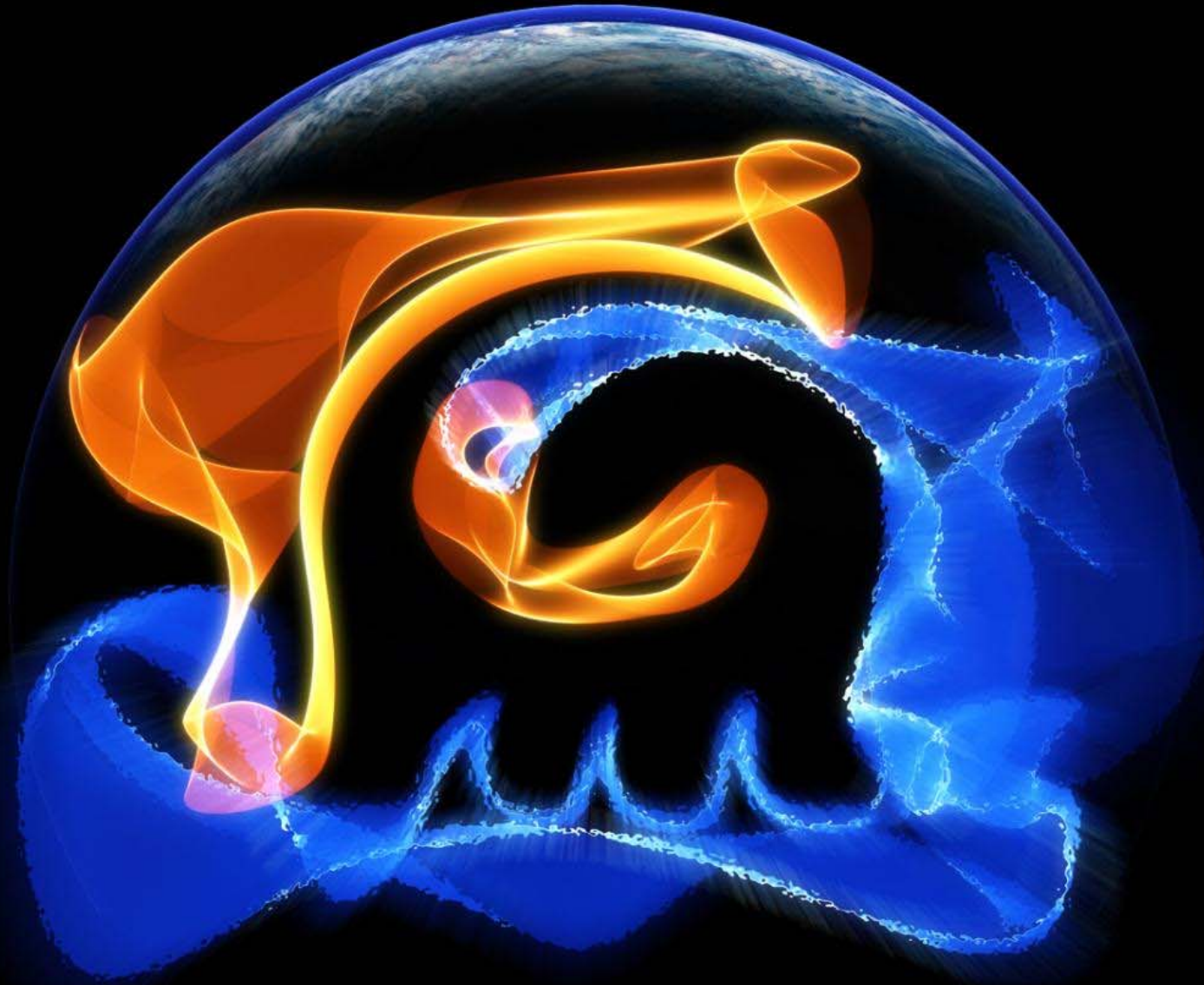
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