

# *The Effectiveness of Stormwater Utilities in Mitigating Stormwater Runoff in the United States*



LAURA A. MULCAHY

BROWN UNIVERSITY  
CENTER FOR ENVIRONMENTAL STUDIES

GRADUATE STUDENT COLLOQUIUM

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3:00 - 6:00 PM

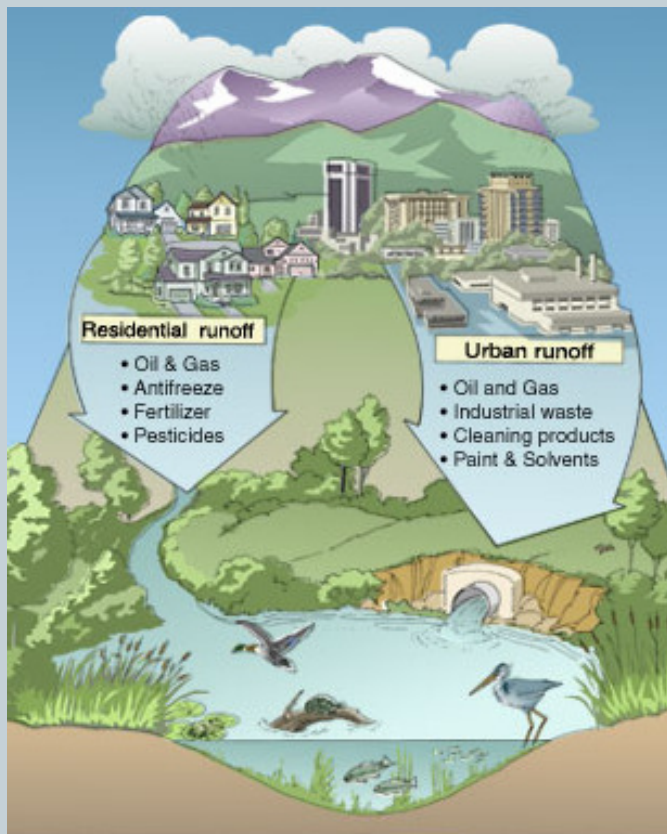
# Research Questions:



- 1) Is a stormwater utility a viable way to mitigate stormwater runoff in the United States? (National Stormwater Utility Analysis)
- 2) Can municipalities use the information gathered from the National Stormwater Utility Analysis in order to implement a successful utility of their own? (Narragansett Case Study)

# Stormwater Runoff

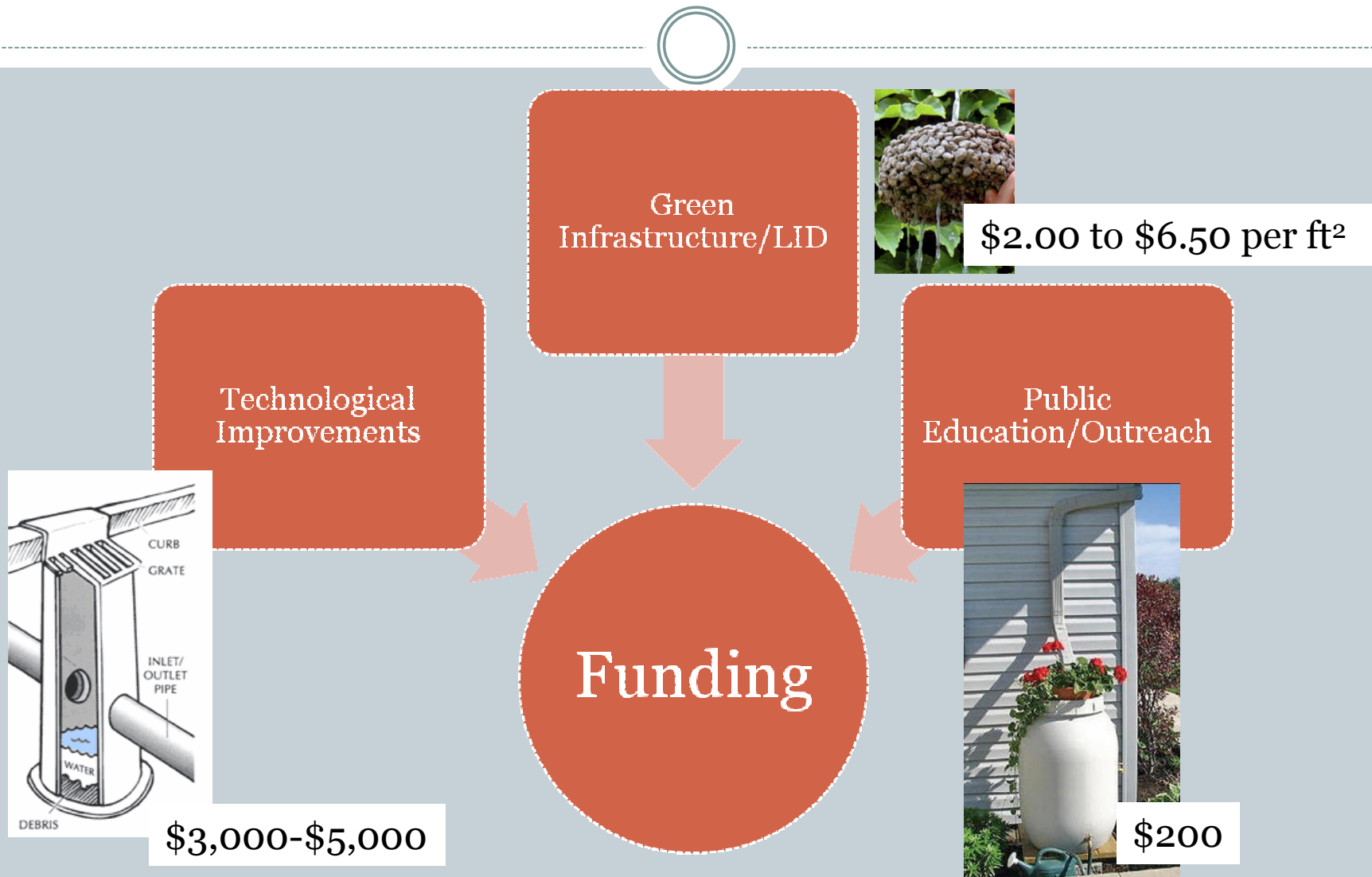
## The Problem with Stormwater



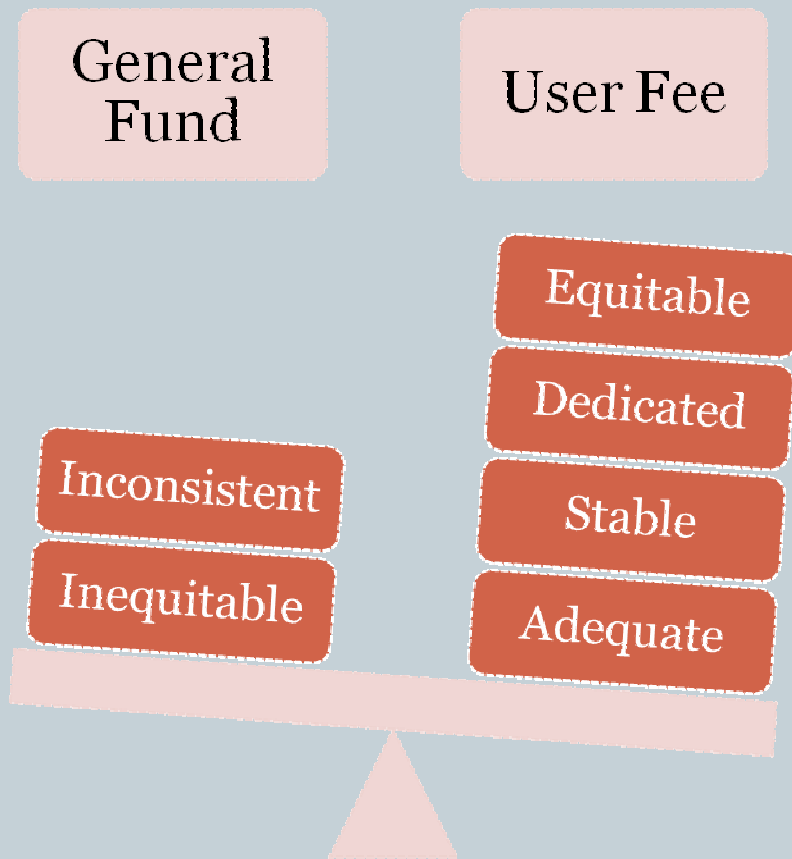
## Stormwater Regulations

- Clean Water Act
  - National Pollution Discharge Elimination System
    - ✦ Six Minimum Measures
      - Public Education
      - Public Involvement
      - Illicit Discharge
      - Construction Runoff
      - Post-Construction Management
      - Pollution Prevention
    - ✦ Best Management Practices
  - TMDL

# Stormwater Management



# Sources of Funding



- General Fund
- Bonds
- Grants
- User Fee/Stormwater Utility
- Loans
- Special Assessments

# Case Study 1: National Stormwater Utility Analysis



**IS A STORMWATER UTILITY A VIABLE WAY TO  
MITIGATE STORMWATER RUNOFF IN THE UNITED  
STATES?**

# Stormwater Utilities



- **Stormwater utilities are intended to be a vehicle for:**
  - consolidating or coordinating responsibilities
  - generating funding that is adequate, stable, equitable, and dedicated
  - developing programs that are comprehensive, cohesive, and consistent year-to-year.

National Association of Flood and Stormwater Management Agencies, 2006

- **~400 Stormwater Utilities in the US**
- **Range in structure and size**

# National Stormwater Analysis Utility Locations



# Methodology



- Web-based search
- 25 utilities
- Four efficacy criteria
  - Efficiency
  - Effectiveness
  - Equity
  - Incentives to Reduce
- Rated on a scale from 0-1 for each

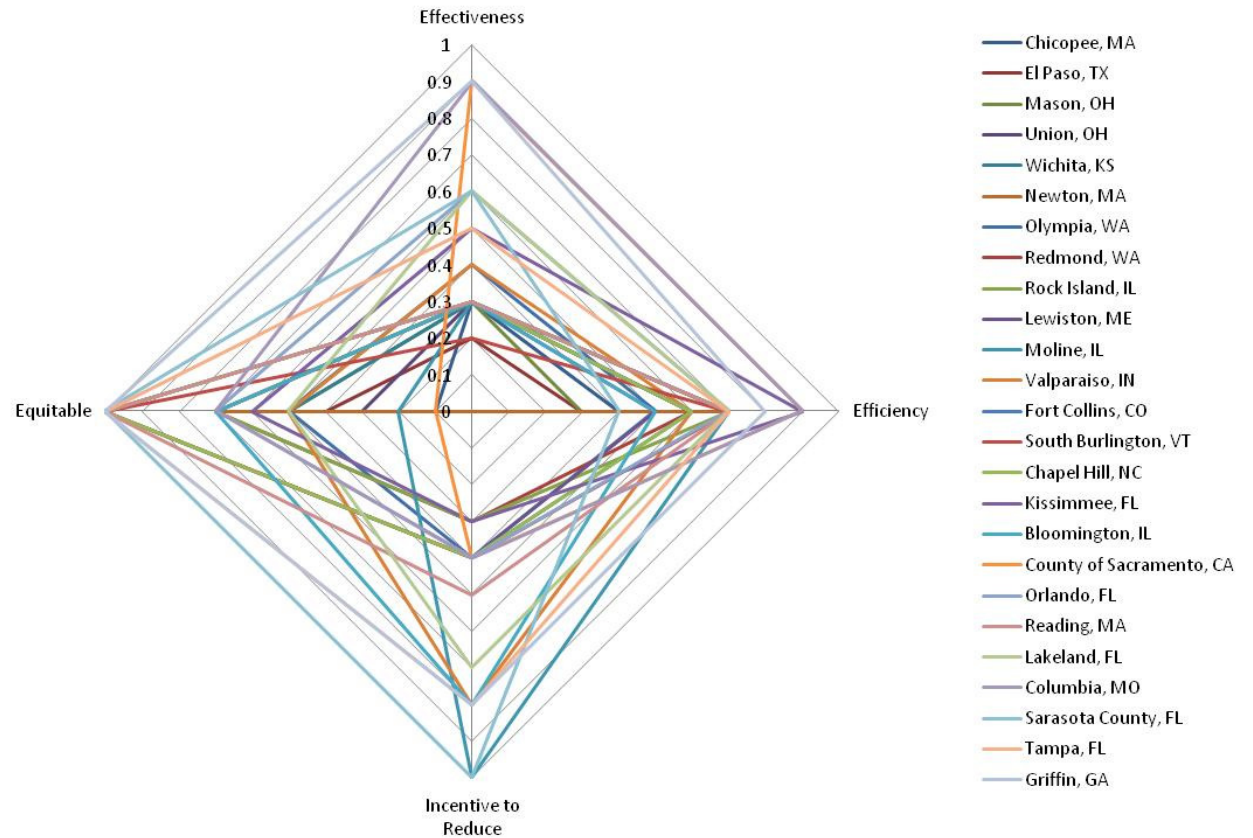
	Effective	Efficient	Incentives to Reduce	Equitable
Griffin, GA	0.9	0.8	0.8	1
Valparaiso, IN	0.4	0.6	0.8	0.5
Union, OH	0.3	0.6	0	0.3
Sarasota County, FL	0.6	0.4	1	1
Fort Collins, CO	0.3	0.6	0.4	1
Clympia, WA	0.4	0.5	0.4	0.5
South Burlington, VT	0.2	0.7	0.4	1
Chapel Hill, NC	0.3	0.6	0.4	1
Reading, MA	0.3	0.7	0.5	1
Newton, MA	0.3	0.7	0	0.7
Tampa, FL	0.5	0.7	0.8	1
Lewiston, ME	0.3	0.5	0.4	1
Chicopee, MA	0.3	0.4	0	0.1
Orlando, FL	0.6	0.7	0.4	0.7

# Results

- 76% (19) offered a credit system
  - 28% have residential credit systems
- 36% (9) have adequate funding to meet all needs
- 84% (21) are organized as part of another utility or municipal department
- 64% (16) use an Equivalent Residential Unit
- 24% (6) have evaluation measures
  - 15% (4) have evaluation measures for both stormwater quality and stormwater quantity
- 32% (8) have highly equitable rate structure
- 56% (14) have highly justifiable rate structures

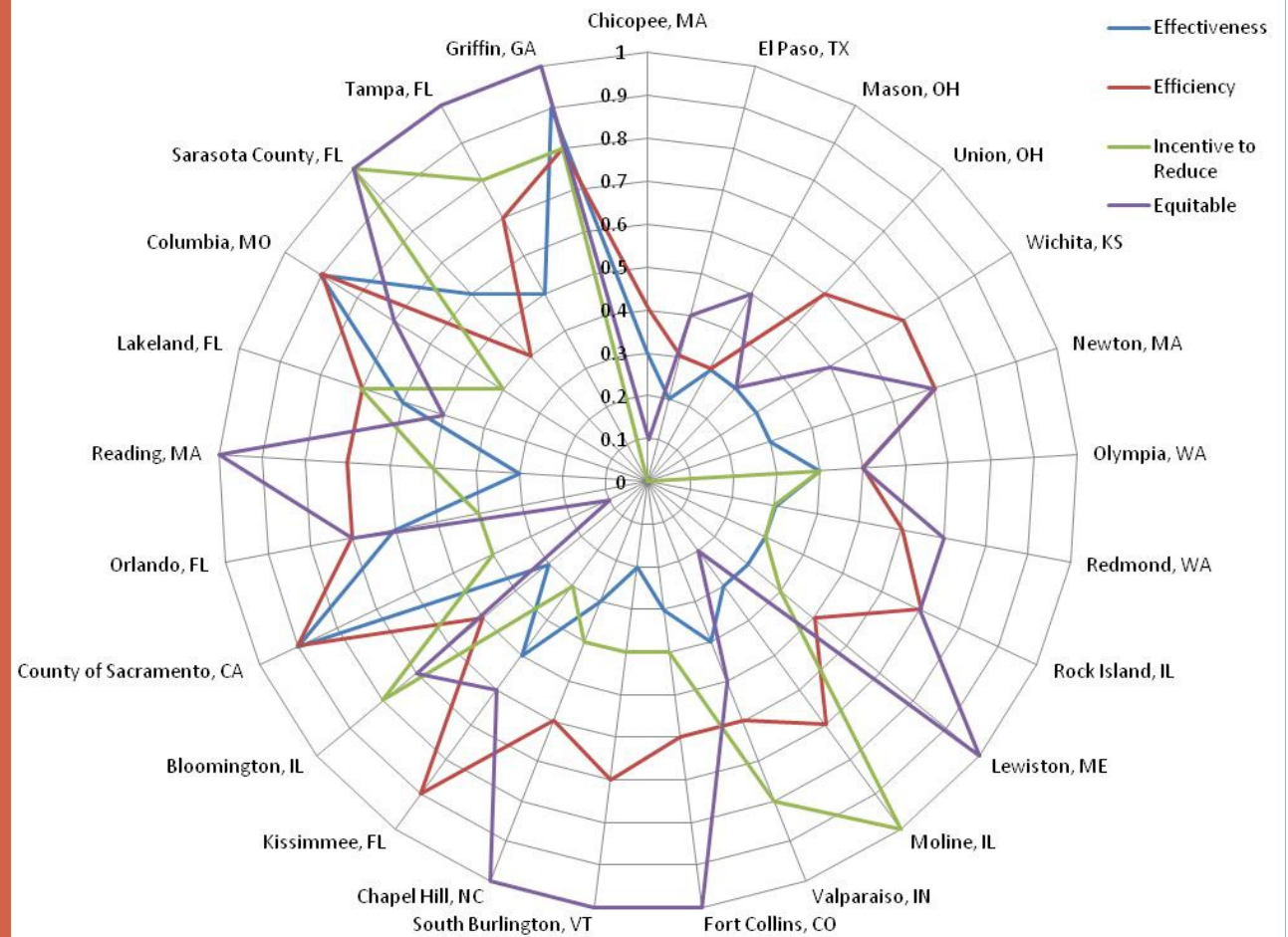
# National Stormwater Utility Analysis Results

Overall trends show that utilities scored higher in equitability and lower in effectiveness.

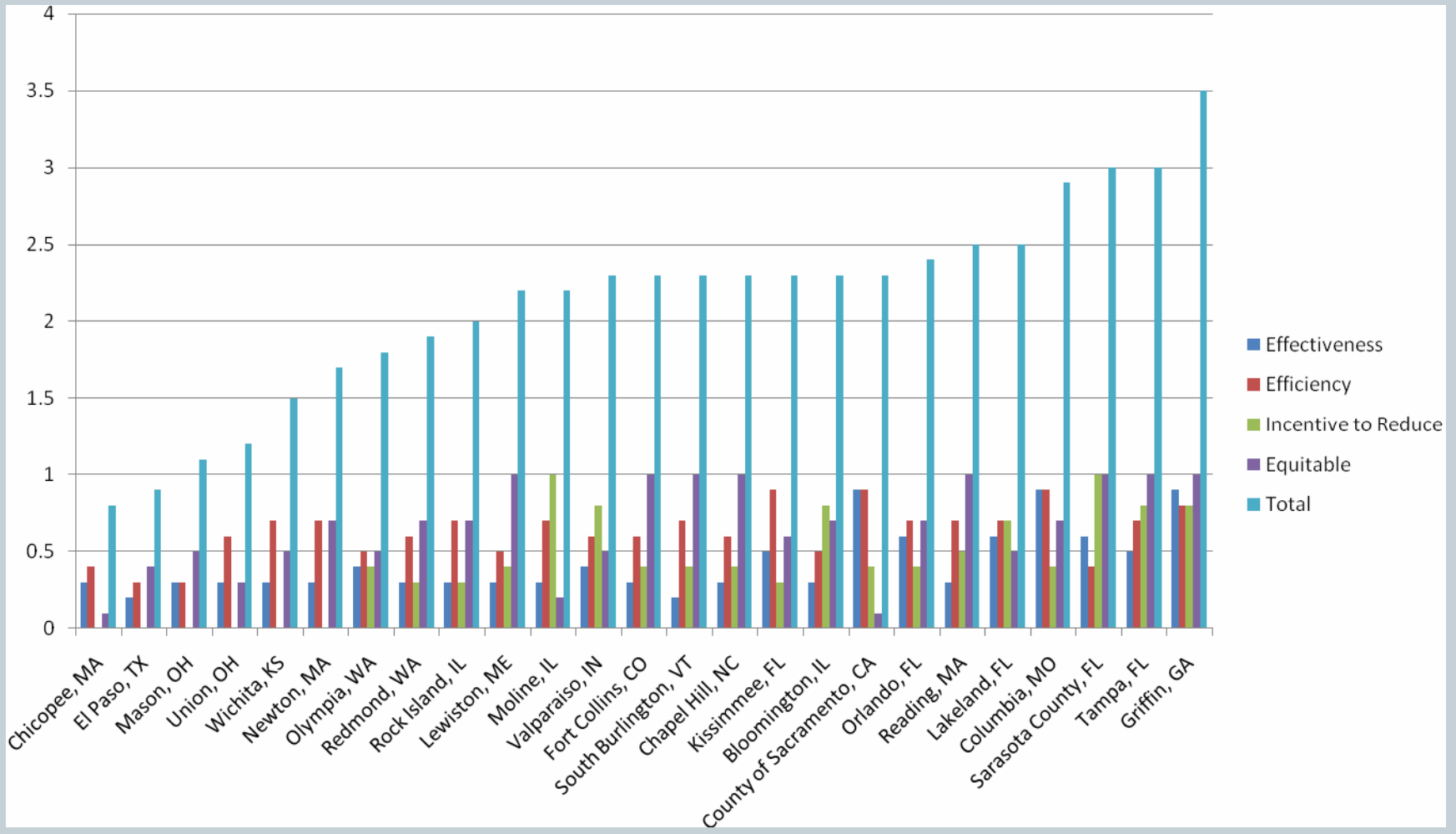


# National Stormwater Utility Analysis Results

Many utilities scored high in one criteria while scoring low in another



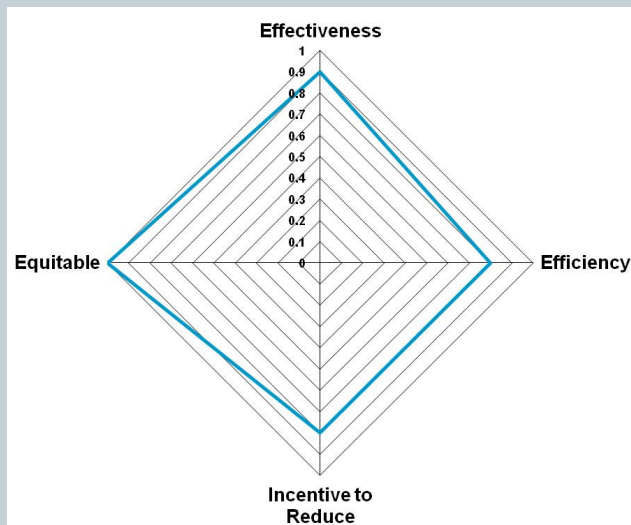
# Results



# Highest Scoring Utilities

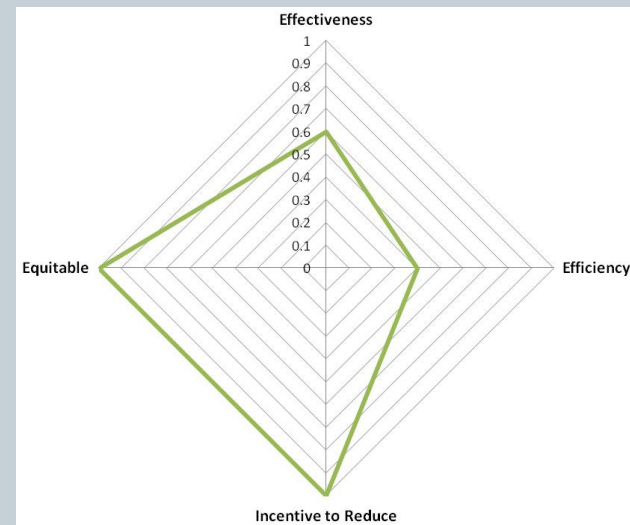
## Griffin, GA

- 3.5/4
- “Champion”, long development period, stormwater quality evaluation, comprehensive public education program



## Sarasota County, FL

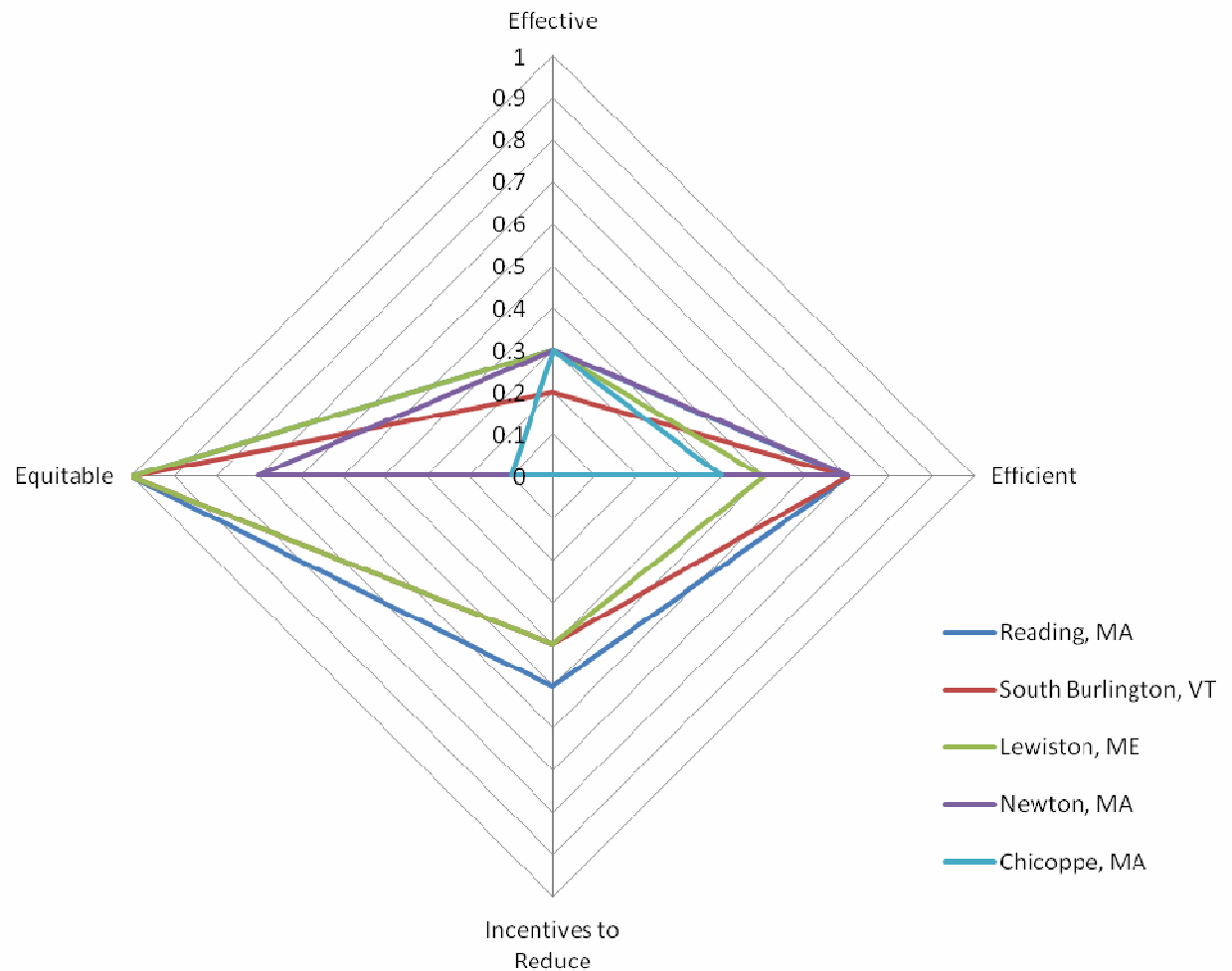
- 3/4
- Unique comprehensive rate structure, ongoing public involvement, 100% credit





## New England Analysis

- Lower overall scores
- Follows national trend with high equitability and low effectiveness
- Reading, MA highest scoring New England Utility
- All relatively young utilities



# Case Study 2: Narragansett, RI



**CAN MUNICIPALITIES USE THE INFORMATION  
GATHERED FROM THE NATIONAL STORMWATER  
ANALYSIS IN ORDER TO IMPLEMENT A SUCCESSFUL  
UTILITY OF THEIR OWN?**



# Stormwater Management in Narragansett

- General Fund supported
- Department of Public Works (DPW) maintains all municipal streets and stormwater structures
- Engineering Department oversees construction, handles stormwater mapping, and provides plans for stormwater projects

- Future stormwater management
  - Increased and dedicated funding
    - ✦ Staffing
    - ✦ Capital Improvement Projects

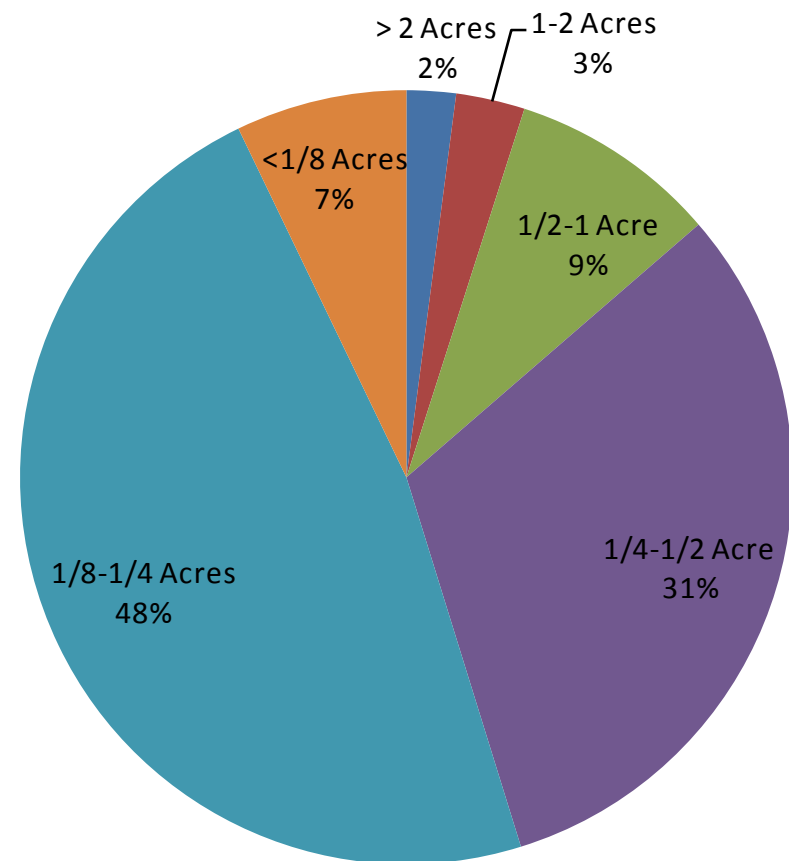
Narragansett Total Stormwater Budget FY 2008

Department	Activity	Amount
DPW	Operations and Maintenance	\$177,600.00
DPW	Personnel	\$80,000.00
DPW	CIP	\$78,000.00
Engineering	Phase II Implementation	\$30,000.00
Engineering	Personnel	\$48,758.00
Total Stormwater Costs		\$414,358.00

# Feasibility Study Results

- Equivalent Residential Unit (ERU) analysis on 70/~7,000 (1%) of Narragansett single-family residential parcels
- Impervious area calculated by aerial photos
- ERU= 2,650 ft<sup>2</sup> of impervious surface

**Town of Narragansett Parcel Area Breakdown**  
Single-Family Residential





- Over 39 million ft<sup>2</sup> of impervious surface
- 14,780 ERUs (1 ERU = 2,650 ft<sup>2</sup> of impervious surface)

## Impervious Surface Area Breakdown by Parcel

Parcel Type	Total Impervious Surface	Percent of Total Impervious	Equivalent Number of Professional Football Fields
Residential	19,946,973 ft <sup>2</sup>	51%	54
Non-residential	3,128,937 ft <sup>2</sup>	8%	346
Streets	12,035,802 ft <sup>2</sup>	41%	278
<b>Total</b>	<b>39,111,713 ft<sup>2</sup></b>	<b>100%</b>	<b>680</b>



# Feasibility Study: Funding Options

## Option 1: Flat Residential, Variable Non-Residential

Monthly ERU Rate	Estimated Yearly Revenue
\$2	\$198,137.54
\$2.5	\$247,671.93
\$3	\$297,206.31
\$3.5	\$346,740.70
\$4	\$396,275.09
\$4.5	\$445,809.47
\$5	\$495,343.86

\* Narragansett FY 08 Stormwater Budget: \$414,358.00

## Option 2: Tiered Residential, Variable Non

Monthly ERU Rate	Scenario A	Scenario B
\$2	\$157,512	\$230,316
\$3	\$236,270	\$345,474
\$4	\$315,024	\$460,632
\$5	\$393,780	\$575,790

- Scenario A:
  - Small Parcel: 0- 1/4 acre ( 1/2 ERU/month)
  - Average Parcel: 1/4- 1 acre (1 ERU/month)
  - Large Parcel: Over 1 acre (2 ERU/month)
- Scenario B:
  - Small Parcel: 0- 1/8 acre (1/2 ERU/month)
  - Average Parcel: 1/8- 1/4 acre (1 ERU/month)
  - Large Parcel: Over 1/4 acre (1.5 ERU/month)

# Rate Option Analysis



Rate Structure Option	Equity	Simplicity	Data Collection Needs	Cost/Ease of Admin.	Legal Defensibility	Total Score
<b>Option 1</b> Flat Residential Variable Non-Residential	5	8	7	9	7	<b>36</b>
<b>Option 2</b> Tiered Residential Variable Non-Residential	8	6	5	5	8	<b>32</b>

# Utility Options for Narragansett



Consideration	Option A	Option B
<b>Start-up Strategy</b>	Start with a simplified fee structure. Refine later.	
<b>Fee Structure</b>	Flat rate for residential. Variable rate for non-residential.	Tiered rate for residential. Variable rate for non-residential.
<b>Multi-Family Approach</b>	Treat multi-family units as non-residential and calculate a variable rate for each.	Tiered structure for residential units based on size/ number of families.
<b>Fee Basis and Data Collection</b>	Estimated impervious surface using the ERU.	Parcel size in conjunction with the ERU.
<b>Administration</b>	Hire a full-time stormwater coordinator.	
<b>Organizational Structure</b>	Within existing utility or municipal department.	Organized as an enterprise fund for financing purposes. Rely on existing entities and resources.
<b>Fee Collection</b>	Local collection through existing utility bill.	
<b>Implementation</b>	Mostly local implementation.	
<b>Expenses Covered</b>	All stormwater management.	All new expenses.
<b>Geographic Coverage</b>	Entire town.	
<b>Exemptions</b>	Only state-owned property.	State owned property and roads, undeveloped or agricultural lands.
<b>Credits</b>	Off-site stormwater quantity reduction credits.	Stormwater quantity and quality credits.
<b>Evaluation Measures</b>	Establish both on-going stormwater quality and stormwater quantity evaluation measures.	

# Conclusions & Recommendations

- Public education and outreach is essential for implementation success
- Evaluation measures (for both stormwater quality and quantity) need to be implemented
- Credit systems for both residential and non-residential parcels are necessary
- Municipal-specific needs must be taken into account
- Existing utility's development process can be used as examples
- Considerations (such as equity, efficiency, incentives to reduce, and effectiveness) can be used to develop a successful utility

# Further Research



## National Analysis

- Add public education/outreach
- Analyze credit system response
- Increase sample size
- Randomize sample

## Narragansett

- Increase ERU sample
- Include all parcels in ERU analysis
- Use updated aerial photos and GIS information

# Thank You!



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