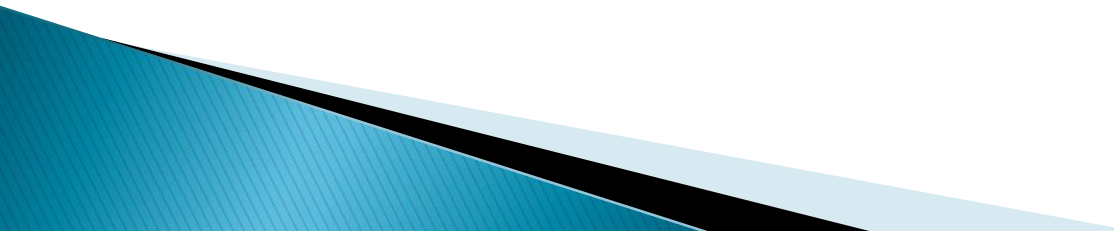


# Factors Influencing the Establishment of Stormwater Utilities in the U.S.

Linda Allen, PhD, PE  
October 16, 2019

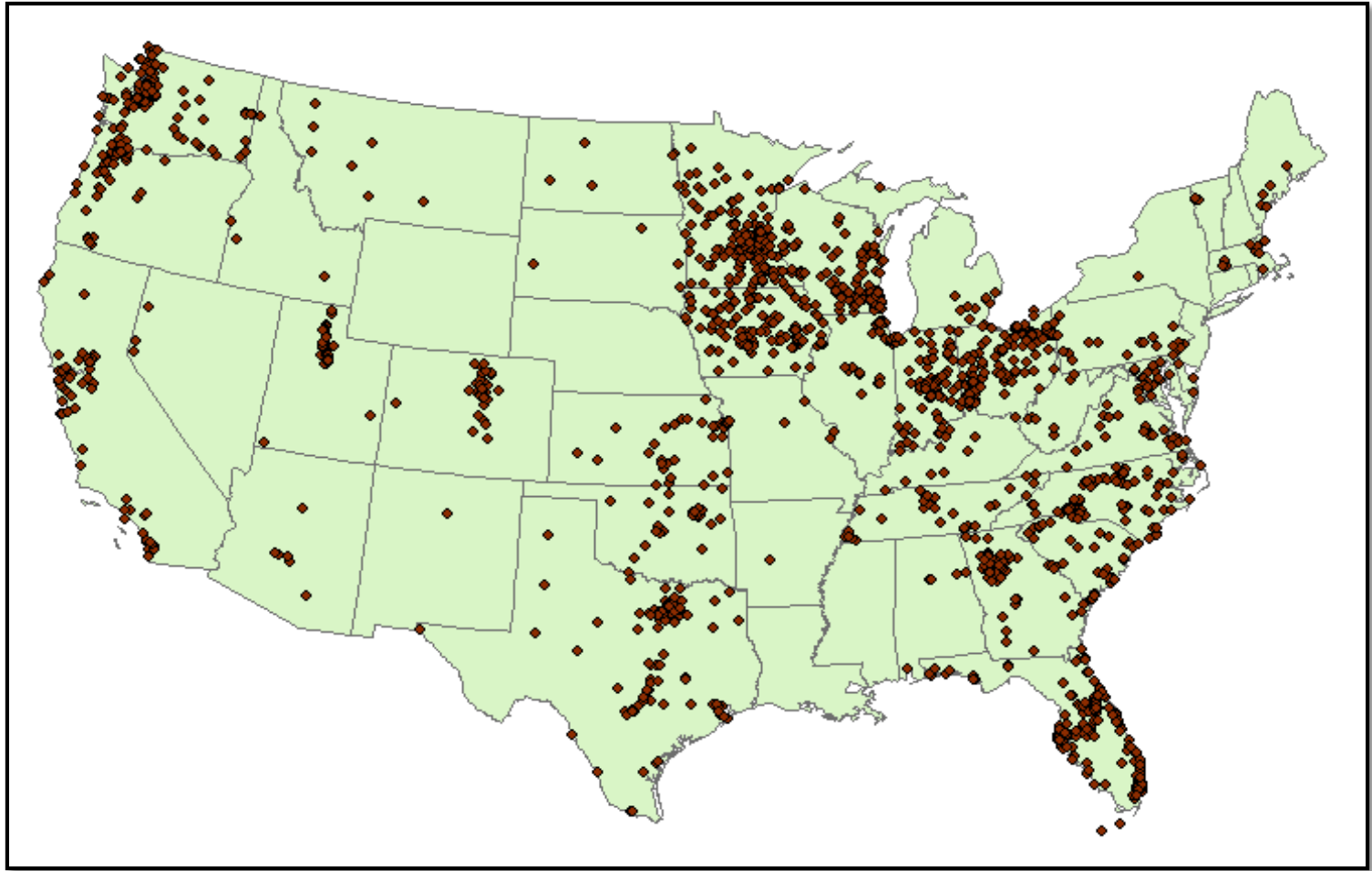
# Overview of Presentation

- ▶ Background
  - ▶ Past Research
  - ▶ Research Design
  - ▶ Findings
  - ▶ Conclusions
  - ▶ References
- 

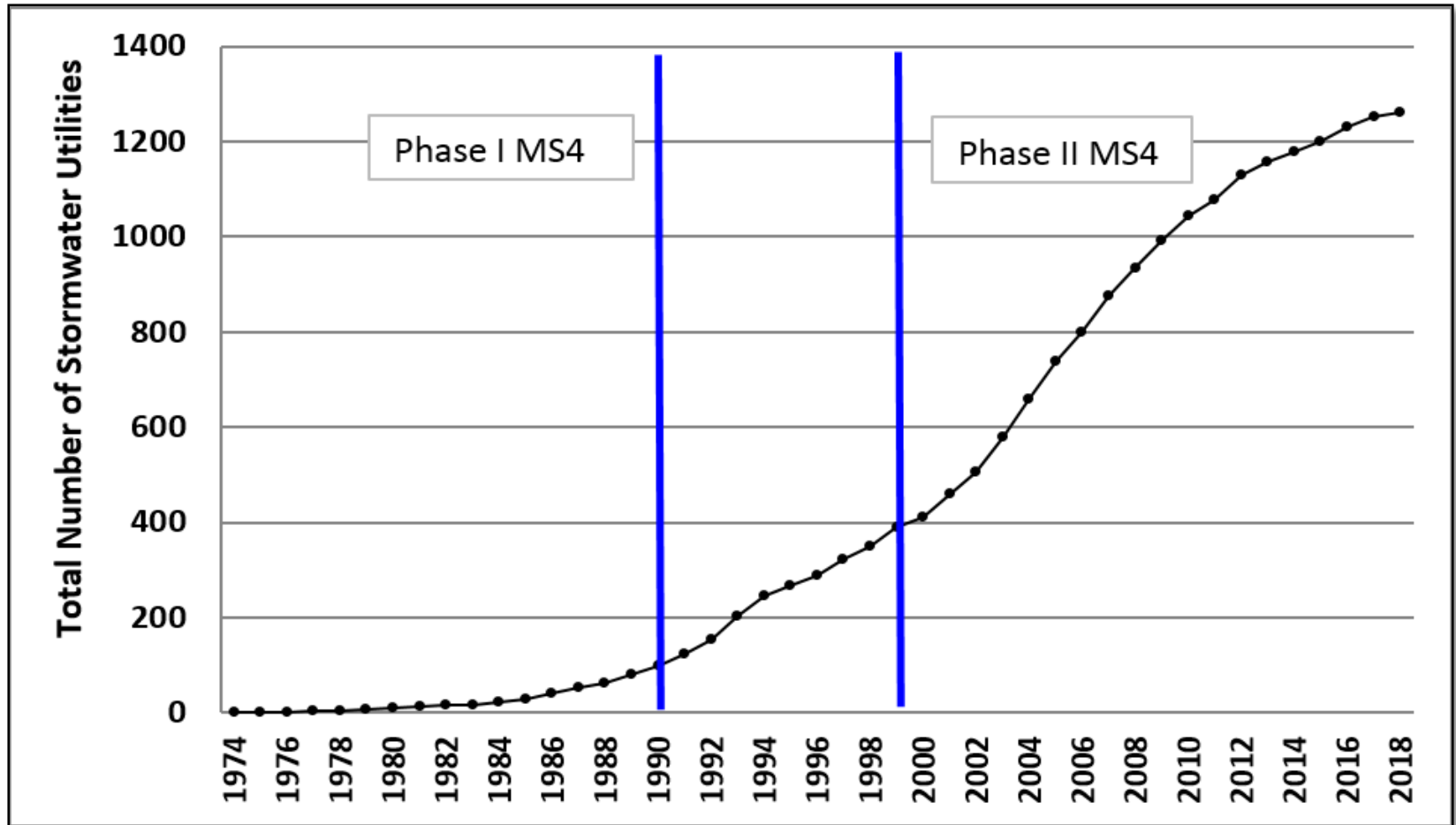
# Background

- ▶ Stormwater management systems critical infrastructure for communities
  - Funding for capital replacement and improvements
  - Funding for regulatory compliance
- ▶ Stormwater management programs funding
  - Historically funded by mix of state and local funds, including general tax revenues, wastewater user fees, exactions and impact fees, and grants
- ▶ Stormwater utilities – a public financing mechanism for stormwater that includes a user fee that is designed to be reasonable, fair, and equitable
  - Dedicated, stable, long-term funding stream
  - Can be designed to equitably distribute the cost burden
  - Can be structured to incentivize stormwater reduction
- ▶ Estimated 1,800 to 2,000 utilities in U.S. as of 2018
  - Fees range from \$10 per year to \$70 per month
- ▶ Establishment has varied spatially and temporally

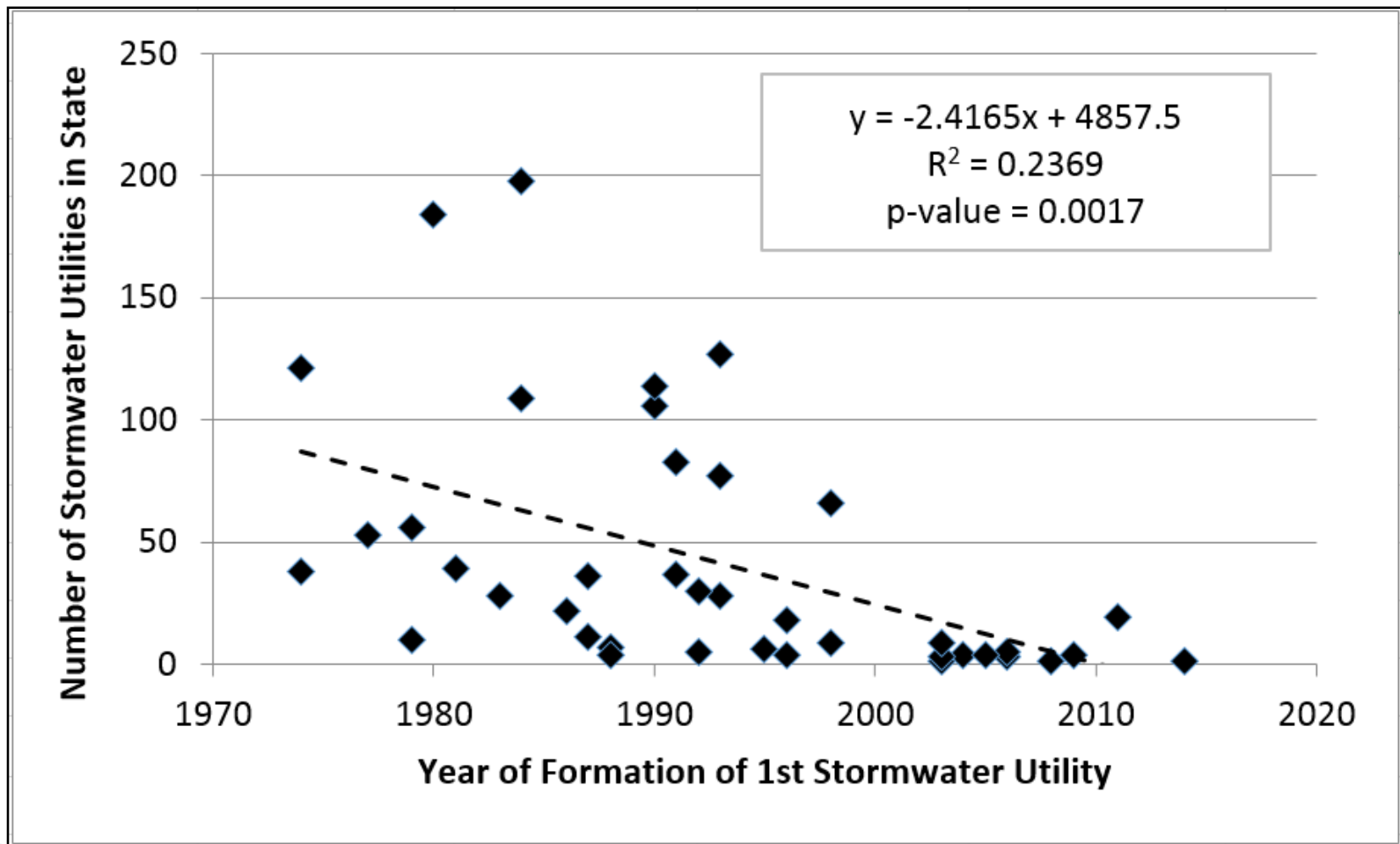
# Spatial Variation



# Temporal Variation



# Temporal Variation



# Utility Structures

Fee Types	Number of Stormwater Utilities
Equivalent Residential Units	787
Fixed Rate	236
Tier System	241
Residential Equivalence Factor (or similar)	140
Two Level System (Residential/Commercial)	108
No information	34
Fee per Parcel Acre	33
Water Meter	7
By Water usage	5
Existence of SWU/ Fee verified	87
Fee per Square Foot Impervious Area	3

# Past Research on Formation of Utilities

Level	Factor	Direction of Influence
National	Presence of Stormwater Regulations	+
State	Lack of Clear Legal Authority	-
	Presence of property tax restriction	+
Local	Political and Public Opposition	-
	Policy Diffusion	+
	High Transaction Costs	-
	Contextual Characteristics	+/-



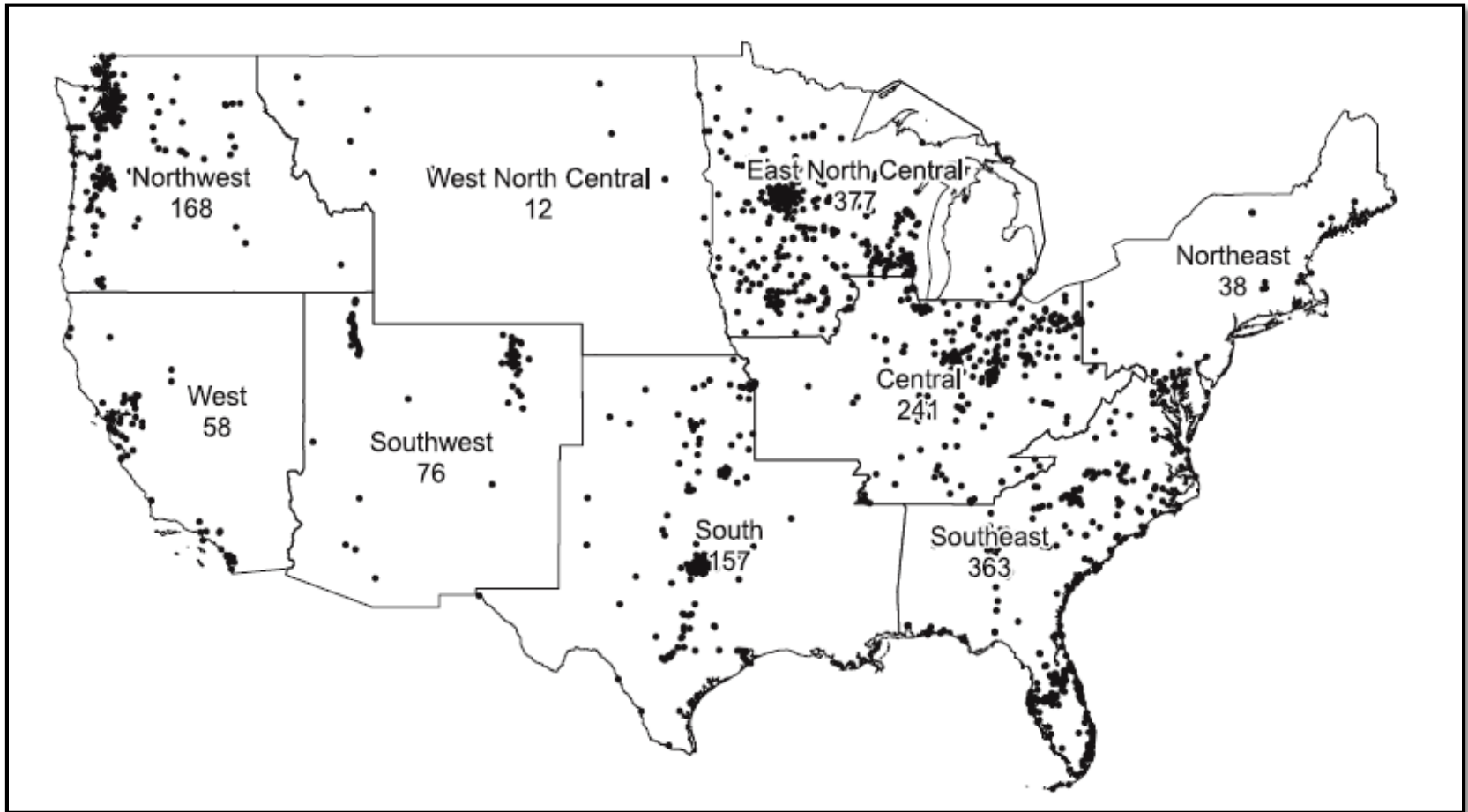
# Research Design

- ▶ Cross-sectional study
  - Subset of states
    - Sampling frame for selection of states included only states that had sufficient legal authority to establish a stormwater utility (45 states)
  - Random sample of municipalities within those states with and without stormwater utilities
- ▶ Data sources:
  - Interviews (semi-structured) with professionals and government representatives
  - Secondary sources such as state laws, ordinances, and utility reports

# Research Design

State	NOAA Climate Region	# of Stormwater Utilities	Date of First Utility Formation	% Total Population with Utilities	% Population in Urban Areas
Alabama	Southeast	4	2009	8.8	59
Arkansas	South	1	2008	1.2	56.6
Idaho	Northwest	4	2004	10	70.6
Kansas	South	37	1991	32.7	74.2
Minnesota	East North Central	198	1984	61.6	73.3
New Hampshire	Northeast	0	–	0	60.3
Ohio	Central	109	1984	62.5	77.9
Utah	Southwest	36	1987	42	90.6

# Stormwater Utilities by NOAA Climate Regions



# Number of Stormwater Utilities and Local Governments by State

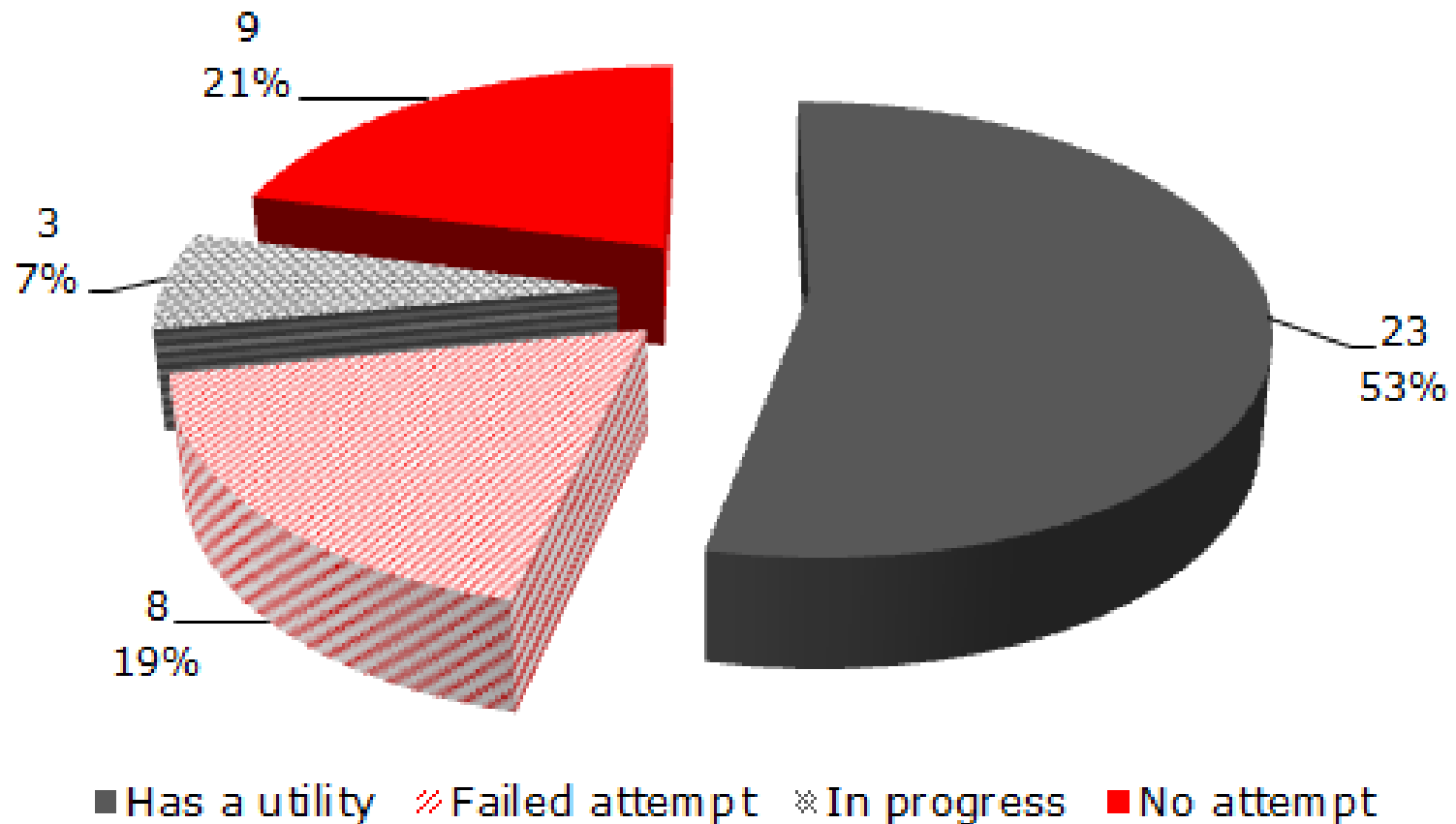
State	# of Utilities	# of Local Governments	State	# of Utilities	# of Local Governments	State	# of Utilities	# of Local Governments
Alabama	4	528	Louisiana	0	366	Ohio	109	2332
Alaska	0	170	Maine	5	505	Oklahoma	22	666
Arizona	6	577	Maryland	18	180	Oregon	53	277
Arkansas	1	106	Massachusetts	9	356	Pennsylvania	19	2627
California	56	539	Michigan	10	1856	Rhode Island	0	39
Colorado	38	333	Minnesota	198	2724	S. Carolina	39	316
Connecticut	0	178	Mississippi	0	380	S. Dakota	4	1285
Delaware	3	60	Missouri	5	1374	Tennessee	25	437
Florida	184	477	Montana	7	183	Texas	105	1469
Georgia	66	689	Nebraska	0	1042	Utah	36	273
Hawaii	0	5	Nevada	3	35	Vermont	3	294
Idaho	4	244	New Hampshire	0	244	Virginia	29	324
Illinois	28	2831	New Jersey	0	586	Washington	117	320
Indiana	83	1663	New Mexico	1	136	West Virginia	9	287
Iowa	106	1045	New York	1	1598	Wisconsin	126	1924
Kansas	37	2003	N. Carolina	77	653	Wyoming	0	122
Kentucky	11	536	N. Dakota	4	1724			

Local governments: borough, village, town, charter township, municipality, plantation, city, city-county, county, and parish

# Research Design

State	# of Stormwater Utilities	# of State Representatives	# of Local Government Representatives	# with Other Affiliations	Total # Interviews
Alabama	4	1	6	1	8
Arkansas	1	1	6	–	7
Idaho	4	1	6	–	5
Kansas	37	1	4	–	5
Minnesota	198	1	6	1	7
New Hampshire	0	1	3	2	4
Ohio	109	1	7	–	7
Utah	36	1	5	–	6
Total # Interviews	–	8	43	4	55

# Stormwater Utilities Surveyed (n=43)



# Findings

Level	Factor	Past Research Direction of Influence	This Study Direction of Influence
National	Presence of Stormwater Regulations	+	+
	Lack of Clear Legal Authority	-	-
State	Effective Implementation and Enforcement of Stormwater Regulations		+
	General Public Attitudes		+/-
	Presence of property tax restriction	+	+
Local	Political and Public Opposition	-	-
	Policy Diffusion	+	+
	High Transaction Costs	-	-
	Contextual Characteristics	+/-	+/-
	Weak Baseline Stormwater Management Program		+

# Findings

## ▶ National Level

- Regulatory pressure from stormwater regulations for MS4s
  - Driver for utility formation but influence of regulations varied notably at both the state and local levels

## ▶ State Level

- Presence of clear legal authority (statutory or case law) is a major influence
  - Alabama and New Hampshire amended state laws to provide legal authority
  - Eight legal challenges to stormwater utilities in five of the states covered in study
    - Chilling effect on other communities



# Findings

## ▶ State Level – con't

- Regulatory pressure varied
  - Minimum control measures, pollution reduced to “maximum extent practical” – allow for more discretion, interpretation, and variability across states
  - Envisioned MS4 permit requirements would be incrementally increased over time – states ratchet up requirements at different paces
  - Variation in extent to which water quality requirements under a Total Maximum Daily Load for impaired waterbodies
  - Varying levels of staff and financial resources dedicated to implement the MS4 regulatory program and enforce the permits

# Findings

## ► MS4 Permits Initial Issuance Dates by State

State	Phase I MS4 Permits (national regulations effective as of 1990)	Phase II MS4 Permits (national regulations effective as of 1999)	Timely 5-Year Renewals
Alabama	1995 – 1996	2003	No
Arkansas	1997	2004	Yes
Idaho (U.S. EPA)	2000	2006 – 2009	No
Kansas	1997 – 2001	2004	Yes
Minnesota	2000	2002	No
New Hampshire (U.S. EPA)	n/a	2008	No
Ohio	1997	2003	Yes
Utah	1992 – 1995	2002	Yes

# Findings

## ▶ State Level – con't

### ◦ Public Attitudes

- Trust in government and collective action vs. libertarian
- Concern for environmental protection

### ◦ Property Tax Restrictions

State	Rate Limit	Levy Limit	Assessment Limit
Alabama	X		
Arkansas	X	X	X
Idaho	X	X	
Kansas		X	
Minnesota			
New Hampshire			
Ohio	X	X	
Utah	X	X	

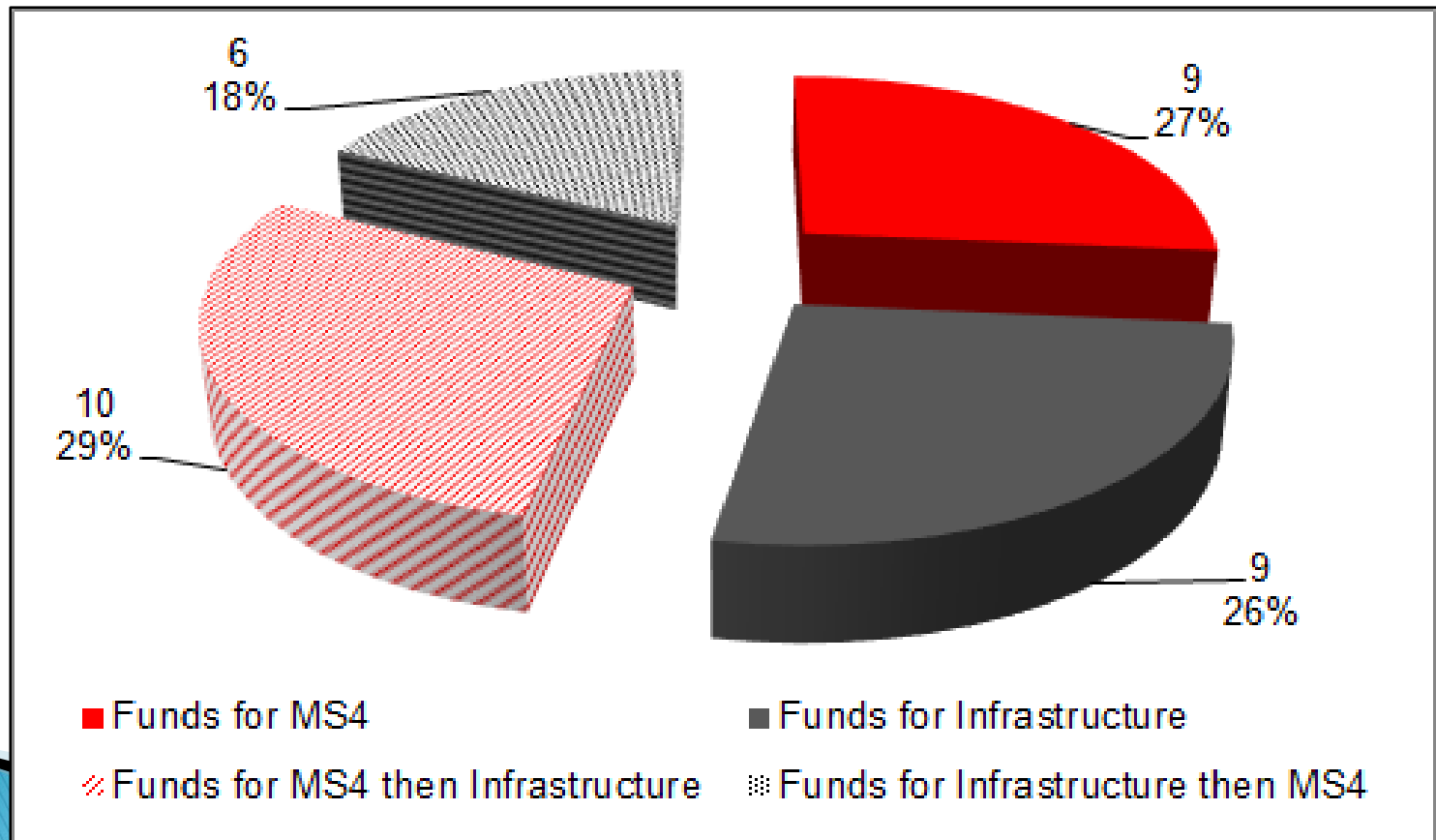
# Findings

## ▶ Local Level

- Political and public opposition have some influence
  - Opposition was not widespread
  - Reasonable level of public outreach and stakeholder engagement sufficient to build support for utility
  - Chilling effect on other communities
- Policy diffusion through learning (peer to peer or peer to third party) minor influence
- Transaction costs minor influence
- Contextual characteristics some minor influence
  - Socio-economic conditions within community
  - Form of local government
  - Local environmental conditions

# Findings

- ▶ Drivers – MS4 Permit Compliance and Capital Improvements
- ▶ Adequacy of Baseline (Non-Utility Funded) Stormwater Management Programs has major influence



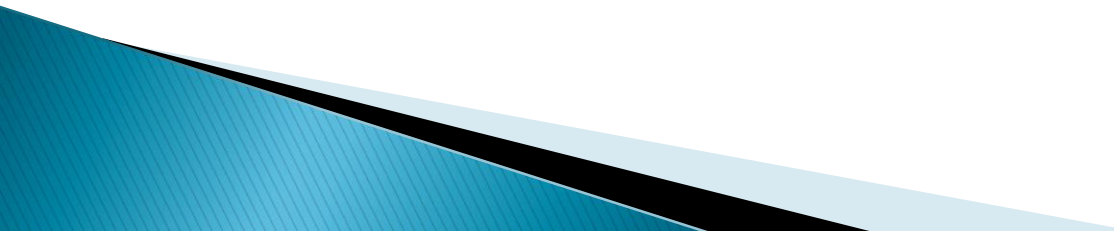
# Conclusions

- ▶ Stormwater utilities are established to fund regulatory compliance, capital improvement, and/or operations and maintenance programs for their stormwater infrastructure if existing funds are insufficient
  - Lack of clear legal authority a major barrier
  - Lack of public and political support is not a major barrier to setting up a stormwater utility
  - Existence of other utilities in a state may lend some support
  - Not a time-consuming or costly process to design a utility
  - Prevailing public attitudes and other contextual factors can either reinforce a community's efforts to setup a utility or work against its efforts
  - Real challenge is overcoming the long-standing approach to not treating stormwater management as a separate public service worthy of its own funding source

# Balancing of Factors

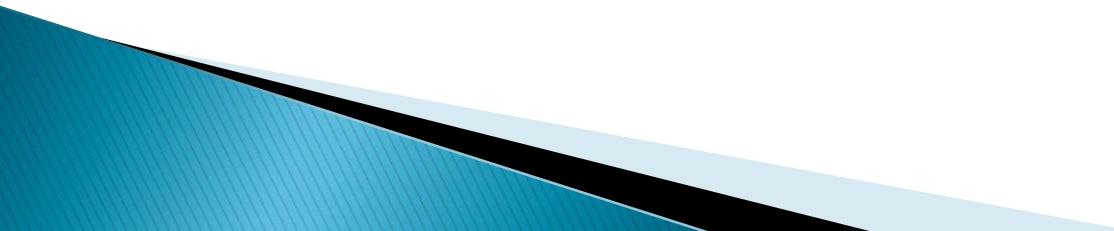
- ▶ Dover, NH – Failed to setup utility in 2011
  - Well-justified need for the utility to address failing drainage infrastructure
  - Community conducted an inclusive and open process to design an equitable utility structure and garner stakeholder support
  - Clear legal authority in the state to establish a utility
  - .... but ....
  - Lack of strong MS4 regulatory pressure
  - A vocal minority in opposition that didn't trust the government
  - A lack of other existing utilities in the state to serve as role models
  - National recession
  - ..... Negative factors served to tip the balance away from the establishment of a utility in this community

# Learning Assessment

- ▶ What historically is the primary source of funding for stormwater management?
  - ▶ The influence of stormwater regulations varies most at what level?
  - ▶ Are stormwater utilities established primarily to fund MS4 regulatory programs or capital improvements/O&M?
  - ▶ What is the most common type of stormwater utility fee design?
- 



# Acknowledgements

- ▶ Dr. Warren Campbell, Western Kentucky University
  - ▶ Drs. Kate Lawson and David Lewis, University at Albany
  - ▶ Interviewees
- 

# Key References

- ▶ Black & Veatch (2016) *2016 Stormwater Utility Survey*.
- ▶ Campbell, C.W. *Western Kentucky University Stormwater Utility Surveys* – at <https://www.wku.edu/seas/undergradprogramdescription/stormwaterutilitysurvey.php>.
- ▶ Campbell, C.W., Dymond, R.L., Key, K., & Dritschel, A. (2017). *Western Kentucky University Stormwater Utility Survey 2017*.
- ▶ Campbell, C.W., Dymond, R.L., & Dritschel, A. (2016). *Western Kentucky University Stormwater Utility Survey 2016*.
- ▶ Chalfant, B.A. (2018) *Paying For Rain: The Emergence, Diffusion, and Form of Stormwater Fees in the United States, 1964–2017*.
- ▶ Kea, K., Dymond, R. & Campbell, W. (2016) An Analysis of Patterns and Trends in United States Stormwater Utility Systems. *J. Am. Water Res. Assoc.* 52(6), 1433–1449.
- ▶ National Association of Clean Water Agencies (NACWA) (2016) *Legal Considerations for Enacting, Implementing, & Funding Stormwater Programs, Navigating Litigation Floodwaters*.
- ▶ National Municipal Stormwater Alliance (2018) *2018 State of Stormwater Report*.
- ▶ New England Environmental Finance Center (NEEFC) (2005, May) *Stormwater Utility Fees, Considerations & Options for Interlocal Stormwater Working Group (ISWG)*.
- ▶ Water Words That Work (2014, Aug. 4) *Stormwater Fees Literature Review*. Prepared for Pennsylvania Stormwater Authority.
- ▶ Western Kentucky University Stormwater Utilities Survey Database (n.d.). Excel database provided by Warren Campbell on October 29, 2018.