Regulating PFAS - State Water Quality Policy to Address an Emerging Contaminant

CUHMMC 2025

Administrative Rulemaking and Emerging Contaminants

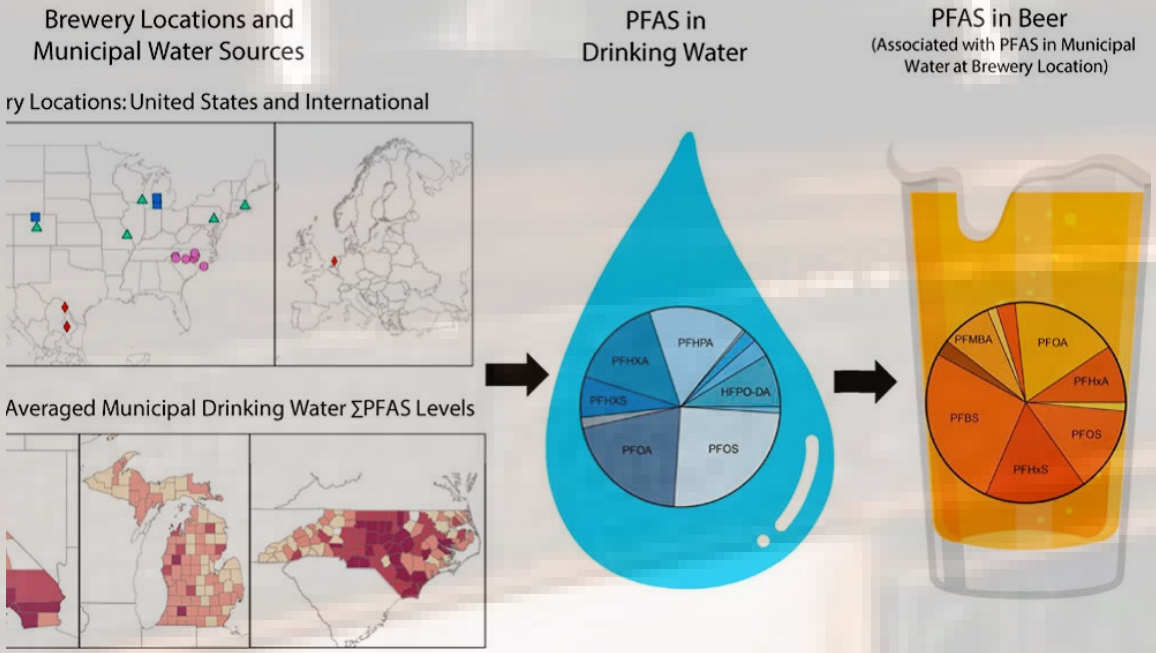
Adopt Rule from EPA

Develop State Rule

PFAS Background

- Developed in 1940's Teflon, Gortex,
- Used in ever ything from Pizza boxes to McDonalds hamburger wrapers to fire fighting foam
- It's everywhere and in every living thing on the planet
- Toxic, persistent and bioaccumulative

Even BEER !!!!



Hold My Beer: The Linkage between Municipal Water and Brewing Location on PFAS in Popular Beverages

J. Hoponick Redmon, N. M. DeLuca, E. Thorp, C. Liyanapatirana, L. Allen and A. J. Kondash
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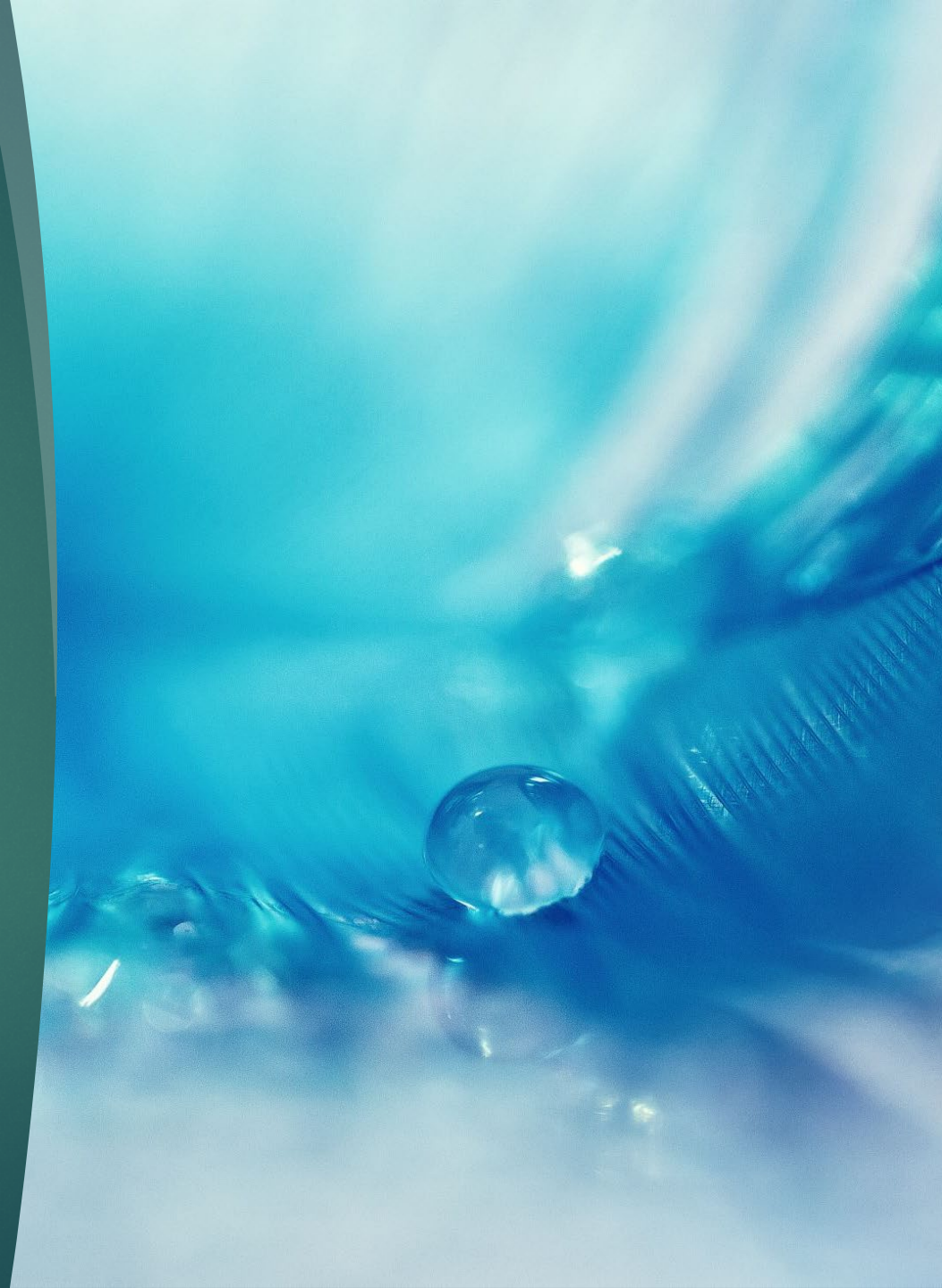
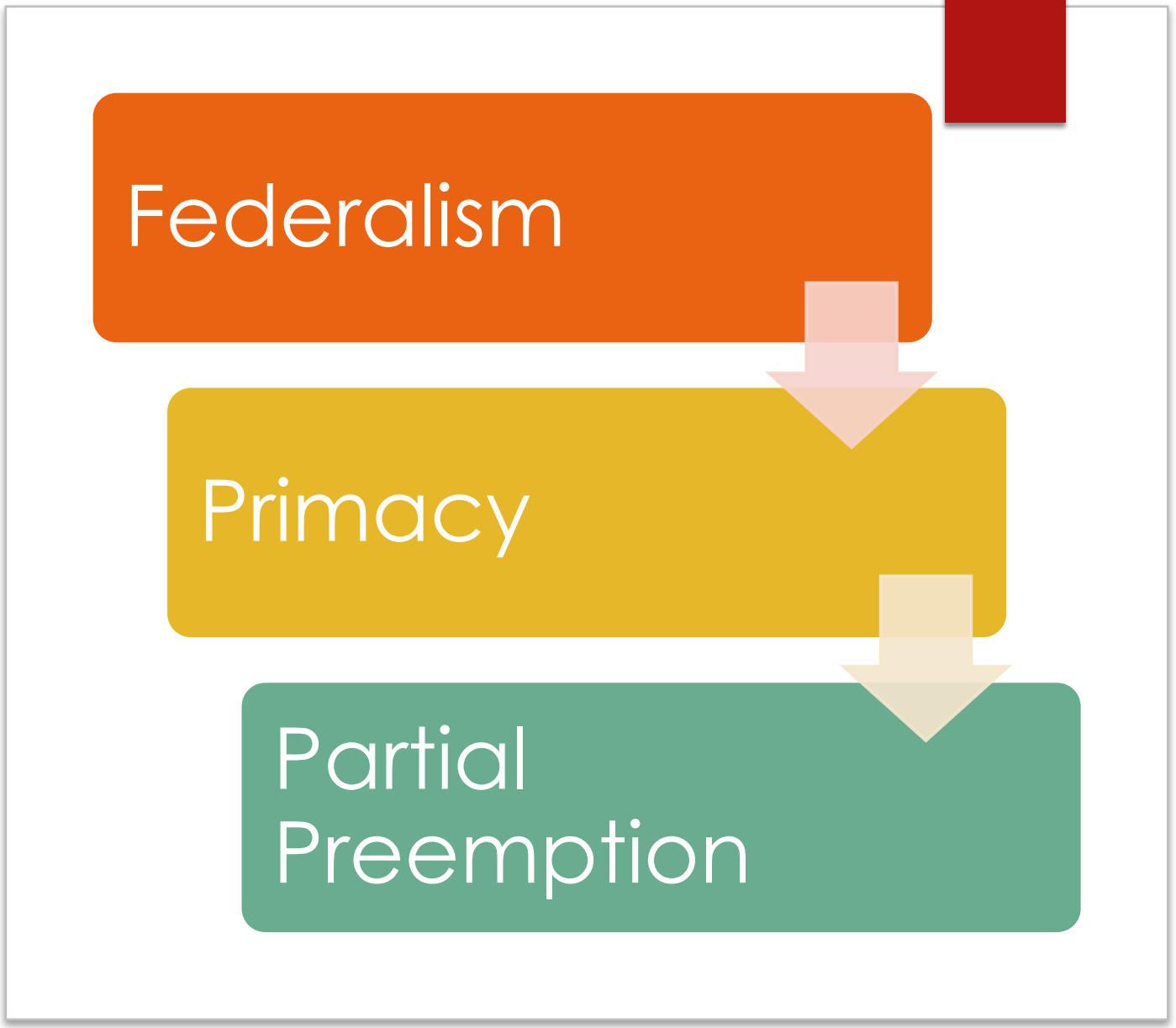
DOI: 10.1021/acs.est.4c11265
https://doi.org/10.1021/acs.est.4c11265

Purpose and significance of my research

- Identify and evaluate the factors that influence state administrative decision-making
- Protection of water resources
- Emerging contaminants
- PFAS issues



Context of State-level Administrative Rulemaking

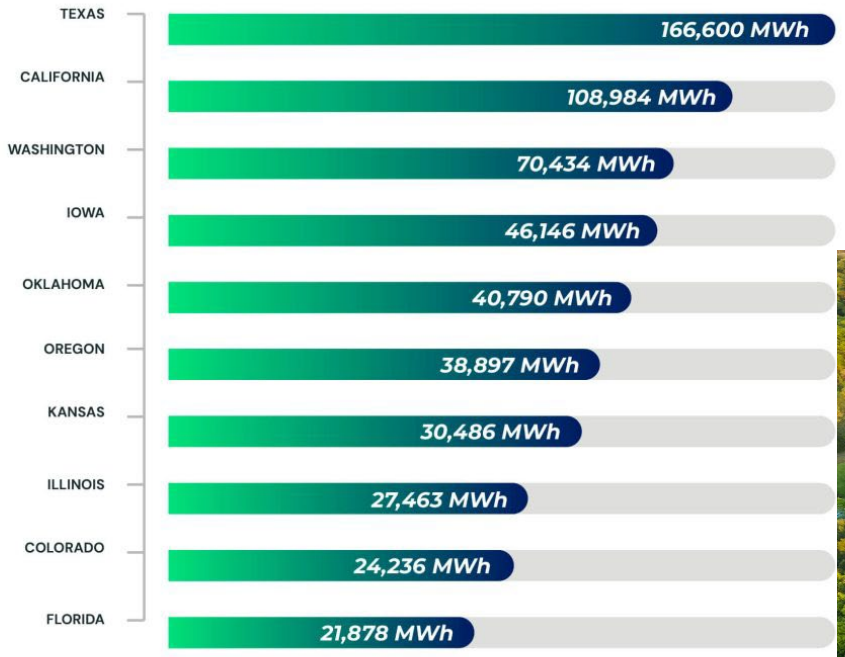


Race to the Bottom

Race to the Top

INTEGRITY ENERGY

Top 10 Renewable Energy Producing States in 2024



Creating Regulatory Policy is Different

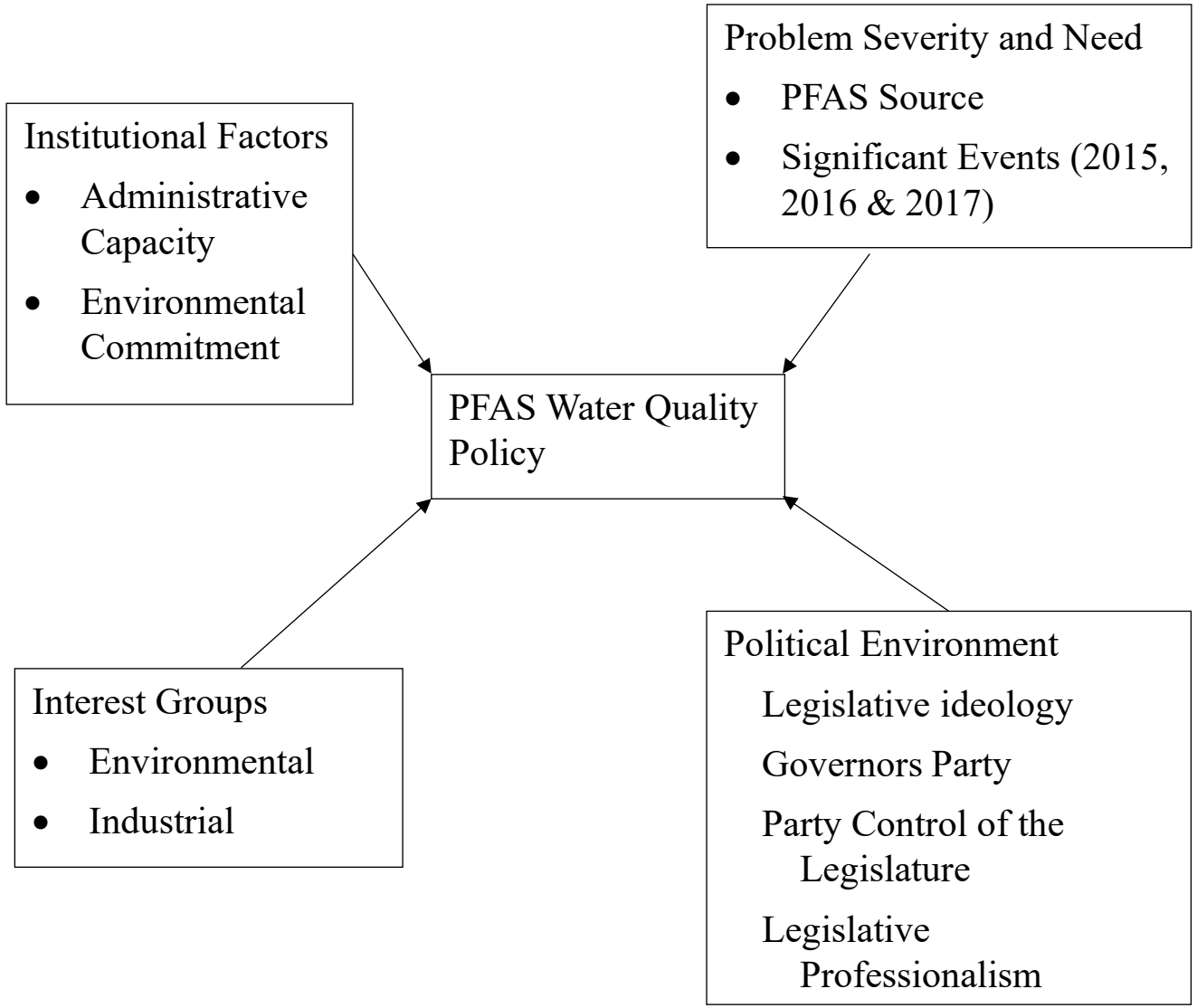
Regulations are expensive

Administrative Procedures

Litigation

Scientific support

Modeling Administrative Decision-making



Methods

Sequential Explanatory Mixed Methods

Phase I Quantitative

- Data collected for all 50 states for years 2005 - 2019
- Statistical regression

Phase II Qualitative

- Comparative Case Study
- Selection Criteria
  - Similar based on presence of PFAS Mfg. Site
  - Differ based on PFAS Rulemaking

Quantitative Findings

Institutional Capacity and Committment

- Per Capita Income – significant positive relationship (+)
- NR Spending – no significant relationship (+)

Problem Severity and Need

- PFAS Facility – significant positive relationship (+)
- Period 2016-19 – significant positive relationship (+)

Interest Group Strength

- Envro Groups – no significant relationship (+)
- Industrial GDP – significant negative relationship (-)

Political Factors – no significant relationships

Qualitative Findings

Factor	North Carolina	Alabama
Institutional and Administrative Factors	- Strong leadership - Proactive DEQ despite budget constraints - Support from DHHS and Science Advisory Board	- Limited resources and staff - Industry-friendly leadership - Reactive ADEM, waiting for federal guidelines
Problem Severity and Need	- Significant contamination from DuPont Bladen Plant - PFAS in Cape Fear River affecting major metropolitan areas - High public health concerns	- Major contamination from 3M Decatur Plant - PFAS in Tennessee River affecting local drinking water supplies - Slow response despite significant contamination
Interest Group Influence	- Effective advocacy by groups like Clean Water for NC and Cape Fear River Watch - Media campaigns and direct lobbying - Strong public pressure	- Advocacy by groups like Alabama Rivers Alliance and Coosa Riverkeepers - Regulatory advocacy and litigation - Significant challenges due to political climate
Influence and Involvement of Elected Officials	- Governor's proactive appointments - Legislative support	- Governor's industry-friendly appointments to EMC - Republican-controlled legislature prioritizing economic considerations over environmental protection

Discussion of Findings

Institutional Capacity and Commitment

- Resources Budget and Staff
- Leadership matters

Problem Severity and need

- Water contamination
- Perceived need

Interest Group Influence

- Effective advocacy
- Access to decision makers

Political Environment

- Governor appointments
- Regulatory autonomy

Practical Implications

Institutional Capacity and Commitment:

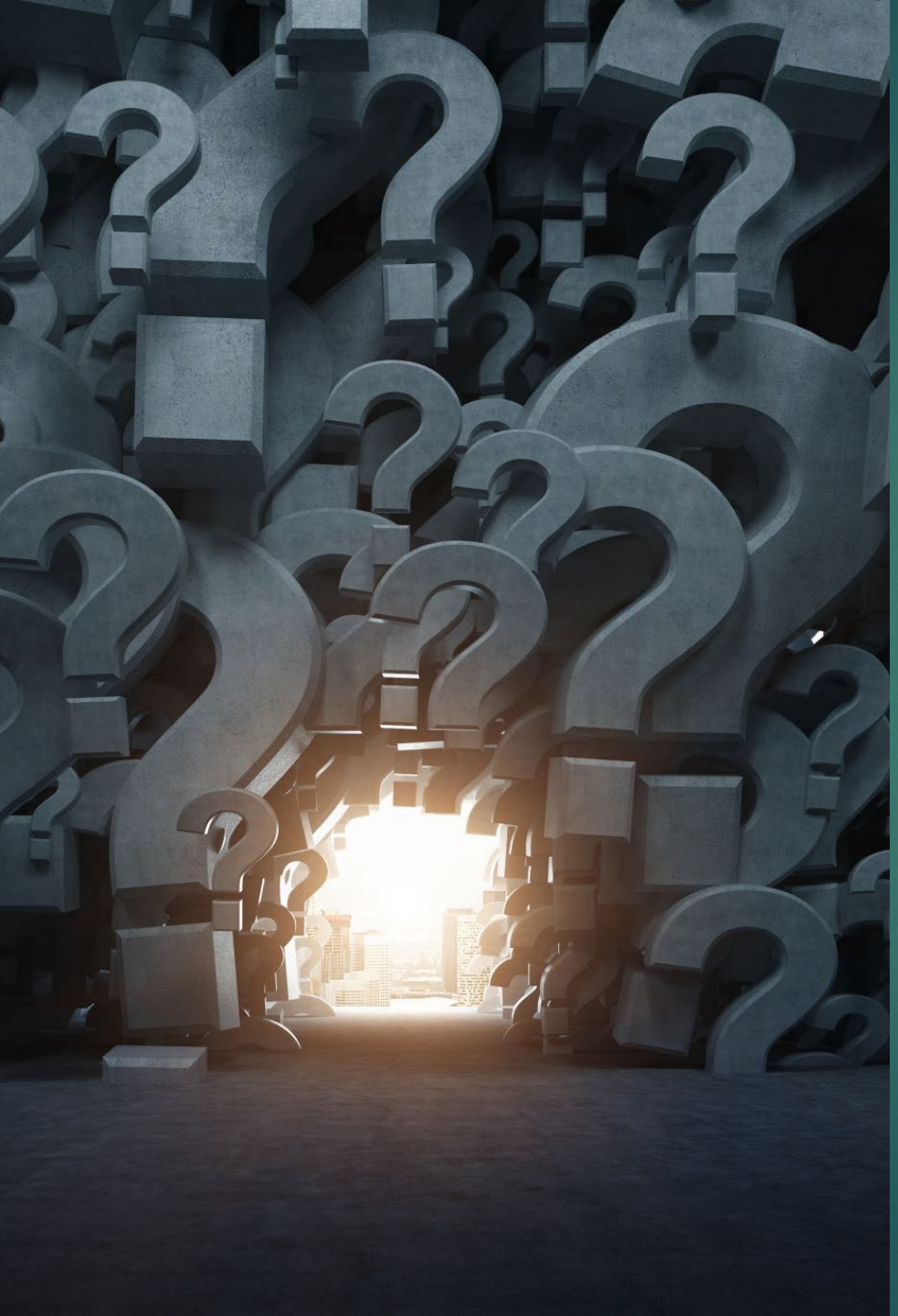
- Increase budget allocations for environmental protection
- Invest in training and retaining skilled personnel.
- Appoint leaders with strong environmental credentials.

Balancing Interests:

Public Awareness and Advocacy:

Current Federal PFAS Rulemaking

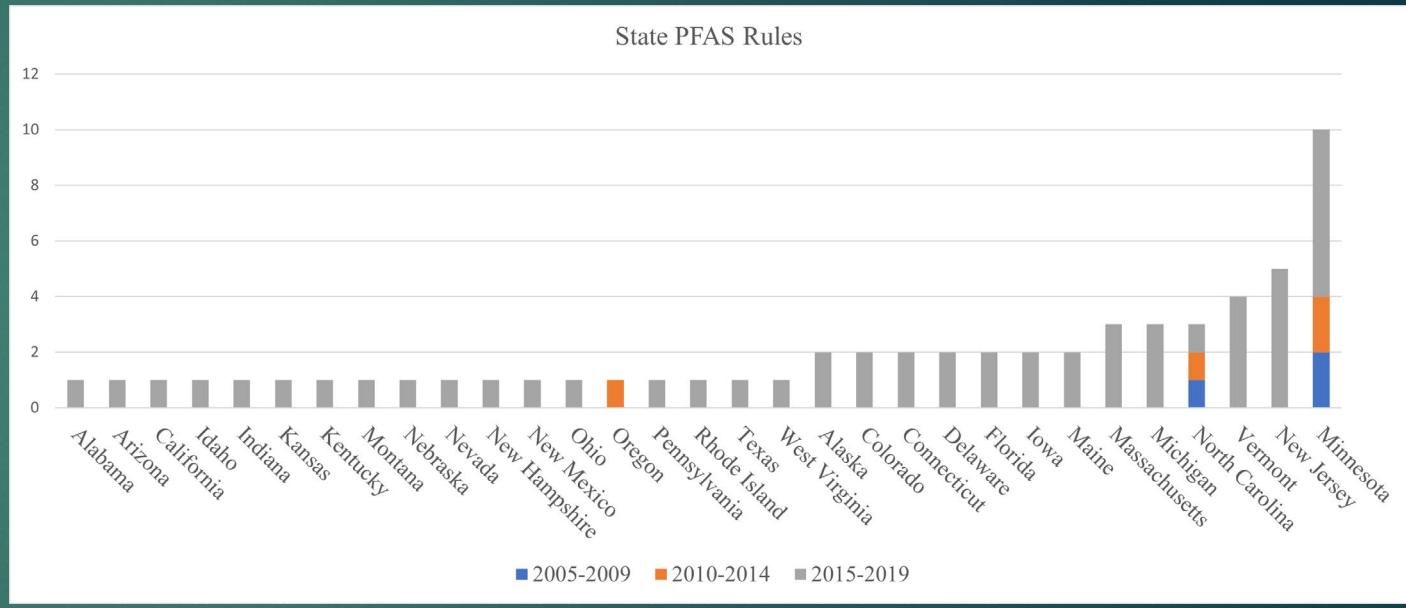
- TSCA TRI Reporting -180 PFAS chemicals require reporting
- Drinking Water Standards April 2024 MCLs for 6 PFAS
- Surface Water – Guidance provided but no enforceable discharge limits
- CERCLA Cleanup standards – 2024 PFOA & PFOS listed as hazardous substances, RQ 1 lb
- RCRA – PFAS not listed HW – propose listing as "hazardous constituent" requiring RCRA cleanup



Questions and Discussion

Dependent Variable

- DV=Water quality Rulemaking
- Count of the number of policy actions in each state year
  - 31 states
  - 60 rulemaking actions
- Variation in
  - Type of policy (standard, guideline, screening level)
  - Media (GW, DW, SW)



State PFAS Rulemaking

Period	Alabama	Arizona	California	Idaho	Indiana	Kansas	Kentucky	Montana	Nebraska	Nevada	New Hampshire	New Mexico	Ohio	Oregon	Pennsylvania	Rhode Island	Texas	West Virginia	Alaska	Colorado	Connecticut	Delaware	Florida	Iowa	Maine	Massachusetts	Michigan	North Carolina	Vermont	New Jersey	Minnesota	Total
2005-2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	3
2010-2014	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	4
2015-2019	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	2	2	2	2	2	2	2	3	3	1	4	5	6	53
Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	4	5	10	60

Types of Rulemaking Actions

Water Type	Action Level	Goal	Standard	Total
DW	6	9	3	18
DW/GW	11	1	2	14
DW/GW/SW	1			1
GW	12		8	20
Non-protected GW	1			1
Protected GW	2			2
SW	3			3
Total	36	10	13	59

Poisson Regression Results

Variable	Coef	Std. Err.	z	P>z	95% conf.	Interval
Per Capita Income (+)	0.0000362*	0.0000203	1.78	0.08	-0.0000037	0.0000761
NR Expenditures (+)	0.0000006	0.0000004	1.48	0.14	-0.0000002	0.0000014
PFAS Mfg Facility (+)	0.8190626*	0.3048547	2.69	0.01	0.2215583	1.4165670
Period 2016 – 19 (+)	2.6552650*	0.3853812	6.89	0.00	1.8999310	3.4105980
Env IG Contrib (+)	0.0000001	0.0000001	0.41	0.68	-0.0000001	0.0000002
Industrial GDP (-)	-0.0000007*	0.0000007	-1.92	0.06	-0.0000026	0.0000000
Legisl. LCV Score (+)	0.0084459	0.0069853	1.21	0.23	-0.0052450	0.0221369
Governor's Party (+)	0.1750634	0.1466954	1.19	0.23	-0.1124543	0.4625811
Pty Control of Leg (+)	-0.0405078	0.2154420	-0.19	0.85	-0.4627664	0.3817509
Squire Index (+)	0.0874431	1.8630370	0.05	0.96	-3.5640420	3.7389280
Intercept	-6.7158110	0.9458608	-7.10	0.00	-8.5696640	-4.8619580

N=750; Wald X2 = 109.61; Prob X2 = 0.000, Pseudo R2 = 0.2496

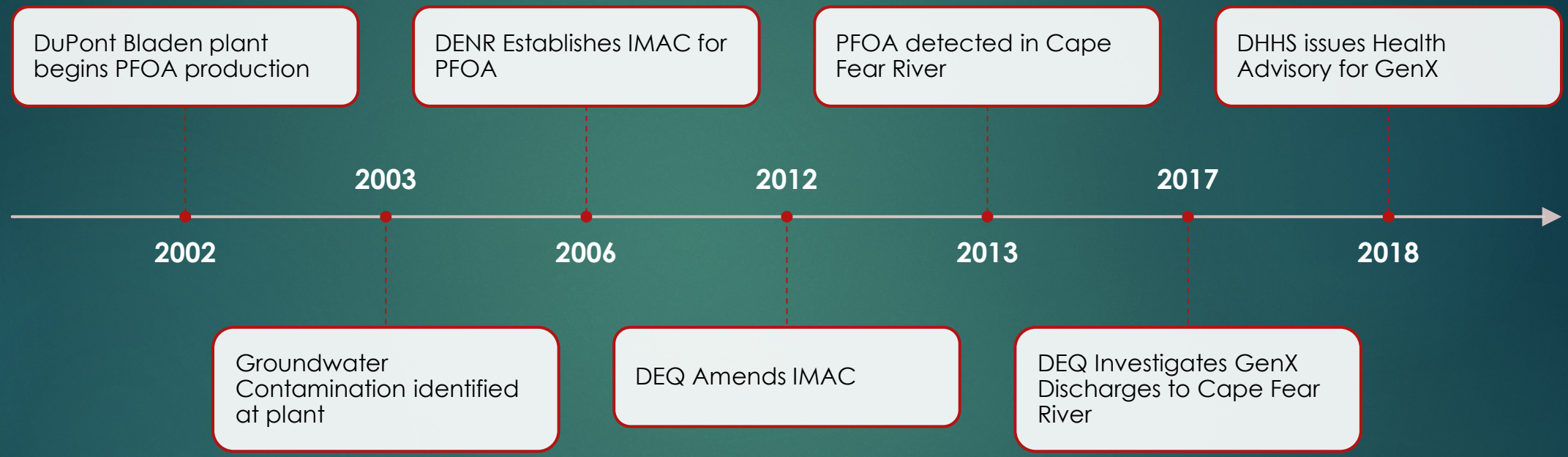
Symbols in parentheses indicate the hypothesized direction of the relationship between the variable and state PFAS rulemaking.

*probability < 0.10, two-tailed test

Comparison of State Characteristics

Measure	Alabama	Rank	North Carolina	Rank
Established PFAS Rule	YES		YES	
PFAS Facility	YES		YES	
Avg Per Capita Income (2017 dollars)	38,971.47	45	42,286.11	14
Avg Natural Resource Exp (Thousands of 2017 dollars)	385,393.30	16	209,500.37	38
Enviro IG Spending (2017 dollars)	136,962.13	16	353,581.36	11
Industrial GDP (Millions of 2017 dollars)	203,244.48	26	493,562.88	41
Avg LCV Score for Legislature	16.77	45	31.60	32
Average of gov_party	0.00		1.47	
Average of leg_party	0.93		0.93	
Avg Legislative Professionalism	0.14	41	0.22	18
Population (avg)	4,788,273	23	9,709,105	10
Land Area	50,647	28	48,619	29
Population Density (avg)	86	26	160	17

North Carolina Case Study



Alabama Case Study