

Cognitive & Institutional Barriers to Adoption of Green Infrastructure



Project 1
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Objectives of Project 1



- 1) Understand the perspectives of the various decision makers** whose actions collectively influence how stormwater management (SWM) is handled in PA
- 2) Discern decision makers' levels of knowledge** about the use of innovative hydrological techniques including green infrastructure (GI) to improve SWM plans
- 3) Identify cognitive and institutional barriers** to the adoption of innovative SWM techniques
- 4) Investigate decision makers' responses to visualization techniques** to introduce state-of-the-art hydrological models and GI solutions for SWM (see also Project 2)

Interview Methodology



Table 1

Types of Stakeholders Interviewed

Local/ County Officials	State Regulators & Conservation Districts	Planners	Consulting Engineers	Developers	Citizen Advocacy Groups	Homeowners Associations	Technical Advisory Groups
12	6	2	5	5	3	4	3

A total of 40 stakeholders were interviewed in 33 interviews.

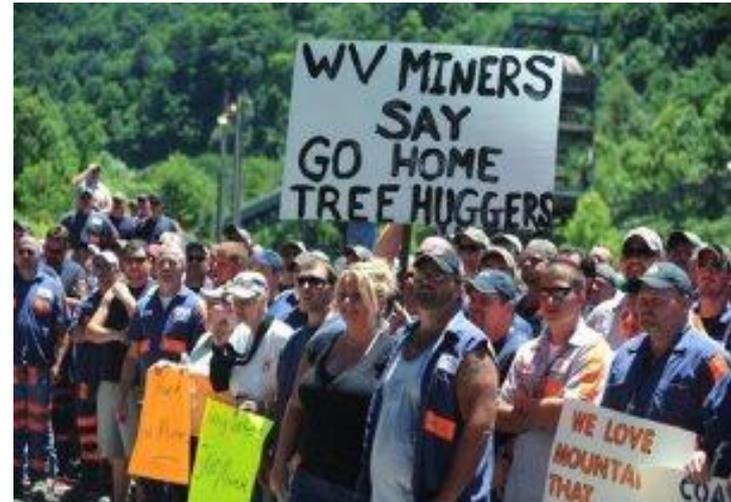
Interviews were content-analyzed to identify cognitive, institutional and practical barriers to SWM and strategies for overcoming these barriers.

Using Frames to Understand Environmental issues



- Frames are like different views through a kaleidoscope
 - Technical & lay groups frame environmental risks differently
 - Designers & users view what is being attempted differently
(Rohracher & Otenzeder, 2002)

- Frames reflect different interpretations about issues—that may not be obvious to or shared by others.

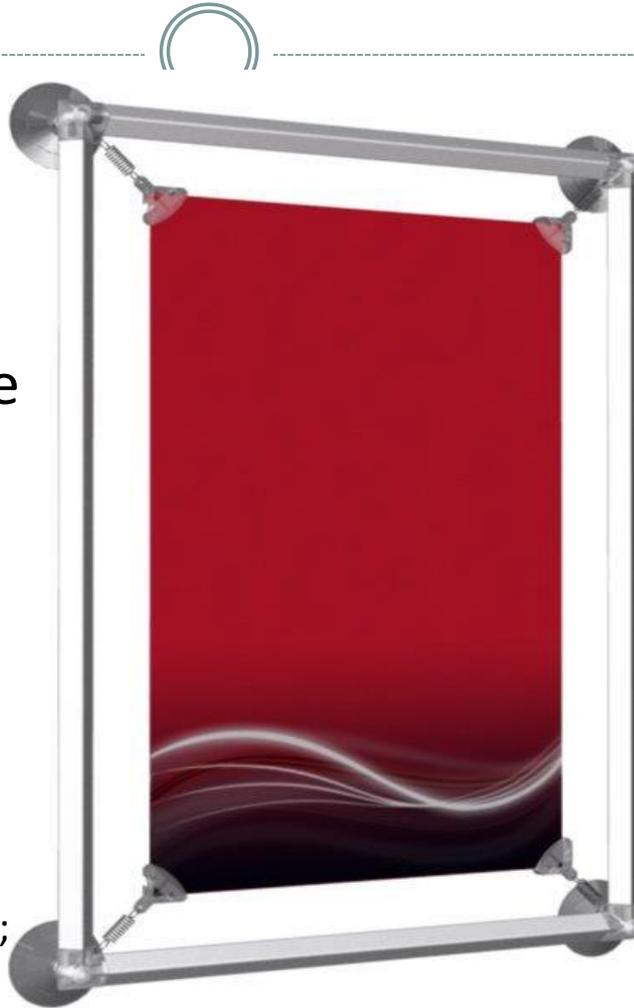


- Differing frames  CONFLICTS

Cognitive Barriers or “Frames”

Frames of reference (i.e., mindsets, schemas, worldviews, psychological biases) that shape how we view an issue or problem.

People use frames to define whether a problem exists how to define it & what to do about it (Vaughan & Seifert, 1992; Gray, 2003)



Frames reflect different interpretations about issues and are not necessarily shared (Gray, 2003)

Stakeholders' Framing Differs

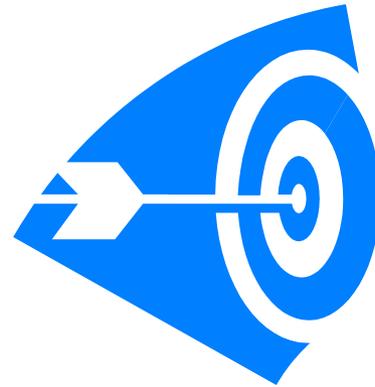


I think certainly municipalities look at things from a totally different perspective than the District does because they are very much dealing with the public and their residence within their municipalities. So, I think, you know, sometimes they carry very different opinions. Certainly, the county agencies whether it be the Planning Commission or other folks within the county levels, they are looking at it from a different perspective because they are looking at it from different political, financial, what is best for the public kind of viewpoints plus they are required to uphold any regulatory requirements from the federal or state level there. So, I think, they have different priorities that they look at. Then we have various watershed groups, nonprofit organizations within our county that, you know, look at it from even a more different perspective in terms of how they want to do the work, they want help to do the work and I think they get frustrated sometimes because people that they are asking to help can't always help whether it be a municipality, our office or in terms of securing grant funding to do work. **(Conservation District Official)**

Positive & Negative Frames about SWM



As flood control



As a moving target



As conservation



As an impediment to growth



As pollution prevention



As social control

SWM Is...



Run by kingdoms

“In this county, I compare most of our municipalities to little kingdoms...And, no one comes into our kingdom and tells us what to do.”



A House of Cards (re: TMDL)

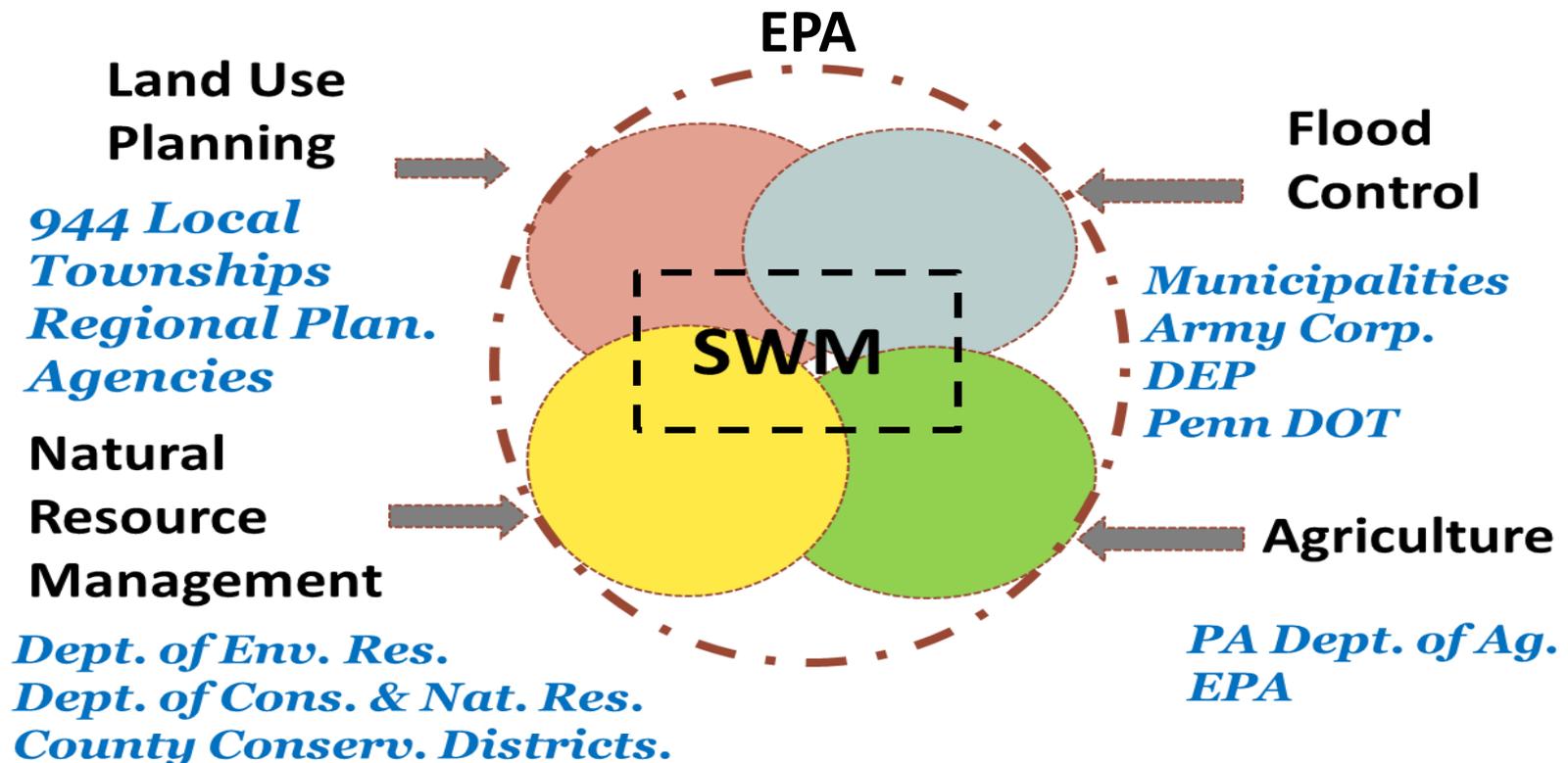
Complete List of SWM Frames



1. SWM as “a necessary evil.”
2. SWM as “defense of kingdoms.”
3. SWM as an “unfunded mandate” and “economically infeasible.”
4. SWM as “curtailing development and violating property rights”
5. SWM as a “means to redistribute wealth.”
6. SWM as an “attractive nuisance.”
7. SWM as “flood control.”
8. SWM as a “means of conservation.”
9. SWM as “compensation for past sins.”
10. SWM as “a house of cards” (re: TMDL).
11. SWM as “a source of conflict.”

Institutional Barriers

- **Institutional barriers:** Impediments to change that result from laws, institutional rules, cultural practices & resource allocations
- **Conflicting regulatory objectives, priorities and mindsets among agencies**

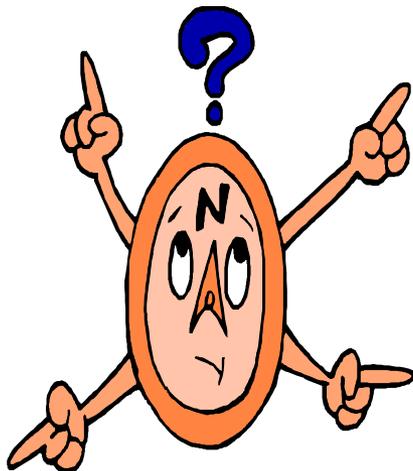


Specific Regulatory Issues in PA



Multiple and Overlapping Regulations

- PA ACT 167
- Federal Clean Water Act (MS4s & CSOs)
- Chesapeake Bay TMDL
- CAFO laws



Confusing and Unclear Guidance

- 2006 PA Manual out-of-date & hard to follow
- Precise road map for compliance with Chesapeake Bay TMDL continues to be uncertain

Institutional Barriers



#1: Conflicting regulatory objectives, priorities and mindsets; no coordinated solutions among agencies

#2: Regulatory Ineffectiveness (e.g., regulations are dispersed in many different acts & implemented at different levels of government)

#3: Absence of a regional solution that involves collaboration across townships and municipalities to address stormwater management effectively

#4: Confusion about and lack of regulatory enforcement to ensure BMPs are properly maintained

Practical Barriers



#1: BMPs are very contrived systems not typical of natural world

#2: Achieving retrofit of systems in built areas is challenging and expensive

#3: People are not knowledgeable about how to maintain BMPs and need education

Recommendations



Recommendation #1: DEP should take a proactive stance in creating educational opportunities for township officials, planners, engineers, maintenance staff and landscapers to learn about green infrastructure solutions and their maintenance and to provide data about their effectiveness in reducing water conveyance and improving water quality and ultimately providing cost savings.

Recommendation #2: DEP & EPA should sponsor and participate in the development of regional watershed planning to address stormwater management.

Recommendations (Cont.)



Recommendation #3: Townships and municipalities should establish dedicated fees or restricted taxes for stormwater management activities.

Recommendation #4: Revitalize PA DEP task force to explore opportunities for municipalities to meet stormwater obligations through investments in riparian buffer restoration in rural, suburban and urban areas.

Recommendations (Cont.)



Recommendation #5: Streamline the storm water management review and permitting processes at the local level to: 1) provide greater clarity about compliance for townships and municipalities, and 2) ensure that developers don't incur a penalty for trying new green infrastructure methods.

Recommendation #6: Greater publicity about stormwater management and its importance is needed by federal, state and local officials as are resources to provide the necessary training for local officials to effectively implement existing regulations and ensure proper maintenance of bmps over time.

Questions? Comments?



terraced weir bioretention

gathering space

educational signage

bioretention

permeable paving turn ground