Water Protection Falling Through the Cracks: How and Why Town, State, and Federal Efforts Fail to Protect Our Rivers

Caroly Shumway, Ph.D.

MRWC

VALLEY ALLIANCE FOR SMART GROWTH

North Smithfield Land Trust

OUR RIVERS/STREAMS ARE DYING. WHY?

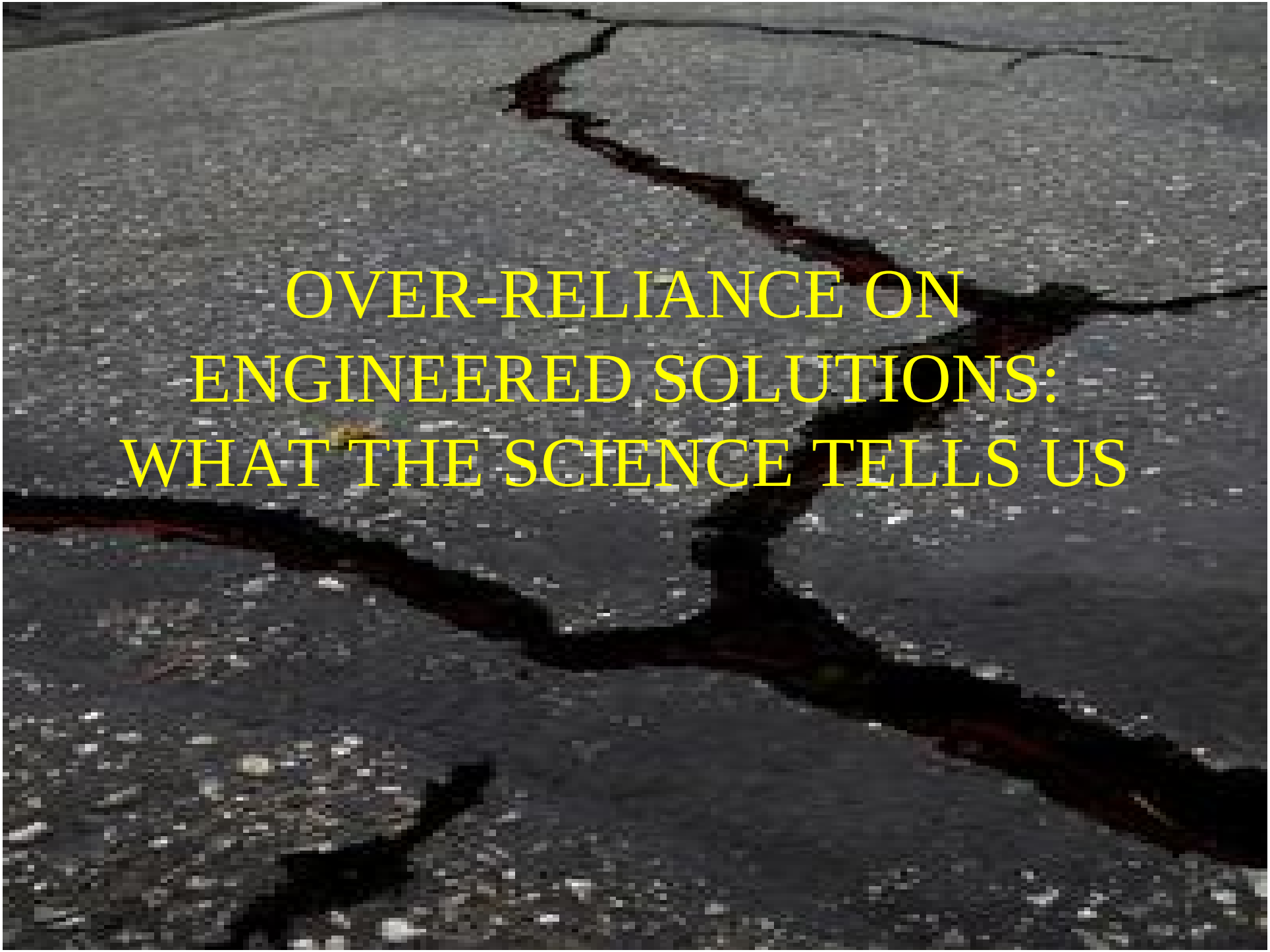
" A decades' worth of new scientific research makes it clear that the ***problems of dying streams have direct and dire implications for the supply of clean drinking water***.

Streams are now understood to be the vital capillaries of the freshwater system."

washingtonpost.com, Nov. 27, 2005

HOW TOWN, STATE, AND FEDERAL EFFORTS FAIL

- Overreliance on **engineered solutions** versus what the **science tells us**
- Lack of **capacity** at local and state level
- Lack of **regulation** and **enforcement** at all levels
  - Case Study: Dowling Village
- **Problems with educational focus and message**
- Solutions


OVER-RELIANCE ON
ENGINEERED SOLUTIONS:
WHAT THE SCIENCE TELLS US

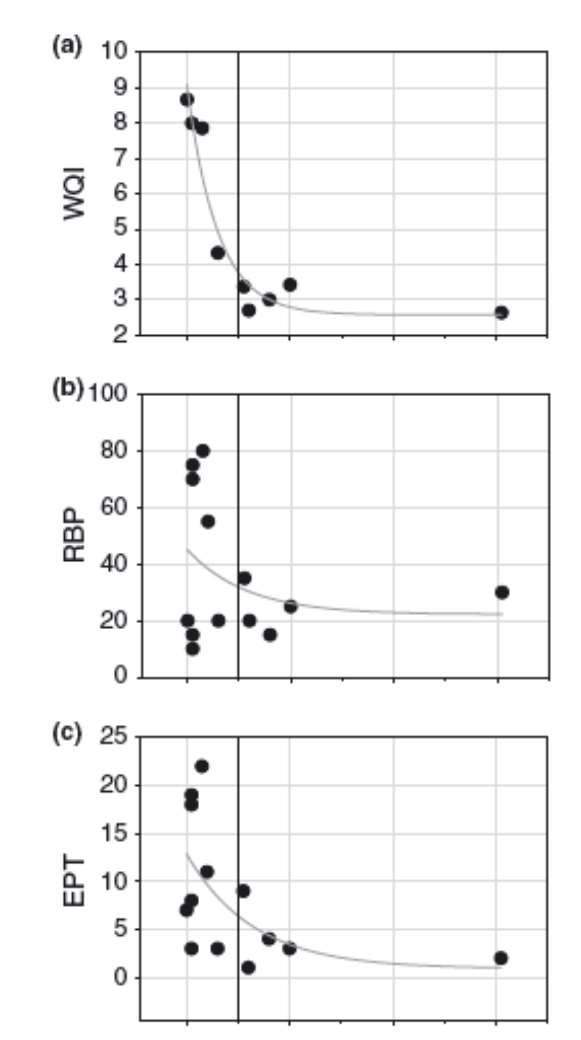
WHAT THE SCIENCE TELLS US

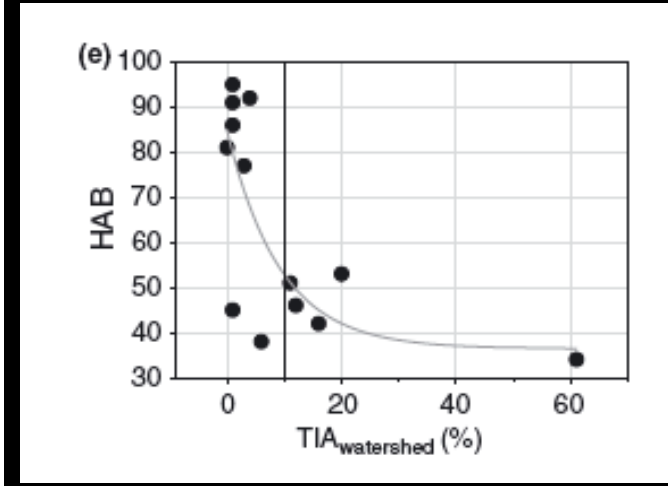
1. *"There is a direct relationship between land cover and the biological condition of downstream receiving waters."* (NAS, 2009)
Impact felt with as little as 5-7% impervious cover.

2 The impacts of excess impervious surfaces are many.
Structural BMPs only address some of these.

3. By focusing on pollutants, we ignore impact to water quantity, flow, and temperature.
"A single design storm cannot adequately capture the variability of rain and how that translates into runoff or pollutant loadings, and thus is not suitable for addressing the multiple objectives of stormwater management." (NAS, 2009)

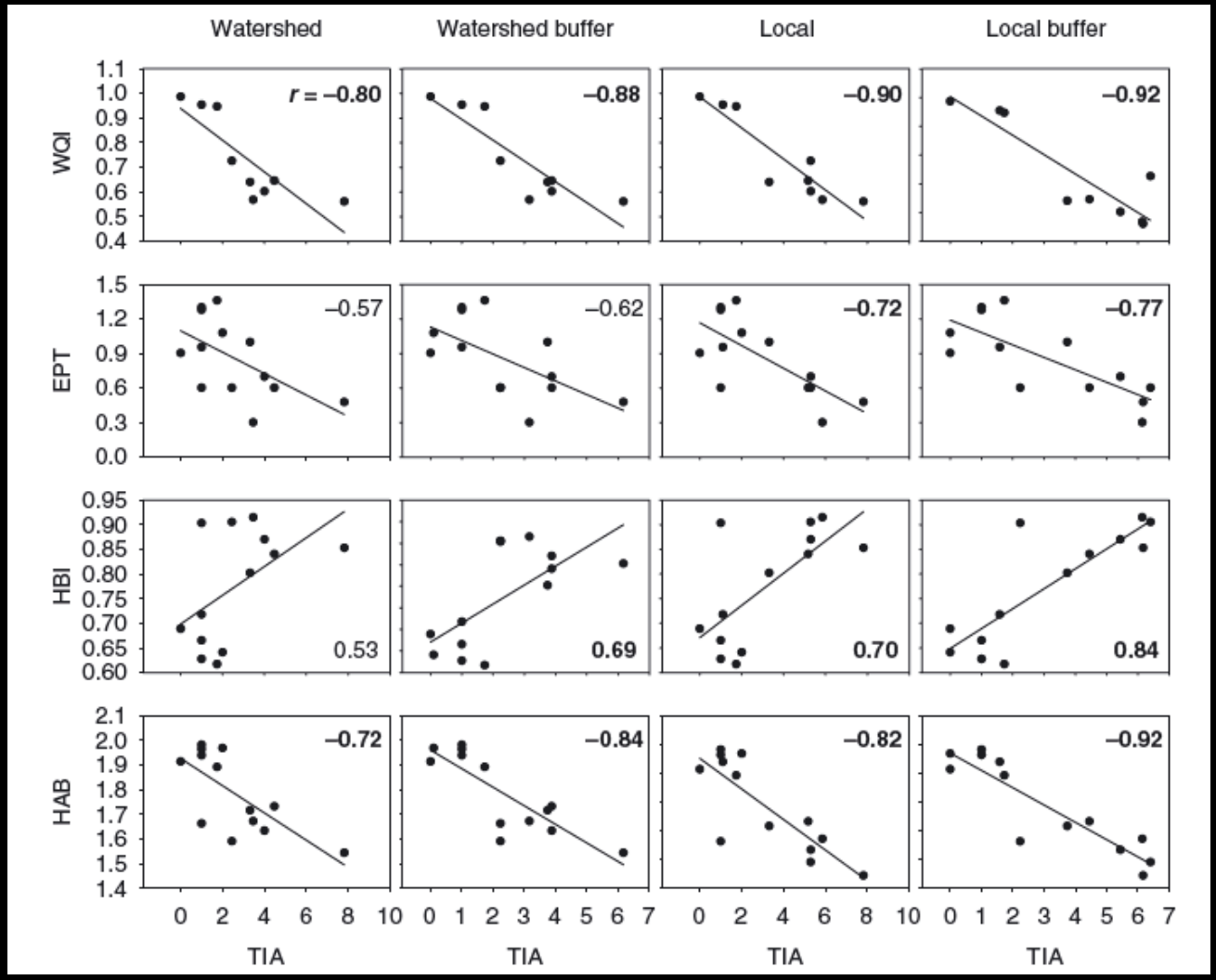
BOTH WATER QUALITY AND ECOLOGY ARE DEGRADED BELOW 5-7% IMPERVIOUS COVER.





Schiff and Benoit, JAWRA (2007)

WHEN CONSIDERING IMPERVIOUS COVER, RIPARIAN BUFFERS MATTER THE MOST.



Schiff and Benoit, JAWRA (2007)

SO HOW WELL ARE WE PROTECTING OUR BUFFERS?

Not well.

While filling in of wetlands is prohibited, we effectively destroy wetlands with limited and out-dated regulations (RI, MA).

Many animal and plant species cannot survive with 50 ft protection. Wetland bird species declining (MA Audubon, 2012).

WHAT ARE WE REPLACING WETLANDS WITH?

Artificial ones that wildlife can't use.

✓"Discourage wildlife as much as possible"

THE MANY IMPACTS OF IMPERVIOUS COVER

- **Pollutants** from stormwater runoff (oil, grease, brake fluid, animal waste, road salt)
- **Nutrients:** Phosphate/nitrate
- **Sediment/erosion**
- **Thermal** stress (heat from impervious surfaces)
- Reduction in water **quantity (1” storm)**
- **Flashiness**, leading to bank erosion.
- **Combined sewer overflow (CSO)**

NO EVIDENCE STRUCTURAL BMP'S CAN MAINTAIN ECOLOGICAL HEALTH

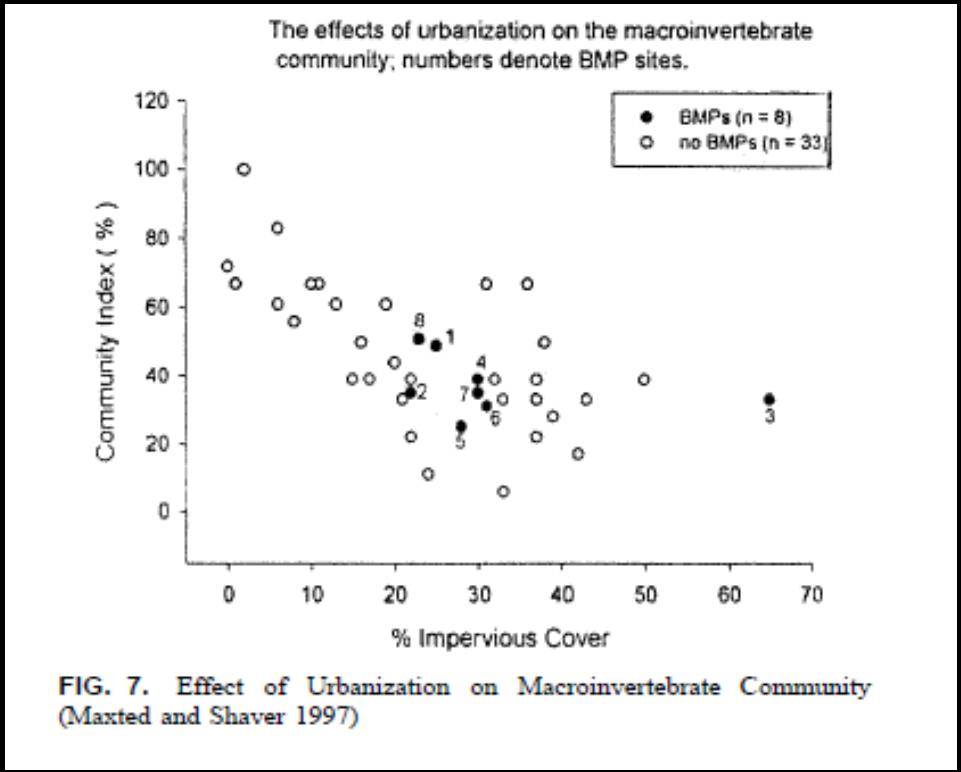
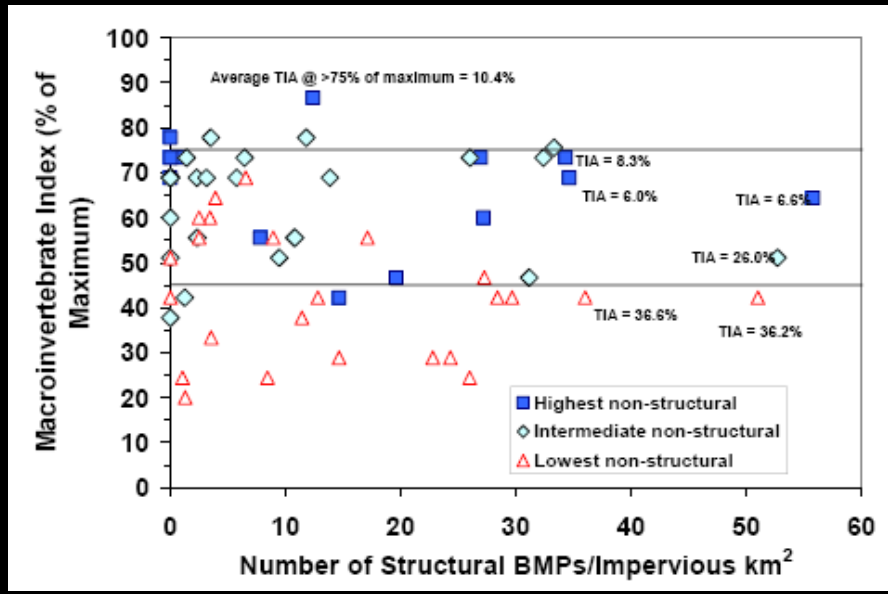


FIG. 7. Effect of Urbanization on Macroinvertebrate Community (Maxted and Shaver 1997)

Maxted and Shaver, 1997



Horner et al., 2003

RESTORING URBAN STREAMS *CAN* IMPROVE WATER QUALITY AND AESTHETICS;

EVIDENCE SUGGESTS THAT IT WILL NOT RESTORE ECOLOGICAL HEALTH

Reference Streams

All less than 5% Urban and > 60% Forest (NLCD 2001)

Baisman Run

NB Jones Falls

Timber Run

Stranko, Hilderbrand, Palmer, Restoration Ecology (2011)

Also Doyle and Shields, JAWRA (2012)

Urban Restored Streams

All > 60% Urban (NLCD 2001)

Substantial Restoration Conducted

Sligo Creek
Stormwater Retrofits (8)
Created Wetland (1)
Channel Recon (2,670 ft)
Tree Planting
Fish Stocked (23 spp, 6 events)
Completed ~2001
About $2.6 Million

Minebank Run
Remove Concrete (500 ft)
Channel Recon (3.5mi)
Tree Planting

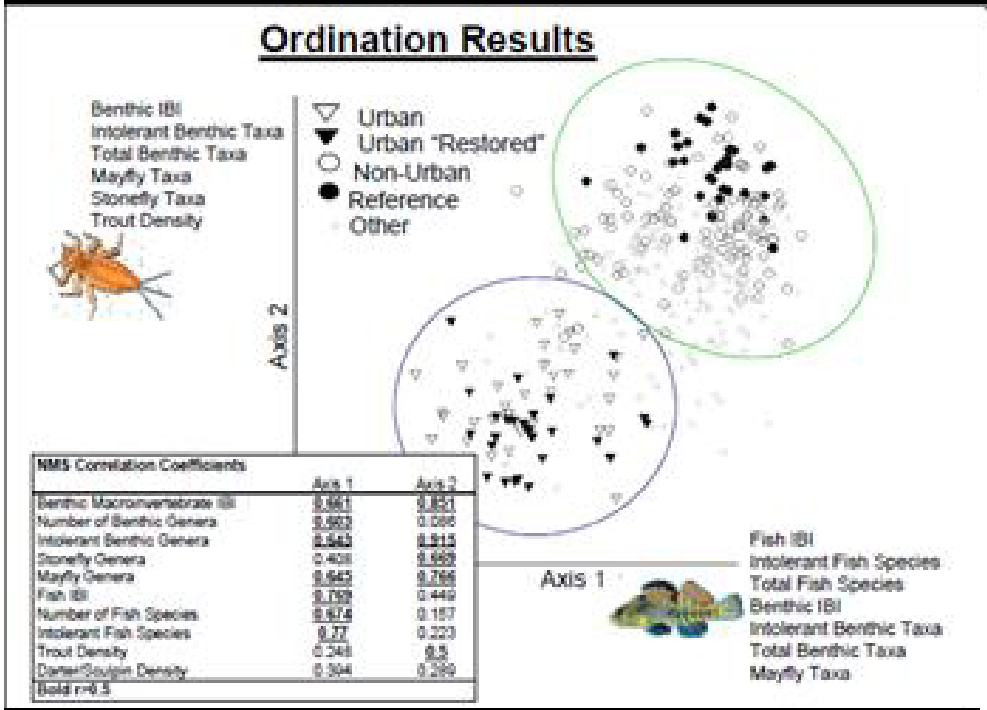
Completed 2005
About $4.0 Million

Longwell Branch
Stormwater Ponds Added (2)
Fortify Banks (~400 ft)
Tree Planting

Completed 1998
About $600,000

Stranko, Hilderbrand, Palmer, Restoration Ecology (2011)

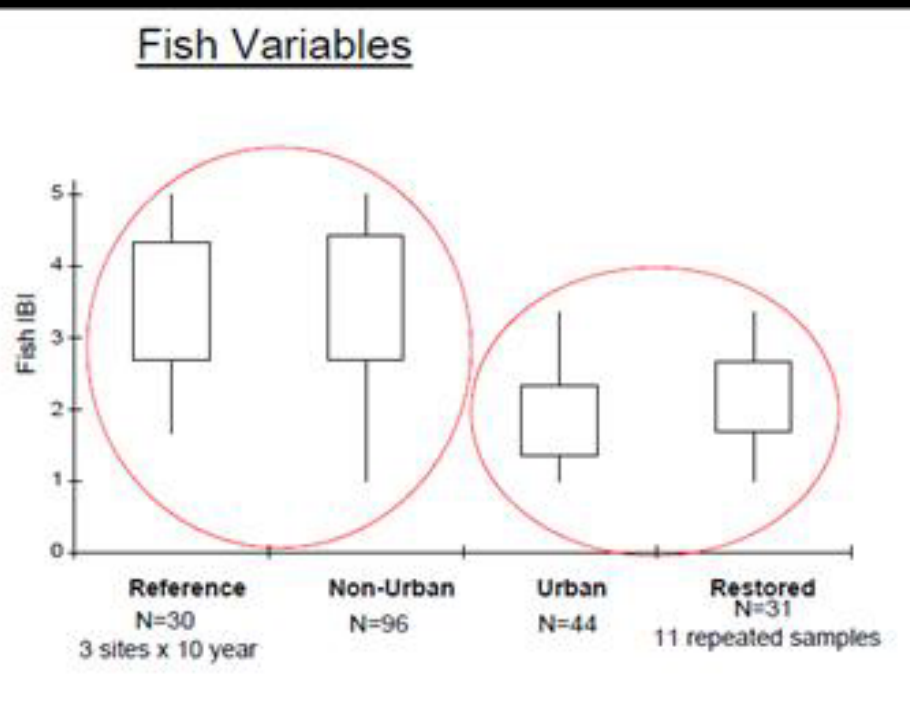
ONCE DEGRADED, BIOTIC INDICES DO NOT IMPROVE WITH RESTORATION OF URBAN WATERS



NMS Correlation Coefficients

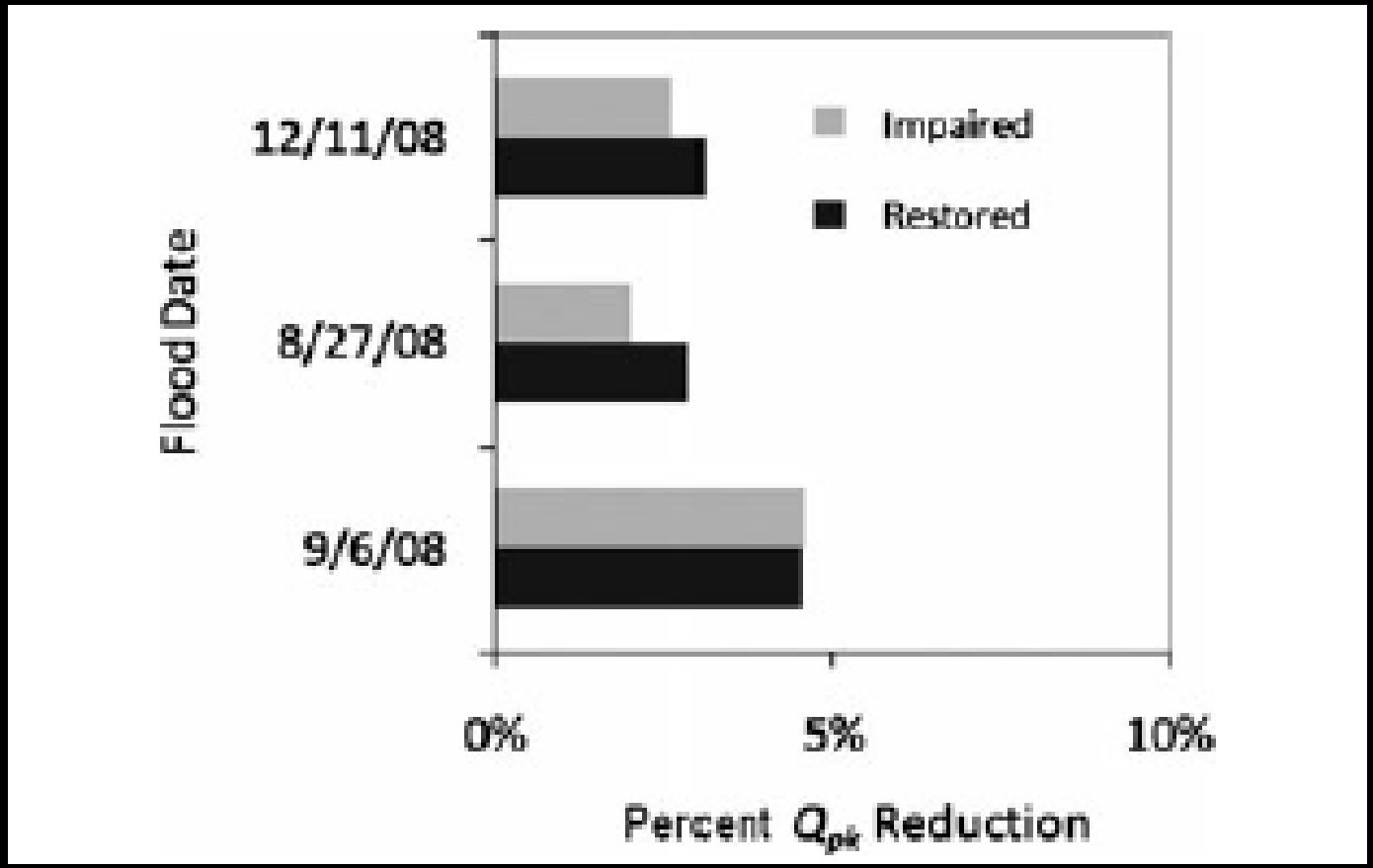
	Axis 1	Axis 2
Benthic Macroinvertebrate IBI	0.661	0.851
Number of Benthic Genera	0.662	0.699
Intolerant Benthic Genera	0.943	0.915
Stonefly Genera	0.408	0.669
Mayfly Genera	0.645	0.766
Fish IBI	0.709	0.449
Number of Fish Species	0.674	0.157
Intolerant Fish Species	0.77	0.223
Trout Density	0.249	0.5
Darter/Sculpin Density	0.394	0.289

Bold r²≥0.5



Stranko, Hilderbrand, Palmer, Restoration Ecology (2011)

STREAM RESTORATION ALSO UNSUCCESSFUL FOR FLOOD ATTENUATION DUE TO PROBLEM OF SCALE



Doyle and Shields, JAWRA (2012)

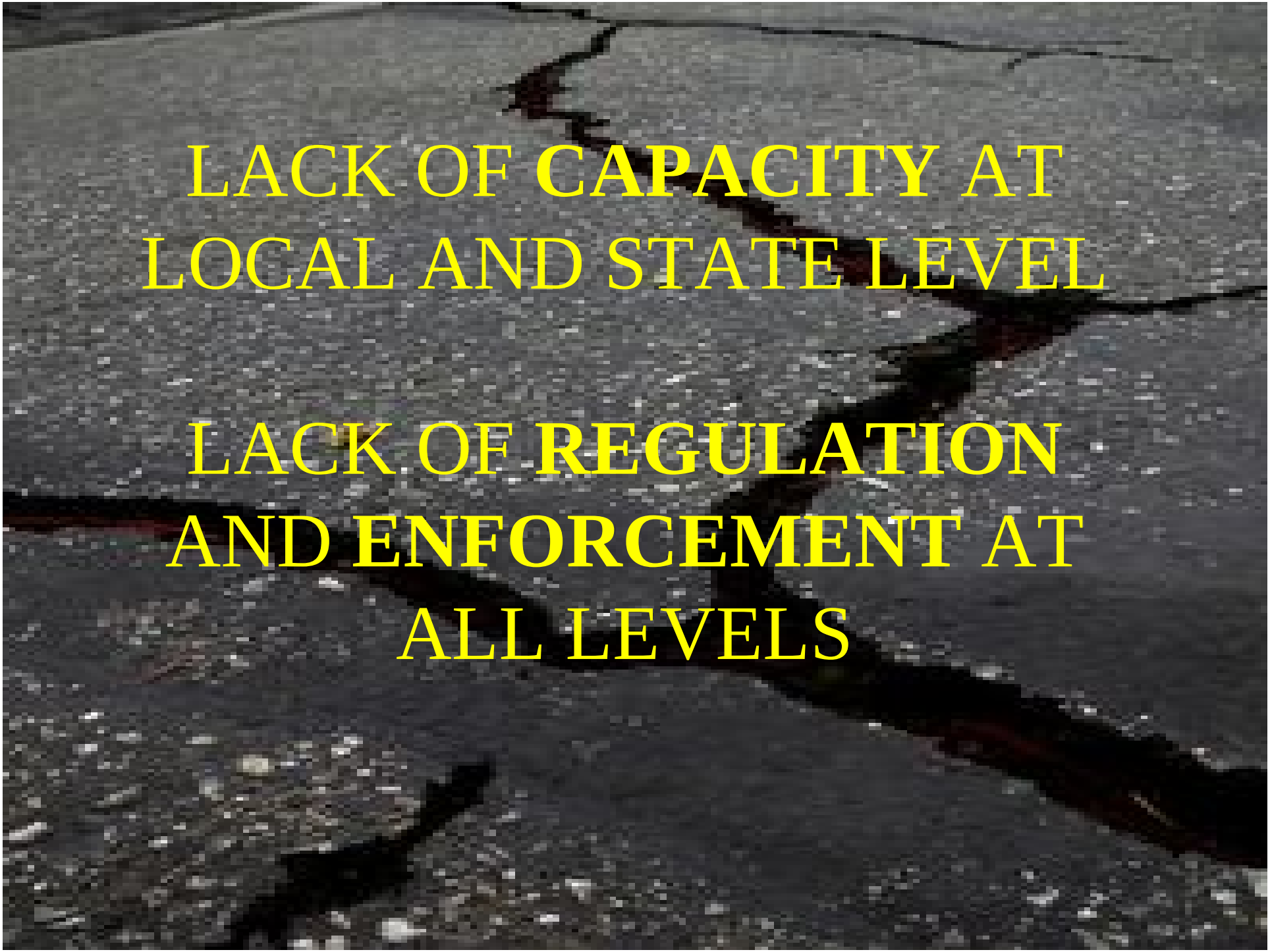
STRANKO ET AL. CONCLUSION

"Protect the least impacted streams and adopt other land-based actions within the watershed where possible."

MILNTER ET AL. (2004) CONCLUSION

"The few sites in our data set where biological integrity was maintained despite high levels of urban land use occurred in streams where the floodplain and riparian buffer was relatively undeveloped.

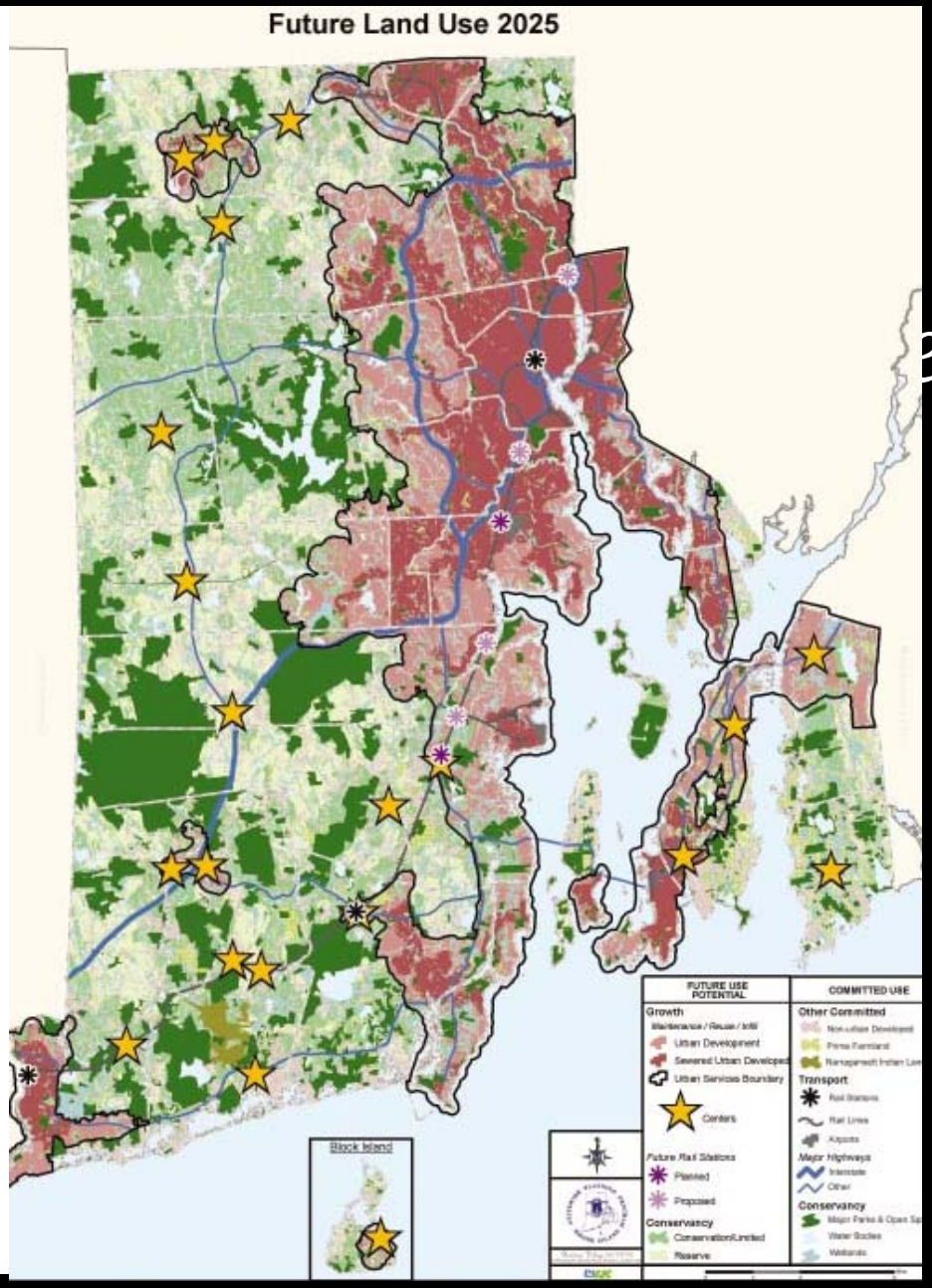
An aggressive stream protection policy that prescribes mandatory riparian buffer widths, preserves sensitive areas, and minimizes hydrologic alteration needs to be part of the larger planning and regulatory framework."


LACK OF **CAPACITY** AT LOCAL AND STATE LEVEL
LACK OF **REGULATION** AND **ENFORCEMENT** AT ALL LEVELS

What state <u>incentives</u> are there for land-use nonstructural actions?

None.

Ex: Land Use 2025.



FEDERAL: EPA

- **Devolves stormwater authority to states and municipalities. Neither have capacity to adequately regulate or enforce.**

  RI: New MS4 requirement is to ensure that soil erosion/sediment control ordinance reflects 6 minimum conditions.

  Solicitor of one town affirmed they had updated their ordinance to comply with MS4 requirements when they hadn't.

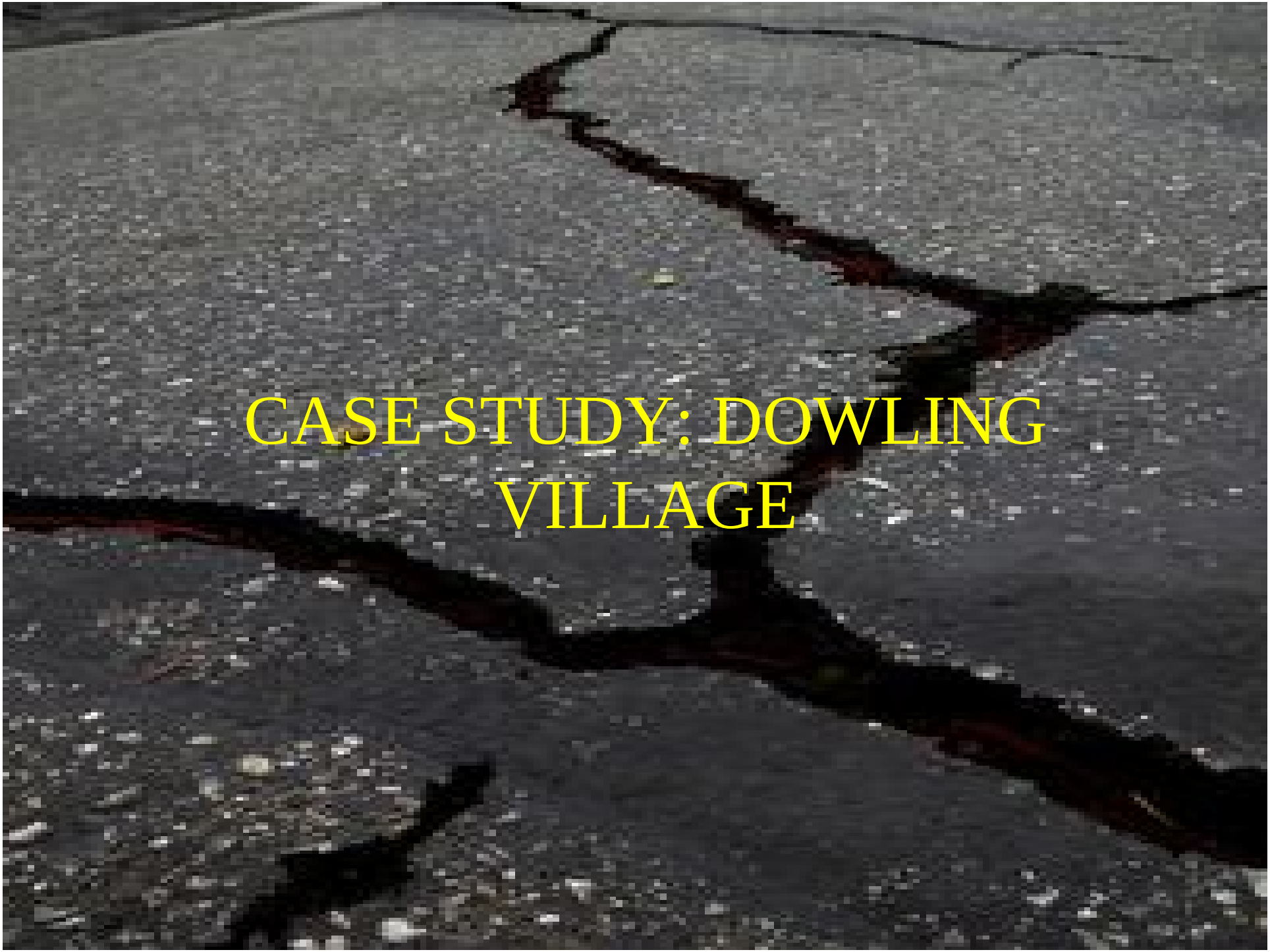
- **Needs more focus on enforcement and capacity.**

  MA: One town had to choose between street sweeper and fire truck.

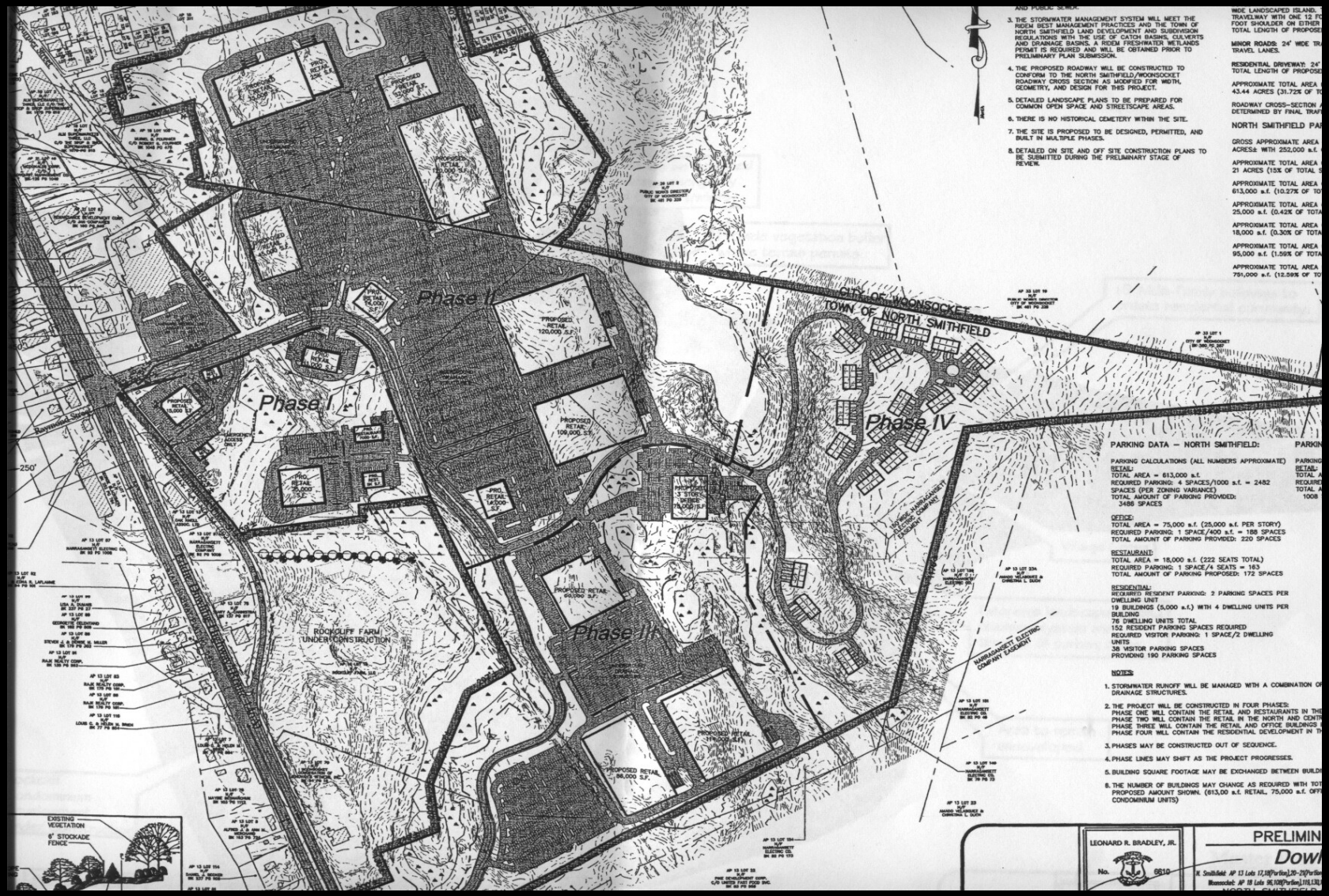
MAJOR NATIONAL LOOPHOLE FOR ZONING: RIGHT TO FARM ACT 2-23-4

In RI, developers have used this loophole to create gravel operations in the guise of accessory or required components of agricultural operations, regardless of zoning restriction.

Both past and present threat in North Smithfield (horse farm, turf farm) and elsewhere in RI.


CASE STUDY: DOWLING VILLAGE

DOWLING VILLAGE 2005



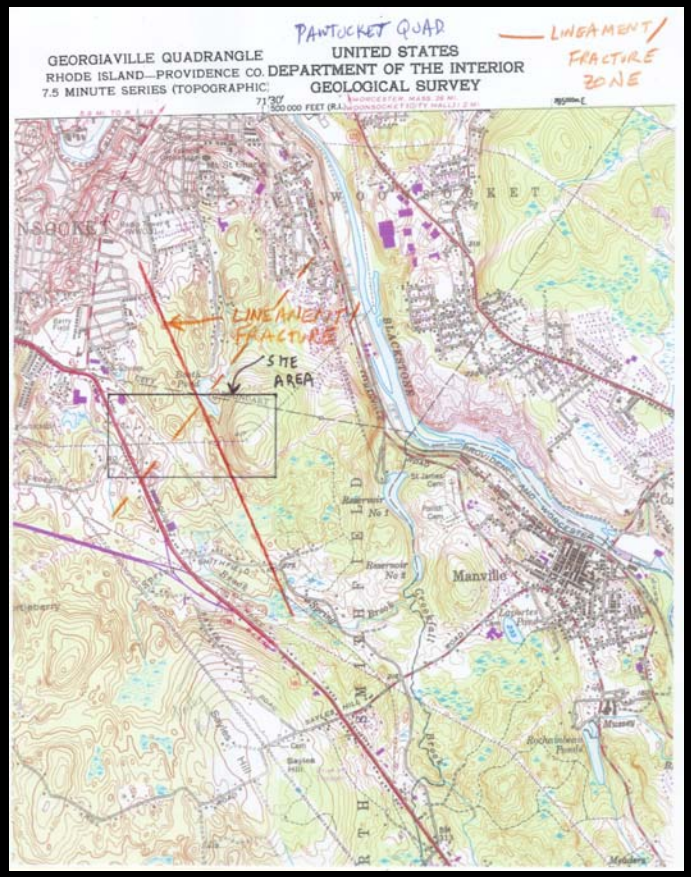
ENVIRONMENTAL CONCERNS

BOOTH POND BIODIVERSITY

- 2nd most diverse pond in RI dragonflies, damselflies
- Home to globally endangered Ringed Boghaunter (47 sites worldwide)
- Rare cold-water fen
- 21 acres of wetlands, vernal pools

DRINKING WATER (GA, GAA)

ENVIRONMENTAL CONCERNS, CONTINUED



- Sprawl in a rural and historic region: The project was the largest proposed retail development in RI at the time.
- <u>Impact to the Blackstone River,</u> already impaired in this stretch for macroinvertebrate diversity and pollution (lead, mercury, phosphate)
- Fractured lineament

Bedrock expert Covel: *It's not a matter of 'if' contamination (of our groundwater) will occur, but 'when'.*

DOWLING VILLAGE - PHASE III

STORMWATER MANAGEMENT / WATER QUALITY AND EROSION CONTROL OVERALL SITE PLAN

SWPPP: CONSTRUCTION REQUIREMENTS

- Water quality testing and analysis at wetland sites and Booth Pond (baseline, construction, post-construction)
- Installation of 2 groundwater monitoring wells baseline. Water quality monitoring at these 2 sites.
- Annual reports submitted to DEM, town, VASG
- Installation of water level by Booth Pond
- Establishment of vegetative transects
- Use of two lines of silt control: straw wattles and silt fence. Hay prohibited.
- Pollution offsets required.

WHAT HAPPENED?

Developer did not comply with terms of SWPPP, Freshwater Wetlands Permit, Town's Soil Erosion Ordinance, Town's MS4 permit.

Limited follow-up by DEM. <u>No</u> enforcement by town.

Developer **fails** to:

- install groundwater monitoring wells as baseline
- test for chlorine as required
- install water level monitoring at Booth Pond
- set up vegetative transects
- use straw wattles consistently.
- Unclear whether has done pollution offsets. DEM has not addressed.

- Problems with timely submission of Annual Reports. Did not receive fall 2011 data til Jan. 2013. No analysis, then no lab sheets.
- Town has independent reports by Pare. - Pare notes repeated problems. Reports go to…town, developer's engineer, developer.

  Do not get sent to DEM for 6 months until I raise objections.

PARE ENGINEERING REPORTS

Took 65 days, or 9 weeks on average to fix problem.

Photo 12: Processed gravel stockpile south of swamp wetland at Retail No. 5 on 6/11/12.

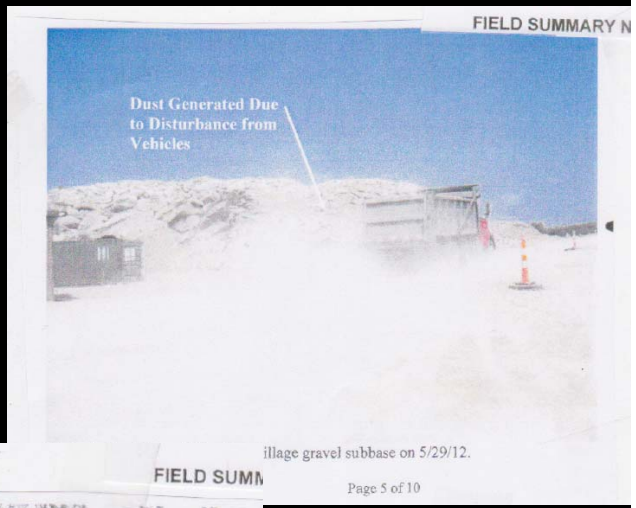


Photo 10: Conditions of erosion control silt fence/baled hay immediately upgradient of fore

AS REPORTED BY THE…

THE VALLEY Breeze NEWSPAPERS

12/12/2012

Homeowners: Water near Dowling Village is undrinkable

DEM notes stormwater violations at development, documents water quality issues in "draft memo"

WHAT'S THE BIG DEAL?
NAS: CONSTRUCTION IMPACTS TO RIVERS ARE SIGNIFICANT

- Nationally: Construction is 2% of nation's land area, but contributes 36% of sediment and 28% of total phosphate load to inland waters (2nd highest after crops).

- Wisconsin: Construction sites can generate 8X more sediment and 18X more phosphorus than industrial sites.

- Wisconsin: Construction was the 1st or 2nd largest contributor of sediment and phosphorus in 12 out of 14 watersheds.

NAS, 2009

THE TOWN'S POSITION IS..

Town does not have enforcement capability; this relies with DEM.

DEM has exclusive jurisdiction over SWPPPs for land disturbance of 5 acres or more. DEM makes independent site visits. They do not send the Town their inspection reports and asked us not to send them ours. Engineer, site contractors, municipalities and other stakeholders know the kind of enforcement they can expect.

Town of North Smithfield Complaint
Re Dowling Village: Decision to Deny Jan. 2013

MS4 FACT SHEET FROM DEM

Construction Site Runoff Control: Polluted storm water runoff from construction sites often enters MS4s and ultimately is discharged into local rivers and streams…. The resulting siltation and other pollutants from construction sites can cause physical, chemical, and biological harm to our State's waters requiring dredging and destroying aquatic habitats.

To meet the requirements of this minimum control measure, the operator of a regulated Small MS4 will need to at a minimum, develop, implement, and enforce a program to reduce pollutants in any storm water runoff to the MS4 from construction activities that result in a land disturbance of greater than or equal to one (1) acre

THE TOWN'S POSITION, CNTD

Even if the town did have enforcement capacity, they could only enforce a 'violation' if DEM issued a 'violation'

In fact, DEM *never* issued violations. On October 3, 2012, DEM issued a letter listing several deficiencies in SWPPP and related permit compliances. The developer responded in two letters dated October 17 and October 22. On October 23, DEM RIPDES Senior Engineer Brian Lafaille, PE wrote that all issues had been adequately addressed with a few exceptions related to documentation.

On November 19, DEM Office of Water Resources Principal Engineer Alisa Richardson, PE separately issued a memo of clarification for the water quality testing component of the SWPPP. That memo contains technical revisions with revised due dates.

Town of North Smithfield Complaint
Re Dowling Village: Decision to Deny

DEM ACTION

Did issue:

- violations in reporting.
- deficiency letter.
- “In-house memo” noting clear noncompliance of SWPPP.

Any cost to developer? Nope. DEM rep tells me the most they could fine is **$1000-$5000 total**. Peanuts to a developer.

Any penalty? Nope.

DEM rep. stated DEM really only acts if town advocates for action.

Catch 22 here! Town won’t act unless DEM acts; DEM won’t act because town isn’t acting!

We are seeking DEM clarification and confirmation on town’s responsibilities under MS4 permitting.


PROBLEMS WITH
EDUCATIONAL MESSAGING

PROBLEMS WITH EDUCATIONAL MESSAGING

- Minimal educational focus on Planning Boards, Zoning Boards, Conservation Commissions when this is where difference could be made!
- Focus on individuals when they are not the greatest drivers of stormwater problems
- Messages to individuals are not tailored to their concerns or to what motivates them


SOLUTIONS

SOLUTIONS

Legislative policy:

1. Pursue **statewide increase** in no-build wetland and riparian buffers from 50 to 100 feet. Triple win: nutrient control, flooding protection, wildlife.
2. Pursue enabling legislation to make Conservation Development by Design mandatory.

DEM policy:

3. Assign 1 lead and ensure coordination across offices for SWPPP enforcement (Freshwater wetlands, NPDES, OCI air, OCI water, Planning).
4. Issue clear guidance to all towns on MS4 enforcement responsibilities.

Office of Planning policy:

5. Provide incentives for towns to pursue LandUse2025.

AT ALL LEVELS

6. Provide incentives for developers to do the right thing ($ or time)

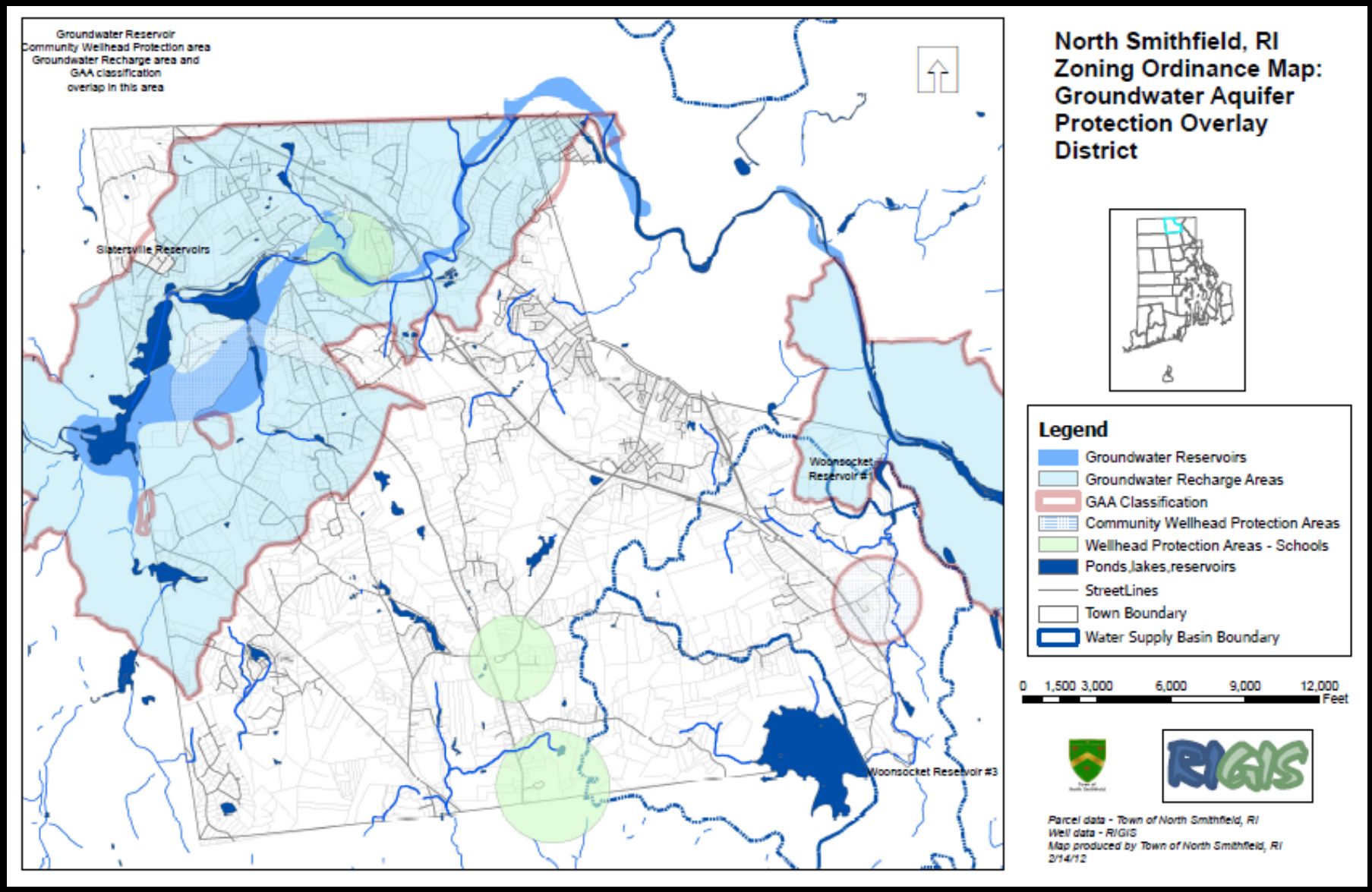
IF THAT FAILS….

7. Swiftly enforce any noncompliance!

8. Price fines **high enough** to ensure compliance

9. Pursue passage of all ordinances that can limit imp. cover!
   - Retail size limits, minimum parking space requirements
   - Surface water/aquifer protection overlay district
   - Impervious percentage limits by zone
   - Increase riparian and wetland no-build setbacks
   - Increase OWTS setbacks

EX: WATER PROTECTION OVERLAY DISTRICT



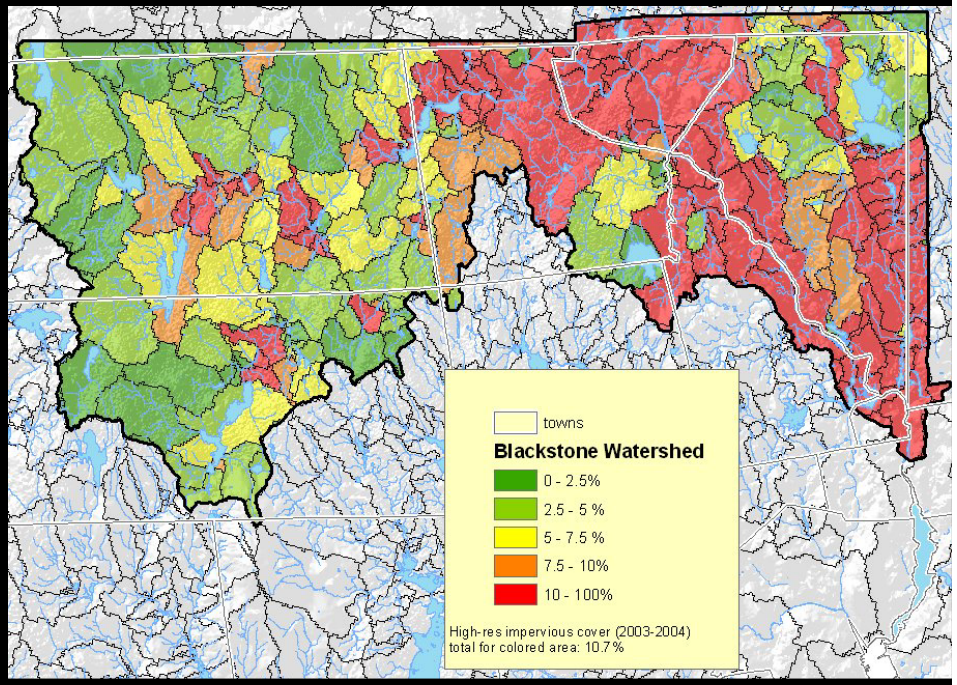
EX: IMPERVIOUS COVER BUILDOUT ANALYSIS BY ZONES

Crookfall Brook/Res 1: Current Land Use, 40% Imperv BH only

Updated pervious	Updated Imperv acres	Zone Impervious ENTER % for ZONE	Impervious over entire area %
42.4	50.7	Roads 54.5	2.7
352.4	2.8	Water, wetlands 0.8	0.2
110.2	3.1	OS 2.7	0.2
63.5	42.4	**BH 40**	2.3
5.2	0.0	PS 0	0.0
16.7	0.8	PS 4.4	0.0
759.1	18.7	RA 2.4	1.0
64.9	5.1	REA 7.3	0.3
316.1	24.9	RS 7.3	1.3
0.2	0.0	RU 0	0.0
1730.6	148.4		7.9
	1879.1		Total for Study area

10. CONSERVATION GROUPS: PRIORITIZE ACTIONS AT WATERSHED SCALE

- Protect and/or maintain HUC12 subwatersheds less than 5-7% impervious cover.
- Try to rehabilitate HUC12 subwatersheds 7-9%
- Identify areas where temperature of greatest concern; pursue riparian buffers/trees there.



AT FEDERAL LEVEL

11. **Regulate** water pollution at the watershed level, including water flow!

12. From National Academy Study (2009):

"EPA should provide more robust regulatory guidelines for state and local government efforts to regulate stormwater discharges."

13. "The federal government should provide more financial support to state and local efforts to regulate stormwater."

14. We need to eliminate loopholes in the Right to Farm Act!

EDUCATIONAL MESSAGING

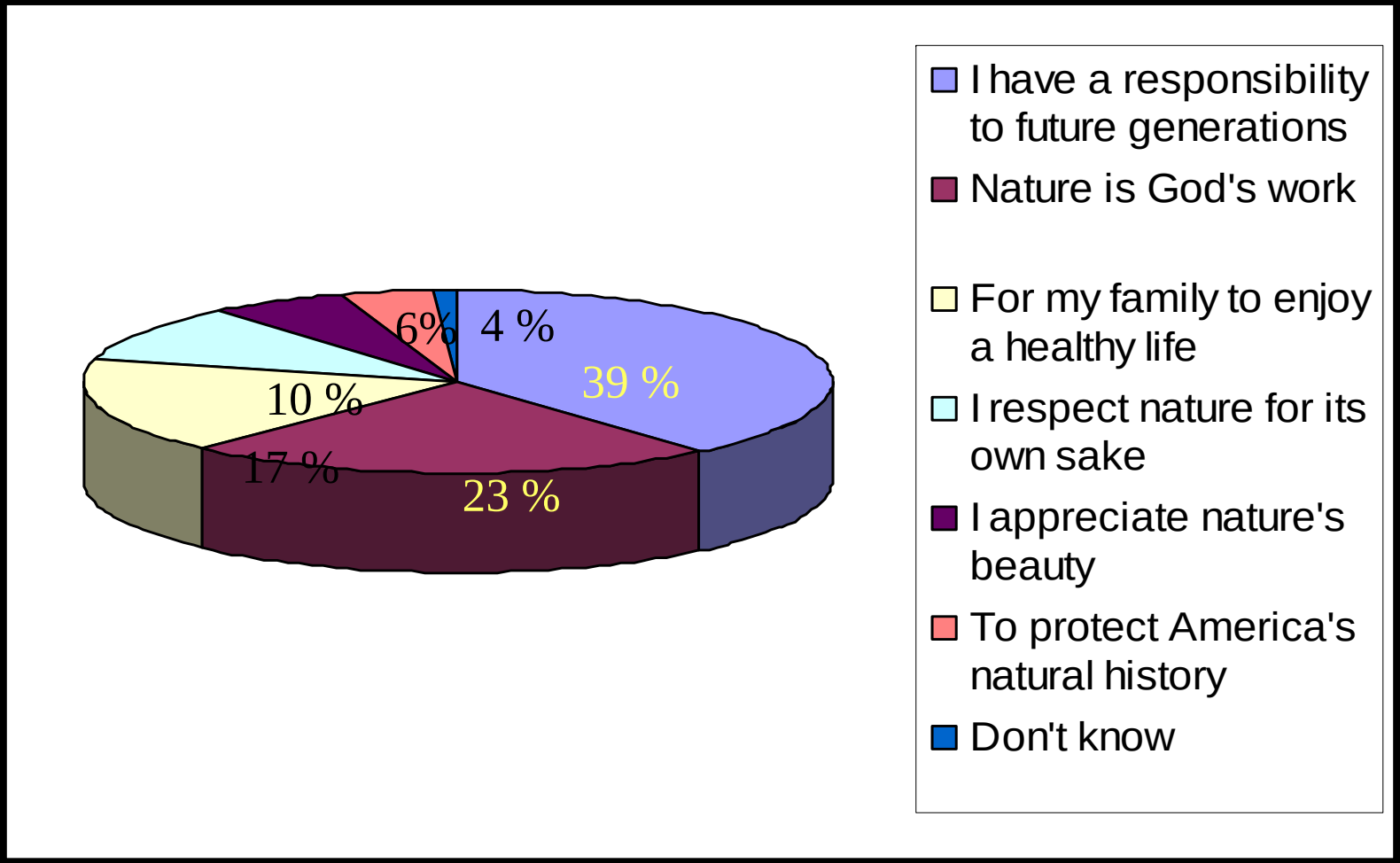
15. DETERMINE WHAT STORMWATER ISSUE IS OF GREATEST CONCERN

16. FIND THE RIGHT LEVERS FOR BEHAVIORAL CHANGE

- Values/Beliefs*
- Attitudes
- Social Norms (aka peer pressure)*
- Habits
- Economic incentives or disincentives
- Time (capacity)
- Laws
- Options
- Enforcement
- Skills

Shumway, 1999

MOST IMPORTANT VALUE: STEWARDSHIP



Source: The Biodiversity Project. Beldon, Russonello and Stewart, 2002.

DRAFT STEWARDSHIP MESSAGE

You only give your baby the purest water... Their babies need it too!

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MRWC
MERRIMACK RIVER WATERSHED COUNCIL

DRAFT SOCIAL NORM MESSAGE