

US EPA ARCHIVE DOCUMENT

# Development and Implementation of State Level Nutrient Strategies

The Application of Social and Economic Data

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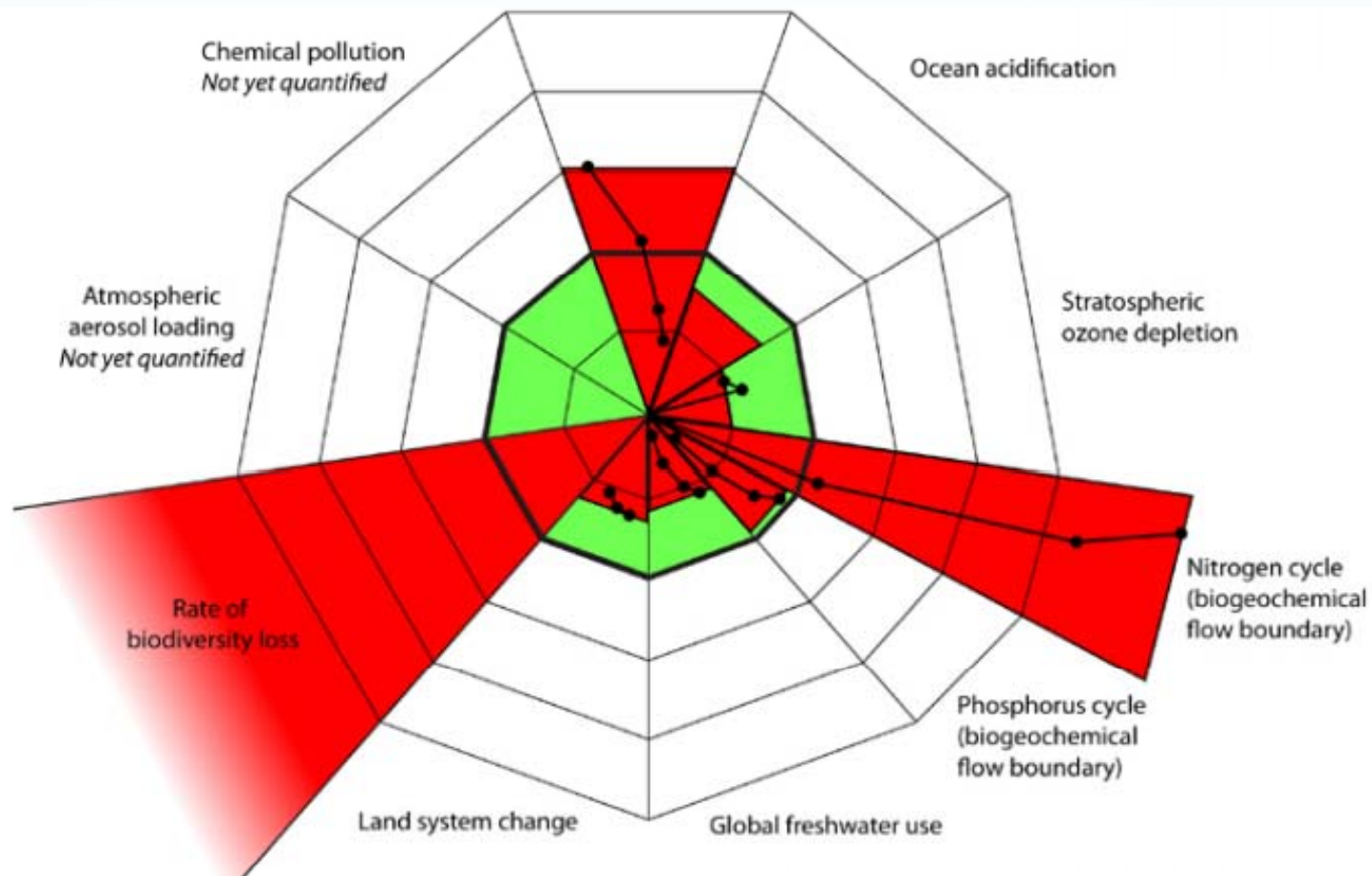
# Presentation Overview

- Nutrients: The good, the bad . . .
- Why social and economic data?
- Strategies for applying social and economic data to state-level nutrient reduction
- Discussion

# Nutrients: Everyone's Issue

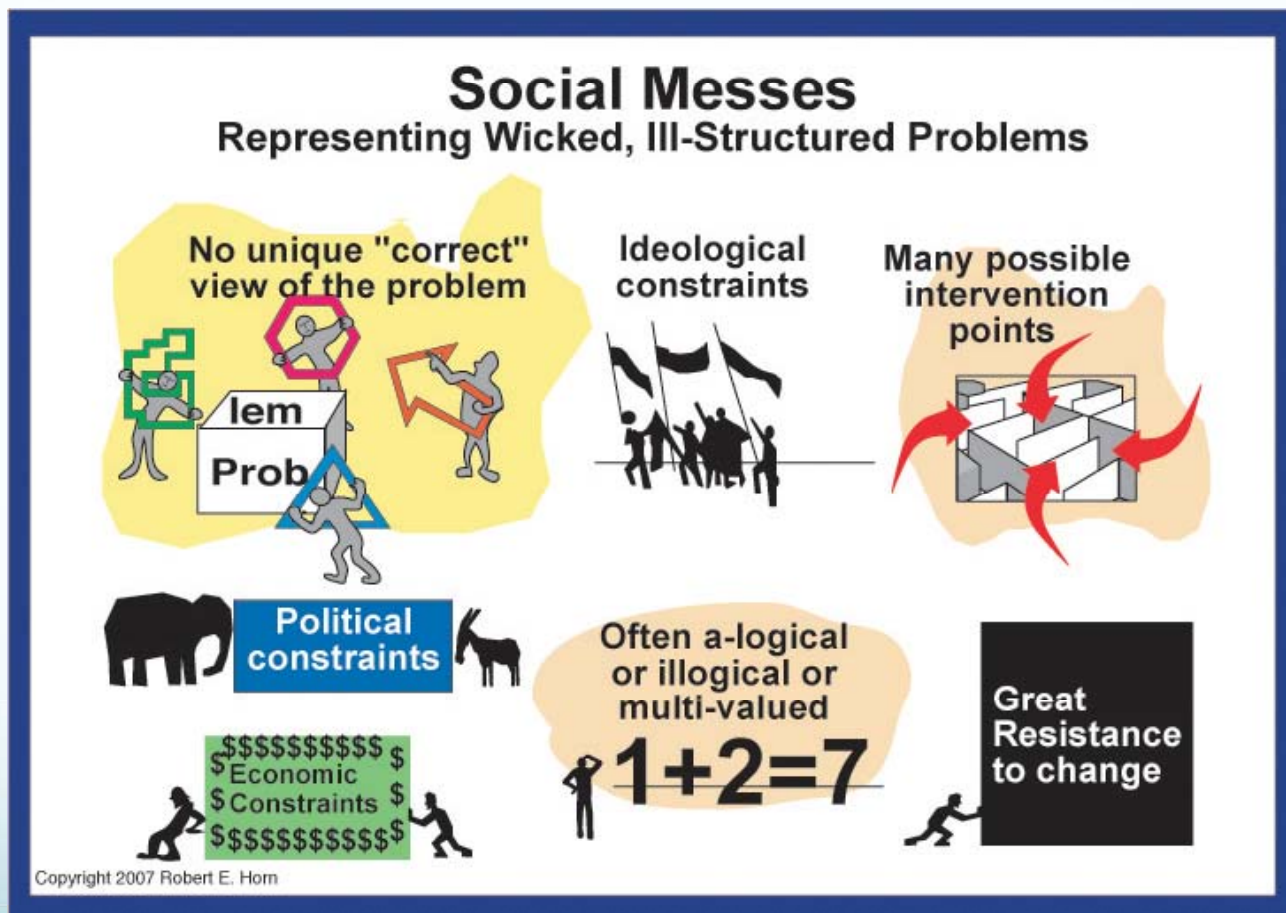


# Nutrients: Everyone's Issue



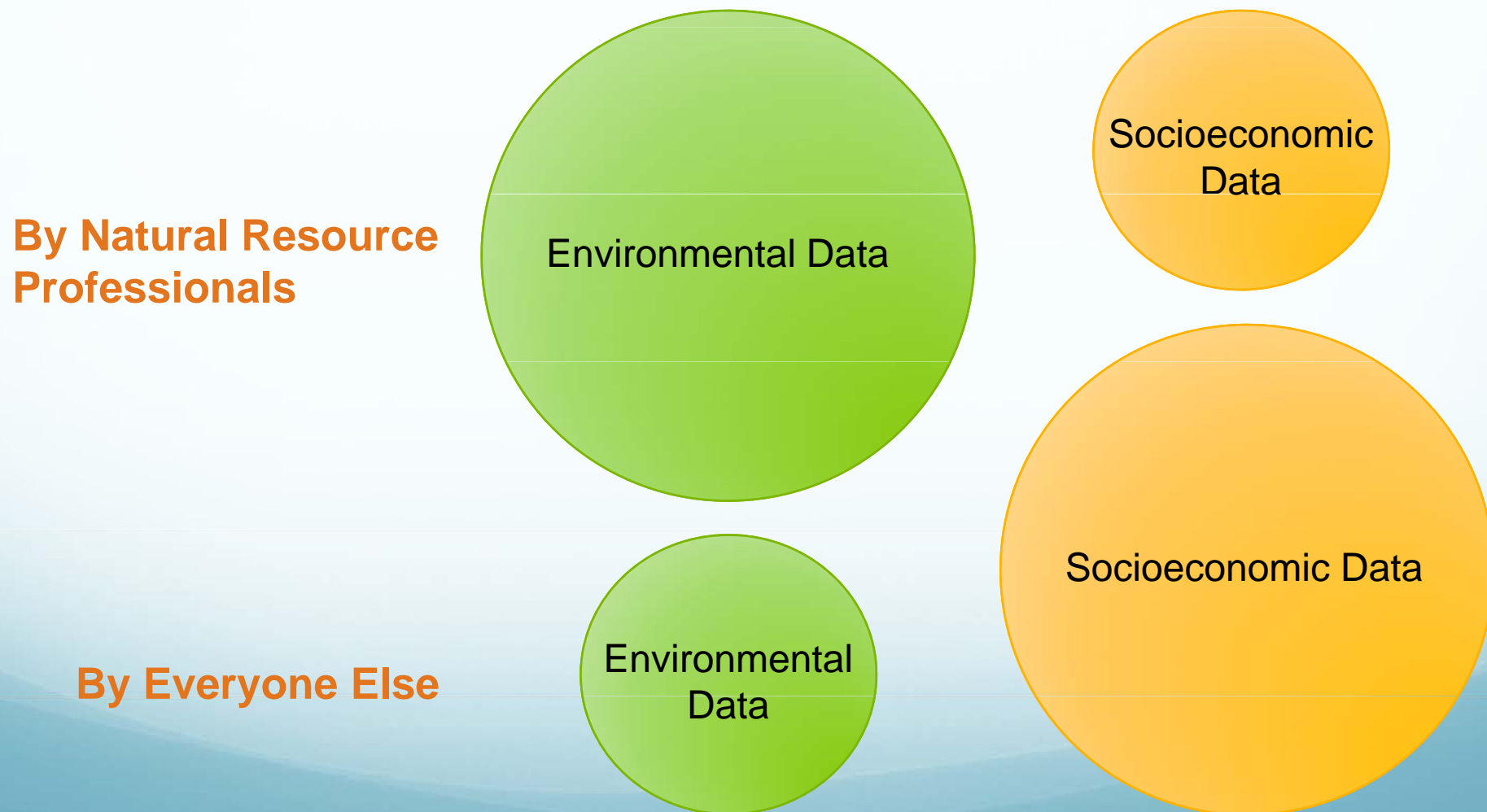
Rockström et al. [Ecology and Society 14\(2\): 32](#)

# Nutrients and Water: A Wicked Problem

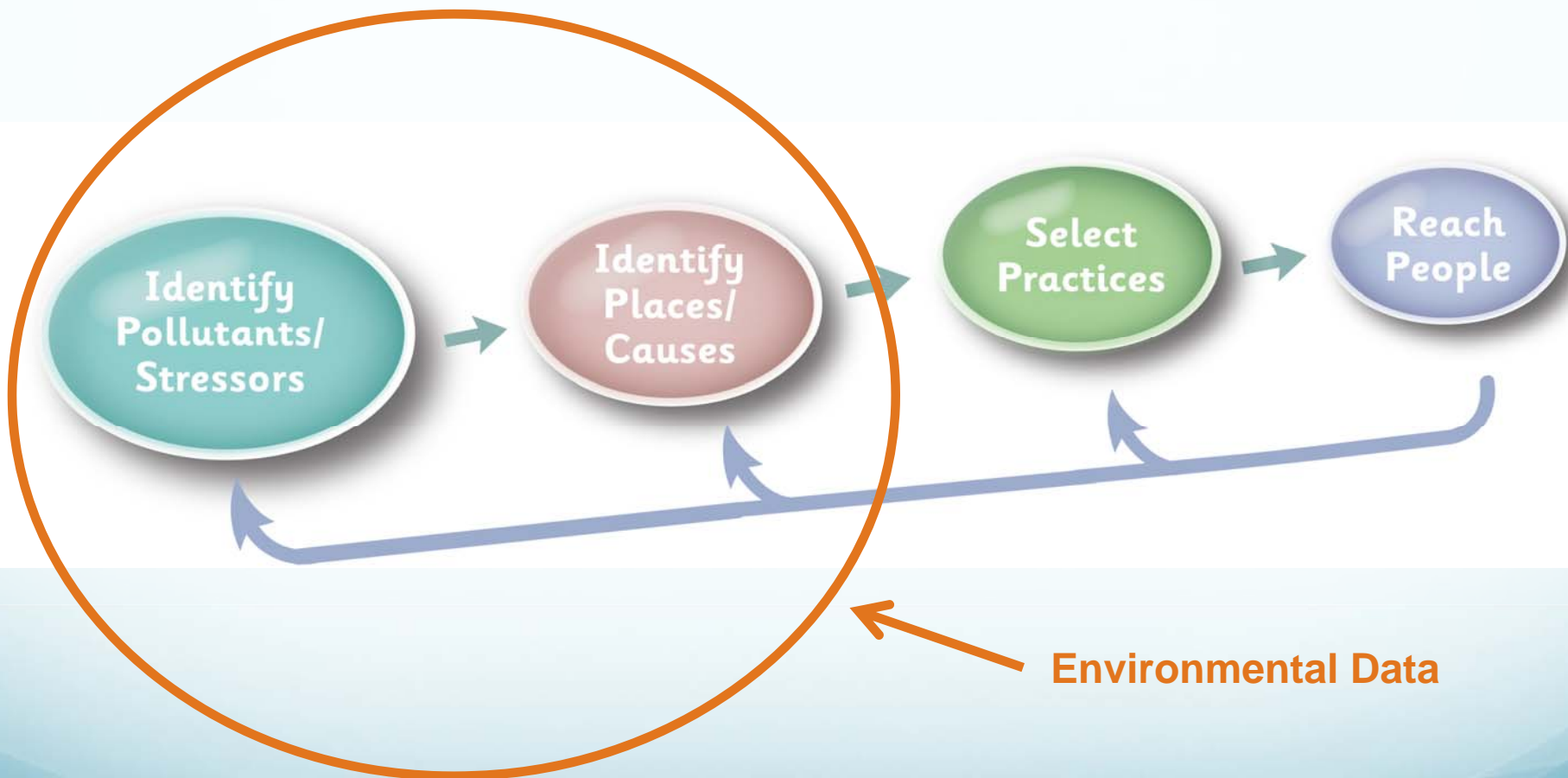


Robert Horn, <http://www.strategykinetics.com/2007/09/this-is-the-sec.html>

# Relative Amount of Data Applied to Reducing Nutrient Pollution of Surface and Ground Water

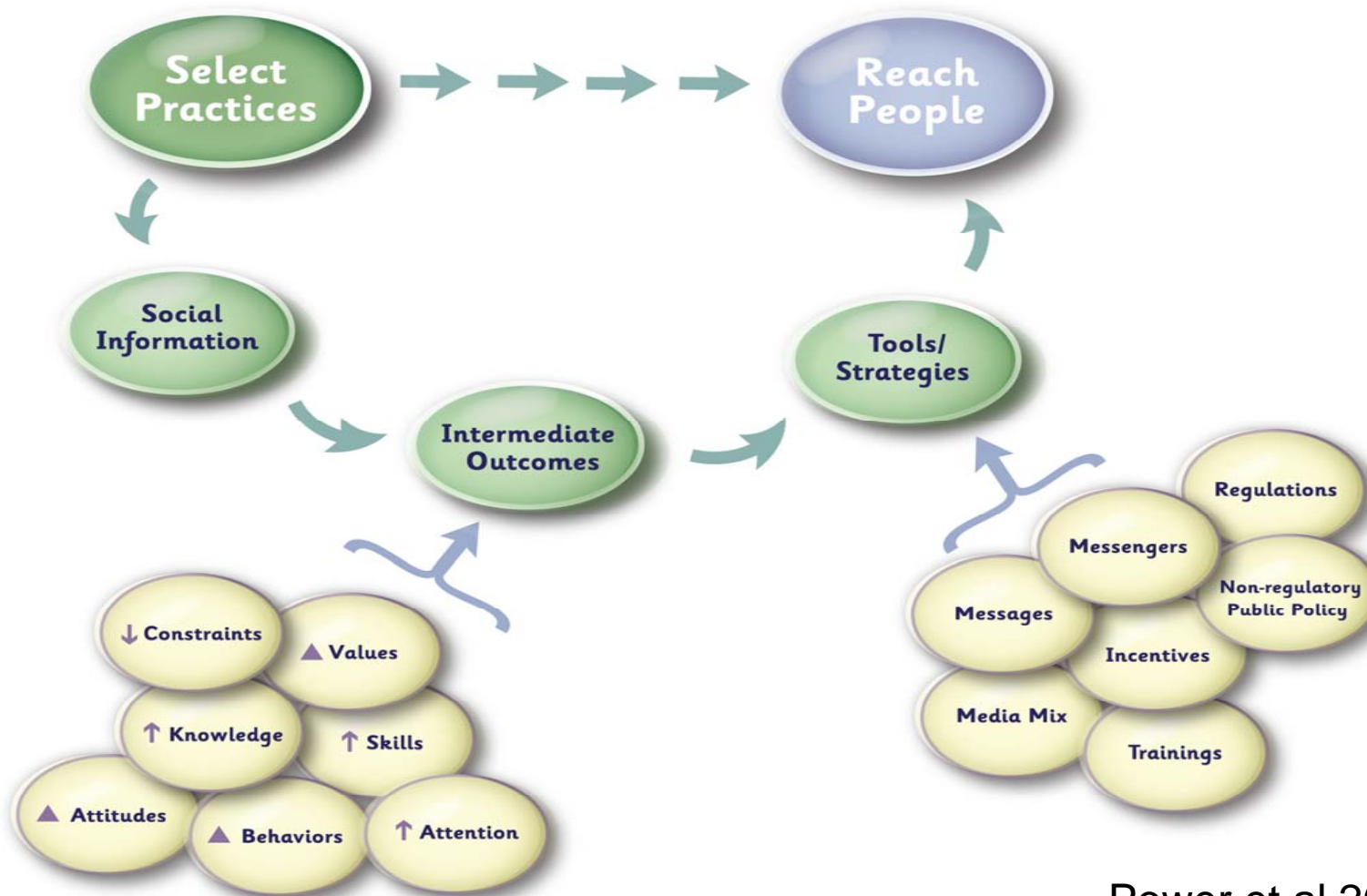


# Strategies for Applying Social and Economic Data to Nutrient Pollution Reduction



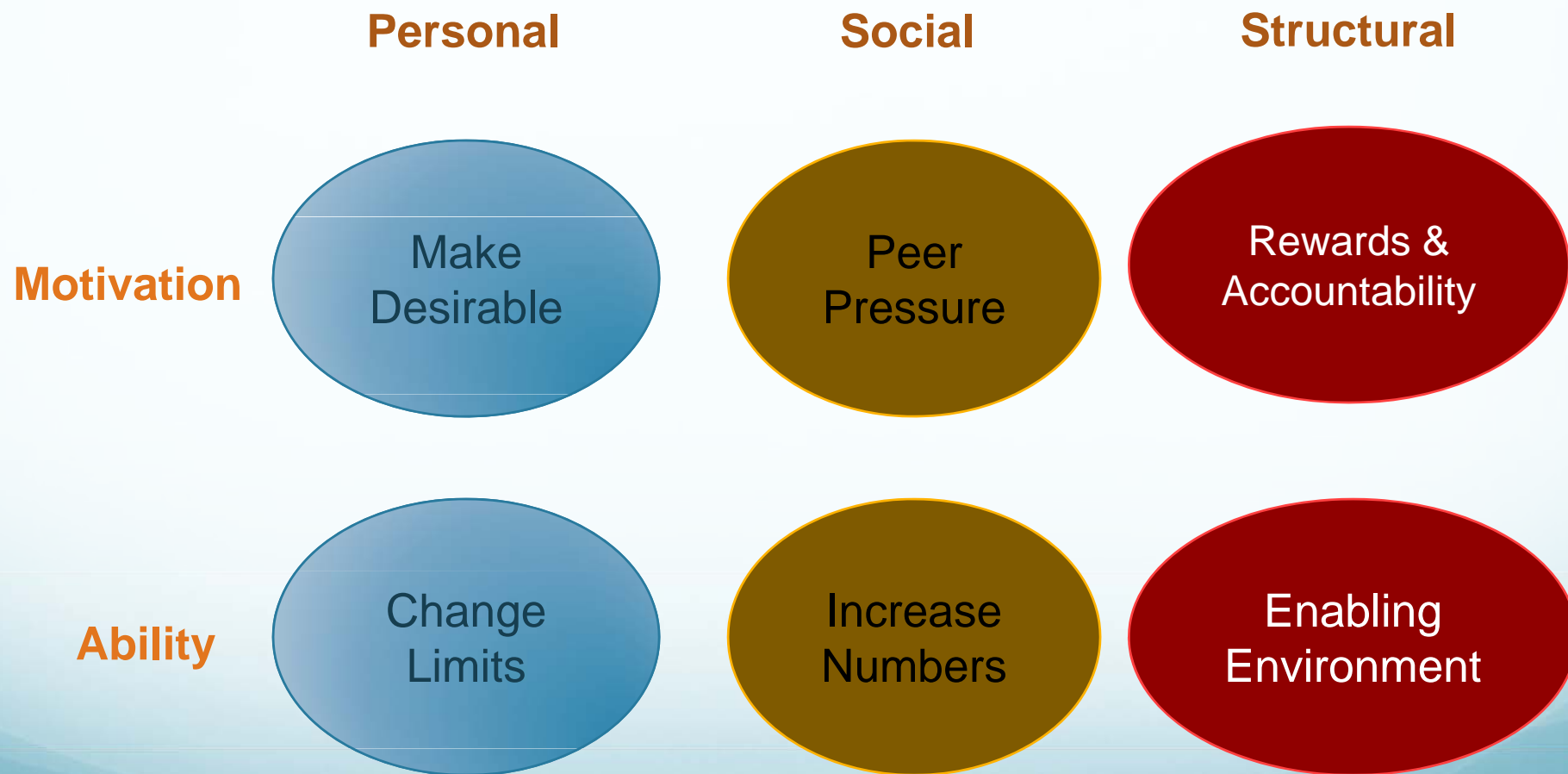


# Strategies for Applying Social and Economic Data to Nutrient Pollution Reduction



Power et al 2008

# Influencing Behavior Change



*Genskow, based on Patterson et al, 2008*

# Willingness to Change

	<b>Already prone to change</b>	<b>Not yet convinced</b>	<b>Resistant to change</b>
<b>Self Interest</b>	Benefits are apparent	Need to see benefits	Can't see/disagree with benefits
<b>Approach</b>	<b><i>Education</i></b>	<b><i>Marketing</i></b>	<b><i>Regulation</i></b>

Rothschild, 1999

# When to engage people: a critical question

- “It is not [acceptable] that expert opinion has defined the problem and it is even more unacceptable that experts have prescribed the solution for an unrecognized problem.”

LW Morton 2011

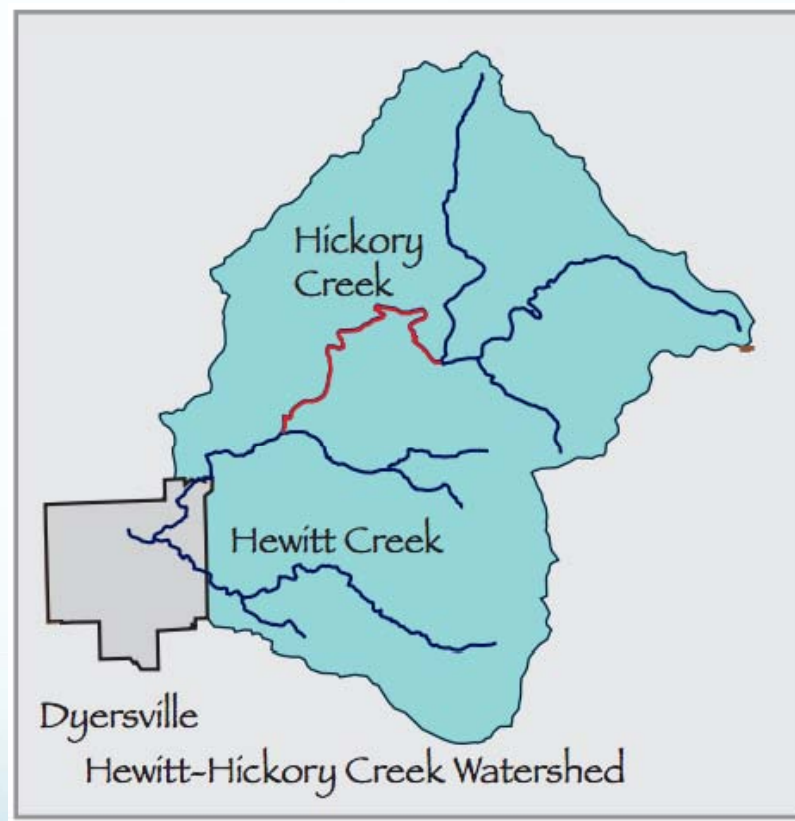
# Hewitt Creek



*Acknowledgements: Lois Wright  
Morton, Chad Ingels, Susan  
Brown, and Jean McGuire – Iowa  
State University*

# Hewitt Creek

- Hewitt Creek is a 23,005-acre subwatershed of the 592-square-mile North Fork and 1,879-square-mile (1.2 million acre) Maquoketa River basin.
- 1.2% urban, 91.2% agricultural and 7.5% woodland
- Hickory Creek listed on Iowa's EPA section 303(d) impaired waters list (for one or more pollutants and biologically-impaired)



# Performance-based Watershed Management



Ingels and Rodecap, 2011

([http://basineducation.uwex.edu/stcroix/Links/CivicEngagement/Ingels\\_stcroix\\_12-15-11.pdf](http://basineducation.uwex.edu/stcroix/Links/CivicEngagement/Ingels_stcroix_12-15-11.pdf))

# Hewitt Creek

- 2002: Hickory Creek listed
- 2004: Hewitt Creek watershed residents took part in a public meeting to address water quality issues in response to the listing
- 2005: Iowa Farm Bureau demonstration funding for water quality improvement plan
- 2005: Iowa State University and watershed residents meet to discuss impairments, performance-based incentives and forming watershed council



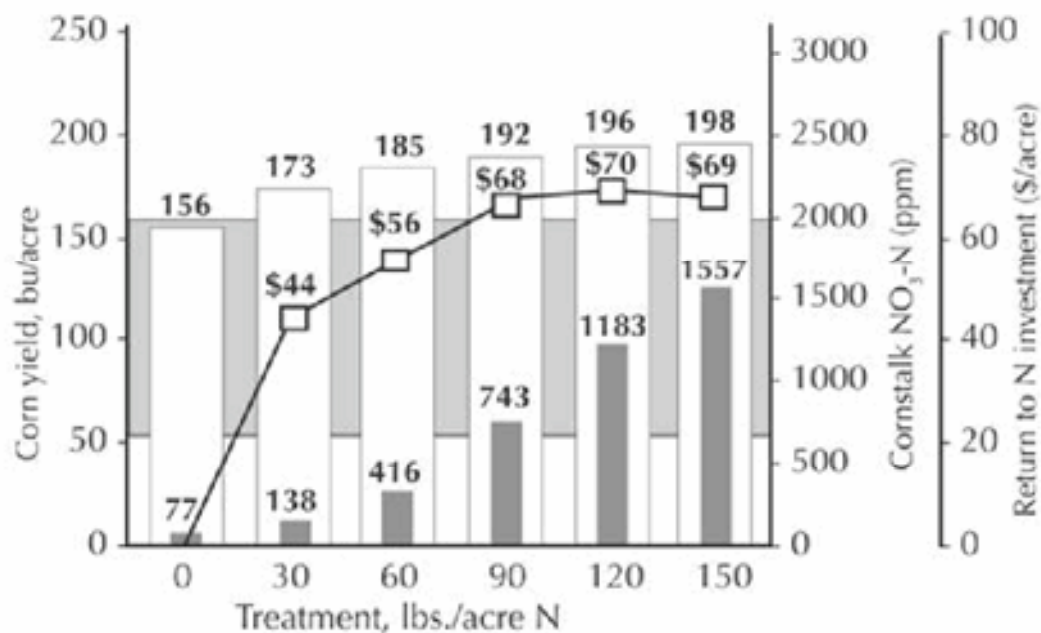
# Hewitt Creek

- 2005: Completion of a pre-project survey of landowners (ISU Sociology)
- 2005: Field day hosted by farmer-leader
- Farm Bureau incentive funds first used to test technologies that measure performance (environmental and economic) of various field and farm management practices
- The first measures adopted for incentives aided in refining manure and commercial fertilizer use

# Hewitt Creek

- 2006-2008 : Iowa Watershed Improvement Fund grant allowed the council to assemble a BMP menu to address performance indices
  - P-index
  - Soil Conditioning Index (SCI)
  - Cornstalk nitrate test
- Indices are calculated on individual fields, weighted by field acreage to attain a farm index
- Cooperator farms are combined to attain a measure of watershed performance.
- Iowa Watershed Improvement Fund \$ allowed expansion of incentive program and continued monitoring

# Hewitt Creek – Making Data Useful



Corn yield, end-of-season cornstalk nitrate-N results and return to N investment from 19 small-plot N rate demonstrations on corn-following-soybeans, 2000-03. (Corn at \$2.40/bushel and N at \$0.20/lb.) The shaded rectangle in the background of the graph indicates the optimal end-of-season cornstalk nitrate range of 700 to 2,000 ppm.

# Hewitt Creek Impacts

“Well, the long-term goal is to get it [Hewitt Creek] off the map, get it to where we’re off the DNR’s radar, whoever is watching this water quality thing. And if we could ... get it cleaned up, I think we’d be the better men...” Farmer #3, (Morton and McGuire 2005)

# Hewitt Creek Impacts

- Participation: 75% of watershed operators
- Cooperators improved PI scores by installing or improving 16,535 feet grassed waterways and vegetative buffers. Ten cooperators planted cover crops on 547 acres
- Since Jan 2010, annual sediment and phosphorus delivery to Hewitt Creek has been reduced 1,894 tons/year and 2,468 lb/year
- Overall, 44 lb/a reduction in nitrogen application and 27 miles of improved grassed waterways

# Hewitt Creek Impacts 2011

- Stream monitoring conducted at four locations Edge-of-field tile monitoring was done at nine sites.
- The seventh year of stream monitoring shows a Family Biotic Index of 5.15 (fair).
- Hickory Creek is still listed as impaired, however, watershed leadership and engagement is high.

# Social Indicators Data Management and Analysis System (SIPES)

- Standardized social indicators for agricultural urban/suburban landowners
- Semi-standardized survey methodology and questionnaire and other methods for measurement and analysis
- Web-based tool and interface for using social indicators, the Social Indicators Data Management and Analysis (SIDMA)



The screenshot displays the SIDMA (Social Indicators Data Management and Analysis Tool) web interface. At the top left, the title "SIDMA" is prominently displayed in a large, bold, blue font, with the subtitle "Social Indicators Data Management and Analysis Tool" in a smaller font below it. To the right of the title is the logo for the "GREAT LAKES Regional Water Program". Below the title and logo is a horizontal navigation menu with buttons for "Home", "About", "Projects", "Map", "Account", "Contact Us", and "Log in". The "Home" button is highlighted in blue. Below the navigation menu are three landscape photographs: a waterfall in a forest, a person fishing in a pond, and a waterfall in a wooded area. Below the photos is a blue banner with the text "Using Social Indicators for Evaluating Nonpoint Source (NPS) Management Efforts". Underneath the banner is a paragraph of text: "The Social Indicators Data Management and Analysis (SIDMA) tool organizes, analyzes, and visualizes social indicators related to nonpoint source (NPS) management efforts through statistical and spatial relationships." Below this text is a white box with a blue header "Start Using SIDMA" containing four buttons: "Learn about Social Indicators", "Create/Work on a Project", "Create an Account", and "Browse Maps". At the bottom of the page is a blue footer with the text "Institute of Water Research, All Rights Reserved 2012".

# SIPES

- Indicators and protocols tested in 29 projects across the region
- Incorporation into several states' NPS funding programs including Michigan, Indiana and Wisconsin
- Training and instruction for using social indicators in project planning and implementation.

## The Case of **Eagle Creek Watershed**

Eileen Hack, Lenore P. Tedesco, Kristin Floress, and Linda S. Prokopy

### Using Social Indicator Research to Enhance Watershed Education for Drinking Water Resources: Eagle Creek Watershed, IN

#### Introduction

The Eagle Creek Watershed Alliance (ECWA), Indiana University-Purdue University Indianapolis (IUPUI), and Purdue University researchers conducted

research to enhance watershed education for drinking water resources in the Eagle Creek Watershed, IN. The reservoir became a public water supply reservoir for a portion of the 1.1 million customers served by Indianapolis Water. Eagle Creek Park, the fourth-largest municipal park in the country, surrounds the reservoir (see Figures 1 and 2). The park is maintained as a natural area park and contains several state designated nature preserves.

Eagle Creek Watershed is a mixed land-use watershed with water quality and use impairments linked to both

increased. The past five years has seen a rapid increase in urbanization in the areas around the reservoir and in southern Boone County. The greatest percent of agricultural land remains in the northern portions of the watershed (Figure 3; Tedesco et al. 2005).

#### ECWA Organizational History

In response to concerns over elevated concentrations of the corn herbicide atrazine in Eagle Creek Reservoir, a

<http://greatlakeswater.uwex.edu/sites/default/files/library/outreach-and-education/2011nonpointsourceemngmtfactsheet.pdf>

*Funded through USEPA Region 5, state nonpoint source programs in Region 5, and the USDA National Institute of Food and Agriculture.*



# Elements of a State Framework

Framework Elements	Use of Social and Economic Data
1. Prioritize watersheds on a statewide basis for nitrogen and phosphorus loading reductions	
2. Set watershed load reduction goals based upon best available information	
3. Ensure effectiveness of point source permits in targeted/priority sub-watersheds	
4. Agricultural areas: targeting places and practices; use innovative approaches; incorporate lessons learned	
5. Storm water and septic systems	

# Thank you

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