Changing Homeowner’s Lawn Care Behavior to Reduce Nutrient Losses in New England’s Urbanizing Watersheds: The Role of Social Science

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Outline

• The Issue
  – The Insidious American Lawn and NPS Pollution
• Using Social Science to Address Environmental Issues
• Methodology
  – Theoretical Framework
  – Methodological Triangulation
• Important Findings for Developing Effective Outreach and Education
• Conclusion
Turf and the American Landscape

- There are an estimated 25-40 million acres of turf in the US (at least twice the acreage of cotton)
- The amount of turf in the US is growing
- Americans spend an estimated $40 billion on lawn care annually (more than the GDP of Vietnam) (2006)
- Lawn care issues have significant environmental impacts
  - Residential runoff is a significant source of nitrogen and phosphorous (non-point source pollution)
  - Negatively impacts water quality
Social Science and Environmental Issues

Simply providing information rarely results in behavior change – Why?

- Addressing environmental issues is interdisciplinary
- Social sciences are often missing from discussions of environmental issues, but identify
  - Research methods
  - Theories (Theory of Planned Behavior)
  - Application and feedback loops (evaluation)
- ...for stimulating environmentally responsible behavior
- Building ground up by learning from “the audience” is essential
  - When top down is not feasible
An Interdisciplinary Approach: Roles of the project team

Changing Homeowner’s Lawn Care Behavior to Reduce Nutrient Runoff in New England’s Urbanizing Watersheds

- Multi-state/University project team
- Environmental research
- Social science research
- Implemented through Extension
- Provides a framework for future projects
The Role of Social Science: Project Goals

• Conduct descriptive research on lawn care practices
• Explore primary drivers of do-it-yourselfers’ (DIYs) lawn care choices and practices, especially with regard to fertilizer application
• Investigate perceived barriers and benefits to adoption of more water quality-friendly nutrient application practices
• Examine relative measures of trust and frequency of use for various sources of lawn care information
• Evaluation phase
Applying Specific Theory to the Problem: The Theory of Planned Behavior (TPB)

• A specific theory is needed to best analyze the phenomena and structure our inquiry
• Augmented version of the Theory of Planned Behavior applied
  – Meta-analysis of research applying TPB to environmentally responsible behavior indicates strong empirical support for the theory (Trumbo & O’Keefe 2005; Sutton 1998, Conner & Armitage 1998)
  – Applied in development of environmental communications
    • Water conservation, NPS burn policies, recycling, agricultural conservation, etc.
Social Research Methods

• Methodological triangulation: Qualitative research informs quantitative, stands on its own

• First stage: In-depth interviews with opinion leaders (n=52)
  – Respondents included: industry/business leaders, outreach/educators, community leaders, alpha neighbors, researchers and scientists
  – Open ended interview protocol
  – Purposive snowball sampling across five New England states
  – Data analysis using content analysis techniques (Glaser and Strauss 1969, Miles and Huberman 1984, Berg 2006)
Qualitative Results: Sample Key Findings

- A perceived lack of knowledge exists among DIYers regarding effective lawn care techniques, including the proper application of fertilizers.
- Opinion leaders believe there is a lack of recognition that home fertilization techniques are linked to water quality.
- Many Opinion Leaders felt that alternative fertilizing methods would achieve results that satisfy most DIYers.
- The standards of lawn care in a DIYer’s community has a significant effect on that DIYers lawn related attitudes, values and ultimately their behaviors.
Sample Outreach/Education
Take Home Messages

• Redefine what a healthy lawn is and promote a more reasonable/attainable image of the desirable lawn
• Outline the benefits of a healthy lawn with emphasis on improved water quality and improved safety for child and pet recreation
• Refer to fertilizer(s) as a “lawn chemical(s)”
• For those set on obtaining the “backyard golf course” and are resistant towards accepting anything less, promote the effectiveness and money saving benefits of “spoon feeding”
• Illustrate the benefits alternative lawn care techniques
• Underscore the assertion that nutrients are nutrients regardless of their origin
Social Research Methods

- Second stage: A scientific random sample survey
- Five communities purposively selected for survey research
  - Hampden, Maine
  - East Lyme, Connecticut
  - Milton, New Hampshire
  - Brandon, Vermont
  - East Kingstown, Rhode Island
- Sample frame built off publicly available records (SSI)
- Third stage: evaluation (to be conducted spring 2010)
Survey Methods

• Survey administered using a modified Tailored Design Method (Dillman 2006)
  – Customized letters & community specific questionnaires
  – Carefully worded appeals
  – Carefully timed, four stage mailing process

• Two tier sample
  – 350 residents of each community
  – 80 residents of specified neighborhoods in communities

• SPSS used to record data and conduct analyses
  – Univariate, bivariate and multivariate analyses

• Statistical analyses show very few significant differences, combined sample data presented today

• 1848 eligible recipients, 754 returned, response rate 40.8%
Why focus on DIYers?

Respondent's description of their Lawn Care Practices

- Perform Own Lawn Care: 79.1%
- Hire Out the Work: 13.3%
- Someone Else Performs Lawn Care for no Fee: 2.9%
- Lawn Does not Get Maintained: 2.9%
- Do Not Have a Lawn: 1.8%
Sample Findings for Outreach/Education Development

- 49.8% of respondents believe that using organics addresses water quality issues related to fertilizer use.
- Fertilizer impacts water quality (there is a lack of knowledge about basic information, particularly on the dynamics of the processes).
- 30.5% of respondents believe their work or business is economically dependent on the quality of their watershed.
- 41.2% of respondents reported they use all fertilizer purchased to avoid storage.
Sample Findings for Outreach/Education Development

• Protecting family and pet health is important or very important to 78.4% of respondents

• Respondents are very accepting of several simple practices: (validates finding from qualitative)
  – using fertilizers that expressly protect water quality
  – cutting grass at a higher height
  – leaving clippings on the lawn

• Respondents indicate that it is not important that a lawn be clover-free
Knowing The Audience: Important Factors

- 76.9% of respondents assert that it is important that their lawn look the same as it currently does if they adopt environmentally friendly alternatives.
- Only a small portion of respondents (9.7%) believe alternatives cannot achieve the type of lawn they desire.
- Linking the impacts of over-fertilization on water quality with a specific body of water is essential.
- 30.5% of respondents believe their work or business is economically dependent on the quality of their watershed.
Importance of Protecting A Particular Body of Water.

- Not Important: 2.5%
- Neutral: 16.1%
- 2: 1.9%
- 4: 39.4%
- Very Important: 40.0%
Knowing The Audience: Important Factors

- The availability of information on alternatives is important to many respondents for them to consider adopting them (41.6%)
- Concern about environmental issues varies across the region
- Most respondents are satisfied with their lawn’s appearance
  - 40.2% agree or strongly agree that fertilization is important for achieving the lawn they desire
  - Only 53.3% of respondents state they use fertilizer on their lawn
  - 20.6% of respondents indicate they use fertilizer 4 or more times per year
Using Social Norms: Key Findings

• “Fitting in” is important to most respondents
  – 69.7% agreed or strongly agreed that they want their lawn to look good enough to fit into their community
  – 46.1% agreed or strongly agreed with the assertion that community members have a responsibility to adhere to community standards of lawn care
  – When asked about what features of a lawn are most important, the most common response was that lawns be safe for the environment
Respondents Mean Rating of the Importance of Each Lawn Issue

- Importance of Having a Weed-Free Lawn: 2.9
- Importance of Having a Dark Green Lawn: 2.6
- Importance of Having Thick Grass: 2.9
- Importance of Having a Clover-Free Lawn: 2.3
- Importance of Having a Pest-Free Lawn: 3.2
- Importance of Having a "Golf-Course Quality" Lawn: 1.8
- Importance of Having a Safe Lawn for the Environment: 4.1
Message Delivery

• A point of purchase effort may be essential for success
  – Results from both the survey and interviews indicate the timing of the messages is important
  – The most commonly used source of information on lawn care is product packaging

• Media sources are not widely used or trusted

• Master gardeners and University Extension are considered the most trustworthy information sources
  – being clear about affiliations is useful and appropriate
Conclusions

• The project exemplifies how social science has utility for improving efforts to affect change
  – Explains current lawn care behavior and attitudes
  – Identified vectors for message delivery
  – Identified key barriers
  – Identified key topics for messages
  – Informs the use of normative approaches to change

• Interdisciplinary approaches require expertise: work together

• Overall, results encouraging for project goals and efforts to affect water quality if outreach is carefully designed
Thank you for your time

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The remaining slides are contain supporting evidence in case questions arise requiring the presentation additional material.
Examples of Conclusions from Social Science Research: Messages & Their Delivery

• Multiple perspectives exist on a fundamental level, and good communications must...
  – Understand differences and their depth
  – Incorporate them in the design of communications
• Place matters, so use it by tailoring messages
• Understand currently perceived barriers
• Assessing use of, and trust in, information sources is important and directly applicable
• Commitments are valuable motivators and may affect norms in the long term
  – Should be public, visible, and active
Augmented TPB Theoretical Model of Hypothesized Relationships Influencing Lawn Care Behavior
### Examples of More Specific Variables Examined in the Theoretical Model

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad environmental values</td>
<td>Frequency of contact with information sources</td>
</tr>
<tr>
<td>Landscaping values</td>
<td>Perceived importance of various messages</td>
</tr>
<tr>
<td>Attitudes towards lawn care related issues</td>
<td>Preferences for message delivery (information)</td>
</tr>
<tr>
<td>Attitudes towards lawn care techniques</td>
<td>Past actions</td>
</tr>
<tr>
<td>Knowledge of environmental issues (information)</td>
<td>Current lawn care practices (including soil test use)</td>
</tr>
<tr>
<td>Knowledge of lawn care related issues (information)</td>
<td>Anticipated lawn care practices</td>
</tr>
<tr>
<td>Relative trust in various information sources</td>
<td>Perceived neighborhood lawn care norms</td>
</tr>
<tr>
<td>Place attachment – social and natural dimensions</td>
<td>Perceived barriers to the adoption of techniques and practices that minimize the negative impacts of nutrient application</td>
</tr>
</tbody>
</table>
Detailed Value Factor in the Augmented TPB Theoretical Model of Hypothesized Relationships Influencing Lawn Care Behavior

- Environmental Values
- Place-Specific Values
- Lawn Care Values
- Values
**Questions on the NEP Index** *(using a Likert Scale)*

- We are approaching the limit of the number of people the earth can support.
- Humans have the right to modify the natural environment to suit their needs.
- When humans interfere with nature it often produces disastrous consequences.
- Human ingenuity will insure that we do NOT make the earth unlivable.
- Humans are severely abusing the environment.
- The earth has plenty of natural resources if we just learn how to develop them.
- Plants and animals have as much right as humans to exist.
- The balance of nature is strong enough to cope with the impacts of modern industrial nations.
- Despite our special abilities humans are still subject to the laws of nature.
- The so-called “ecological crisis” facing humankind has been greatly exaggerated.
- The earth is like a spaceship with very limited room and resources.
- Humans were meant to rule over the rest of nature.
- The balance of nature is very delicate and easily upset.
- Humans will eventually learn enough about how nature works to be able to control it.
- If things continue on their present course, we will soon experience a major ecological catastrophe.
Construction of Values Factor

Environmental Values

Place-Specific Values

Lawn Care Values

Values

Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Measuring Environmental Values

• Measuring environmental values is a long and well-researched topic
• Dunlap and Van Liere (1977): New Ecological Paradigm Scale
  – Uses an index of scaled questions to measure proenvironmental orientation
  – Scaled questions are statistically treated as an index to produce an overall environmental values measure
  – Revised repeatedly over time, used in many studies
  – Well supported in studies of behavioral intentions (Vining et. al. 1999; O’Connor et. al. 1999; Dunlap et. al. 2000)
  – Conceptualized as commitment to the *Dominant Social Paradigm* or to the *New Ecological Paradigm* (Leopold view)