Green Grass, Clear Water:

Can We Move Lawn Care Behaviors Toward More Water Quality-friendly Practices?

Julia Peterson

N.H. Sea Grant Extension Program Leader and Specialist, Marine and Water Resources

ME-NH Beaches Conference
June 2019

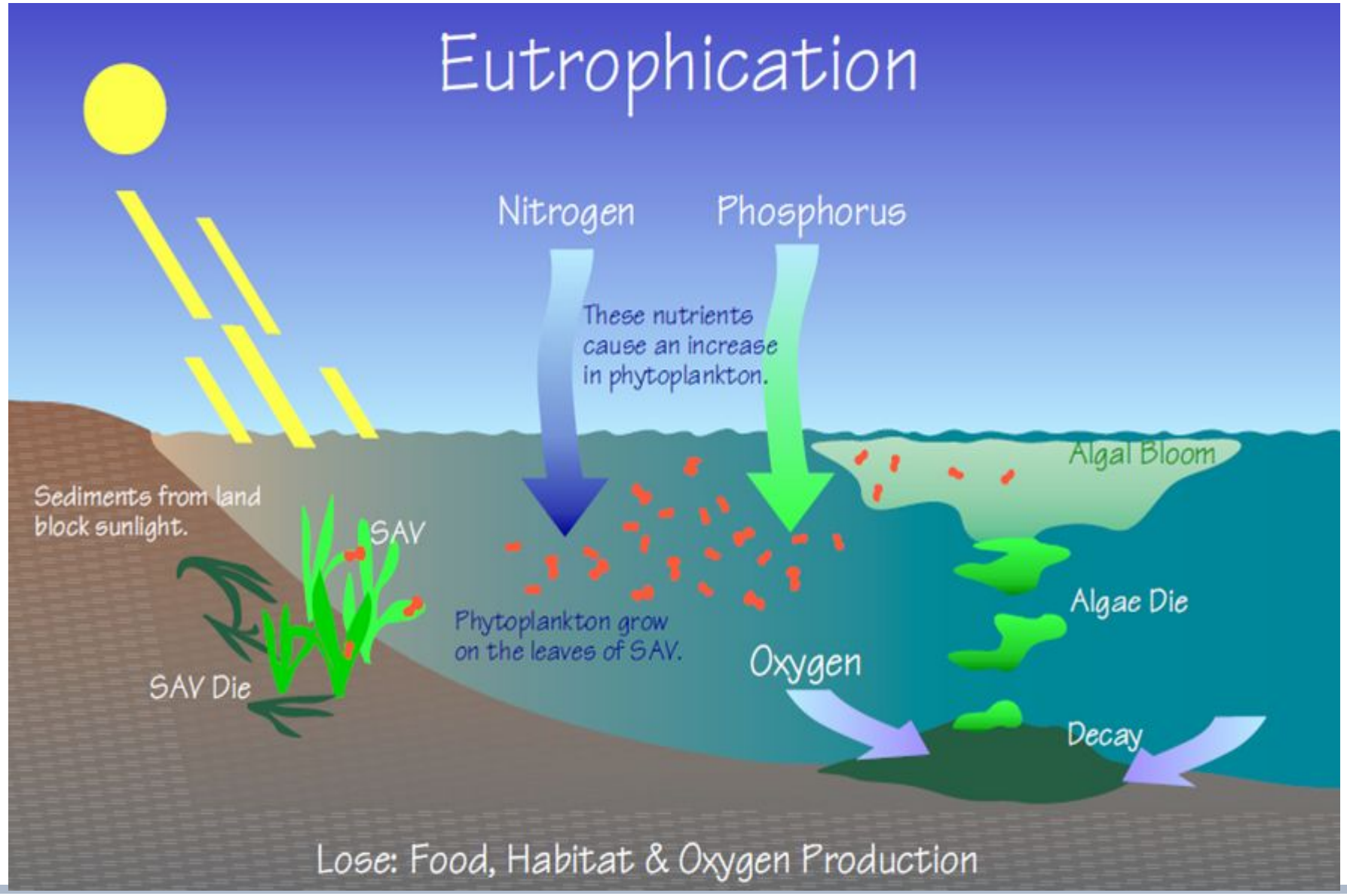


Image from www.fiu.edu/~envstud/labs/nutrientanalysis.html.

Nitrogen Sources

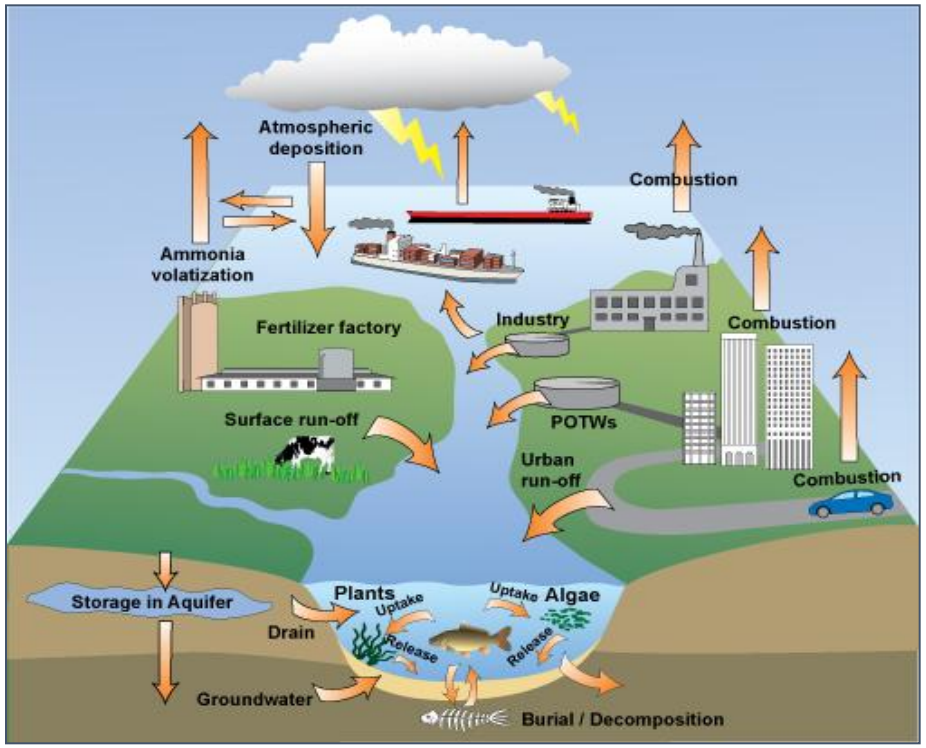


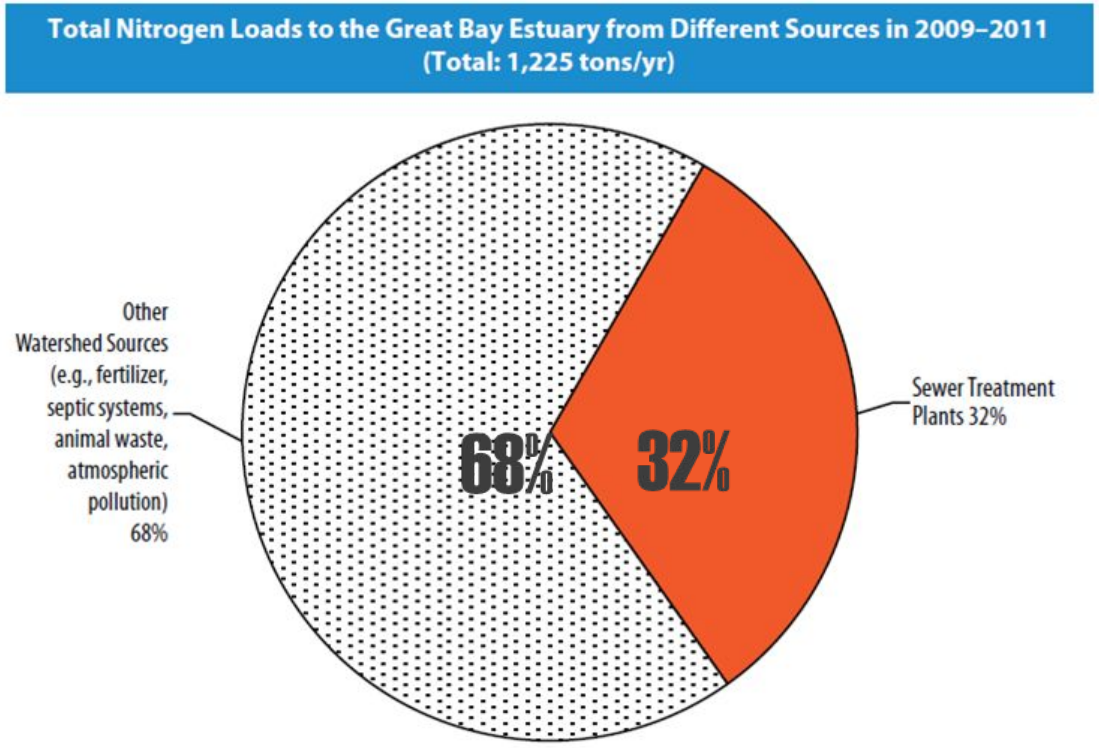
Illustration: sccwrp.org

Photo: K. Guillard

Nitrogen in Great Bay

PREP
Piscataqua Region Estuaries Partnership

Total Nitrogen
1,225 tons/yr



Sources of Non-Point Source Pollution:

- Lawn Fertilizer
- Animal Waste
- Atmospheric Depo.
- Septic Systems

Today:

1. Introduce a regional, integrated lawn care-water quality project
2. Identify a few key social science findings about lawn care and WQ
3. Introduce some outreach products that integrate natural and social research
4. Share lessons learned

Changing Homeowner's Lawn Care Behavior to Reduce Nutrient Losses

USDA/NIFA 2006-51130-03656

Applying knowledge to improve water quality

National Water Program

A Partnership of USDA NIFA & Land Grant Colleges and Universities

Applying knowledge to improve water quality

Northeast States & Caribbean Islands Regional Water Center

A Partnership of USDA NIFA & Land Grant Colleges and Universities

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What We Had to Work With

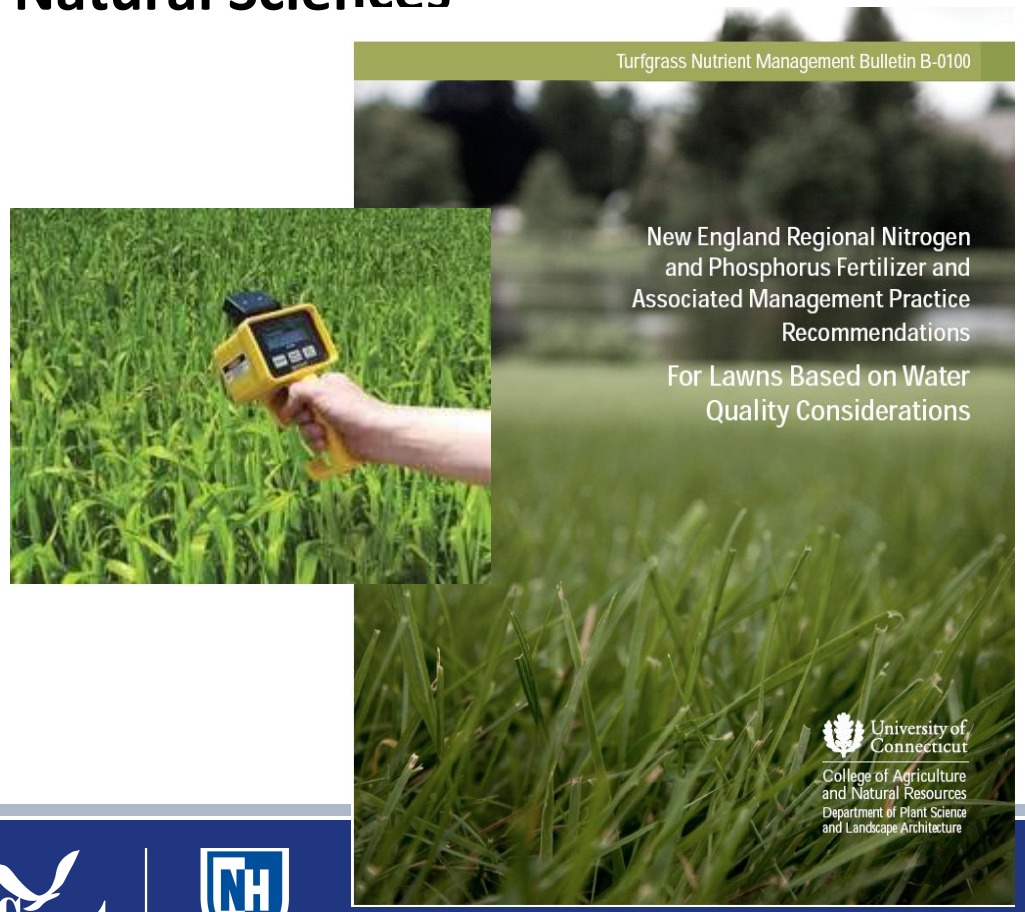
- USDA Regional Water Program
  - multiple land grant institutions
  - multiple discipline experts
  - collaborative relationship
  - regional funding; *got project funding*
  - shared problem and *shared objectives*
  - strong relationships with partners – *advisory team*

Primary Challenges for Outreach/Extension

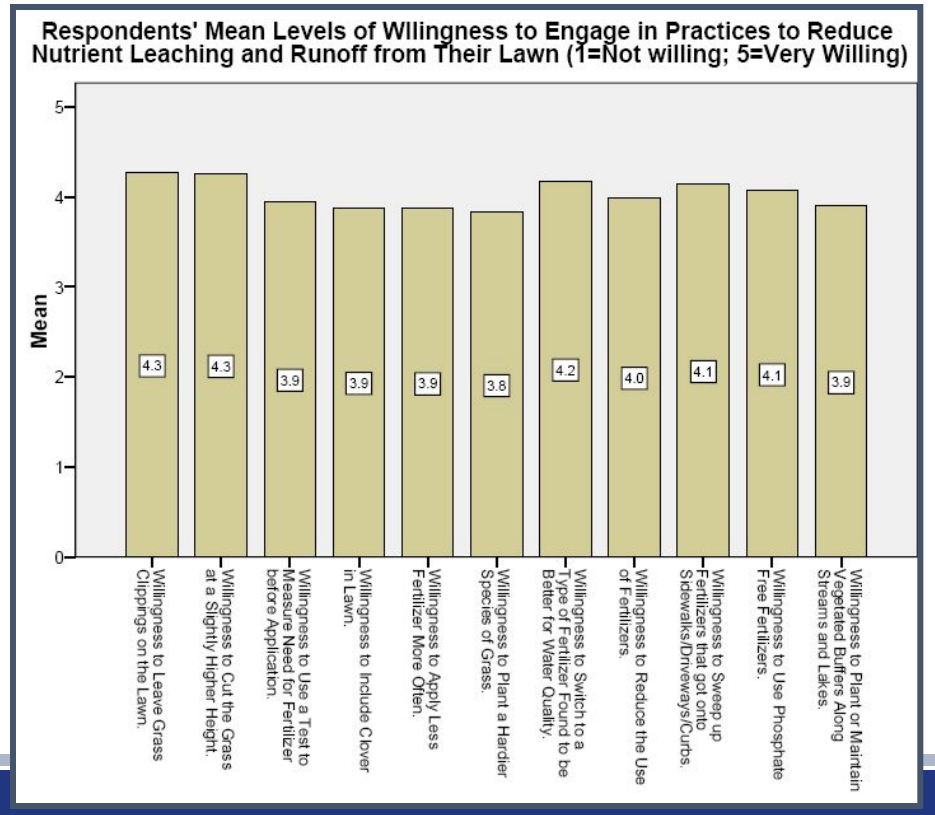
- Variable fertilizer recommendations across states
- No site specific nitrogen soil test for turf
- Uncertainty about drivers of homeowner's (DIY) yard care practices
- Uncertainty about willingness and ability to change practices

Crossing Disciplines

Natural Sciences



Social Science



Cross Research, Education and Extension

Research

RESULTS

Relationship Between Soil Nitrate-N and Turf Reflectance

Significant ($p < 0.01$) LRP and QRP models were obtained for the CM1000 and NDVI reflectance meters for Kentucky bluegrass and tall fescue when data were pooled across three years. The responses suggest that Kentucky bluegrass color is optimum when soil nitrate-N is between 11 to 18 mg kg^{-1}. For tall fescue, color is optimum when soil nitrate-N is between 5 to 10 mg kg^{-1}. Beyond the optimum soil nitrate concentration range for either grass, there

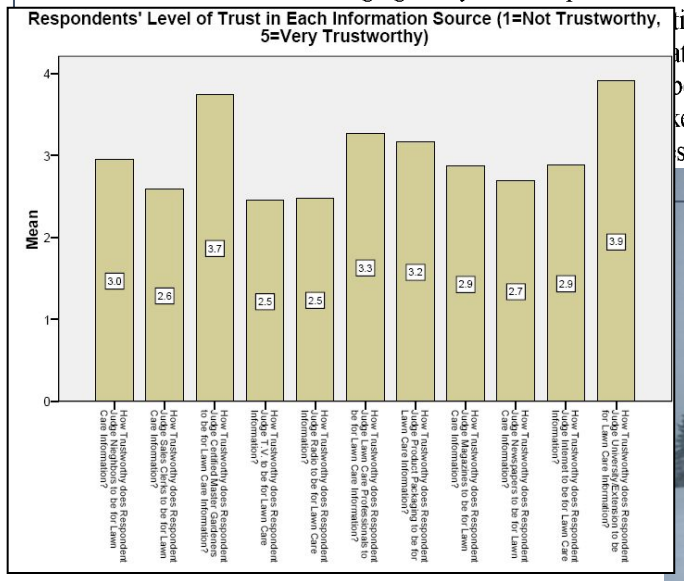
tions increase; however, there will be an increased

ate.

between meters with respective plateau models for

edly lower than the critical values for Kentucky

s less N than Kentucky bluegrass for maximum



Education

Extension

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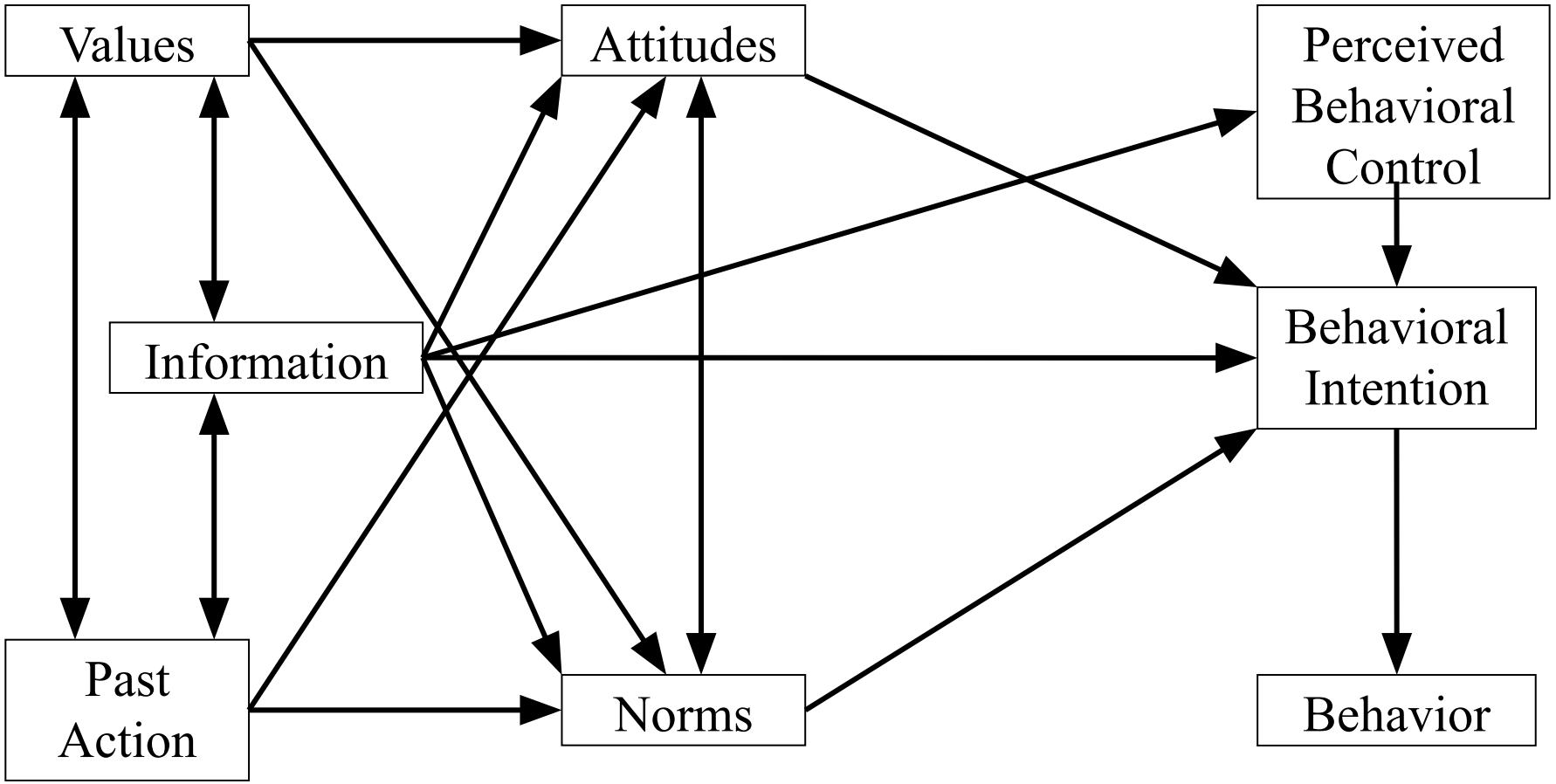
Augmented TPB (Ajzen and Fishbein) Theoretical Model of Hypothesized Relationships Influencing Lawn Care Behavior



Water Quality Friendly Lawn Care Recommendations

Sea Grant New Hampshire | NH Extension

Compiled and edited by Karl Guillard, PhD, University of Connecticut, Plant Science

USDA CSREES *(now NIFA)* project # 2006-51130-03565

Social Science Results and Recommendations for Outreach

Brian Eisenhauer, PhD
Plymouth State University

From *Report of Social Science findings from Changing Homeowner's Lawn Care Behavior to Reduce Nutrient Losses in New England's Urbanizing Watersheds*

Changing Homeowner's Lawn Care Behavior to Reduce Nutrien
New England's Urbanizing Watersheds

New England Regional Water Program
Applying knowledge to improve water quality
A Partnership of USDA CSREES & Land Grant Colleges and Universities

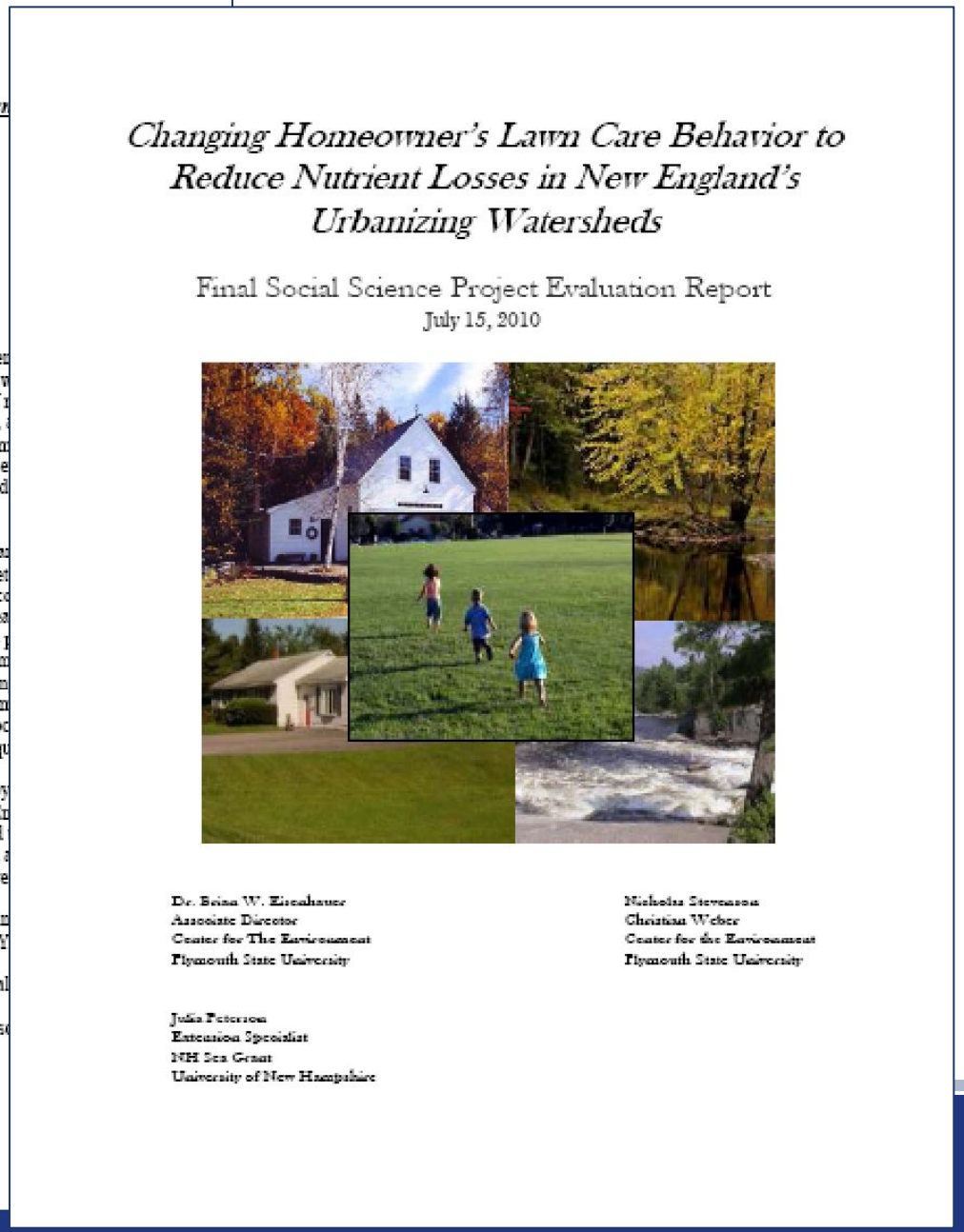
Social Science Results Summary

Nutrient losses from common lawn care practices, such as fertilization, have beer
significant contributors to Non Point Source Pollution (NPS) in New England's w
order to create an effective educational outreach program to stimulate the use of r
environmentally responsible lawn care practices, and reduce this source of NPS,
amount of social science research has been conducted to inform the design of a n
program informed by the principles of community based social marketing. This e
summary highlights the key findings from the survey portion of the project to aid
of outreach and education messages.

The question of what motivates environmentally responsible behavior in lawn ca
to the future of environmental health throughout the Northeast. Attempting to get
lessen the negative impacts lawn care practices have on their watersheds has beco
Extension efforts throughout the region, however little research exists on the mea
this goal. Designing an outreach program that leads to measurable change in the p
scale landowners use to care for their landscapes is a challenge that can best be m
application of findings from hypotheses-driven social science research. Instigatin
change among landowners in a watershed can be a complex task because of the n
involved in fostering environmentally responsible behavior, however existent soc
research provides a framework that can be used to successfully structure this inqu

The social science research was conducted using methodological triangulation by
qualitative, in-depth interviews with turf care opinion leaders throughout New En
ascertain their perceptions of, and opinions about, critical turf care issues related
In addition to being valuable information in its own right, the data collected and a
also used to inform the quantitative stage of data collection. The social science re
of the project was designed with 4 goals:

1. Explore primary drivers of do-it-yourselfers' (DIY's) lawn care choices an
especially with regard to fertilizer application. Information from non-DIY
analyzed.
2. Investigate perceived barriers and benefits to adoption of more water qual
nutrient application practices.
3. Examine relative measures of trust and frequency of contact for various s
care information by neighborhood residents.



Changing Homeowner's Lawn Care Behavior to Reduce Nutrient Losses in New England's Urbanizing Watersheds

Final Social Science Project Evaluation Report
July 15, 2010

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Green Grass & Clear Water

Water quality friendly lawn care and fertilizer recommendations for northern New England

According to a recent survey, it's likely that you and your neighbors believe having a lawn that is safe for the environment is very important.* However, some lawn care practices can create water quality problems. Excess nutrients (including nitrogen and phosphorous found in fertilizers) that run off our properties into local waterbodies can trigger algal blooms that cloud water and rob it of oxygen.

Many of us enjoy the time we spend working on our lawns and are willing to try new practices as long as our lawns continue to look good.* Here are some easy practices for creating and maintaining a truly healthy lawn – attractive and safer for the environment.

For additional resources, please visit:

www.extension.unh.edu/Sustainable-Landscapes-and-Turf

Simple Recommendations for Every Lawn

1. Choose the Right Grass Seed

- Consider limiting lawn area to locations where grass will grow easily and will actually be used for outdoor activities.
- Choose grass varieties that require less maintenance. For northern New England, choose seed mixes with higher percentages of turf-type tall fescues, compact-type fall fescues and/or fine fescues. Choose mixes with smaller percentages of Kentucky bluegrass and/or perennial ryegrass.
- In shaded areas, select shade-tolerant turf grasses like fine-leaf and tall fescues.
- Up to 10% of total seed mix can be white clover to help fix nitrogen in soil naturally. Avoid clover if anyone in the household is allergic to bee stings.

2. Don't Overwater

- If irrigating, one inch of water per week is typically enough. Overwatering can lead to runoff and leac of contaminants into groundwater.

3. Test Your Soil

- Sometimes adjusting the soil pH or organic matte the only treatments needed to improve a lawn. If t test results come back as acceptable but your lawr not, then check for other problems like pest infest Learn more at: bit.ly/Test-Your-Soil

4. Mow Smart

- Mow grass 3" or higher. Cut no more than 1/3 of th blade to encourage longer, stronger turf grass roo Leave the clippings after mowing to provide a sou low release nutrients.

Recommendations for Lawns that Need Fertilizer

1. Determine How Much to Apply

- Measure the dimensions of the area where you plan to apply. The square footage of the area will determine how much fertilizer to purchase and use.
- Only use what you need. Nearly half of homeowners mistakenly use the entire bag whether it is needed or not.* Seal and store opened fertilizer bags in an airtight container or share excess with others.
- Lawns older than 10 years usually need less nitrogen than newer lawns, especially if the clippings are left, so apply only half of the amount directed on the bag. Only apply more if there's no improvement over time in turf color and density. Staying under four applications per season at this reduced rate helps keep the overall application at the recommended level† for water friendly practices.
- Lawns less than 10 years old may need the full amount of nitrogen as indicated on the fertilizer instructions. Apply less than four times per year.

2. Know When & Where to Apply

- Avoid applying fertilizers mid-summer when turf growth naturally subsides or before a big rain when it can run off into nearby waterways or leach into ground water.
- In northern New England, apply no earlier than spring green-up and no later than mid-September to ensure the proper soil temperature for grass to take up the nutrients.
- Know your local and state laws related to fertilizer application. For example, do not apply any fertilizers within 25 feet of water bodies in New Hampshire.

3. Choose the Right Fertilizer

- Avoid combination products that include both pesticide and fertilizer unless confident you need both. Unnecessary applications of fertilizers and pesticides can lead to soil and water contamination.
- Select lawn fertilizers with low or no phosphorus unless your soil test indicates otherwise. The fertilizer formula (e.g., 20-0-15) tells the relative percentages of nitrogen (N), phosphorous (P) and potassium (K).

3. Choose the Right Fertilizer, cont.

- Slow release formulations (>50% water insoluble nitrogen – WIN) are generally preferable. Only use quick release products when there is a need to grow turf very quickly, for example to prevent erosion of bare soil during a new seeding. Check the product label to see what type of nitrogen it contains.
- Organic fertilizers are typically slow release and contain micronutrients that are beneficial to soil. They are not petroleum-based like most synthetic fertilizers. Overapplying any type of fertilizer or over-irrigating fertilized turf can lead to water quality problems.

For more information:

www.extension.unh.edu/Sustainable-Landscapes-and-Turf

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*Recommendations adapted from:
New England Regional Nitrogen and Phosphorus Fertilizer and Associated Management Practice Recommendations for Lawns Based on Water Quality Considerations. 2008. Karl Guillard (ed.). *Turfgrass Nutrient Management Bulletin 0700*. College of Agriculture and Natural Resources, University of Connecticut. USDA CSREES project # 2006-51130-03656.

*Survey references from:
Eisenhauer, B.W. and B. Gagnon. 2008. "Changing homeowner's lawn care behavior to reduce nutrient losses in New England's urbanizing watersheds: the report of findings from social science research." USDA CSREES project # 2006-51130-03656.

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Designed by: Rebecca Zaiser, NHSG science writer. Publication #: UNHMP-IS-56-13-27

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Outreach products – CT, MA, NH, RI, VT

- Workshops, trainings, skills clinics, library programs
- Community festivals, booths, press releases, SD stenciling, doorhangers,
- Flyers, fact sheets, newsletters, articles, book marks, sticky labels, brochures, guides, manuals
- Video clips, commercials, TV spots
- Websites, social media
- Prompt kits

Social Research Methods

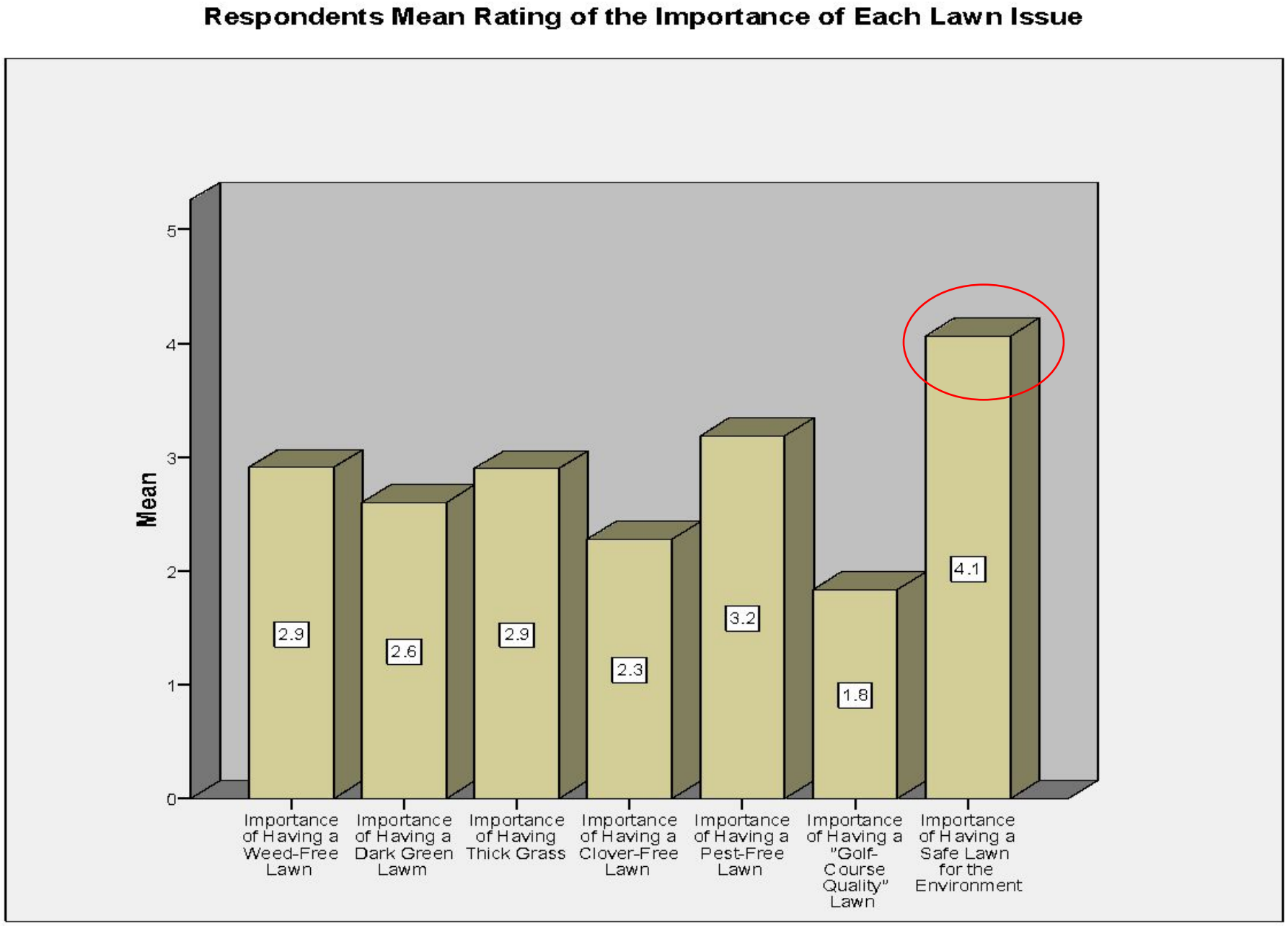
- Stage I
  - Qualitative = In depth interviews of opinion leaders (N=52)
- Stage II
  - Quantitative = random sample survey in five purposively selected urbanizing watershed communities (1/state)

  (N >1100)
  - 40.8% response rate

Qualitative Results: Sample Key Findings

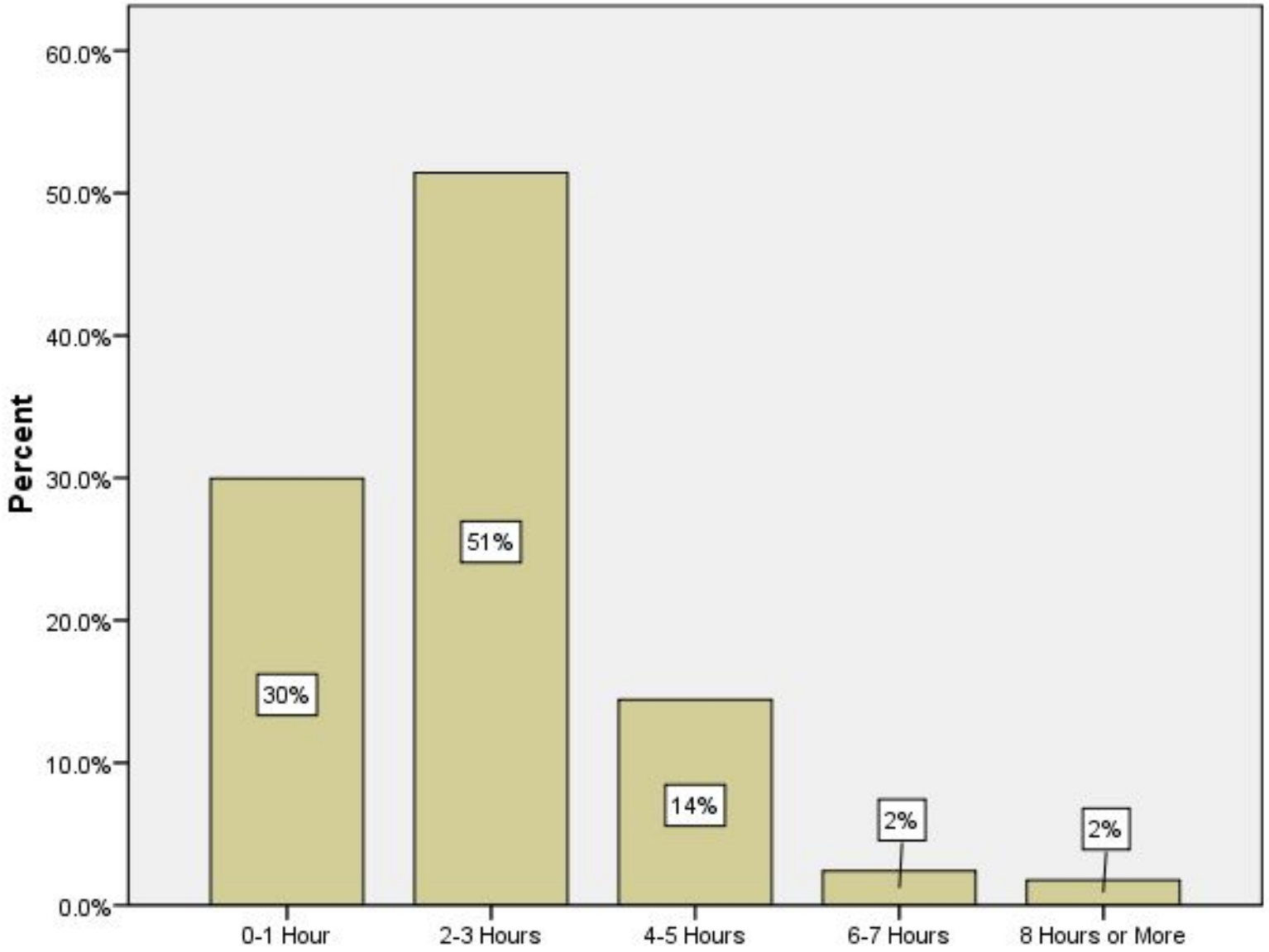
- OL believe there is a lack of recognition that home lawn fertilization techniques are linked to water quality.
- Concerns that DIYers inaccurately identify organic fertilizers as a solution to nutrient leaching.
- Many OL felt that alternative fertilizing methods would achieve results that satisfy most DIYers.
- It is perceived that the acceptance of prescribed lawn care practices will hinge on levels of time, money, and labor needed to carry out the recommendation.

What Matters to People in New England Regarding Lawns?

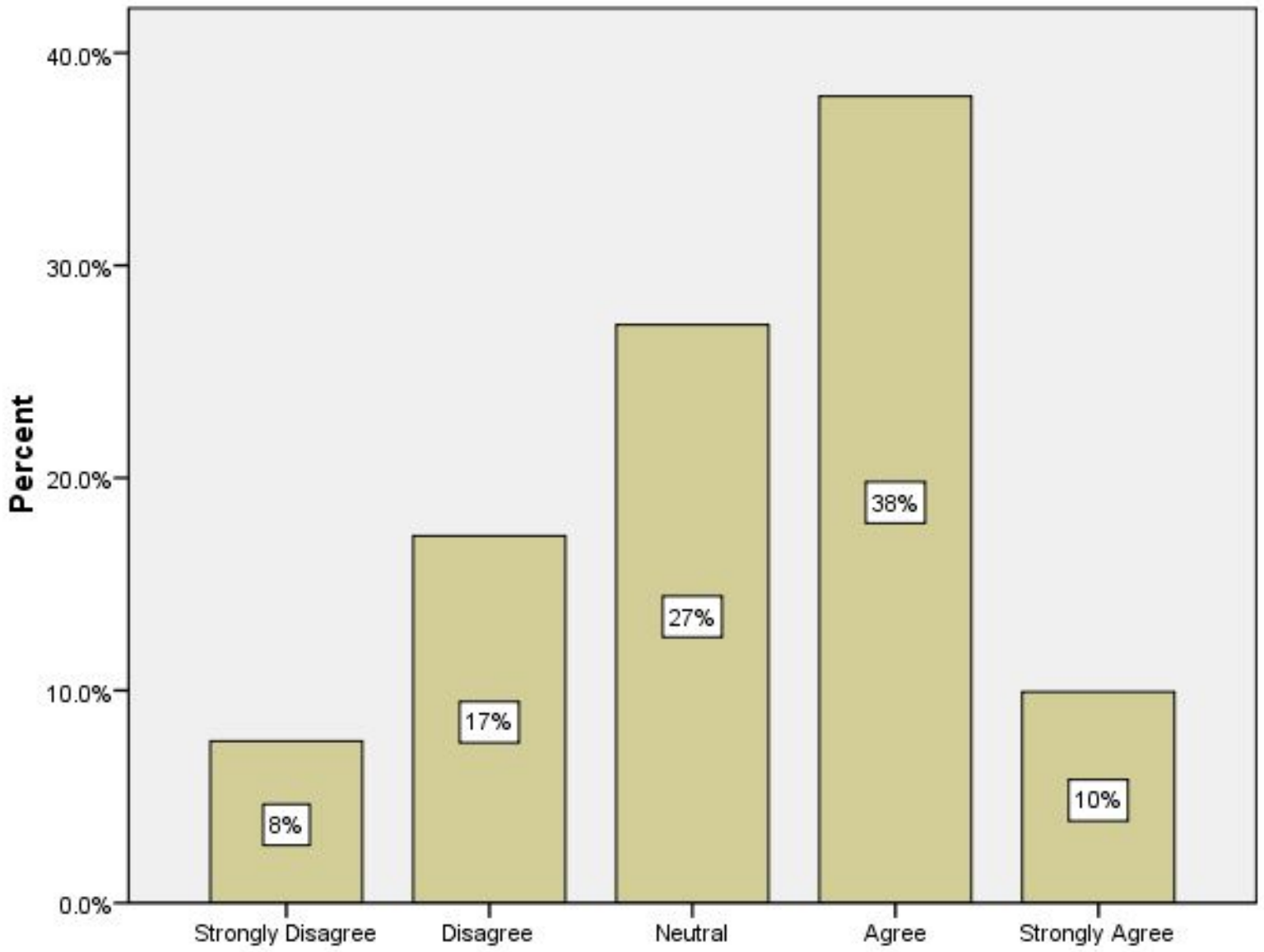


What Are Respondents Currently Doing?

Number of Hours per Week Respondent Spends on Lawn Care



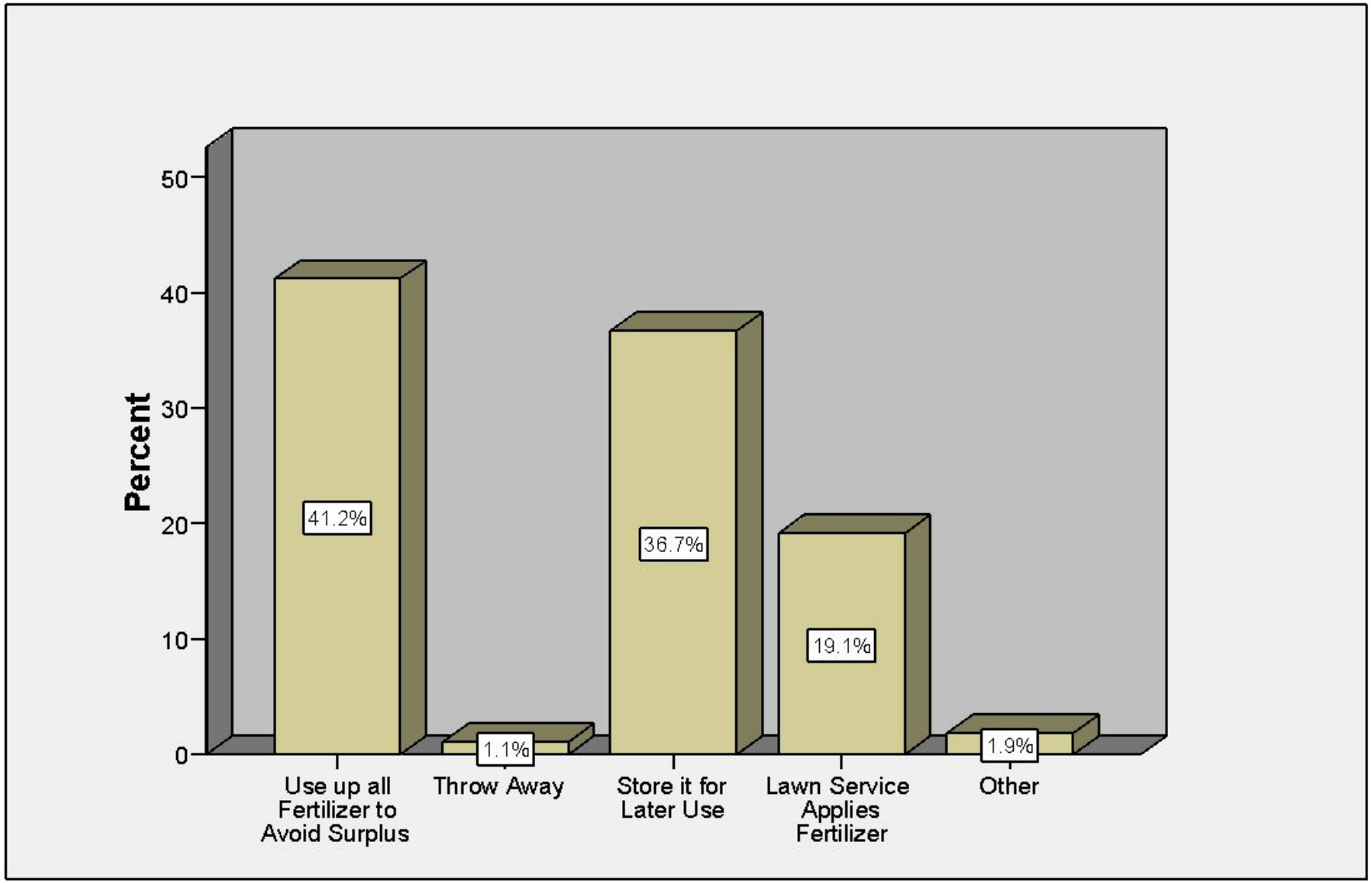
Respondent's Level of Agreement that they Enjoy Spending Time on Lawn Care



Would Respondent Prefer to Spend Less Time on Lawn?

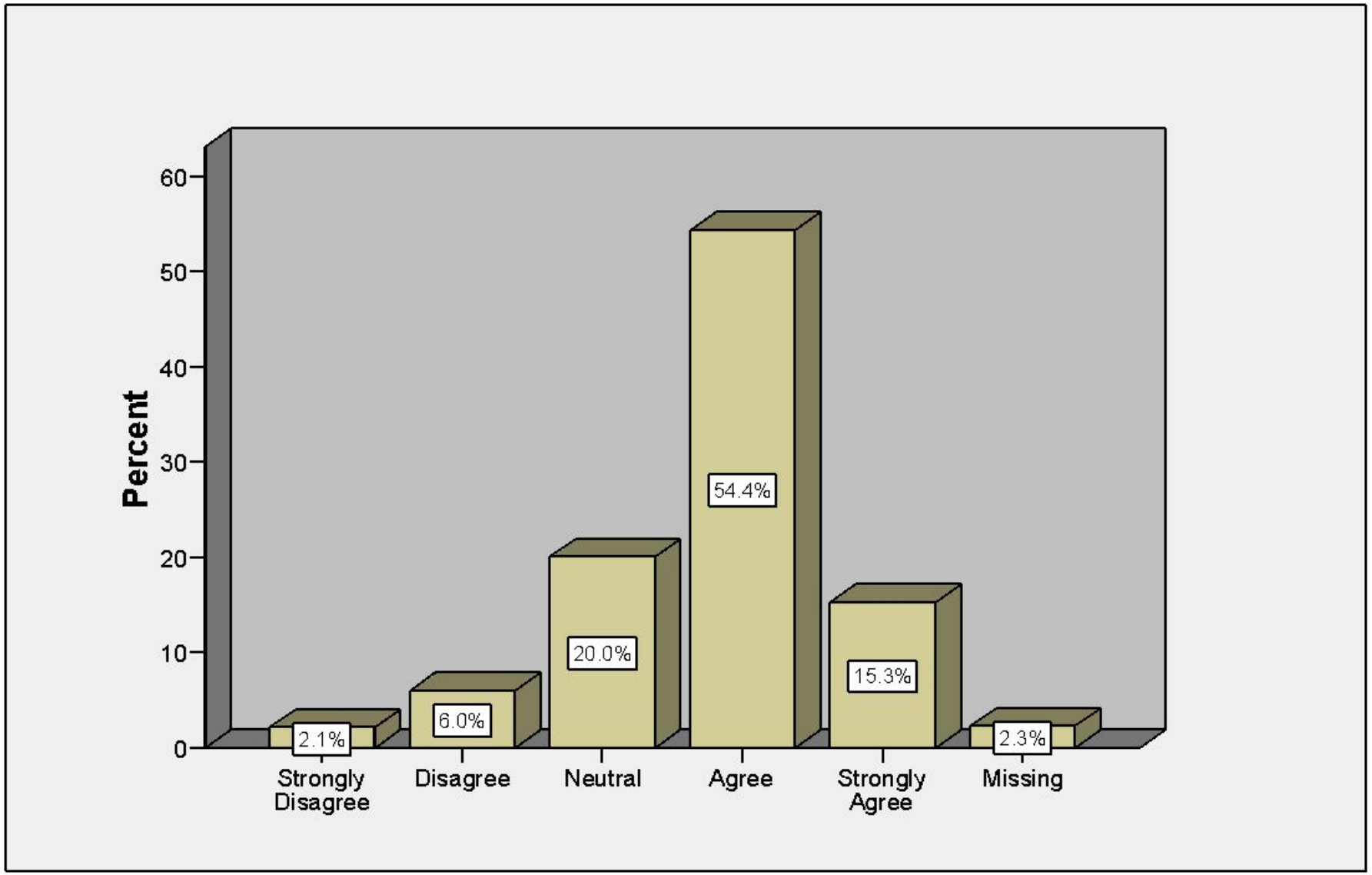
		Frequency	Percent	Valid Percent
Valid	No	198	36.3	41.6
	Yes	219	40.0	45.8
	No Preference	61	11.2	12.6
	Total	478	87.5	100.0
Missing	Don't Know	1	.1	
	Not Applicable	58	10.6	
	Missing	9	1.6	
	Total	68	12.5	
Total		546	100.0	

What Does Respondent do with Left-Over Fertilizer?



What Do They Want? (Values and Attitudes)

Respondent's Level of Agreement that they Want their Lawn to Look Good Enough to Fit in With the Community



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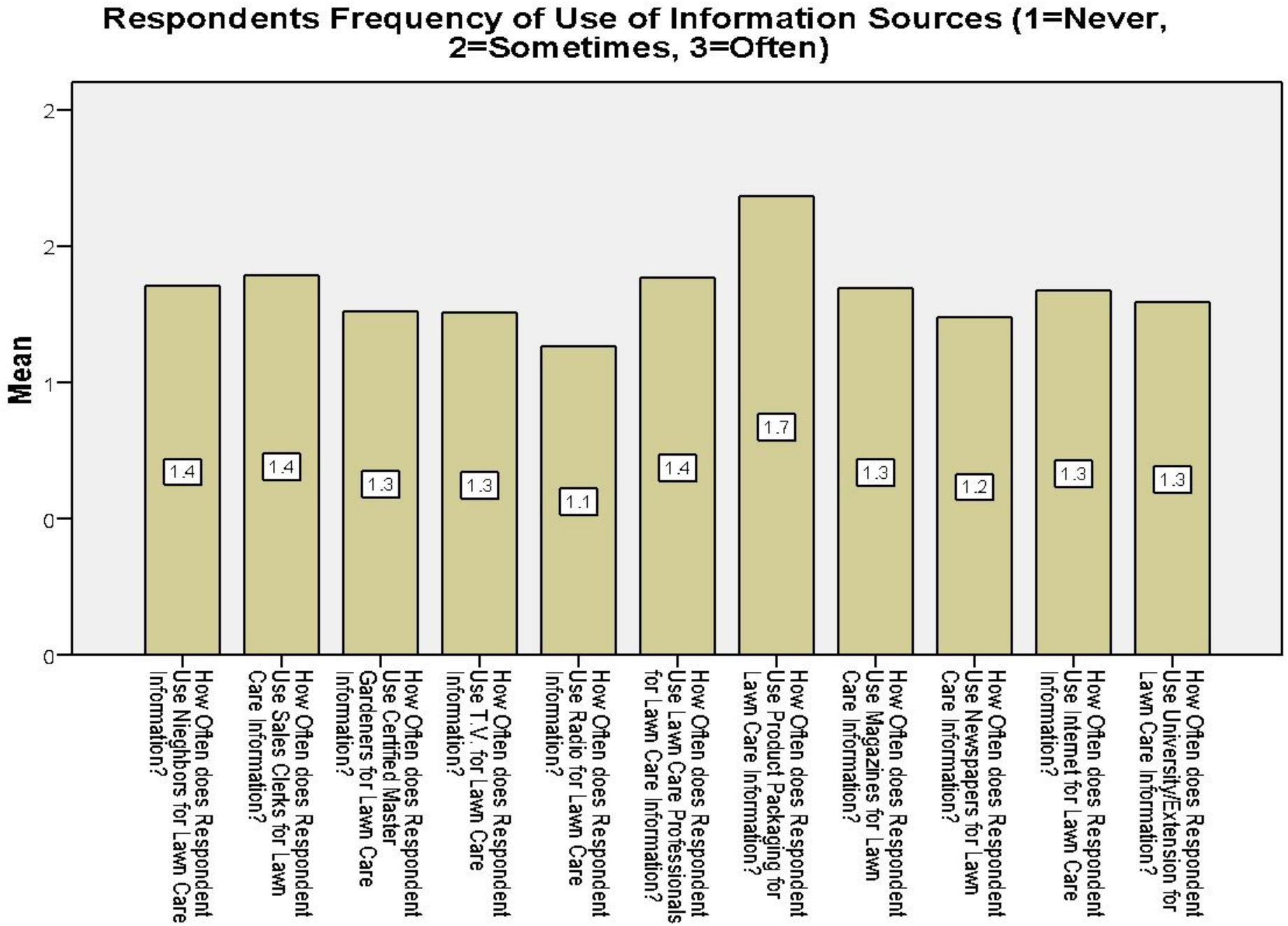

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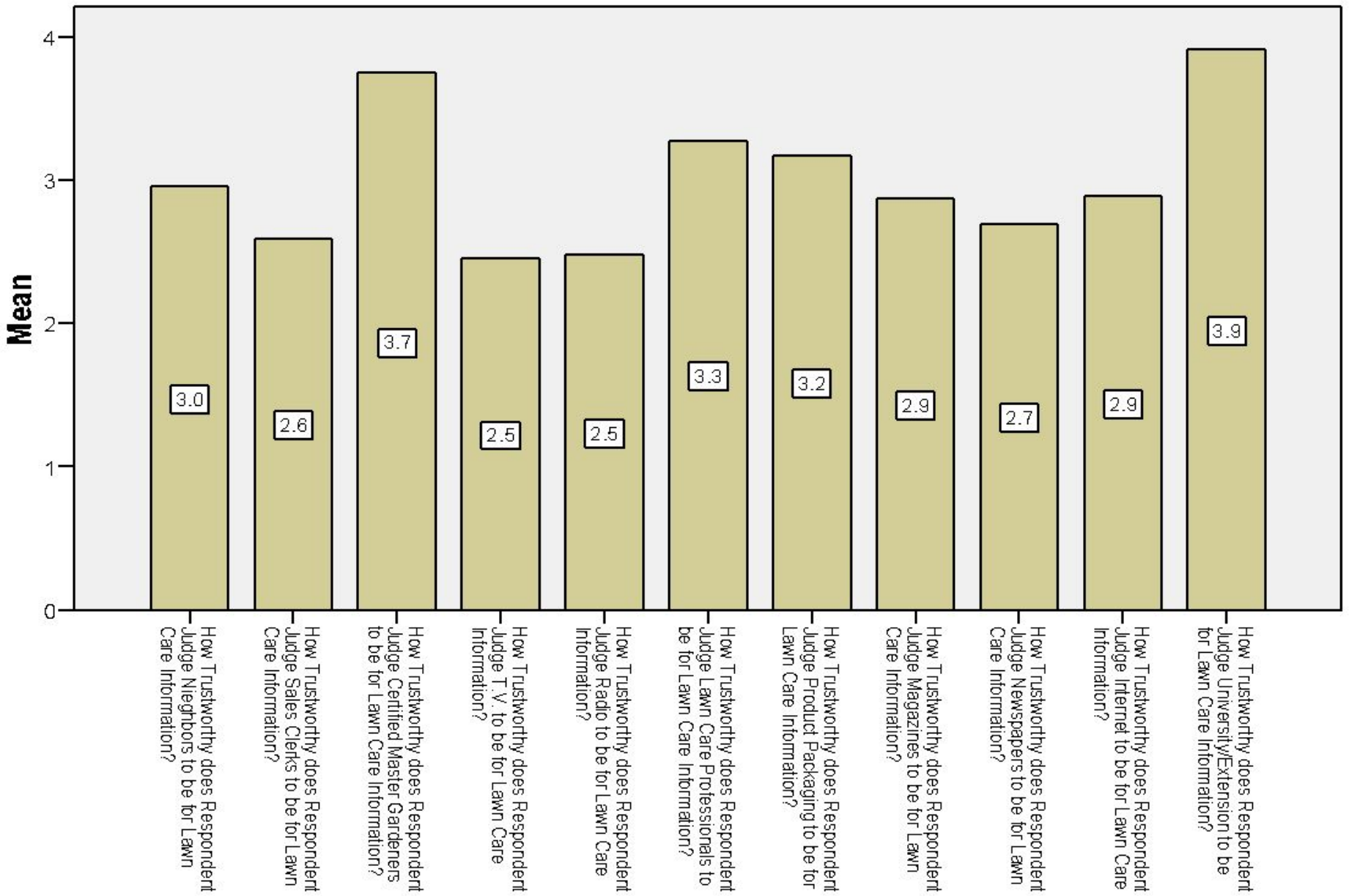
Respondents' Level of Trust in Each Information Source (1=Not Trustworthy, 5=Very Trustworthy)



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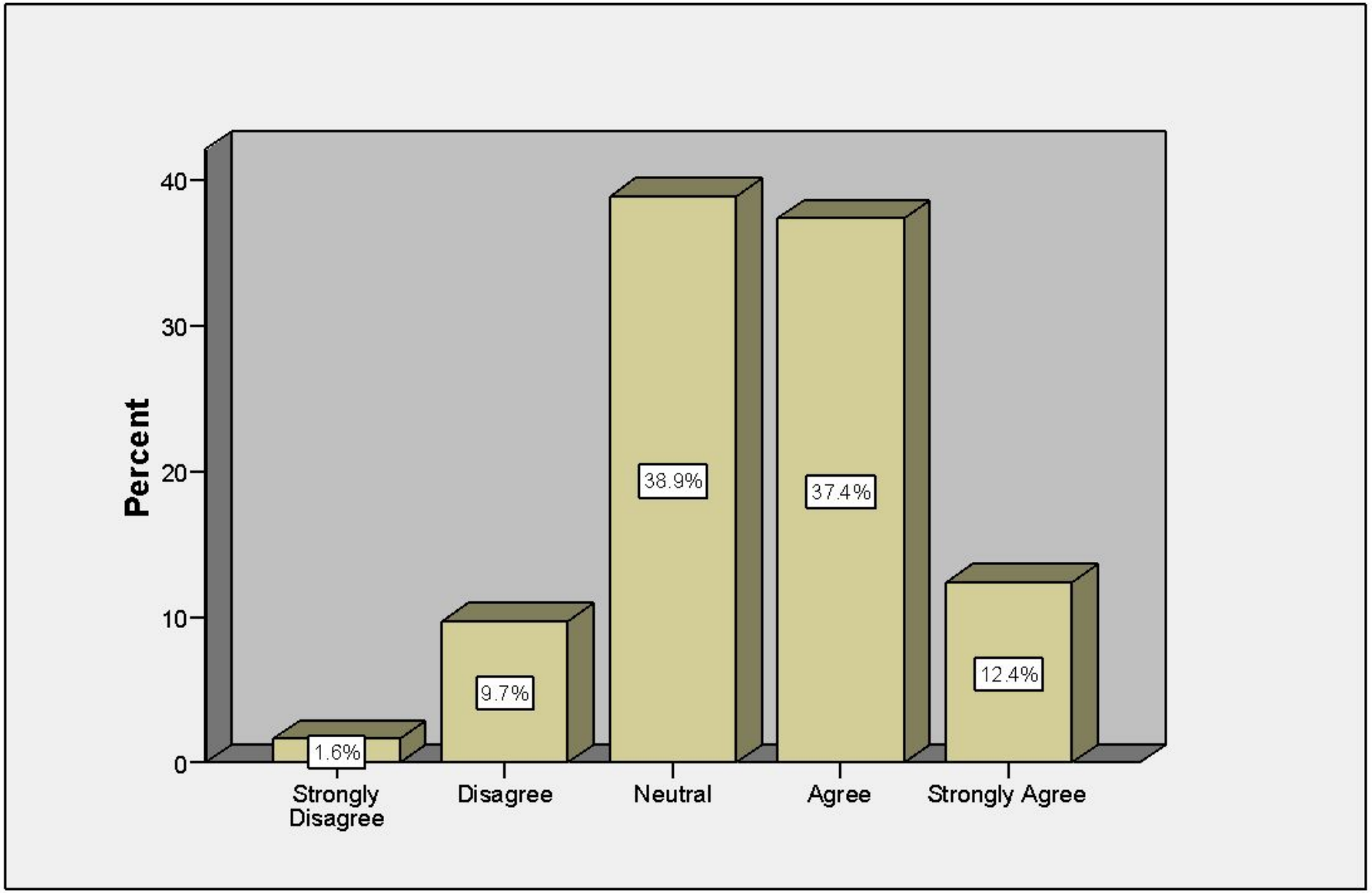
What Are Their Specific Information Needs?

Agreement that Using Organic Fertilizers Adresses Water Quality Issues Related to Fertilizer Use.



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Bangor Area Pilot

- Following the principles of CBSM, findings from the research, and partnering with the BASWG a multifaceted approach was developed :
  - Doorhangers
  - Storm drain stenciling
  - Website
  - Business partnerships

Evaluation Results to Date (~2009-2010)

1. Did behavior of target audience change?
   - Surveys indicate 55% of respondents experiencing Extension programs use less “lawn chemicals”, but only 25% were being reached by Extension in past 3 years regarding lawn care. Need more dissemination.
2. Which message framing is most effective?
   - Normative framing was most effective at stimulating behavior change.
3. What is the assessment of project overall by key stakeholders?
   - Project consistently viewed as high quality and producing valuable environmental and social science. Needs more dissemination!

Where are we now?

https://extension.unh.edu/tags/landscaping-water-quality

https://extension.unh.edu/tags/home-lawn-care

Lessons learned

- Working across disciplines (natural and social science, agriculture and water quality) improves message content, framing, delivery and acceptance.
  - Find willing, enthusiastic partners
  - Plan more time, money and effort than you think you'll need
  - Invest in co-learning
  - Use the investment for the long haul, evolve and keep testing