

# Science communication of slow impacts: Applying lessons from climate change communication to motivate publics' understanding of and action against nutrient pollution

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## The science of science communication



This social science research explores how to communicate science in a way that will help targeted publics understand complex topics, why following best practices can be difficult for researchers, and how and why people assess scientific information differently. Key findings from this field include:

- Increasing public understanding of scientific topics will not necessarily lead to more public “buy-in” for science<sup>14</sup>
- Mental models research explains that people draw on lived experiences and personal beliefs to interpret scientific information and assess risk<sup>1,6,10,11,13</sup>
- Design of communication products needs to incorporate the anticipated audiences’ mental models and social identities as intentionally as the actual science being conveyed

## Nutrient pollution on Cape Cod



- On Cape Cod, Massachusetts, on-site waste water treatment systems-septic systems, including cesspools-are the main source of excess nitrogen<sup>2,9</sup>
- Excess nutrients, particularly nitrogen, can cause increased algae production, which can lead to fish kills; unpleasant odors; and algal blooms, while also affecting coastal recreational quality and access
- Nitrogen reaches coastal waters from these systems at various time scales, ranging from immediately for homes on the shore to up to 100 years, creating a disconnect between a pollution source and impact<sup>16</sup>

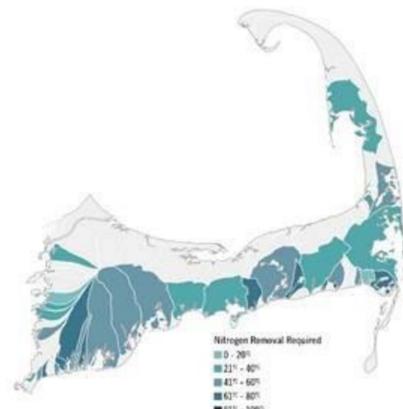


Figure 1. Map of watersheds and needed nitrogen removal in Cape Cod, Massachusetts. Darker blue denotes more needed nitrogen removal to meet total maximum daily load (TMDL) requirements. From Perry, Smith, and Mulvaney, 2020.

## Climate change + slow impacts



- Changing greenhouse gas concentrations are a chronic environmental stressor
- The extended onset time of impacts and decentralized nature of the stressors and impacts allow both for continuance of actions and delayed reactions
- Perceived uncertainty and lack of localized information leads to ineffective risk assessment and personal action against said risks<sup>7,15</sup>

## Climate change communication



An application of the science of science communication, climate change communication research studies scientists’ and media’s methods to inform publics about climate change. Takeaways from this research include analysis of the most and least successful ways to communicate the science of climate change, including how imagery and message interact to motivate actions to address slow and fast impacts



- Best practices suggest a move from the “deficit model” (talking at) towards participatory communications (talking with) to increase trust and buy-in<sup>3-5,11</sup>
- There is a need to balance imagery that conveys the seriousness of the issue with the potential consequences: solution-focused imagery is more effective than fear-inducing imagery<sup>8,13,17</sup>
- Beware of social marketing: tailoring messages to appeal to audiences’ values, beliefs, and preferences is only effective at motivating positive action when the communications rely on views that align with the desired end goal of the communication<sup>3,4</sup>

## Translating communication lessons: climate change → nutrient pollution



- 1) Relate to **human experience** rather than abstract analysis<sup>11,12,15</sup>
- 2) Define and activate **social norms** around severity of the problem and urgency of action<sup>3,7,15</sup>
- 3) Emphasize **immediate actions** to be taken and **local impacts** of nutrient pollution<sup>15,17</sup>

## Motivating action on Cape Cod



- 1) Produce an infographic about the impacts of nutrients on beach quality, and emphasize the health risks experienced in the recent past (blue-green algae and beach closures)
- 2) Highlight statistics on the number of impaired watersheds, and organize neighborhood-level awareness campaign to build collective efficacy about the problem and potential mitigative actions
- 3) Share actionable solutions for nitrogen loads that reach the coast (i.e. innovative alternative septic systems, aquaculture) and appeal to community reliance on clean beaches for tourism dollars

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