

Cultural Ecosystem Services, Changing Environments, and the Communication of Science

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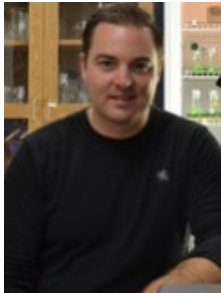
- Background
- Methods
- Preliminary Results
- Next Steps



Exploring the links between
harmful algal blooms
and human well-being:
how and why communities
take action



Background



Franklin/Grand Isle Community Action Program

EPA Grant Goals

1. Investigate connections between HABs & human well-being
2. Understand why and how people take action to address the blooms

Mental Models Project Research Questions

1. Investigate connections between HABs & human well-being
 - How can we better understand these connections, specifically potential impacts to cultural ecosystem services?
 - How do people's relationships with the lake influence these connections?
2. Understand why and how people take action to address the blooms
 - What does the public perceive as the causes and impacts of the blooms?
 - What misconceptions might they have about the blooms?
 - How are people responding to the blooms?

Mental models are...

- “ a representation of the world that is constructed from perception, memory, or imagination, and that underlies thinking.” (*Johnson-Laird 2013*)
- Internal
- Constructed
- Dynamic
- Socially influenced
- Incomplete and limited
- Frameworks for decision making
- Frameworks for understanding new information

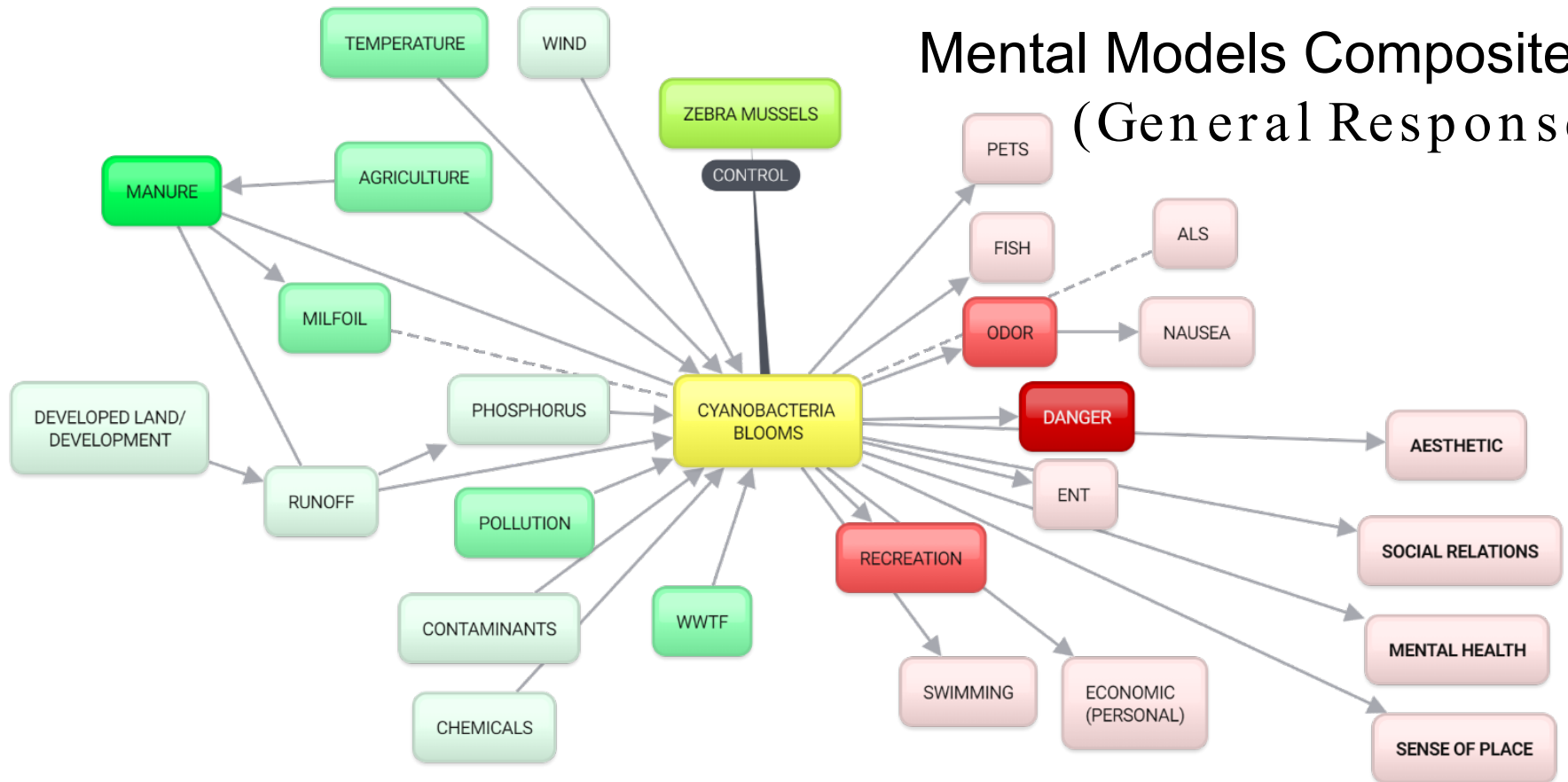
Study Design

- Purposive Design
- Semi-structured interviews
- General → Specific Questions about causes & impacts, specifically cultural ecosystem services (*Morgan et al. 2002; Gould et al. 2014*)
- Environmental worldview + demographics
- Qualitative analysis in NVivo
- Mapping with MentalModeler, NVivo, Bubbl.us



**None of
the above**

Mental Models Composite (General Responses)



CES- Aesthetic

“There's times of day when the sun is you know at a particular point in the light and it's beautiful and certain parts of the season looks gorgeous. We have amazing sunsets. We do have amazing sunsets right here.”

“Then all of a sudden it became this cotton -batten cotton candy attachment onto all the Eurasian milfoil. A big slimy, not delicious looking thing at all that you couldn't see the fish in the bottom, or, it was kind of like everywhere and very gross...”

CES- Bequest

“If I do decide to have kids, well, I want to, I would take them fishing with me. No doubt about it. No questions, hands down. I would teach them everything I know about fishing. Um, and what to fish for, and how to fish for it and stuff, that I know how to fish for it. Um, I want them to experience what other kids experience. I want them to enjoy that. I don't want them to be in a nasty lake because of something we did, or our species did.”

CES- Identity

“It's what part of like my memory, the experiences that I've had. So, it's kind of like where I live. So for me, this is part of who I am, this whole community. And the things that are, that was, you know, exposed to me before.”

[Do you think the blooms impact that identity at all?] “They... I don't think so because. No, I don't think so because there's other places I can go where there aren't blooms. But if it gets worse, then, sure, I'm not going to, I mean, because I won't be able to do that.”

CES- Recreation

“We just find alternative activities to do... if the water looks really terrible and murky and just crappy we just don't do any of it.”

“Not as tasty but also like the ability to catch them. The types of fish to catch...the sizes...the quality...that's all going to be contributed to their natural environment. And if their natural environment is compromised, they are going to be compromised. So therefore, we're not coming back with the right kind of, kind of catch that we want. Or the catch that we remember.”

CES- Sense of Place

“I mean they know, St. Albans has a bad reputation”

“Vermont seems to want things to be green. With caveats... If you're going to be the green state, it's a lake, it's the lake. It's, it's the identifying landmark of the state.”

“... dairy and maple, agriculture really are staples of Vermont. They're, they're kind of identifiers. If you're not from here, it's Vermont.”

CES- Social Relations

“Well, I think, um, a good thing about it [St. Albans Bay] is it brings people together. Meet new people and stuff. You get to interact with other people so.”

“So. The, the hesitation of like taking family trips near the water is a big thing because of what could be the side effects of the kids either drinking it, uh, being around it...”

Discourse

A rose by any other name...

- Blue-green
- Blue-green algae
- Algae bloom
- Bloom
- Cyanobacter

*“But, the, the cyanobacter,
the blue-green algae has
been just really awful.”*

Blooms also commonly associated/conflated with weeds, especially milfoil

Discourse

Sympathy for farmers:

“Because there are laws and regulations that are supposed to do that but farmers are hostile to it because they like, they don't feel the government should be telling them what to do with their life. And I see their point of view, absolutely... It's like they don't know what hard work is because these guys work 16-17 hours a day.”

Allusions to an “all -in” approach:

“Honestly, it's not just one community that needs to address it. It's all the communities that are connected to the lake. Meaning, like, it's not just Vermont. It's not just New York. It's both of us. It's all the communities that are near that spot.”

Discourse

Barrier to change isn't knowledge or information, it's political will and money:

“...I truly believe there are people in this world that are smart enough to figure out what's wrong and how to fix it...we could find people right, in an hour, that could tell us how to fix it. So I don't think that's the problem. I think it's getting enough people to agree and then put the money forward to do it.”

Next Steps

- Continue interviews and analysis
- Triangulate findings with two -question surveys, media analysis, and community survey
- Present findings to community partners
- Facilitate community dialogue through focus groups

Selected References

- Bang, M., Medin, D. L., & Atran, S. (2007). Cultural mosaics and mental models of nature. *Proceedings of the National Academy of Sciences*, 104(35), 13868–13874.
- Carlton, J. Stuart, and Susan K. Jacobson. “Using Expert and Non-Expert Models of Climate Change to Enhance Communication.” *Environmental Communication* 10, no. 1 (January 2, 2016): 1–24.
- Dunlap, R. E. (2008). The New Environmental Paradigm Scale: From Marginality to Worldwide Use. *The Journal of Environmental Education*, 40(1), 3–18.
- Gould, R. K., Klain, S. C., Ardoin, N. M., Satterfield, T., Woodside, U., Hannahs, N., ... Chan, K. M. (2015). A protocol for eliciting nonmaterial values through a cultural ecosystem services frame. *Conservation Biology*, 29(2), 575–586.
- Hoffman, M., M. Lubell, and V. Hillis. “Linking Knowledge and Action through Mental Models of Sustainable Agriculture.” *Proceedings of the National Academy of Sciences* 111, no. 36 (September 9, 2014): 13016–21.
- Johnson-Laird, P. N. (2013). The Mental Models Perspective. *The Oxford Handbook of Cognitive Psychology*.
- Jones, N., Ross, H., Lynam, T., Perez, P., & Leitch, A. (2011). Mental Models: An Interdisciplinary Synthesis of Theory and Methods. *Ecology and Society*, 16(1).
- Morgan, M. G., Fischhoff, B., Bostrom, A., & Atman, C. J. (2002). *Risk Communication: A Mental Models Approach*. Cambridge University Press.
- Pierce, J. C., & Steel, B. S. (2017). *Prospects for Alternative Energy Development in the U.S. West: Tilting at Windmills?* Springer.
- U.S. Environmental Protection Agency Region 1, New England. (2016). Phosphorus TMDLs for Vermont Segments of Lake Champlain. Boston. Retrieved from <https://www.epa.gov/sites/production/files/2016-06/documents/phosphorus-tmdls-vermont-segments-lake-champlain-jun-17-2016.pdf>

Thank you!

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