GUIDING PRINCIPLES FOR NATURAL RESOURCE MANAGEMENT AND CONSERVATION:

LESSONS LEARNED FROM >40 YEARS OF TRYING TO USE SCIENCE TO SUPPORT DECISION-MAKING IN THE REAL WORLD

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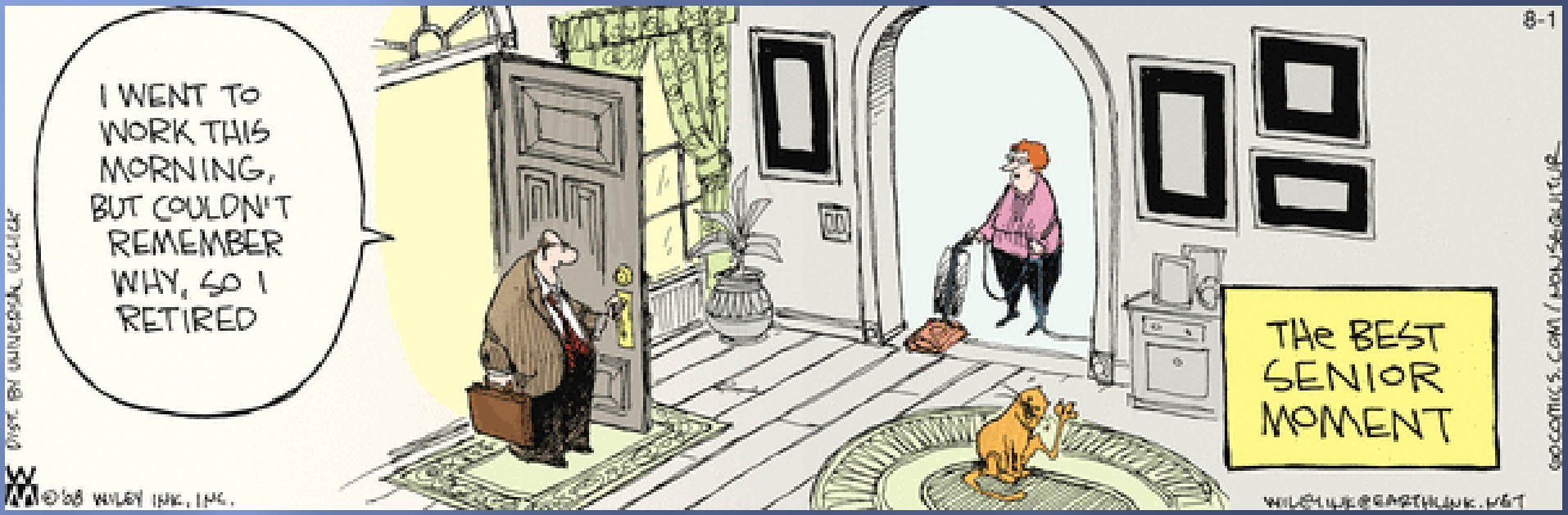


Scientist, Deputy Director, Director: South Carolina Department of Natural Resources (retired)

Senior Scientist, Science Advisor: NOAA (retired)

Examples of Relevant Experience

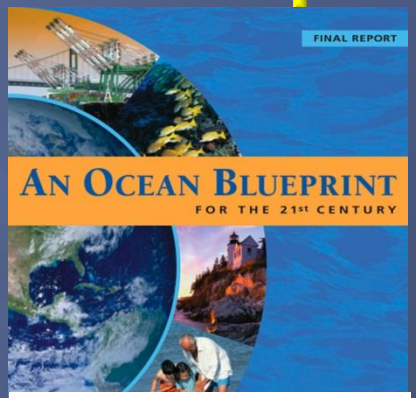
SC Department of Natural Resources

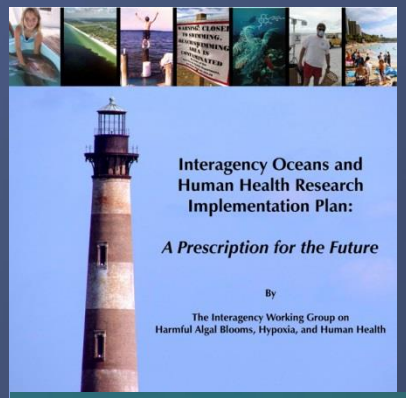
- Host of issues involving aquaculture; marine, coastal and inland fisheries; conservation of special lands and biodiversity; emergency response.
- ACE Basin Project (nearly 200,000 acre coastal protection effort, multi-decadal, many partners).
- Jocassee Gorges (~45,000 acres acquisition & protection of most biodiverse area in southern Blue Ridge mountains); numerous other land, island & water conservation and preservation activities).

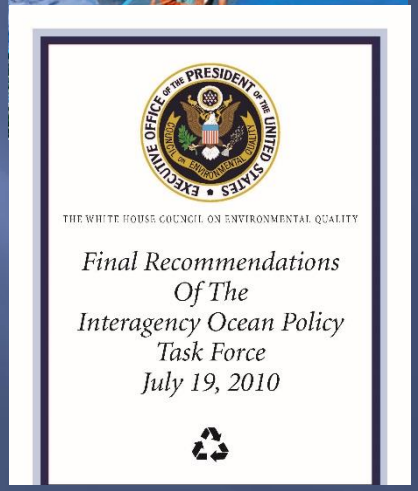
Examples of Relevant Experience

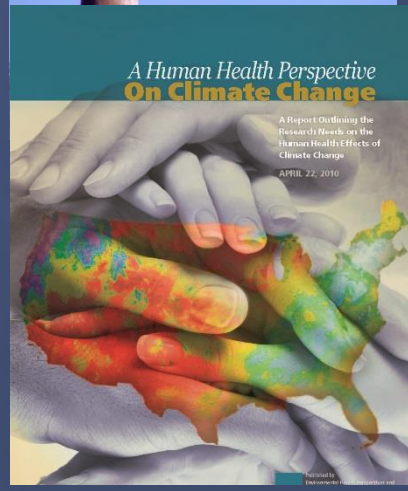
NOAA

- US Commission on Ocean Policy
- Oceans and Human Health "metadiscipline"
- U.S. National Ocean Policy – roles in development and implementation
- Numerous interagency working groups and leadership roles including co-chair of Subcommittee on Ocean Science & Technology
- DWH Oil Spill Response
- NOAA Scientific Integrity Policy
- Climate and health





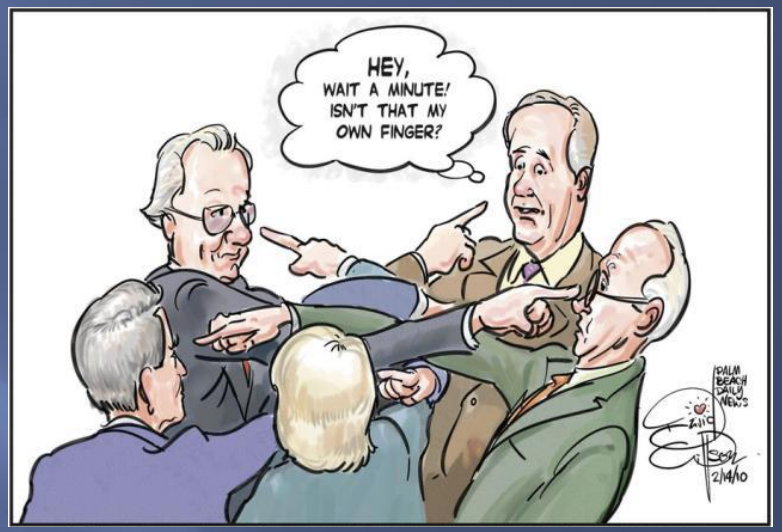





Social and economic drivers
Fishery stakeholder
Science-based Conservation

Paul's Cardinal Rules of Management and Regulation

- Rule 1: Everyone wants government to tell someone else what to do; no one wants government to tell *them* what to do!

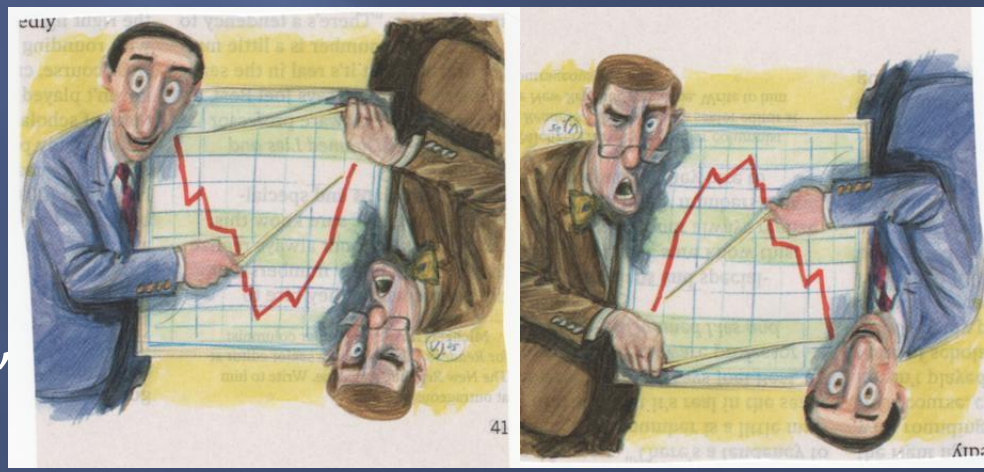


- Rule 2: Perception actually is reality.

Paul's Cardinal Rules of Management and Regulation

Rule 3: Everyone says they want decisions based on the "best available science" or "sound science." But only if that "best available science" supports their point of view.

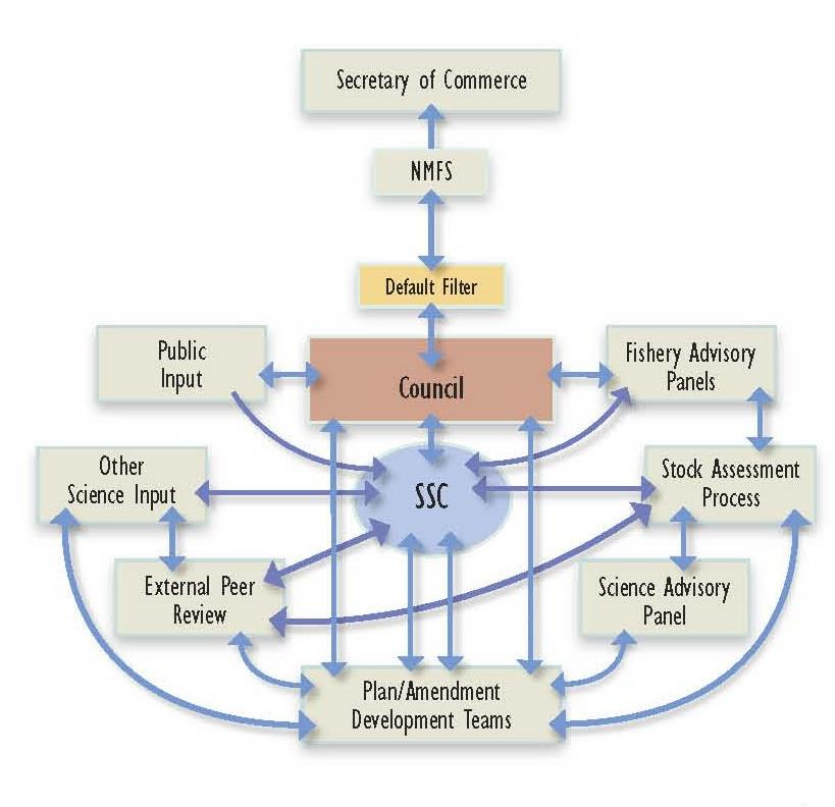
Rule 4: "Just The Facts, Ma'am": But whose facts? Yours, mine, his, theirs, or ours? And who interprets? Me, you, them, someone else, or all of us together?



Paul's 10 Rules of Science/Data Use in Environmental Decisions

Rule 1: Data and scientific analyses – no matter how extensive or rigorous – cannot make management and conservation decisions. They can only ***inform*** decision-making.

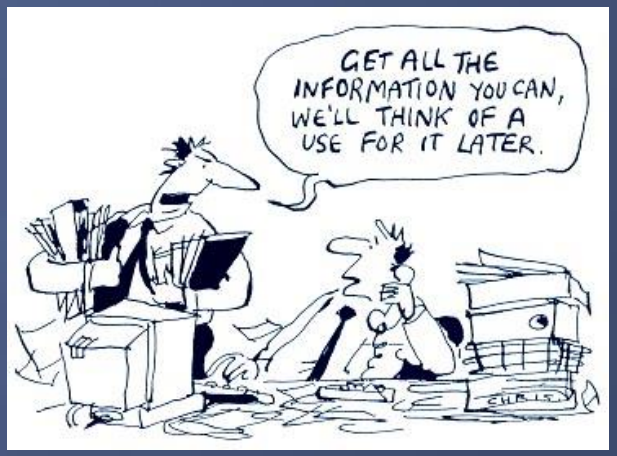
Rule 2: There is never enough data or "hard" information. And information from both natural and social sciences is needed, along with Traditional Ecological Knowledge.



From Sandifer & Rosenberg 2005

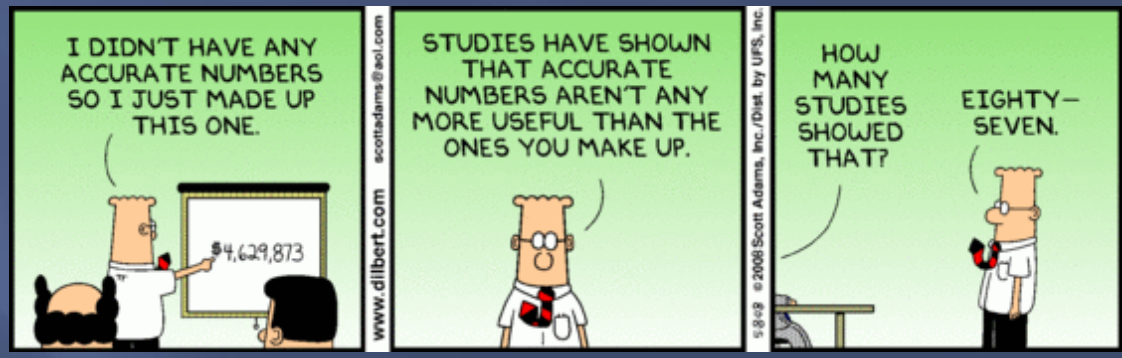
Paul's 10 Rules of Science/Data Use in Environmental Decisions

Rule 3: The available data and analyses often don't tell you what you really need to know.



Rule 4: The data and analyses are open to different interpretations – and get them!

Rule 5: Everyone thinks they know more about the data than you do. And they often have their own, some of from questionable sources. Rigorous peer review is essential.



Paul's 10 Rules of Science/Data Use in Environmental Decisions

Rule 6:

If you give scientists another week/month/year/decade – and some funding -- they promise to answer the question you originally posed. But if you give scientists another week/month/year/decade, they'll come up with another question.

Paul's 10 Rules of Science/Data Use in Environmental Decisions

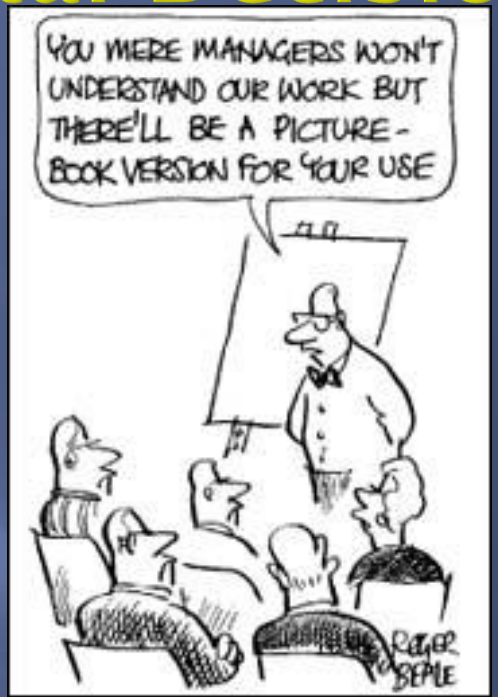
Rule 7: You'll rarely have enough scientific data to unambiguously resolve a management question on the basis of science alone.

Rule 8: Nearly all of the time, you have to make decisions without defining data.

Rule 9: But that is FAR preferable to making a decision with no data at all or by ignoring the data.

Paul's 10 Rules of Science/Data Use in Environmental Decisions

Rule 10: If scientists want their data to count in policy decisions, they must get involved in the policy-making process. And to do so, they have to learn to speak in plain language.



So How Might We Go About Management and Conservation?

- Begin with the realization you must work with 360 degrees of public opinion.
- Never, ever start with a formal public hearing and a proposed regulation, rule, or conservation plan! Use only when required by law or policy, but never as first step.
- Engage, partner! Engage, partner! Repeat *ad infinitum* (and *ad nauseum*).
- Use *ad hoc* committees or other similar constructs as tools to initiate important conversations.

So How Might We Go About Management and Conservation?

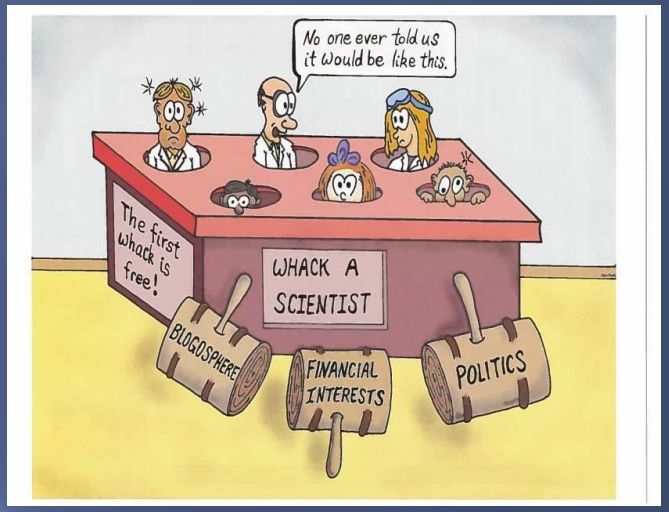
- Through engagement and partnering, develop consensus definition of problem/opportunity.
- Only then begin discussing ideas to solve the problem or take advantage of opportunity.
- Listen and **hear** 2- 10 times as much as you talk.

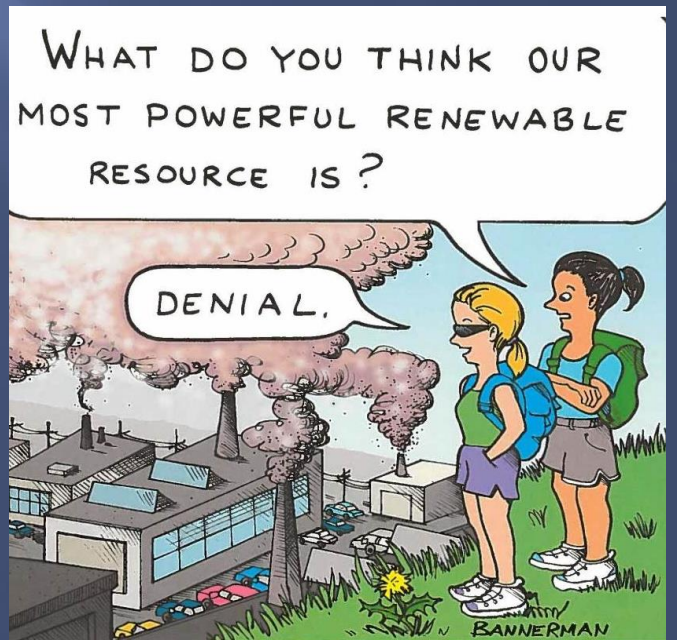
So How Might We Go About Management and Conservation?

- Document and demonstrate that you heard what was said.
- Make sure final proposal clearly expresses how it is – and perhaps not - based on what was heard and why. This will be crucial when it is brought before a legislative or rule-making body for action.

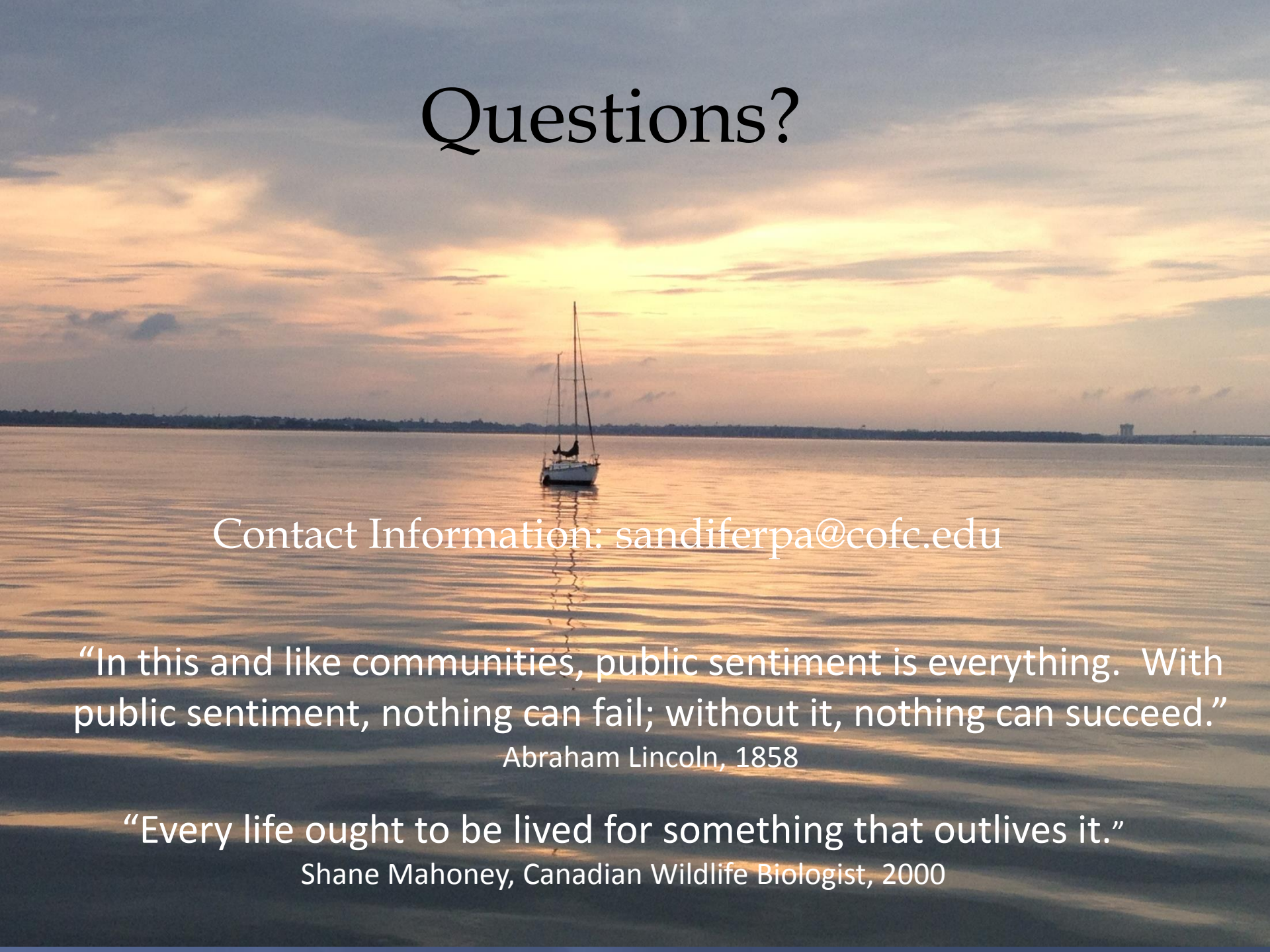
So How Might We Go About Management and Conservation?

- Be prepared to go through this kind of process over and over. Multiple iterations may be necessary to get to final action and acceptance.
- Be prepared for vitriolic attacks on your knowledge, abilities and even integrity.
- Be prepared to deal with the most vocal tribe in America, the "Deniers."
- Stay the course.





Questions?



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"In this and like communities, public sentiment is everything. With public sentiment, nothing can fail; without it, nothing can succeed."
Abraham Lincoln, 1858

"Every life ought to be lived for something that outlives it."
Shane Mahoney, Canadian Wildlife Biologist, 2000