Best Practices for Communicating Climate Science for Fisheries Professionals

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Summary

Climate change has been documented for over 120 years with increasing scientific rigor, and its impacts are already observable in marine and freshwater fisheries. But after decades of communication to underscore the validity of these changes, and the urgency for action, a large component of the public and many elected officials deny the scientific consensus and reject the need for action. Therefore, we outline a more effective strategy to convey the climate message to stakeholders and inspire them to act.

Brief history

Scientists have long studied the effect that human activity can have on the climate. The concept first entered scientific literature in 1856 with research spearheaded by Eunice Foote who suggested that historical carbon dioxide concentrations influenced the Earth's natural temperature (Mariotti 2019). Four decades later, the Swedish scientist Svante Arrhenius proposed that as humanity burned fossil fuels, more carbon dioxide gas would be added to the Earth's atmosphere, trapping more of the Sun's energy and raising the planet's average temperature (Arrhenius 1896). The topic received greater attention with the work of C. D. Keeling, who revealed that the level of carbon dioxide in the atmosphere was indeed rising year by year and temperatures were increasing as a result (Keeling 1960). Further, the rate of change was unlike any natural fluctuation observed in the geological record.

Since those early days, scientific studies have continued to reaffirm the consensus that human activity is responsible. Numerous international meetings, intergovernmental organizations, focus groups and task forces have spent decades stressing that active steps must be taken to curtail greenhouse gas emissions; however, the message of needed action or the cost of inaction to human-wellbeing did not resonate or have lasting impacts on the general population.

Today, the consequences of this inaction are manifesting, along with their associated economic fallout. Sea levels are rising, storms are intensifying and becoming more frequent, ocean temperatures are trending upwards, and oceans are becoming more acidic (Doney 2012). Acidification is making it difficult for organisms like corals, zooplankton, shrimp, and oysters to form their calcium carbonate shells. Temperature and changes in ocean currents are altering the distributions of fishes, and there is evidence that a majority of fish species will experience reproductive failures (Dahlke et al. 2020).

Freshwater fishes are already among the most imperiled of biodiversity on the planet, and those residing in inland waters are particularly vulnerable to the effects of changing climate (Comte and Olden 2017). Elevated stream temperatures and alterations in flows will extirpate some species

from their southern ranges. Unmitigated climate change is predicted to reduce cold water stream habitat 62% by the next century (EPA 2015). Species that can tolerate increased temperatures may still struggle due to food web alterations or reproductive failure as a response to more frequent and severe flood events (Woodward et al 2010).

Given that 1) the theory of greenhouse gases was proposed over 160 years ago, 2) a host of studies provide strong affirmative evidence for anthropogenic climate change, and 3) the climate is responding as predicted in the form of record-breaking temperatures and increased severity of weather events, why have we failed to instill action? Why are significant segments of the public, as well as elected officials, unwilling to accept the scientific consensus for immediate action?

Why haven't we gained traction in our communication efforts?

As scientists we are trained to rely on empirical evidence. The more data, the better our results can be supported and accepted. But this approach is less effective for communicating to the general public. Outside of the scientific community, most people are unfamiliar with how to easily interpret graphs, tables, and scientific terminology. A list of statistics, such as mean global temperature targets and carbon dioxide levels, seem abstract and intangible. More importantly, the relationship between climate data and one's daily life is not apparent to the average person.

People perceive information as it relates to their personal worldviews, values, and social norms. That which conforms with their mindset is well understood and applied to their daily lives, whereas conflicting information is not only questioned but often rejected. Overall, the scientific community has failed to establish a relationship of trust with a wider public audience. In our academic and agency environments, we have forgotten that the messenger is just as important as the message itself. People are more receptive to, and accepting of, the message if the messenger is a part of their community and has a history of trust. Authenticity is as critical, if not more so, than authority.

Finally, scientists take professional pride in trying to eliminate the emotional sentiment in our narratives. Yet, the negative aspects of climate change beget feelings of depression and even despair. These impacts are certainly frightening, but their communication often serves to overwhelm our audiences without providing positive solutions and reasons for hope.

How to conduct effective public engagement

Before scientific evidence can influence personal behaviors, it must first be effectively communicated. There is ample research in the social sciences on how to do so, and those studies find that how the story is presented, or *framed*, is critical. In other words, the way an idea is stated often matters more than what is said. For example, if someone says, "Don't think of a leaping tarpon," you cannot help but depict a leaping tarpon in your mind. Thus, if a message is properly framed within the context of an audience's personal environment and values, its communication is easier to accept and digest. It becomes more relevant to them personally, and thus more likely to be accepted and adopted.

Climate Outreach (https://climateoutreach.org/), a leading organization specializing in the communication of climate science, has developed six principles of public engagement that allow climate scientists to better frame and communicate the broader subject of climate change (Corner et al. 2018). These principles are similarly appropriate for fisheries biologists as they communicate with their constituents about the effects of climate change.

The six principles of effective public engagement

We present these within a fisheries context and have added some practical examples and situations that may be encountered.

1. ***Be a confident communicator.*** Even when facing a challenging audience, you can employ your own experiences and perspectives so as to build trust and thus communicate with confidence. Evaluate your audience ahead of time and be aware of, and sympathetic to, their potential attitudes and opinions. Scientists are often perceived as elitists, so be sure to deflect this preconception by cultivating humility.

   If you are talking to your local bass club, lead off with a personal story about your experiences with a local lake or reservoir to which they can relate. Use their love of the resource to grab and keep their attention. Remind your audience that your end goals and theirs are the same: Everyone wants a healthy and productive fishery. Humor can be a good tool to establish a positive vibe but remember that humor is like seasoning – a little is good, but too much can be unpalatable.

2. ***Talk about the real world, not abstract ideas.*** Start the conversation on common ground, using clear language and familiar examples. Keep your focus on what is relevant to your audience and avoid the bland restating of facts. Frame the topic based upon the interests of your audience. For example, more conservative audiences are often more responsive to topics framed around ‘avoiding wastefulness’ and ‘maximizing cost-benefits,’ while more progressive audiences might respond to messaging that incorporates ‘social responsibility.’ More mature audiences may prefer messages that emphasize ‘the way it was’ whereas younger audiences might prefer ‘in the coming decades.’ Be creative in your use of metaphors and analogies. For instance, if you wish to convey that local streams may not continue to sustain trout populations as a result of greenhouse gas emissions reflecting longwave radiation and increasing temperature, it might be more appropriate to say that these gases act as a blanket that traps heat, and the more we release, the thicker that blanket becomes.

3. ***Connect with what matters most to your audience.*** Research consistently demonstrates that a person’s values and politics drive their attitudes toward climate science. The information they receive is filtered according to whether it fits their beliefs. Try to identify common ground with your audience. First connect with widely shared public values and local areas of interest and then find creative ways to introduce the scientific evidence without instilling resistance. Tap into and utilize their values.

For example, if you are talking to a group from the National Association of Charterboat Operators, find ways to show you understand their perspective. Show a picture of your daughter and yourself while on an offshore fishing trip and comment on the significance of this family time and the opportunity to appreciate nature. By accentuating similarities between you and your audience, you can then share the concerns on how climate change will affect these activities you all fervently care about.

4. ***Tell a human story.*** A compelling story should allow people to relate to an issue and connect on a personal level. By connecting human stories to convey a scientific message, we not only assist the audience to better understand complex issues, but it helps make the science easier to remember and process. Maya Angelou said it best, "…People will forget what you said. People will forget what you did. But people will never forget how you made them feel."

   Scientists tend to rely on facts (i.e., we know this …AND we know that …AND here is another thing we know …AND …AND). However, storytelling is most effective when placed within a logical flow using a strong narrative structure. One method to create this structure which often used by the entertainment and marketing industry is the ABT Narrative (And, But, Therefore; see Box insert). In this method, the topic is first presented with information that is not disputed (e.g., We all love fish AND fish need water to survive). Then the problem is presented (…BUT due to changes in local climate, lingering drought has caused low water conditions). The solution is then presented (…THEREFORE, we are locating deep water temperature refuges where fish can survive, and we ask for your assistance in protecting these refuges). Our simplified example ends with a critical component – How people can personally respond to the risks of climate change.

ABT FRAMEWORK

The ABT Framework is a communications method based upon the book, "*Houston, We Have A Narrative*," written by a marine scientist-turned-filmmaker, Dr. Randy Olson.

It employs a narrative structure that our brains are hardwired to seek: Momentum ("And"), conflict ("But"), and resolution ("Therefore"). These are the fundamental building blocks of developing a narrative for storytelling. Dr. Olson has led many workshops worldwide and has concluded that when scientists' embrace the ABT narrative, the end-result is staggering. Suddenly, they are not just talking about their work—they are *telling stories* about it, and audiences respond.

The American Association for the Advancement of Science (AAAS) developed a video to explain why the ABT framework is such an effective and important communication tool, especially for those scientists that love to talk at length and rely on just facts.

See this link for the video: https://youtu.be/ungl-jozHLA

5. ***Lead with what you know.*** Although there is great consensus that climate change is human-made, ongoing, and a threat to our way of life, climate models inherently have associated uncertainty. As scientists, we understand uncertainty is part of the scientific process, but it also can be a major obstacle in conversations with non-scientists. The solution is to focus on what is known and on areas where there is strong scientific agreement.

   For example, considerable doubt is expressed in the following statement: "…it is not clear how much more frequent or stronger future storms will be." To avoid doubt, lead with what is known, such as: "…The risk of more frequent and more intense flooding has increased." In the above example, consider framing weather events before they have occurred, rather than after. This helps to normalize the concept and avoids the perception that you are opportunistically exploiting a serious prior event to establish a premise, especially if that prior event has caused personal harm or damage to the audience.

6. ***Use effective visuals in your communication.*** Just as the language you use is important to convey your message, the choice of images and figures can have a powerful impact on conceptualizing climate change. The recurring images of polar bears on thin ice, belching smokestacks, melting glaciers, and potentially polarizing protest events fail to connect with people on local and personal levels. Instead, authenticity is key. Show real people displaying real emotions. When possible, relate thought-provoking stories that have a regional or local context. Emotionally overwhelming images of climate disaster must be balanced with depictions of concrete actions that can make a difference. Images depicting solutions to climate change elicit mostly positive emotions on both sides of the political divide. It is also critical that images, and especially figures, can be easily understood by anyone.

   Here's another example. An event with coastal anglers in New York to discuss effects of climate change on sea level would be poorly served if photos of bleached corals or emaciated penguins are shown. Instead, show an image of an angler in the Hudson River with a largemouth bass, followed by a simple figure illustrating how salinity of the lower river increases as sea levels rise. Explain that largemouth bass cannot tolerate high salinity and, given this situation, would disappear from the lower river. Then tell people what they can do to help reduce these impacts on their sport fishery.

Putting it all together

There is no single approach that connects with every audience. You must first understand the background and attitudes within your audience, anticipate their response, and adapt your message accordingly. Connect with what they care about, demonstrate that you also care, then tell a story in which they can visualize themselves as the protagonist. Offer simple solutions by suggesting actions they can initiate to make a difference. Audience members can then envision themselves saving their beloved fishery and becoming the hero of your story.

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