So You Say You Love Fish

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Key Points

- Conservation requires both an ability and a willingness, both scientific information and ethics.
- Scientists can contribute importantly to the kind of understanding that leads people more directly to right action.

> The rope lies in the cellar for years,
> coiled, stinking of the sea and the fish
> that once lived in the sea and the sweat
> of the man who wishes he could save one
> strand of the world from unraveling.
> —Alison Hawthorne Deming, from the poem "Rope"

> The scientific community has been relatively ineffective in conveying this message of planetary change to our society, whose collective choices propel us along this path. As scientists, we are trained to avoid speaking in ways that touch people's souls.
> —F. Stuart Chapin, III

People become natural resource scientists and professionals usually, we believe, because they possess a deep-seated desire to protect and restore natural systems and populations. We see this desire in the conservation scientists with whom we have collaborated and in the students we have taught over many years. But why? Why do people choose a science career in order to protect the animals and populations they study? Perhaps because at some level they believe in the direct connection between what people know and what people do. That is, people who become scientists in this field believe that conservation science is directly

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linked to conservation, or so it is assumed. Perhaps aspiring conservation scientists believe that if scientists only knew how the mercury from burning coal affects fish populations, if citizens only knew how their use of fossil fuels was impacting the climate, or how their land use practices were directly linked to the extinction of bird species, we would collectively mend our ways, we would cease these harmful practices, we would become conservation-minded and activated.

This belief even has a name. Social scientists refer to it as the "information deficit model" (IDM) of behavior change. Within the realm of conservation, this model would imply that conservation (as a behavior) is most fundamentally limited by information. And information comes from science. The message could scarcely be clearer: the path to conservation is through information, the kind gathered by the sciences.

The assumed relationship between information and action is embodied in the current debate over anthropogenic climate change. As the public fails to respond adequately to this reality, scientists redouble their efforts to spread the message, speak with a single voice, speak with greater volume and force and skill.

But, here is the painful problem: the IDM does not reflect reality. As social scientists have been telling us for decades, the IDM does not explain how the world works, does not represent how behavior really changes. There is no, there can be no, necessary and linear connection between facts about nature, or facts about changes in nature, or even facts about how it is that people value nature, and the conservation of nature. We do not act simply because we know. We do not care for something simply because we understand how. The discovery that Canadian oil sand mining operations release toxins into freshwater ecosystems (Kurek et al. 2013) does not, by itself, imply the cessation of Canadian oil sands mining. The fact that Brook Trout *Salvelinus fontinalis* populations will almost certainly succumb to the affects of anthropogenic climate change does not, by itself, mean that we ought to abandon them to that fate. To arrive at a prescription for action requires us to consider facts together with deeply held values.

Several kinds of evidence show us that information and actions are not related in this way. Knowledge alone does not necessarily lead to right action because the health of the Earth's species and populations and ecosystems is not improving even as conservation science grows. On the contrary, we seem to cause greater harm even as information and knowledge increases. Moreover, social scientists have repeatedly demonstrated, for the past 40 years, how our basic beliefs about the world are not necessarily reflected in our actions. As one review paper puts it, there is a well-known "gap between the possession of environmental knowledge and environmental awareness, and displaying pro-environmental behavior" (Kollmuss and Agyeman 2002).

We may even find evidence against the IDM in our own actions, yours and ours. Think about the relationship of knowledge, attitudes, and actions in your own life. At this point in your career, you know a great deal about fish, more than nearly any other person in the world. Do you still sometimes treat fish and the environments they depend upon in ways of which you are not always proud? Why? Is it because you have not yet acquired enough facts about fish? Do you really believe there is some magical fact about fish that you have not yet discovered, that when you do you will begin to treat fish better?

When you are in a restaurant, perhaps you refrain from ordering fish you know to be harvested unsustainably. Maybe you would remove other species from your diet if you learned they too were being fished unsustainably. This is laudable, but think harder. Do you, for example, contribute more than you should to water pollution? If so, is this because you

do not know that water pollution is a problem for fish populations? Likely you already know quite a bit about that. Is it possible that your actions are limited by not having yet learned how to love fish enough? Of course you love fish. But do you love them enough to pollute less? If not, the challenge is not the acquisition of more facts, but learning to love more. The challenge is learning how to do that and then teaching others how to do that.

This disconnect between "knowledge about" and "love of" is in large part an extension of a logical mistake. Consider the logic we use to reach conservation policy decisions of any type. Any argument arriving at a conclusion about what we ought to do must have two premises. The first presents the facts of the matter. These facts are delivered to us by science. The second premise presents the values and principles at stake, the culture's collective moral wisdom about what is just and good and fair. Consider this argument, that some might point to, as an example:

> Premise 1. Fish are capable of experiencing pain and suffering caused by catch-and-release fishing [or electrofishing].
>
> Premise 2. We should not cause unnecessary pain and suffering.
>
> Conclusion: We should refrain from catch-and-release fishing [or electrofishing] unless it is absolutely necessary.

The first premise is an empirical claim (Braithwaite 2010). It might be disputed, but it falls within the knowledge domain of science. But, the second premise is critical. If it is true, the conclusion is true. And this second premise is not the realm of science, but rather the realm of the humanities, art, poetry, and other disciplines charged with understanding, shaping, and conveying our collective values. Only when we combine facts and values can we arrive at a conclusion we would recognize as conservation (such as concluded above for these two premises).

In a nutshell, this is our mistake. We mistakenly take an important element of conservation for conservation itself. We mistakenly jump from the premise that good conservation science is critical for conservation to the conclusion that good conservation science will somehow deliver conservation. We forget that we conserve not only because we can, but also because we want to, that conservation is dependent upon both an ability and a willingness.

We believe all of this is both true and a tragic indictment of so much of our current conservation efforts. So the critical question for fisheries scientists and professionals is this: how can scientists, without leaving behind the scientific world in which they are credentialed, competent, and confident, contribute to the kind of understanding that leads people more directly to right action (see Box 1)?

The answer begins by recognizing that knowledge comes in two kinds. One kind of knowledge helps us do things in the world—knowledge to help us conserve nature, knowledge to restore damage we have caused nature, and knowledge to live sustainably. However, the knowledge that helps us do good things can also be used for the most disgraceful endeavors, to live unsustainably and to unnecessarily exploit others, be they human or otherwise. Some of our most unhealthy relationships with nature are fueled by knowledge of how nature works (or our belief that we know how nature works).

We might use our knowledge about wildlife habitat selection to work to save a species from extinction, and we might use that same knowledge to more efficiently eradicate a species. It is not our knowledge but our attitude that determines whether we use knowledge to do right or wrong, good or bad.

Box 1. Science and Ethics Dancing Together

In November of 2011, a group of environmental scholars—scientists, philosophers, writers, poets, and religion scholars—gathered at the H. J. Andrews Experimental Forest in the Oregon Cascades, a designated long-term ecological research site, to write a new, ecologically inspired ethic for our time. Note the interplay between science and ethics, between what we know about the world empirically and what we value. We offer this as one example of collaboration between science and ethics. Here is some of what they wrote:

> Humanity is called to imagine an ethic that not only acknowledges, but emulates, the ways by which life thrives on Earth. How do we act, when we truly understand that we live in complete dependence on an Earth that is interconnected, interdependent, finite, and resilient?...
>
> The questions of our time are thus: What is our best current understanding of the nature of the world? What does that understanding tell us about how we might create a concordance between ecological and moral principles, and thus imagine an ethic that is of, rather than against, the Earth?...
>
> The necessity of achieving a concordance between ecological and moral principles, and the new ethic born of this necessity, calls into question far more than we might think. It calls us to question our current capitalist economic systems, our educational systems, our food production systems, our systems of land use and ownership. It calls us to re-examine what it means to be happy, and what it means to be smart. This will not be easy. But new futures are continuously being imagined and tested, resulting in new social and ecological possibilities. This questioning will release the power and beauty of the human imagination to create more collaborative economies, more mindful ways of living, more deeply felt arts, and more inclusive processes that acknowledge the ways of life of all beings. In this sheltering home, we can begin to restore both the natural world and the human spirit.

The complete text and list of authors of "The Blue River Declaration" can be found online at http://springcreek.oregonstate.edu/documents/BlueRiverDeclaraton.2012.pdf.

Knowledge that can change our attitude about nature is the second, arguably more important, kind of knowledge. It is also the kind of knowledge that we spend less time and effort developing. Think about knowledge that makes you go, "Wow!" Wow, that's so beautifully complicated… wow, look how magnificently nuanced… wow, how astonishingly connected. Wow: to be held in a state of wonder about nature. It would seem exceedingly difficult to intentionally abuse nature while being held by its wonder. How can you do anything but care for nature, while astonished by its beauty, complexity, and interrelatedness?

How does one go about conducting wonderment-generating science? It is largely characterized by audience and purpose. In regular science, the audience is often just the dozen or so other scientists that might read the technical paper describing your discovery. For wonderment-generating science, the audience is much broader. It is any segment of the general public—elementary or secondary school children, adults at the public library or senior center, or whatever. In other words, the audience for wonderment-generating science is your fellow human beings, the people who are funding your salary and your research and the people counting on you to show them how we ought to relate to nature. The message is to convince this audience, convince them beyond a shadow of a doubt, why you love or are in awe of something in nature such as fish. Explain how it is that your life story brought you to this point. You have to explain why you love fish at every level in the hierarchy of life—fish genes, individual fish, fish populations, and the role of fish in the ecosystems they inhabit. You should know that you are better qualified for this task than virtually every other person on the planet. No one else can take your place. If you are unwilling or unable to communicate that love for fish, how can anyone else be expected to love fish? And this is not a one-time exercise. This is your life-long vocation: to become better and better at sharing with others why you love fish. Done effectively, this love becomes infectious. It will become the foundation for why we should all love fish, or anything else you that has wowed you.

Conducting wonderment-generating science requires two strategic skills. One skill is learning how to pursue wonderment-generating science in a world that is mostly focused on science aimed at learning to control nature. Certainly, there are always constraints, but within those constraints there is always a great deal of freedom, and it is too easy to forget that. Your challenge is to ensure your research is maximizing the opportunities to illustrate why we should love fish. If that ambition is ever on your mind when you are developing and conducting your research, you will achieve the objective. You also have to be prepared to conclude that some research is, quite simply, not worth conducting, even if someone is willing to pay for it.

The second skill involves messaging. Rather sadly, we, as scientists, have some serious inhibitions about sharing our love of nature. This is a skill that requires cultivation. Interestingly, people seem to begin loving nature without further provocation when they are presented with wonderment-generating narratives about nature, narratives that build on themes like interconnectedness, contingency, complexity, and empathy. If you learn how to communicate your research and love of fish as a story built on those themes, then you will be doing the most important work you could ever possibly be called to do.

Before engaging wonderment-generating science, you have to ask yourself an important question. Do I really love fish, and if so, why? Do I love them mainly for the selfish interest, to satisfy my own curiosity about how they work or because I love to work outside near the water? Do I love fish mainly because they are what have made me successful and admired by colleagues? Do I love fish mainly because fish are so important to human welfare? Curiosity, professional success, and human welfare—that is all fine, but it misses the mark. Do you love fish—fish genes, individual fish, fish populations, and their role in ecosystems—because they are wonderful creatures that deserve your love. Unless you and your peers scream "yes" to this last question, unless we can all hear the message of love echoing from harbors and river valleys, then rest assured, fish are doomed.

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