

Science: Beacon of Reality

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I'm delighted to have the opportunity to address the 141st Annual Meeting of the American Fisheries Society.

Delighted, in part, because I've been fortunate to attend most of the AFS plenary sessions for the past 40 years, and, during every one of those sessions, sitting out there, just like you are now, listening to these talks, I often wondered: exactly how are the plenary speakers selected? What's the formula? How does it happen?

Now I know. Here's the inside story.

Someone from the AFS leadership calls. He begins the conversation by praising whatever can be found worth praising about your professional record, then, eventually, asks:

"Hey, Bob, want to give a plenary talk at the next AFS meeting? The Program Committee has decided to have a respected local politician, a veteran policy advocate, an esteemed scientist, an innovative educator, but we also want someone who isn't afraid to pry us out of our professional comfort zone. Someone to place our work in a larger context. Someone to provoke us a bit. I am hoping that you would be willing to do that for us?"

What could I say? Here I am, the designated provocateur in today's lineup!

However it happened, I am delighted to take up the challenge and address this year's theme, *"New Frontiers in Fisheries Management and Ecology: Leading the Way in a Changing World"*.

"New frontiers." "Changing world." "Leading the Way." These words have the ring of a political speech.

A political speech? I'll confess upfront that giving political speeches is not my strong suit. In fact, I have approximately zero tolerance for the twaddle that so often passes for political discourse.

But, I will assume that being the designated provocateur means that no one expects me to pander for votes by treating you as if you were an adolescent who will only respond to a "feel good" message dressed up as a campfire sing-a-long. If you are expecting this, be prepared to be disappointed.

Let's get to the task, addressing the theme of this meeting. I'll start with the "changing world" part.

Where have we been and where are we heading?

My first serious jolt about the "changing world" part happened 40 years ago this month when I was a young assistant professor at Virginia Tech. Like many newly minted PhDs, I was enamored with the latest and greatest scientific and technical developments.

I was convinced, with just a few more decades of scientific progress, and with more grant money, of course, that we fisheries scientists could solve most of the remaining challenges in fisheries management. To me, our profession was mostly about collecting more data, embracing the latest improvements in technology, and developing ever more elegant computer models.

Exciting times for a young technocrat!

My professional naiveté was abruptly demolished at one of these annual AFS meetings. I was sitting next to one of the giants in our profession listening to technical talks. He is someone who you all know at least by name. When the last speaker finished, he leaned over and lamented:

“Bob, you know the thing that disappoints me most here is that the majority of these folks are focused on yesterday’s problems. They don’t even realize that a changing world has made most of what they are doing essentially irrelevant.”

I well remember his words, and they had an effect. Here I am, 40 years after this conversation, and I still fret about his prediction.

He turned out to be right. I did see our profession change, change dramatically. As one of my long-term colleagues regularly reminds me:

“Bob, over my four decade career, the fisheries issues that I once worked on have moved, moved either from the sports page to the front page, or have disappeared entirely from the newspaper.”

I have also observed these changes. In 1964, when I worked for the California Department of Fish and Game, I read *Field and Stream* to keep abreast of what was professionally relevant. Now I read *The Economist*. Where once the first day of trout season was practically a public holiday, now the first day of trout season scarcely makes the sports page, much less the front page.

Wait just a few years. As soon as the last newspaper ceases publication, our younger colleagues won’t even know what a “front page” is.

Sure, agencies still set creel limits for Mud Pond and Clear Creek, necessary stuff, but not likely to make much difference to anyone except a few fishing diehards, and agency administrators who see their budgets eroding as demographics shift.

Now, we decide whether a particular run of salmon will fall under the bureaucratic tentacles of the Endangered Species Act, a decision that can affect the lives of millions of people, define the careers of thousands of biologists, and, as well, provide economic sustenance to hordes of lawyers.

But today’s so called important fisheries issues need to be placed in the grand scheme of a changing world.

Let’s consider our profession and our priorities in this changing world.

Imagine you are sitting in the audience at that very first AFS annual meeting, New York City, 1870, just 141 years ago. Listening to those plenary talks, you are well aware that the European states are globally dominant, both economically and politically. The United States is still recovering from a nasty internal war, the consequence of half the states seceding from the Union and forming their own, independent nation. Secession worked once, in 1776, but not the second time, in 1861.

So there you are, a fisheries professional in 1870, 5 years after the end of the Civil War, listening to AFS plenary talks.

It was a world so different that it can scarcely be imagined today. To illustrate, let's add a bit more economic and political context.

As an attendee at the 1870 annual meeting, you know that the once again re-united United States is not in the top tier of nations. At best it is toward the lower end of the second tier. The BRICs, Brazil, Russia, India, China, are not factors in your economic or political worldview in 1870. The realities of the time.

But things change, and these changes affect society, and our profession.

Back to the future, 141 years later, to 2011, to Seattle. You're still a fisheries scientist, still listening to plenary talks, but the European states, with the possible exception of Germany, are in decline. The PIIGS, Portugal, Ireland, Italy, Greece, and Spain, are functionally bankrupt.

Time Magazine's cover story last week captured it all with the headline: "*The Decline and Fall of Europe*".

Before you get too smug, remember that the United States is the largest debtor nation in the history of the world. And worse, the U.S. has yet to demonstrate much appetite for the difficult and painful choices needed to reverse this downward spiral.

And remember those BRICS? They were lost in an economic backwater at the time of the first AFS meeting in 1870. Today, Brazil has a booming economy and sits atop one of the world's great untapped oil deposits. Russia, now pumps more oil than Saudi Arabia and through its oil and gas sales, has gained international prominence as a political and economic force. India, boasting the largest middle class in the world, awards more college degrees than the United States. And China, if it maintains its current economic growth rate, will be the largest economy in the world by the end of this decade.

In the span of 141 years, the international order has been turned up-side-down. Dream on if you think this change hasn't fundamentally altered our profession.

OK, we can easily see the changes that have taken place, but what's coming? More change.

Let me use an example of what we should expect and how this change will affect the context of our work.

The population of the United States has now topped 310 million. By 2100, just 89 years down the road, expect it to hit 500 million, half a billion people. And don't forget to add in the 50 million Canadians expected in 2100.

Out here in the Pacific Northwest, British Columbia, Washington, Oregon, and Idaho, what demographers call “fill in country” with its exceptionally rapid growth, we now have a population of roughly 15 million.

Think about the Pacific Northwest in 2100. Think about the human population of these 3 States and 1 Province, not 15 million as we have today, but 50 to 100 million residents. Imagine, a quadrupling or quintupling of the human population of the Pacific Northwest by 2100!

When faced with such population trajectories, many fisheries professionals buckle, even some of us “tell it like it is” scientists fold, and end up grasping for intellectual life rafts by mumbling something like:

“The future is too difficult to predict.”

or

“I choose to remain optimistic about the future.”

Such responses are nothing more than denying simple facts by clutching delusional reality and wrapping it in a cloak of personal virtue.

For fisheries professionals, especially for scientists, be fearlessly realistic: no to pessimism, no to optimism, yes to realism. Just cold, unblinking, honest information upon which society and policy makers must make choices.

As the late Senator Daniel Moynihan said, surely referring to fisheries professionals:

“Everyone is entitled to his own opinion, but he is not entitled to his own facts.”

OK, let’s practice a bit of this realism, a little test drive for each of you. Look outside your hotel window tonight and imagine the Pacific Northwest in 2100. Contemplate the future demand for houses, apartments, hotels, schools, tennis courts, football stadiums, roads, airplanes, trains, Wal-Mart’s, electricity, drinking water, natural gas pipelines, lithium for electric car batteries, McDonalds, Starbucks, and for the Canadians out there, feel free to add Tim Hortons to my list.

It will be a long, long list.

You can fill in the consequent effects on the aquatic environment and everything else. Think European population densities.

I can almost hear the moans and groans out there, a yearning for the good old days. Tell me, would the good old days be the first AFS meeting in 1870, five years after the Civil War, where we lost more soldiers than any war our history? Or perhaps the decade following the 1929 stock market crash where overall economic conditions were still as bad in 1939 as they were in 1929? Pick any era you want.

Face it, there are no “good old days”. There are simply old days. The same holds for the future.

Now let’s move on to the other part of this year’s theme: Leadership.

Most of us think of policy leadership as coming from an energetic politician, or perhaps an enlightened government bureaucrat.

We usually do not expect policy “leadership” to come from scientists. But the public should expect policy leadership to come from scientists. But I don’t mean leadership like dazzling breakthroughs in genetics, ever more elegant population dynamics models, or razzle-dazzle, “*knock-your-socks-off*” GIS technology.

I’m talking about a different type of policy leadership we should expect from scientists. I look at it as leading from behind. Let me elaborate.

Many of you have jobs where you are expected to provide relevant, accurate, timely, and unbiased science to inform the public and decision makers. For much of my career, I have also had such a job.

And, I know that a good many of you are fisheries managers or decision makers who use science, along with many other inputs, to make choices. I have great respect for managers and decision makers because they must take science, and all the other inputs that go into the political process, and make a decision. Science is important to them, but it is only one of many inputs.

As with policy makers of all types, managers and decision makers are, in effect, picking winners and losers.

Still others of you are policy advocates, pushing a particular policy preference. You might be advancing a preference to preserve wild salmon runs, to develop ocean wave energy, to abolish all forms of whaling, to increase domestic oil production, or any of a thousand other policy preferences.

Advocacy is legitimate in a democracy, even though many scientists disparage it. And, policy advocates are free to use whatever tactics will work to advance their policy goals, and they do.

But scientists are neither decision makers nor policy advocates. Scientists have a different, but critical and essential role.

Let me illustrate. The constitution of the American Fisheries Society states that its purpose is to “promote the conservation, development, and wise use of the fisheries.”

But the meaning of these words has no inherent definition in science. Ultimately it is society at large that judges what is fundamentally meant by these words.

Think about the practical meaning of conservation, development, and wise use given the daily demands of those half billion people who will be living in the United States in 2100.

OK, where does this leave scientists?

It is, and it will continue to be absolutely essential that scientists help society, and decision makers, understand difficult policy tradeoffs. But exactly how should scientists help?

Welcome to the world of politics. Surprisingly, at least to me, I have found it to be a place of excitement and challenge. Exciting and challenging yes, but often downright terrifying.

To be truthful, I have also found the political and policy world to be a landscape populated by delusional bureaucratic cheerleaders, overrun with feel-good politicians, and infested with very well funded policy advocates. And, all of these folks will try to use science, and some scientists, to advance their political agendas.

Nevertheless, as scary as it may be to most scientists, the policy world is also a place where scientists can and should contribute.

But, for scientists who take their civic responsibilities seriously, all is not well. Far from it.

Specifically, for scientists at least, advocating personal or organizational policy preferences has become widely tolerated as acceptable professional behavior. Scientists may even be encouraged to do this by a portion of our professional community.

The risk: we will diminish ourselves and the scientific enterprise when we allow personal or organizational policy preferences to color our scientific contributions.

This is a morass into which we scientists must not allow ourselves to slip. As scientists, we have a special role, an exclusive role because we are uniquely qualified to provide technical knowledge that is based on rigorous scientific principles.

It is this policy neutral knowledge that the public and decision-makers sorely need.

Is the scientific enterprise at risk? It is! A recent U.S. national poll revealed that 40% of the general public has little or no trust in what scientists say about environmental issues. And, about as bad, the remaining 60% were not overly positive either. I suspect that similar results would be found in Canada, especially relative to fisheries science.

How pervasive is this distrust?

I have a good friend who has worked for several big national environmental organizations. When I shared with him some of the ideas I planned to present today, he stopped me cold with a blunt reality check:

“Bob, you’ve got to move into the 21st century. Science is a weapon in the policy wars. We buy the most believable scientists we can find and send them into court to battle Government scientists. Eventually the judge gets overwhelmed by the minutiae and orders the parties to go away and work out some kind of a compromise. This is how it works now. When this happens, we nearly always win because the agency just wants to make the case go away. And, best of all, they usually agree to pay our legal costs. That’s the real world, my friend!”

What did I say to warrant this rant?

But he was more upfront than most policy advocates, and I’ll accept that his is a sound political strategy, for an advocacy group, but it is a corruption of science and the scientific enterprise. He is paid to understand and manipulate the political and legal system to achieve his organization’s goals. Fine, but it is still a corruption of science.

What role should scientists play in policy debates? How can they best provide leadership? How does a scientist lead from behind?

First, scientists should contribute to and inform policy deliberations. This is not only the right thing to do, but it’s an obligation, especially if our work is publicly funded.

I also do not hold with the notion that it is sufficient for fisheries scientists to publish their findings in scholarly papers, papers that only a few technical experts will ever read. I take it as a given that scientists also should provide, and explain, the underlying science, including uncertainty, around important policy questions.

Second, when scientists do contribute to policy analysis and implementation, and they should, they must exercise great care to play the appropriate role. Unfortunately, working at this interface is also where some scientists mislead or confuse decision makers by letting their personal policy preferences color their science.

It is so easy to do.

Let me share a slightly embarrassing story that demonstrates one consequence of allowing policy preferences to infect science. It involves a veteran Government lawyer, someone I have worked with for years.

We were relaxing in a Portland pub after spending a long, long day listening to dueling scientists testifying in an Endangered Species Act trial. I was trying to convince him, from my perspective as a scientist, that it seemed reasonable to expect opposing litigants to at least be able to agree on the basic science relevant to a particular court case, the so-called “scientific facts of the case”. After all, the legal debate should be over interpretations of the law, not science, right?

Perhaps I was badgering him a bit too much, but his response to my pestering jolted me:

“Bob, you guys have no credibility. All of you spin your science to lend support to whatever policy outcome you or your organization favors. I’m not sure science was ever a beacon of truth, but it sure isn’t now, at least not in the legal arena. I watch scientists routinely misuse science in case after case.”

No credibility? Science spin? Misuse of science? He was wrong, wasn’t he?

No — he was not entirely wrong. Let me offer an example.

The most common misuse of science is to assume a policy preference and then incorporate that policy preference into scientific information. Such science is called normative science, and normative science is, unfortunately, increasingly common.

Let me be unequivocal. Using normative science is stealth policy advocacy, plain and simple. Ignorance is no excuse.

Who would do such a thing?

It happens and it happens often.

An example from this part of North America: the case of the 160 year decline in wild salmon and the role of dams. Here is a big insight: dams have an effect on wild salmon populations and the effect is negative.

Along the West Coast, it is common for scientists to be asked to gauge the likely effects on wild salmon of removing a particular dam, or building a particular dam.

This is a legitimate and appropriate role for fisheries scientists, and one that we are well positioned to play. But, there is no scientific imperative to remove, or build, dams. Policy imperatives come from people's values and priorities, not from science.

All of the policy options regarding the future of dams have ecological consequences, some of which may even be catastrophic from a salmon perspective, but ecological consequences are simply one element that the public and decision makers must weigh in choosing from a set of typically unpleasant alternatives.

Hardly a week passes that I don't receive an online petition from an advocacy group asking me, and other scientists, to sign as a show of support to remove a particular salmon-killing dam for reasons that sound like science, read like science, are presented by people who cloak themselves in the accoutrements of science, but who are actually offering nothing but policy advocacy masquerading as science.

Scientists, acting in their role as policy neutral providers of information, should not decide whether it is more important to use water to sustain wild salmon, or use the same water to generate electricity to run air conditioners, or the same water to irrigate alfalfa fields, or the very same water to make artificial snow at your favorite ski resort.

Politically, from what I observe today, the use of normative science cuts across the ideological spectrum. It seems no less common coming from the political Left *or* Right, from the Greens *or* the Libertarians, or from Government agencies *or* Private sector organizations.

Regardless of the political ideology, normative science is a corruption of science. No matter how strongly a scientist feels about his or her personal policy preferences, practicing normative science is not OK. No exceptions.

Let me conclude with a few words about the "new frontiers" that we should anticipate in upcoming decades.

- First, as the theme of this meeting implies, there will be change, dramatic social, political, and environmental change. Don't be surprised. Don't be overwhelmed. You will be confronted with new frontiers. Expect them. Prepare for them.

- Second, decision-makers, fisheries managers, and the general public will continue to need cold, hard, scientific facts, and uncertainties, provided by sources they trust. If you want to be an effective scientist, become that trusted source.

When it comes to science, I say: Shun pessimism. Reject optimism. Embrace realism.

Regardless of the change that you are confronted with, whatever new frontiers might appear unexpectedly, science must be the source of the facts upon which decisions are made. Scientists can provide leadership, but that leadership comes from behind. Tell the truth, the whole truth, nothing more, and nothing less.

However uncomfortable, however unpleasant, however unappreciated it may be to those of us who are scientists, science can be, and should be, a beacon of reality in a changing and uncertain world. For scientists, be that beacon.

Thank you.

About the Speaker:

Dr. Bob Lackey is professor of fisheries science and adjunct professor of political science at Oregon State University. In 2008 he retired from the Environmental Protection Agency's research laboratory in Corvallis where, over a 27 year career, he served in various senior science and leadership jobs. Since his very first fisheries job nearly five decades ago mucking out raceways in a trout hatchery, he has worked on an array of natural resource issues from various positions in government and academia. His professional assignments involved diverse aspects of natural resource management, but mostly you would find him working at the interface between science and policy. He has published over 100 articles in scientific journals and authored or edited 5 books. Dr. Lackey has long been an educator, having taught at 5 North American universities. He continues to teach an on-campus and an on-line graduate course in ecological policy at Oregon State University. A U.S./Canada dual citizen, he was a Fulbright Scholar at the University of Northern British Columbia during the 1999-2000 academic year. Dr. Lackey holds a Doctor of Philosophy degree in Fisheries and Wildlife Science from Colorado State University and was selected as the 2001 Honored Alumnus by their College of Natural Resources. He is a Certified Fisheries Scientist and a Fellow in the American Institute of Fishery Research Biologists. In 2008 he was awarded the U.S. Environmental Protection Agency's highest honor — the Gold Medal — for exceptional contributions in strengthening the role of science in ecological policy.
