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Column: Guest Column

The emergence of religious ecology

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A long career in fisheries and an even longer membership in the American Fisheries Society may provide perspectives that are useful in the future. In this column, I will propose one. My assertion here is that the scientific enterprise is at risk of losing its social license as a source of trustworthy information. In short, fisheries scientists collectively are at risk of being categorized as one more advocacy group (of many), albeit one that wraps its advocacy in science, but at its core, is just one more advocacy voice.

Let me lay out my line of reasoning and the experiences that resulted in this conclusion.

I have watched many times in my career that debates over *science* often become surrogates for debates over competing values and policy preferences. Many contemporary ecological policy issues (including fisheries) are driven by a complex and bewildering mix of scientific information (frequently termed the scientific "facts") and competing, often mutually exclusive values (generally expressed through an individual or organization's choice of policy preferences). Even a cursory assessment of major contemporary ecological policy issues (Box 1) shows they are complex, nuanced, and fractious. Thus, the line between scientific information and competing values and policy preferences is often blurred.

As any policymaker or fisheries manager knows well, many factors beyond *scientific* information are important in policy making. Thus, while some scientific information may be needed in policy making for each of these example issues, perhaps even being essential to clarify ecological policy trade-offs, science alone is insufficient. Even though there are many policy drivers beyond scientific information, lack of scientific information is often used to justify funding thousands of scientists producing massive amounts of technical detail aimed at "solving" policy problems, but resulting in disappointing policy outcomes. Thus, many jobs are on the line and the participants are not disinterested third parties.

An especially muddying factor in unraveling ecological policy disputes is identifying the role of religious or spiritual views in shaping scientific information. These days, religious,

Box 1. Contemporary examples of current ecological policy issues for which science could potentially play an important role. However, Religious Ecology is commonly found in the relevant peer reviewed scientific literature for all these examples, although it may be undetected by some readers.

1. Deciding which species to save from extirpation or extinction, recognizing that the future climate and other ecological conditions will differ from the recent past (e.g., at some level of expense or social disruption, people may decide it is not worthwhile to sustain species in all of their current locations).
2. Selecting how to manage wildfires to achieve society's overarching priorities, knowing that segments of society oppose every policy or management option (e.g., people adversely affected by wildfire smoke likely will oppose prescribed or allowed burns).
3. Balancing competing demands for scarce water supplies, an ever-present conflict exacerbated by the increasing water need of an expanding human population, changing climate, and higher living standards.
4. Managing large predatory species (such as wolves, cougars, and grizzlies), given the overall demands of a substantial regional urban/suburban human population (including expectations for unaltered landscapes and the associated large, predatory wildlife), balanced against the resulting adverse effect on relatively small rural human populations.
5. Recovering and sustaining wild salmon runs (and other species and populations) in regions with large human populations and their many other competing policy priorities (e.g., fishing for food and recreational, housing, farming, irrigation water, airports, manufacturing, flood control, energy generation, mining for lithium and other strategic minerals, ski resorts).
6. Evaluating the trade-offs inherent with dams (e.g., baseload electricity production to complement sun and wind power sources, flood control, river transport, drinking, irrigation, and commercial water demands vs. sustaining species adversely affected by dams).
7. Resolving the ubiquitous multiple-use conflicts in managing publicly owned forests along the West Coast of North America (e.g., killing hundreds of thousands of barred owls *Strix varia* to save small populations of spotted owls *S. occidentalis* from extirpation).
8. Addressing changing climate given the socioeconomic reality that worldwide, most people are poor by U.S.,

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Canadian, and European standards, so a large transfer of wealth from "rich to poor" is a key element of many proposed policy options (e.g., will people in the Global North vote to send some of their wealth to the Global South?).

9. Weighing political opposition to the Indigenous harvest of at-risk or highly emotionally valued species (i.e., whales and other marine mammals), and conflicts with competing beliefs about moral/ethical values and notions around cultural imperialism and political sovereignty.
10. Understanding conflict over balancing the protection of pristine marine environments vs. the critical need for massive quantities of wind, wave, and tidal energy generation, coupled with the necessity for a suite of minerals required for large-scale electrification (e.g., how much mining for required minerals should be permitted in marine environments).

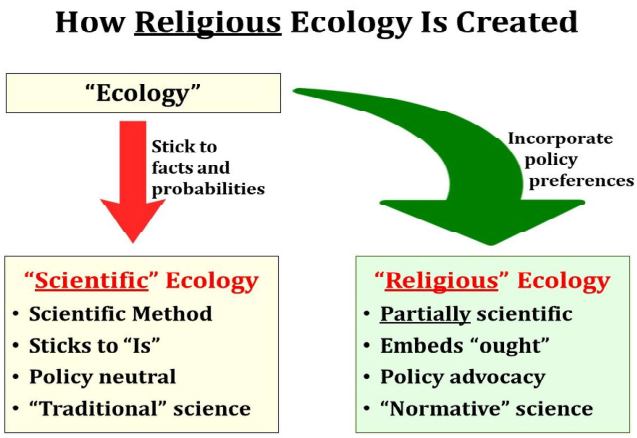

Figure 1. Traditional or scientific ecology becomes religious ecology when policy preferences or values are embedded in the presented information. Religious Ecology is normative science, a form of policy advocacy, and it is often unrecognized because the embedded policy preferences are often subtle.

ethical, or moral values are often embedded in science to form a type of information that is no longer entirely scientific. Here, I will label this type of information "Religious Ecology," which is now prevalent even in the peer reviewed scientific literature. Such information superficially resembles "Scientific Ecology," but rather than being policy neutral, it incorporates particular religious or ethical assumptions, often in ways that are opaque to the average reader or listener (Figure 1). Thus, Religious Ecology is a corruption of Scientific Ecology and is a form of policy advocacy often unrecognized because the embedded and assumed policy preferences are difficult to detect.

How does this happen? Religious Ecology assumes a set of norms about how humans should live and make decisions about ecological policy issues. Over my career, after reading many peer reviewed scientific articles, sitting through thousands of scientific presentations, and listening to testimony at public hearings, many of which exhibited *embedded* values and policy preferences, I have modeled an analogy to the well-known Judeo–Christian 10 Commandments (Box 2). This may strike some as an offensive comparison, but I contend that it fits.

In practice, the 10 Commandments of Religious Ecology are not rigid, but provide insight into *how* the policy advocate (i.e., the "believer") perceives policy choices and thus why *those* values and policy preferences are embedded in the resulting scientific reporting.

For many scientists, it is perhaps surprising that the word "ecology" may be based on these (or other) religious and value-based underpinning rather than science (Figure 2). Religious Ecology describes the world as it *ought* to be and, therefore, is normative because it biases the information toward particular policy choices. The 10 Commandments of Religious Ecology provide commonly embedded value judgments and implied policy preferences for some policy advocates. When these (or other) value-based assertions are embedded in Scientific Ecology, the information becomes Religious Ecology.

Of course, many religious and ethical-based philosophies offer their preferred "rules" or "guidelines" for ecological policy issues, but within Religious Ecology, the values-based and science-based ideas are intertwined and difficult to separate. Specifically, in ecologically oriented science, at their core, they share some version of the well-known Judeo–Christian Garden of Eden's "romantic view of nature," wishing humans to live harmoniously with the natural, non-human world. The Garden of Eden was a paradise on Earth, but the fall from grace began with humans succumbing to temptation and greed—and enduring the resulting pollution. The 10 Commandments of Religious Ecology similarly delineate a path back to the Garden of Eden, the natural and optimal state of ecosystems. Thus, Religious Ecology is either a form of science infused with ethical values or, perhaps more accurately, a religion imbued with science.

Let me illustrate with an example. Consider Commandment One (Box 2) and how it is sometimes stealthily embedded in scientific information. Referring to a piece of land as a "wheat field" is a policy neutral statement of information (i.e., science or a scientific fact). It is the essence of classic Baconian science. In contrast, referring to the *same* field as a "degraded or disturbed ecosystem" or a "healthy and thriving ecosystem" is not policy neutral because it has an embedded, *assumed* policy preference (i.e., Commandment One is accepted as the preferred policy). Nothing has changed scientifically; only the labeling differs. Thus, it is *normative* science.

Often, incoming students in my graduate-level ecological policy class are unaware of the impact of word choice and subtler forms of normative science (Box 3). Realistically, should professors expect graduate students (much less undergraduates) in ecology, fisheries, wildlife, forestry, natural resources, environmental science, and conservation science to understand issues such as normative science and stealth policy advocacy? Or do they understand the arguments, but choose to advocate their preferred policy preferences, nonetheless? Perhaps a more accurate answer is the observation (paraphrased) from one student,

> Many scientists across divergent scientific disciplines use their positions to pitch their or their employer's policy preference, so why should ecologists and other scientists be held to a higher standard?

Box 2. In ecological and natural resource disciplines, it is common for "science" to include embedded or assumed policy preferences. These embedded policy preferences are often characterized by their superficial similarity to the commandments found in many religions. Here are some frequently encountered in the policy case studies listed in Box 1.

The Ten Commandments of Religious Ecology

1. Thou shalt recognize that when humans interfere with nature, it often produces disastrous consequences; *therefore, all significant alterations of natural conditions should be regarded with resistance.*
2. Thou shalt grant that plants and animals have as much right as humans to exist; *therefore, no species should be significantly impacted or driven to extinction by human actions, regardless of the reason.*
3. Thou shalt know that the balance of nature is delicate and easily upset; *therefore, any proposed change to ecosystems should be avoided.*
4. Thou shalt understand that Earth now supports more humans than it should; *therefore, policies to reduce the future number of humans should be encouraged.*
5. Thou shalt acknowledge that Earth is highly constrained because it is limited in size and possesses finite resources; *therefore, humans should aggressively reduce their ecological footprint.*
6. Thou shalt anticipate Earth will soon experience major ecological disasters; *thus, dramatic, pervasive lifestyle changes are overdue, and implementation is an existential imperative.*
7. Thou shalt acknowledge that the risks of climate change are existential and immediate; *therefore, governments should promptly do whatever is needed to save Earth and its inhabitants, regardless of the costs to individual countries or segments of the population.*
8. Thou shalt never use the requirements of democratic governance as an excuse for inaction on ecological issues; *therefore, the overarching public policy goal must be to protect ecosystems and save species from extinction, irrespective of legal and democratic impediments to doing so.*
9. Thou shalt accept that humans have no more right to Earth's resources than any other species; *therefore, meeting human priorities should not decrease biological diversity.*
10. Thou shalt know that modern technology rarely, if ever, offers improvements over natural alternatives; *therefore, as a precautionary principle of governance, technology, especially new and unproven technology, should be avoided.*

Students in this class commonly accept that this assertion reflects contemporary reality and is, therefore, professionally acceptable. Further, many students also accept the 10 Commandments of Religious Ecology as self-evidently true and appropriate for scientific communication (Box 2).

Like other simplified summaries of religious doctrine, nothing in their application to ecological policy issues is unequivocally absolute or consistent. However, the 10 Commandments of Religious Ecology afford insight into how many ecological policy advocates (including professional scientists) tend to embed *their* values in the scientific information they develop and provide. Rarely will such advocates explicitly categorize their *scientific* information as influenced by religious or faith-based values, so "users" of scientific information must be alert and not assume that all scientists are playing it straight. Perhaps most stick to science, but others intentionally do not. Hence, it is not surprising that public trust in the impartiality of scientists has declined.

I encourage caution when assessing the scientific impartiality of professional ecologists who use their scientific credentials to promote their personal (or their employer's) policy preferences. For example, without resorting to *the 10 Commandments*

Figure 2. Scientists can assess with some degree of confidence the likely effects of removing (or maintaining) a particular dam on Salmon runs. Scientific information alone, however, is an insufficient justification for removing (or maintaining) a dam. Competing values and policy preferences are much stronger policy drivers. Photo credit: U.S. Army Corps of Engineers.

of Religious Ecology, nothing in science says that killing individuals of one species to favor another species is inherently desirable scientifically (Figure 3). For a scientist, it is not "better or worse" without applying a value-based benchmark or baseline (i.e., often one or more of the 10 Commandments of Religious Ecology). Similarly, there is no exclusively scientific basis for labeling an ecosystem's condition as "healthy" (or "degraded") unless a value or policy preference is applied to scientific information.

It is easy for readers or listeners inexperienced with policy analysis to interpret "benchmarks" or "baselines" presented by scientists as the implicitly *preferred* policy choice when that may not be the scientist's intent. Such value choices (i.e., healthy, degraded, better, worse) arise outside the scientific enterprise, at least in a democracy (Figure 4). Conversely, concepts like healthy are common in medicine because there is broad public and political agreement about what constitutes a healthy *individual* human. Thus, the metaphor of a healthy ecosystem analogous to a healthy individual human is weak and misleading. Unlike individual humans, ecosystems do not get sick and die

Box 3. Definitions vary between disciplines, and it is important to be clear on how each of the critical policy-oriented words is defined. Here are the definitions I use for keywords used in this article.

Key Definitions in Ecological Policy, Management, and Science

Policy maker: *a person (or more than one) who implements the process of selecting from among the various policy options. (Usually an elected or appointed official).*

Natural resource manager: *a person who implements ecologically oriented policies or laws and typically works for a governmental organization. (Commonly focus on fisheries, wildlife, or conservation policy issues).*

Policy analyst: *a person who formally assesses the consequences and implications of the viable options or choices for addressing a policy problem. (Usually a government employee, but not always).*

Policy advocate: *a person (or organization) with active, covert, or inadvertent support of a policy or class of policies. (Usually private citizens or employees of a nongovernmental organization, but not always).*

Scientist: *a person who generates or interprets scientific information or "science." (Almost always, scientists are employees of an organization, either governmental or non-governmental).*

Science: *information gathered in a rational, systematic, testable, and reproducible manner. Sometimes called "positive" science. (Contrasts with faith-based information or "traditional" or "experiential" knowledge or "expert" opinion, plus other sources of information).*

Normative science: *information developed, presented, or interpreted based on an assumed, usually unstated, preference for a policy or class of policy choices. (Often mislabeled as "science").*

Assertion: *a statement, claim, or declaration based on purported scientific knowledge and understanding, but lacking a verifiable scientific basis. (Often called an "assertion of fact").*

Policy: *a decision or plan of action for accomplishing a desired outcome. (May be anything from a simple statement to a detailed plan of action).*

Politics: *the debate, negotiation, and compromise process aimed at achieving a desired policy goal. (May take place in public or behind the scenes).*

Preference: *the preferred option from among policy choices or alternatives. (Often, many choices are being considered or contested, and individuals and organizations have strong and weak preferences from among those policy options).*

Value: *a core or fundamental belief that tends to determine or shape personal or group policy preferences. (Values tend to be highly permanent and generally do not change, unlike preferences).*

Benefit: *the "good" things resulting from implementing a policy option; includes monetary and intangible/nonmonetary aspects such as cultural, moral, or behavioral values. (Whether a "thing" is considered a benefit or a cost, depends upon the prevailing policy preference).*

Cost: *the "bad" things resulting from implementing a policy option; includes monetary, intangible, and nonmonetary aspects such as cultural, moral, or behavioral values. (Whether a "thing" is considered a benefit or a cost depends upon the prevailing policy preference).*

Figure 3. The decision by the U.S. Government to kill hundreds of thousands of nonnative barred owls to save dwindling populations of native spotted owls from extirpation along the West Coast of North America was informed by scientific information, but values and policy preferences drove the choice from among competing policy choices, including some of the 10 Commandments of Religious Ecology. Photo credit: U.S. Fish and Wildlife Service.

Figure 4. A "healthy" ecosystem can be either a malarial-infested swamp or the same land drained and converted into an intensively managed agricultural field. Ecosystem health is a metaphor often passed off as policy neutral science to unsuspecting policymakers and the public, but it is a classic example of normative science (i.e., Religious Ecology). Photo credit: U.S. Department of Agriculture.

unless someone, using specific values and policy preferences, defines the desired, undisturbed, benchmark, or otherwise preferred state of that particular ecosystem.

For scientists working on contemporary and highly contested fisheries and ecological policy issues, sticking to science and policy neutrality requires sustained commitment, but it is the right thing to do from my perspective. Graduate training, professional mentorship, and institutional standards of practice can help ensure that scientists operate within scientific "good practices" and avoid becoming just another confusing advocacy voice struggling to be heard by misusing science. The public is best served when scientists (sticking to Scientific Ecology) are honest brokers of scientific information. Conversely, those slipping into Religious Ecology or other value-based policy constructs are working in the realm of policy advocacy.

The opinions and views expressed in this column are those of the author and do not necessarily reflect of those of his current or past employers or the American Fisheries Society.