

Incorporating Traditional Ecological Knowledge into Environmental Impact Assessment

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Working and living in California, there has been a lot of discussion over the last few years about how we might learn and benefit from traditional ecological knowledge in our state. This has especially been a topic of conversation due to the increase in wildfire damage over the last decade, as well as the depletion of many of our offshore fish resources. Since our indigenous tribes in California managed this land for thousands of years, many would argue it's about time we took their knowledge more to heart and incorporated it into our environmental management and impact analysis.

But what is traditional ecological knowledge? And how can we benefit from it? How might we incorporate it into our National Environmental Policy Act (NEPA) assessment process?

Fikret Berkes, a Distinguished Professor Emeritus at the University of Manitoba's Natural Resources Institute who studies community-based natural resources management in societies around the world defined traditional ecological knowledge as, "*a cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment...*" (*Sacred Ecology. Traditional Ecological Knowledge and Resource Management, 1999*). As an example, particularly relevant to California and much of the western United States, traditional ecological knowledge is inclusive of a comprehensive familiarity and understanding of fire's biogeochemical cycling, the scale of effects on ensuing forest population dynamics, and the ability to recognize and forecast future forest implications. It is also inclusive of a comprehensive knowledge of plant physiology and morphology and how those relate and shape plant populations' resilience to disturbances. Historically, fire was one of many management tools utilized by tribal communities to accomplish a wide spectrum of ecosystems' management goals, often on scales unparalleled today.

Those methods can still benefit us today if we take the time to learn from them. Traditional ecological knowledge has long used controlled burns and other practices to promote healthy tree growth, animal habitats, and soil quality. While governments and agencies will often use these same methods to try and manage state and Federal lands today, either due to budget restrictions or the practice of applying such techniques on a broad scale, these methods may have proved less effective than the focused approaches used by tribal communities in the past, which was often based on generational knowledge of the area. As a result, we have seen wildfires rage over thousands of acres in California on more than one occasion with devastating effects that can be seen for years to come as we drive down our roads.

But how do we actually incorporate this lesson into our approach to environmental impact assessment? There are three main areas we might consider as we approach the NEPA process, especially since many of these projects will impact indigenous communities in one way or another:

Considering how to measure environmental impacts: Under NEPA, every agency has the responsibility to set forth how project proponents are to gauge the potential impacts their projects may have on the environment. Those of us who have been performing this work for decades are familiar with our standard scientific approaches to determining these potential impacts. But we should all step back and ask ourselves whether we might be missing additional assessment methods traditionally used by the

tribal communities who have been observing these ecological systems for thousands of years. In the United States Department of Agriculture technical report *Exploring the Role of Traditional Ecological Knowledge in Climate Change Initiatives* (May 2013) an example is cited from the Quileute. As the report notes, “[They] know something is wrong because there are no smelt eggs in time for Honoring Elders Day to make ‘stinky eggs,’ so they know the smelt are out of balance often before scientists realize that this keystone species is faltering.” Indigenous narratives and traditions often include references to environmental conditions and events, giving them a fine-tuned sense of nature’s temporality, diversity, and variability. This knowledge can be useful when attempting to understand natural systems over time. Could it also be incorporated into our approach to determining a project’s potential impacts on the environment? Or used as a measure in the monitoring of mitigation measures?

Designing mitigation and restoration projects: Generational practices have guided tribal communities when gathering and retaining knowledge required for a thorough understanding of a variety of new and changing ecosystems. Traditional landscapes foster diversity and sustainability, supports edible and medicinal plants, and creates an environment that encourages spiritual involvement. While more modern technology and tools have their place, Indigenous ecological knowledge is actively being reintroduced by tribal elders and community members to help teach and better understand the historical relationship between fire, the environment, and people. How often have we considered consulting with local tribes when it comes to the design of wetland mitigation project or an upland meadow restoration? One must step back and wonder whether we might be missing opportunities to restore a project site not only to its previous condition, but even better to a condition that might have existed before colonization.

Outreach to our local Tribal communities. NEPA always benefits from public scoping and input, and a valuable part of this is outreach to the tribal communities. Here in California, AB 52 requires an even more extensive outreach to include tribes that might not yet be Federally recognized, and also incorporates consideration for spiritual sites that might not have archeological significance. But we must keep in mind that Indigenous peoples might not always have the reaction to Western scientific approaches that we expect, and we need to respect and incorporate all perspectives. For example, here are some perspectives that came from a recent discussion of an offshore wind project in California:

- Many tribes consider the ocean as the location of the afterlife; it is where people go when they die. There are lands out over the horizon that they migrate to, and the process is an epic journey. It would be the Western equivalent of putting wind towers in heaven.
- The ocean migratory routes/territories of salmon and other species are sacred. Salmon is a prominent figure for many tribes who not only have kinship with salmon, but also have very old obligations and responsibilities towards the health and well-being of salmon. Disturbing their ability to migrate and spawn is perceived as harming one's family. In the way that spiritual cause and effect work in some tribal communities, there is direct physical harm that can happen to tribal members and their children if the salmon are harmed.
- Indigenous people can also have mixed feelings about climate change. For some, climate change is the will of the Creator; it is supposed to happen, as are the effects. This means some may not be in a big hurry to move to alternative energy sources. Some tribes’ +communities are socially and economically conservative about Climate Change.

- Putting the windfarms out over the horizon may be perceived as mitigation, but that will not negate potential impacts. Because of the particular spiritual beliefs of the California Tribes, it is not just about viewshed, it can be more about their presence in a sacred space.

While we might not expect or agree with all of these perspectives, we nonetheless need to consider and respect them in our NEPA analysis.

While it can be easy for us as scientists to slip into a place where we feel both confident and comfortable with our understanding and approach to NEPA impact analysis and mitigation, every now and then there can be a real benefit to stepping back and asking if there might be a better approach to our projects. After all, the progress of science requires us to constantly be proving ourselves wrong. Why should we be resistant then to updating our approach to NEPA? The impacts of climate change have absolutely shown us that there must be a better approach to managing our impacts on the environment. Perhaps it is time to consult with those who have been managing this environment for thousands of years to consider whether there might be a better approach to environmental impact analysis and mitigation as well.