

Reconnecting People to Their Natural Environment

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Key Points

- It is our responsibility as natural resource professionals to build stronger and more relevant ways to connect the public and ourselves with the importance of local, regional, and global aquatic resources
- Creative and relevant outreach efforts must engage people that are physically or mentally separated from the natural environment to understand the critical components that support all of us.
- Measures that allocate the quantity of resources used in the production, distribution, and consumption of products are excellent tools for understanding the complexity of individual personal decisions.

Introduction

Smartphones, social networks, and countless search engines provide information about the surrounding world with the simple push of a button, click of the mouse, or touch of the screen. Ironically, many of us are mentally and physically disconnected from the natural environment around us. Nowadays, it is more common to have a TV, a cell phone, or a computer at home than to have a vegetable garden, yet even simulated farming is available on the Web (i.e., FarmVille). How can we increase the public awareness of the global and local human connections to the environment that provides our food, water, and air? Effecting these changes will require committed professionals working locally, regionally, and internationally.

For young students studying in urban settings, careers in science are often perceived as related to medicine or human health. I (CMM) was a Sputnik generation student in grade school when the United States rose to challenge Russia's lead in the space race. Even with

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that national science challenge, my junior and high school exposure to science in suburban Los Angeles involved the “bright,” likely college-bound kids taking a biology class with an emphasis on human health and molecular biology. Physical sciences, including astronomy, were occasionally included as an option. The emphasis on human health was likely because it was the most visible connection with science in the urban environment. My love of animals was interpreted by my college-educated parents to be a career in veterinary medicine, again a health-related field. They and most others in my community were ignorant of the opportunities for natural resource studies, and no one had an idea of careers in natural resource management or ecology.

Reflecting on my own beginnings, and the serendipity of ending up in fisheries resource education, I am especially concerned about the critical need to bring into all our communities information about and training in aquatic and other natural resources. These challenges are international and multicultural. When our civilizations and communities were simple and more locally place bound, understanding the natural environment was part of the survival package. If you did not prepare for and exceed the capacity of the natural environment, you migrated or you did not survive. With increased ease of mobility for human and natural resources, and the wealth of large corporations, the environmental costs of development and commodity production are less obvious. Today, natural resources come to us, rather than us to them. Most of our foods are not grown locally, although there is increasing interest in local foods in some communities. Most people have no idea how their food and other goods are obtained, or the pollution associated with their production and distribution. The consequences of production of all commodities are not well incorporated into general understanding and decision making.

I pose three broad questions to all our young professionals. How do we as a society incorporate the larger context of place, the region, and earth into our own lives and the greater public in meaningful ways? Can we create a sense of community and use modern tools to help us make these connections to the greater public? Can we provide a challenge for young citizens to be informed and aware of the importance of their natural world to provide sustainable water, food, and air to breathe?

I asked two graduate students with diverse backgrounds to address these disconnections and provide their perspectives on how to educate and reconnect humans back to the natural environment.

Perspective from Zachary Penney, an Indigenous Graduate Student

Many indigenous peoples able to retain ties to their ancestral homelands feel that there is no clear separation between themselves and the natural environment. The health and well-being of one's body is ultimately determined by the health and state of the environment they belong to. As a Nimiipuu (Nez Perce tribal member), I was raised with this philosophy and taught to practice it from a very young age through hunting, fishing, root gathering, and camping trips with my family. Listening to oral traditions told by Nimiipuu elders was especially vital in establishing my connection to the landscape. These traditions taught not only moral lessons and values, but were also used to describe the origin and traits of organisms, as well as the formation of various geological features of the local landscape. As a result, these stories established a strong sense of belonging and responsibility to the place I lived, as well as relationality (a connection to the “act” of doing with your ancestors, as well as with the stories, power of place, and spirituality of the act). This sense of place was continually reinforced by physically interacting with my environment, whether it be dipnetting salmon

and hunting with my dad and brother (Figure 1) or digging camas with my grandmother. These experiences required the use of all five senses (sight, hearing, touch, smell, and taste), which in my opinion, is a critical link being lost to many people living apart or segregating themselves from the natural world.

Despite my strong cultural connection to the Nimiipuu homeland, my transition to the study of fisheries and natural resources was not an easy one. Like many young students, I found it hard to relate many scientific and mathematical disciplines to the world that existed outside the classroom. The very idea of natural resource management or stewardship implies that we (humans) must keep dominion over the environment and that natural resources are simply a commodity to be sold or used for recreation. Culturally, these ideas are contradictory to what I learned growing up. Fortunately, my aversion to science changed following a high school internship with the Nez Perce Tribe on projects focused on the restoration and protection of various fisheries. Salmon restoration is a particularly important goal to the Nimiipuu because salmon not only provide nourishment, they act as a symbol, providing a sense of comfort that our world is healthy much in the same way keystone species are viewed by modern ecology. I was able to clearly see and appreciate the relationship of science and math to the world I belonged to through my experience as a high school intern. Thus, it was this experience that helped me make this connection and solidified my choice to pursue a career in fisheries.



FIGURE 1. Aaron Penney, Nez Perce tribal member, dipnetting salmon in Idaho's middle fork of the Salmon River. Photo by Ernie Whitman.

Having not grown up in an urban area, I cannot claim that people raised in rural areas are any more connected to the natural environment than people raised in urban settings. Today, even some of the most remote rural areas are equipped with Internet access and cellular service. With our increased use of technology for information, communication, and entertainment, we have become increasingly reliant on only two of our senses: sight and hearing. At the same time, many of these same technologies allow us (humans) to search, find, and disseminate information at an astounding rate, which undoubtedly has provided more opportunities for people to educate themselves about the natural environment beyond their own backyard. However, reading about elk hunting in a magazine or observing how a Nez Perce dipnets salmon via computer offers only a limited glimpse of the actual experience. These physical elements cannot be substituted by a book, game, phone application (or App), TV show, or movie. Therefore, I believe that experiences engaging all five senses are an essential component to helping reconnect people to the natural world.

While it is easy to assert that people need to go outdoors and rekindle their physical connection to the natural world, this statement is both idealistic and aimless. As fisheries and natural resource professionals we have a special opportunity to help establish and foster this strong sense of place and connection to the landscape among people of all ages. If people are not able to see the value or relevance of the natural environment beyond what they learn from a textbook, phone, TV, or computer, many will only see the world as a distant observer without making the connection between their own health and happiness and the state of the environment. Like the elders who took time to sit and talk to me, we must be willing to take the time and transfer our knowledge to students of all ages in a language they can understand. Considering that not everyone can simply venture out and experience the natural environment, we must be creative in how we engage people into understanding how the natural environment works from “unnatural” settings (e.g., classroom, conference centers, and public forum).

Various forms of outreach are already used by tribal, state, provincial and federal agencies, but an increase in hands-on experiences that engage all five senses will be highly beneficial. From an educational standpoint, programs such as “Fish in the Classroom” provide students with actual hands-on learning experiences in regards to fish biology, life history, and the importance of a clean, healthy environment for their fish. As an example, elementary students at the Lapwai School District in Idaho raised steelhead *Oncorhynchus mykiss* derived from local hatchery broodstock from the eyed egg to fry stage (March to May). The students were responsible for feeding, cleaning, and maintaining the proper rearing environment for their fish (e.g., temperature, dissolved oxygen, and pH) in preparation for release into a local stream containing a recovering population of steelhead. Throughout the rearing process, tribal (Nez Perce), state (Idaho Fish and Game), and federal (U.S. Fish and Wildlife Service) scientists, as well as tribal elders, shared expertise and helped students connect their own existence to the juvenile steelhead they were raising (Figure 2). In the end, students at Lapwai Elementary released 98 fry out of an original 100 steelhead eggs and told the incredible odds their steelhead would need to endure to survive. Although this lesson occurred primarily within the classroom, these students were intellectually and emotionally invested into the well-being of their fish and began to understand that there were numerous factors influencing their survival. Programs providing experiences such as this can serve as an important tool into helping connect people to the natural environment regardless of the environment they come from.



FIGURE 2. Justin Petersen, a Nez Perce tribal fisheries employee, teaches Lapwai elementary students about healthy streambeds and macro and microinvertebrates. Justin worked with the fifth graders on a weekly basis and helped to monitor the steelhead fry. Photo by D'lisa Penney-Pinkham.

The physical experience of learning, especially in relation to the natural world, is important in reconnecting people to the world they live in. Connections, relationality, respect, and reciprocity cannot be made if students do not have an experience that is culturally responsive and relevant. In the case of education, there is no such thing as too early or too late. With time, the technology we use will continue to change; however, the need to educate and remind people about their connection to the natural world will always remain.

Perspective from Luvia Cajas Cano, a Hispanic Graduate Student

I was born and raised in Guatemala City. Guatemala is a Central American country slightly smaller than the state of Tennessee. Because of its rich cultural heritage and dynamic landscape, my country is known as “the land and heart of the Mayan people” or “the country of the eternal spring.” Culturally, Guatemala is comprised by a mix of Amerindian-Hispanic population and numerous indigenous peoples (mainly of Mayan heritage). Guatemala’s natural environment is shaped by highlands, volcanoes, rainforest, and exotic flora and fauna (e.g., ceibas, orchids, jaguars, and resplendent quetzals). Guatemala has abundant water resources (freshwater and both the Atlantic and Pacific oceans) that sustain indigenous populations. Historically, these populations have worked with nature rather than exploiting it;

however, their livelihoods are more dependent on commercial economies. Unfortunately, the need for more food and increased agriculture has contributed to changes in traditional uses of the land and deterioration of the environment fueled by lack of awareness of how to create sustainability, poor law enforcement, and limited infrastructure.

Increased urbanization surrounding many of our freshwater ecosystems has resulted in a decrease of water quality and increase of eutrophication. In many areas there are no regulations for water use or wastewater management, thus no way to enforce the sustainable use or treatment of water. Many of the freshwater lakes, such as Amatitlán, Atitlán (Figure 3), and Peten Itza lakes, receive urban and industrial wastewater from the surrounding areas without any treatment.

My father, a veterinarian parasitologist who specialized in cattle, was among my influential mentors. He understood the connections between clean water and food safety for human and environmental health. His knowledge and guidance helped me develop a personal passion for protecting water and the environment. My interest expanded to learn about ecosystem services and conservation of water.

One of the best approaches for protecting our water resources is to help people realize that our livelihood is closely related to the quality of the environment in which we live. I teach methods for calculating water footprints for different human activities. Water footprinting is a tool used to estimate the volume of freshwater consumed and polluted during



FIGURE 3. Lake Atitlán, Guatemala, viewed from a lake overlook. The lake is surrounded by volcanoes and small towns. Photo by Victor Cajas.

the entire life cycle (from cradle to grave) of any product or activity, similar to a carbon footprint. I conduct workshops about environmental protection for Central American exchange students and their teachers. In one of the lessons, I give away T-shirts with logos promoting environmental sustainability, but then I explain to participants that each T-shirt has a water footprint of 22,000 liters. It is a big surprise for the students to learn the impact of their consumer decisions on the environment.

Clothing choices are minimal compared to the large footprint of agricultural food production. In the United States, it takes an average of 2,000 liters of water to produce 1 kilogram of soybeans, and 16,000 liters for 1 kilogram of edible boneless beef. Learning and understanding about water footprints can lead to improved choices of consumption and encourage mitigation of pollution. I encourage my readers to think of water as money (as an example); how much and how/where would you spend a certain amount of water that is allocated to you in a certain period of time (daily, or in your lifetime). These tools will help regulators and those managing water resources locally and regional to improve their management of water resources. Some countries are taking water footprints into account in promoting certain human activities. For example, the Kingdom of Jordan has prioritized their imports and local productions in order to protect their water resources. Using the water footprinting tool helps regulators and those managing water resources to improve their use and better water management.

It is important for everyone to understand the embedded water and the water pollution involved during the production chain of all goods and foods. Use of bottled drinking water may be needed in some locations when water systems are not available or safe, but use of bottled water for convenience or prestige is not needed. Bottled water must be transported, and the bottles manufactured and then disposed of.

Regardless of the country or ecosystem, engaging humans to make changes in their nature stewardship is difficult, especially if many are not so inclined or there are not feasible alternatives. Environmental programs related to water use and natural resources management are needed at all levels in the education to enhance the people's understanding of how they affect the environment and how their choices will affect their future health and quality of life. The use of the water footprint is just one of the tools that can be used to help establish this connection and can be used at many levels of sophistication. In Guatemala, environmental education has been successful when there is an environmentally friendly alternative or choice for people to use. I am highly supportive of educating people about the power of individual and community choice on the natural environment quality, but a key element remains to provide people with the tools and knowledge to make this education effective.

Conclusion

Education is central to engaging students to careers in fisheries and natural resources, but as professionals we must be willing to go the extra step to help students and the public make these connections. Although various technologies can interfere with direct connection to the natural environment, some can serve a role in education, and the ease of collecting data from across the globe improves our ability to grasp a world context. By enhancing the awareness of the connections from local to global with tools that include experiential education, stories from elders, and water footprinting tools, we will aid understand of the linkages between our environment, our personal health, and our prospects for the future.

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