

Living Waters

Linking Cultural Knowledge, Ecosystem Services, and Wilderness

BY LINDA MOON STUMPF

Abstract: American Indian tribes value pristine water sources that often originate in wilderness areas to support provisioning and cultural benefits. Based on interviews with four traditional leaders, this article focuses on the concept of living waters in ways that connect ecosystem service benefits to wilderness. Cultural knowledge connects indigenous water stewardship and protection of living waters throughout watersheds as threats increase due to climate change and development.

Cycle of Life

Water energizes the cycle of life at the intersection between culture, ecology, and spirituality. Pristine, cool water can be thought of as the most important asset held by the environment over long periods of time. It encompasses weather, mists, underground springs, precipitation, drainages, and watersheds in a system of human cooperation and stewardship. In recent literature these assets held within the environment are referred to as ecosystem services (Daily et al. 2009). Water is more than a resource, it is *living water* to native people.

Weidner (2011) suggested that ecologists, economists, modelers, and geographers would have to work together to help build spatial tools that support ecosystem services assessments. Traditional ecological knowledge will also enhance this work. This article employs a simple definition of traditional ecological knowledge and adaptive ecological knowledge developed through intimate reciprocal relationships between groups of people in a particular place over time (Ecological Society of America 2012).

The Speakers and the Method

This article brings together knowledge from four in-depth interviews with native wisdom keepers, chosen for their knowledge of the cultural, spiritual, and ecological values of water. Each articulated knowledge within their cultures, and they all enjoy the role of elder wisdom keepers within their cultures and play recognized leadership roles locally, nation-

ally, and internationally outside their internal roles. They were all asked to answer 10 open-ended questions in an ethnographic-style interview. All four have grown up in traditional culture and are cognizant of the fact that watersheds transcend land-use boundaries. They come from four different tribes, three from the northwest and one from the

southwest United States. The first three take a regional focus. Billie Frank Jr., of the Nisqually Tribe, speaks of living waters connected to Mount Rainier and its wilderness. Delbert Miller, a spiritual leader of the Skokomish Tribe, shares origin narrative associated with wilderness and adjacent areas in Olympic National Forest and Olympic National Park. Calleen Sisk-Franco is the traditional leader of the Winneman Wintu Tribe in California. She speaks of alpine wilderness areas on Mount Shasta as a source of living waters. Lomayumtewa Ishii, chair of Native Studies at Northern Arizona University and a Hopi priest, gives the final southwestern interview, focusing on the relationships between living water and wilderness areas on the San Francisco Peaks. All spoke of spiritual and cultural uses of water and the need to prevent disruption of the natural systems that produce clean, clear water.



Linda Moon Stumpf.

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Living Water as an Ecosystem Service

It was clear in all interviews that moisture, as it arrives in the form of snow high in the alpine peaks, is critical. The peaks are the true homelands because they are the homes of the spirits and the origins of the people, of water, and of all life. Snow, ice, and rain at these high elevations represent the purest, coldest, and most valuable form. Cultural narratives recount origins in these alpine areas where spiritual beings make contact with humans and recharge the systems of life. The quality and quantity of these headwaters predict the water supply below and the sustainability of human occupation. Speaking for the water, Billy Frank Jr., an international leader on fisheries from the Nisqually and chair of the Northwest Indian Fish Commission, holds an intimate connection to the watersheds and springs related to Mount Rainier and the Nisqually River (see Figure 1). He gives us a description of the reverence and respect for these living waters:

The creator gave us all the gift of water; we respect it. It is for Indian people and it is for all people. It is what life is all about. Cool, clear water. Water is key to the culture and way of life, the spiritual and the cultural. We are gatherers and harvesters. Both quantity and quality of water are important. The salmon and the shellfish need it. ... Indians still go to the springs at the foot of our mountain Tahoma and get water to take home. Spring water. It is beautiful there. Blue water. Beautiful blue water. You can drink it right out of your hand. It generates from under the earth. I'll take you there sometime. (Frank 2011)

These high elevations are holy places. To commodify these resources

for economic markets is the greatest of "takings," for it denies people's origins. The willingness of tribes to use enormous amounts of their resources to fight for the protection of sacred peaks evidences the respect with which they are held. They communicate the indigenous understanding of their importance as the origin point of services that sustain their culture and their existence.

For the Winnemem Wintu Tribe in northern California, the icy water high on Mount Shasta (see Figure 2) is the home of their benefactor, the McCloud salmon. Their cultural existence is threatened without the icy water and the salmon (Sisk-Franco 2011). Access to clean river water is essential for the young women's ceremony: young women swim across the river in the ceremony in the process of becoming a woman of the tribe. For the Hopi and the Navajo and other Arizona tribes, the San Francisco Peaks (see Figure 3) represent a homeland for which they bear a responsibility to protect as a source of spiritual and life-giving benefits. The threat to their cultural existence includes the loss of their wisdom, their respectful relationships,



Figure 1 – Mount Rainier. Photo by Dave Graber.

and their understandings and practices related to the support of ecosystem services through the protection of the waterscape. The cultural existence of indigenous people who have lived on the land for thousands of years is in itself an ecosystem service because their residence records an interaction with the environment that supports a rich



Figure 2 – Middle Falls on the McCloud River. Photo courtesy of the U.S. Forest Service.



Figure 3 – San Francisco Peaks. Photo by John Batchelder.

cultural and religious life. This is the only long-term record of human interaction with the ecosystem that comes from a direct, original source.

Indigenous scientists with parallel Western scientific training recognize the significance of origin stories that function as primary sources of connectedness and continuity. The same understanding is transmitted by Western scientists who have deep and long-term dedication to understanding indigenous knowledge. Physicist David Peat (2005), for example, writes: “That to deny a people’s origins is to cut them off not simply from the land they physically occupy but also internally – from the very sense of their own bodies.” In Arizona, tribes worked to establish the Kachina Wilderness as a way of protecting such values. But today, the city of Flagstaff, Arizona,

sells treated sewage water to be piped to the top of the San Francisco Peaks next to the Kachina Wilderness to make artificial snow. Evaporation and displacement disrupt the cleansing return to the aquifer. With a focus on the market price of water alone, the city failed to understand the interconnectedness signaled by Hopi elders. Ishii describes the connectedness of living water as it flows, rises, and transcends land management boundaries:

It is better for the water to return to communities through natural systems to carry out daily life projects ... it is all part of a system. ... Fir boughs are used by the Kachinas because the firs live higher and they need water: clouds live on the boughs of these trees. By using fir boughs in ceremonies, prayers will return to the Kachinas

on the peaks. They return to us as rain. (Ishii 2011)

Commodified water piped out of the watershed and sprayed in the air misses the natural cleansing process of seeping deeply into the earth to be purified, balancing out its human use with its pristine, icy origins atop the peaks. Snowmaking machines lack the ecosystem functions of the natural seasonal flows that support the peaks’ rare alpine meadows, plant willows, the herbaceous plants used for medicines, and life-forms in all seven life zones. Thirteen tribes in Arizona, recognizing the critical functions that the peaks and the associated precipitation provide, continue to fight to protect them on native religious grounds. But the federal courts, unable to recognize the broad meanings drawn from indig-

enous epistemology that connect the belief system with ecosystem services beyond land management boundaries, fall silent. The very nature of water is to move, flow, permeate, evaporate, and precipitate in ways that cannot be contained. Nor can the impacts to the associated spiritual beliefs be contained: "Certain deities, such as Kachina (Hopi) or Ga'an (Apache), dwell on the peaks, and that snow-making (irrespective of the source of water) will negatively impact the deities, potentially causing drought or other suffering" (Ishii 2011).

Echoing the southwestern example, the life-producing wild waterscape that was threatened in the Northwest impacted the culture of the Skokomish Tribe. Their culture is so water dependent and so closely connected with fish that they recognize the salmon as their ancestor. Delbert Miller relates the emergence of the people from the second branch of the Skokomish creation story that mirrors the deep sense of connectedness with the salmon and its continuous celebration in the origin of the Water Ceremony: "They climbed out of water, now turning into humans. You could still tell they were half salmon, the first ones. The Father came and said, 'I will return and you prepare for me.' They prepared the blessing of the Water Ceremony. They began to do that as instructed" (Miller 2011).

Clear, cold, pristine water is needed for the Skokomish Water Ceremony held at high elevations. Ceremonial bathing in icy water at high elevations ties spiritual beliefs to indigenous life activities through origin stories:

The Changer wept and said:
"These are my beloved people ...
wherever they go wild roses will
grow." This is the beauty of the gift.
... It was so sacred that everything

was frozen and went into a fast. ...
People swim in those tears: it is the
kind of water they drink and set aside
for cooking. The water is called "sweet
water." It waters the sacredness within
us: it waters our internal sacredness
and spirituality. (Miller 2011)

The ecosystem functions of living water are poetically described in Delbert Miller's narrative:

There are a few basic rhythms
of life: fish swimming back and
forth, wind coming down to the
valley, streams coming from
mountains to the valleys, butterflies
flying, leaves falling. It's a living
dance. Do not change the dance of
the stream. Every year the stream
moves, creating different places. You
return and it's different because it's
alive and dancing. They dress
themselves by logjams, by flowers
and trees, and they give refuge for
the ones they are to protect. They
know they are home to fish and
things that live there. They give
retreat for things that need a place.
(Miller 2011)

Water and Ecosystem Services under Conditions of Climate Change

The contribution of clean, cold waters for fish habitat is integral to the indigenous diet, but this is being impacted by climate change. Salmon represent one of the most efficient systems in nature. They leave the streams of their birth as tiny fingerlings and go to the ocean where they absorb the nutrients and resources of the sea. They return to the icy streams of their birth with pounds of rich, healthy flesh for the diets of wildlife and humans. Almost no other ecosystem service is as efficient, as bountiful, or as healthy as the production of salmon from cool stream habitats. Northwest cultures make

direct linkages between water and food that are impacted by climate change. The right to have salmon as food is founded in the responsibility to care for the water. Indigenous adaptation is the constant practice of the responsibility to keep the water clean, founded in spiritual practice and connected with the right to take salmon:

The salmon need clean water.
We pray for blessing of the water, no
refuse to be in the water. ... Some
beings became the Tree People whose
leaves fall and hit the ground and
they called to the Salmon People. The
leaves hit each other on the way down
and called to the Salmon People to
come home, telling them that the
people have kept the water clean. The
Father of the salmon comes; he is the
first for the Salmon Ceremony. In the
Salmon Ceremony, his remains are
put into the water and he would
swim back to his home and tell the
salmon that people have done the
ceremony and the leaves have fallen,
so it's time to return home to the
people. (Miller 2011)

When a species such as salmon is critical to healthy diet, water issues, and cultural uses, a careful assessment is needed as climate change proceeds. We are reminded that life-forms are vulnerable and require certain qualities of water to be sustained. Billy Frank Jr. talks of the critical free-flowing clean, cold water habitat required for salmon, and he identifies the direct impacts to ecosystem services from climate change:

In the past, glaciers melted
slowly during the summer months
and helped contribute cool, clean
water to the rivers where salmon
begin and end their lives. But today
our rivers are getting warmer and our
glaciers are disappearing, harming
salmon at every stage of their life
cycle. Salmon and Indian people

evolved together over centuries, but climate change is happening in the blink of an eye. It's happening too quickly for salmon – and us – to keep up. (Frank 2011)

Embedded in the Skokomish origin stories are descriptions of climate change and adaptation to changing ecosystem services that narrate the people's move from forest to coast, from deer and elk to salmon. The reproductive capacity of salmon is recorded in the portion of the narrative that marks the increasing abundance of offspring. The connection with cedar is also embedded in the cultural narratives of the Skokomish people: "Grandmother Cedar taught generosity. ... For thousands of years it stands ... the Plant People are cheering, applauding the salmon coming home ... see them standing together" (Miller 2011).

Medicinal plants and herbs produced by the forest's interaction with healthy watersheds define a provisioning service that requires sufficient amounts of pristine water for growth that may be affected by climate change. Tribal members have specific gathering areas for medicinal plants. Traditional ecological knowledge describes their potency as dependent on certain gathering sites, sacredness, and human interaction with these sites.

The mountain is like a pharmacy. Plants are adapted to a water system that provides pure water at specific times and quantities. Religious uses of plants are important like gathering of (certain plants) for the kiva, the need for pure and unpolluted sources of material. Impure water can have a bearing on spiritual practice ... you cannot assume the threat is the same to all tribes, since they have different practices. (Ishii 2011)

Prehistoric and historic reactions to major shifts in climate often combined with human conflict over water. Fagan (2011) agrees that migrations and dispersal were often the result of changes in climate, and he suggests that cultural landscapes can be redefined as homelands under adaptive management. Even so, without the preservation of cultures, migrations may result in significant impacts and loss of the wisdom that supports living sustainably within the watershed, and the sustainability of ecosystem services is intimately connected to culture and the recognition of connectedness.

Living Waters and the Weather Cycle

The respondents agreed all types of water provide important cultural and provisioning benefits: the liquid, flowing water, the gas vapor in the clouds and mists, the dew on the boughs of spruce, the solid ice and snow, and various types of precipitation. They are understood as part of a system that moves precipitation to seepage into groundwater, from running streams to gurgling springs. Weather patterns take place over long periods of time and may be little understood by newcomers who take them to be static and absolute (Logan 2008), so memories of indigenous people are important in discerning shifting patterns. The intersection of special forms of water with the shifting cycle of weather patterns is specific to a given region. These are understood and shared through a ritual calendar that recognizes the role of weather in sustaining ecosystem services and in stories and prophecies that record cataclysmic events. For example, the montane meadows that produce the medicinal herbaceous plants for the Hopi and Navajo are dependent on snowmelt. Alpine and subalpine plants are particu-

larly sensitive to pollution, so clean, natural snow provides the moisture that is needed. Cultural symbols mark these relationships and underline the need for good heart, for collaboration, and for good behavior as part of indigenous stewardship.

Like the Skokomish oral traditions, Hopi understandings bridge the long history of prehistoric agriculture and what happens when humans disrupt the natural and ceremonial cycles to upset critical ecosystem services. Ishii warns of unknown and uncontrolled effects as he indicates the predictive capacity of indigenous knowledge. Traditional stories hold markers that may indicate when the range of variability experienced and recorded in traditional knowledge is exceeded:

What interferes with these cycles when unknown effects occur? We have the stories of drought from Chaco Canyon. What happened there? What got out of balance when the water and animals went away? A spiritual disconnection of some kind occurred. This approach is guided by an indigenous way of thinking, acting, and the ceremonial cycles. We look at things through time: versus the now thing. How people were in cycle in the past and how they will be in the future are tied. What will happen ... not what happens. The world we used to know. (Ishii 2011)

Protecting Living Waters, Cultural Knowledge, and Wilderness

Traditional ecological knowledge as expressed through the concept of living waters and indigenous water stewardship strengthens cultural/community-based institutions, preserves long-term traditional ecological knowledge, and points to the need to conserve connected watersheds.

Cosmologies that articulate the balance between Father Sky and Mother Earth connect precipitation and weather cycles with water systems on earth. This is a source of long-term knowledge about weather and water sources: "A good number of American Indians and Alaska Natives have maintained thousand- and hundred-years-old relationships with specific landscapes and seascapes. The knowledge embodied in these deep spatial relationships to homelands have served indigenous peoples well." (Wildcat 2009, p. 3)

Indigenous markers identified through traditional ecological knowledge operationalize the traditional values of indigenous stewardship into knowledge and practice. They point to important strategies and alternatives when the earth-sky balance reaches a tipping point. This deserves consideration in wilderness management along with strategies to protect watersheds adjacent to wilderness areas. Failure to ensure provisioning and cultural benefits basic to indigenous cultures results in the disappearance of bodies of knowledge, practices, and technologies that emerged from a long evolution of interaction with wild places. Without enhanced protection, climate change may result in forced migrations and

dietary changes. The seriousness of this loss should not be underestimated. If the fish are gone from their icy homes, if the practice of indigenous fishing and agriculture stop, the interconnected practical knowledge of the species and their place in the cycles of living water will be lost. It isn't possible to assess the tipping point for ecosystem services unless the whole can be described. Traditional ecological knowledge is embedded in the land and living waters for each indigenous nation that has participated, observed, and recorded information for thousands of years (Stumpff 2006; Turner and Clifton 2009). It is virtually irreplaceable and deserves consideration. New strategies are needed to protect these water-based ecosystem services connected to wilderness. This reaffirms protection of traditional ecological knowledge and the cultures that carry it. The idea of living waters engages deep discussions beyond land management boundaries. It paints an ongoing mural so we can see ancient scenarios, their contemporary evolution, and the future of living water.

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