

Place Based Management: An Indigenous/Western Science Perspective



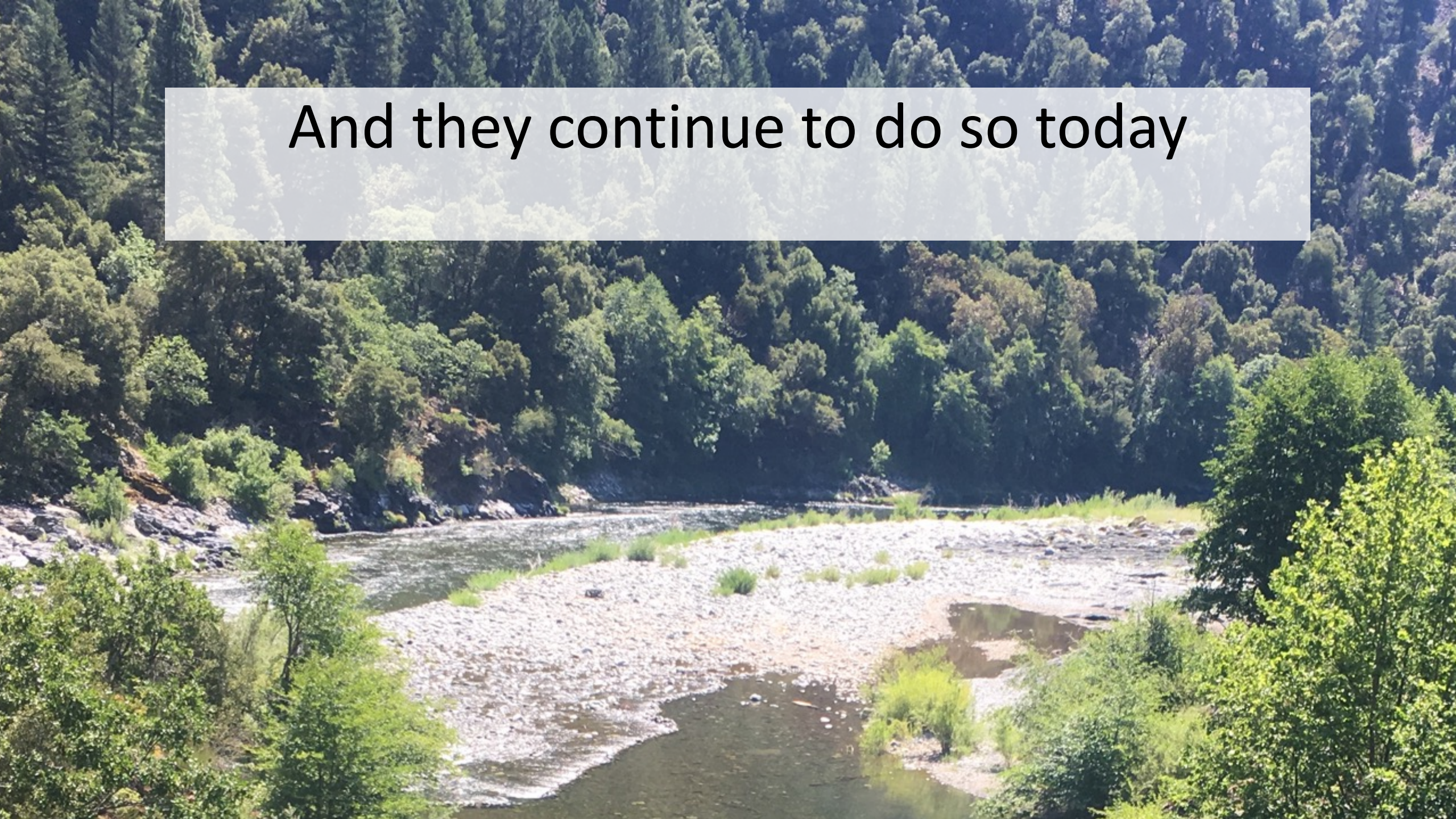
Ron Reed Karuk Tribe, Kari Norgaard University of Oregon
Spring Chinook Symposium July 23, 2020

(all photos credited to Karuk Tribe)

Indigenous
peoples have
been managing
for Spring Chinook
on the Klamath
for a long time . . .



And they continue to do so today



Karuk ecological management has shaped species abundance, distribution, and habitats in a wide variety of ways . . .

The exceptional biological diversity of the Klamath River region has emerged in conjunction with sophisticated Karuk land management practices, including the regulation of the forest and fisheries through ceremony and the use of fire.



Karuk culture, knowledge, values, and political savvy shape Spring Chinook management today

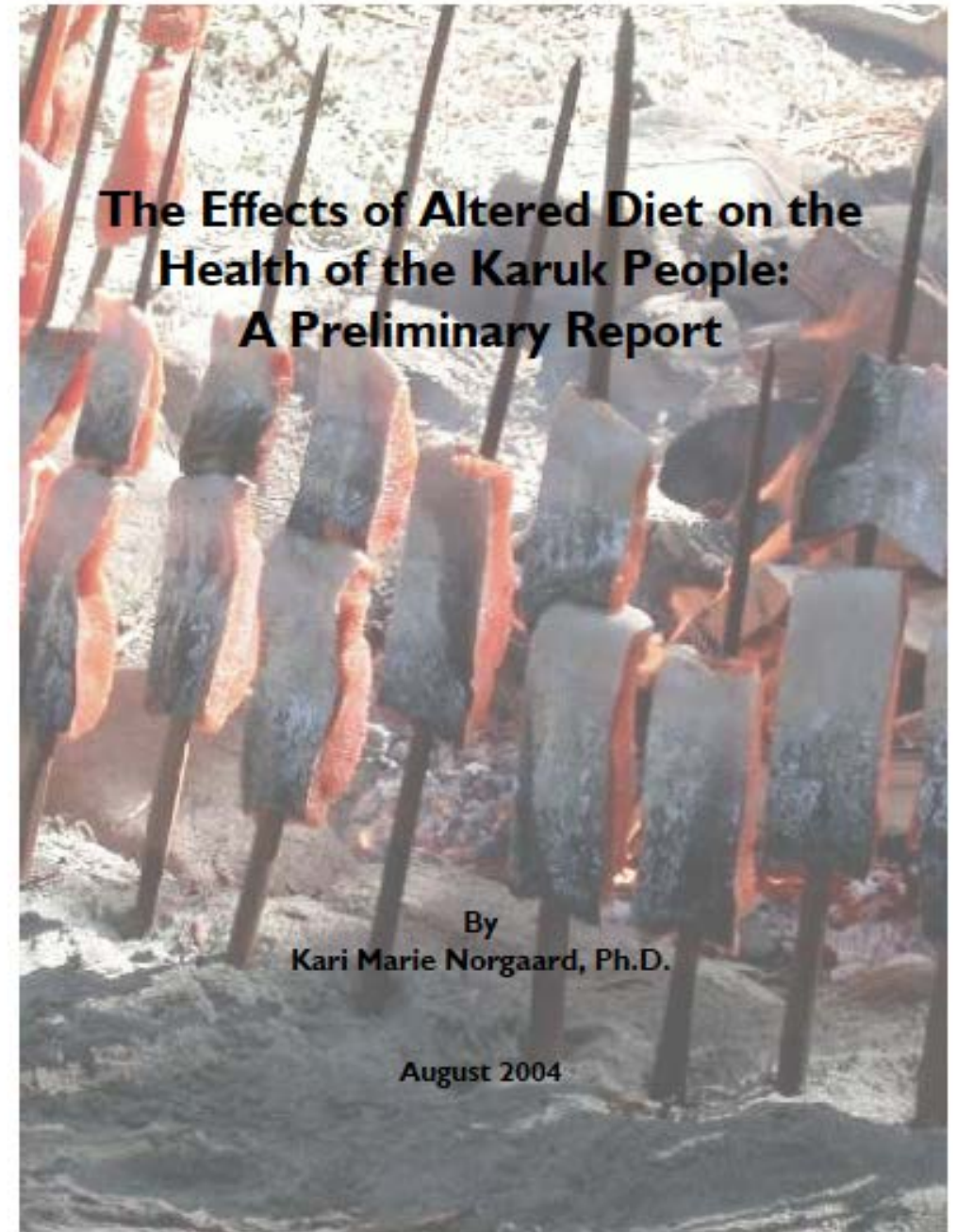
- Past ecological management shaped existing ecology:
Indigenous ecologies
- Western scientific research on Klamath fisheries has benefitted from Indigenous science
 - Reed and Norgaard FERC altered diet study, more recent publications
 - Dr. Frank Lake
 - Smoke shading
- Political presence in dam relicensing and natural resource policy
- Relevance of Karuk traditional knowledge in guiding how to move forward
- Community organizations, e.g. SRRC

Karuk knowledge and sciences are shaping scientific research in the basin

- Western scientific research has benefitted from Indigenous science



Reed and Norgaard: FERC altered diet study



The Effects of Altered Diet on the Health of the Karuk People: A Preliminary Report

By
Kari Marie Norgaard, Ph.D.

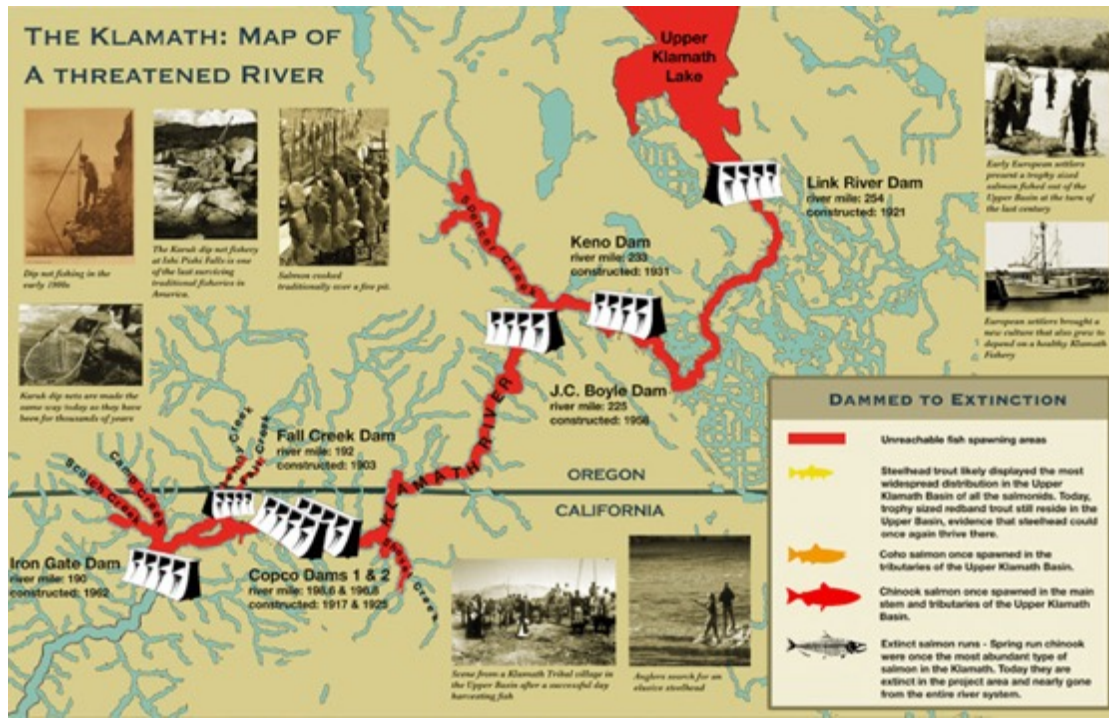
August 2004

Why Have Karuk Diets Altered?





Karuk became the first Tribe to claim in a Federal process that a dam was giving them artificially high rates of diet related diseases




Context

- Federal Energy Regulatory Commission re-licensing of Klamath Hydro-electric Project
- Evaluate impacts of dams
- Identify health impacts of loss of salmon for Karuk Tribe



How have Karuk diets changed?

- Pre-contact diet: 1.2 pounds of salmon per person per day

- 
- A photograph of a salmon in mid-jump, clearing a rocky barrier. The fish is silvery with dark spots and is angled towards the right. The background shows a bright blue sky with soft, white clouds. The foreground consists of dark, wet rocks.
- **1960's: Salmon consumed up to three times/day**
 - **2019: < 5 pounds per person per year**

- 
- **Karuk Tribe has one of the most recent and dramatic diet shifts of Indian Tribes in the United States.**

Integration of interdisciplinary frameworks: Social Consequences of Denied Access to Traditional Foods



Photo: Karuk Tribe of California

Gender studies/masculinity



Original Research Article



Sociology of Race and Ethnicity
1–16
© American Sociological Association 2017
DOI: 10.1177/2332649217706518
srs.sagepub.com
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How Environmental Decline Restructures Indigenous Gender Practices: What Happens to Karuk Masculinity When There Are No Fish?

Kari Marie Norgaard¹, Ron Reed², and J. M. Bacon¹

Abstract

On the Klamath River in northern California, Karuk tribal fishermen traditionally provide salmon for food and ceremonies, yet the region has sustained serious environmental degradation in recent years. What happens to Karuk masculinity when there are no fish? Using interviews and public testimony, the authors examine how declining salmon runs affect the gender identities and practices of Karuk fishermen. Gendered practices associated with fishing serve ecological functions, perpetuate culture in the face of structural genocide, and unite families and communities. The authors find that the absence of fish resulting from ecological damage affects both food availability and the quality of social connections, which in turn affects individual gender practices and symbolizes genocide to the community. Karuk men's individual struggles to construct themselves as men are thus interwoven with struggles against racism and ongoing colonialism. The authors coin the term *colonial ecological violence* to describe these circumstances. They also describe how some men restructure masculine identities by transferring "traditional" cultural responsibilities to fish, community, and "collective continuance" to new settings as activists and fishery scientists. The authors call for a decolonized sociology that uses more theorizing of the particular and very real ways ecological relationships structure gender in traditional Native communities to understand the operation of gendered and racialized colonial violence in the form of environmental degradation, today.

Keywords

Indigenous, colonialism, environment, masculinity, racism, Karuk

It's an important role in being a man in the tribe . . . you know . . . you fish for your family, you fish for the people . . . And there's fish days, and the ones who owned those fish days were responsible for feeding the community . . .

Karuk fisherman and father

It's been a way of life for as long as I can remember. My grandfather and his parents and on and on have been fishermen. I can't imagine life without having a whole line of fishermen. I don't even know how to compare it to someone else because it's just such a big part of who I am. Our whole culture . . .

Karuk woman, weaver in her 40s

If fishing and hunting and providing for your family is what makes you a man, then if you are

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Sociology of Emotion



Emotional impacts of environmental decline: What can Native cosmologies teach sociology about emotions and environmental justice?

Karl Marie Norgaard¹ · Ron Reed²

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Abstract This article extends analyses of environmental influences on social action by examining the emotions experienced by Karuk Tribal members in the face of environmental decline. Using interviews, public testimonies, and survey data we make two claims, one specific, the other general. We find that, for Karuk people, the natural environment is part of the stages of social interactions and a central influence on emotional experiences, including individuals' internalization of identity, social roles, and power structures, and their resistance to racism and ongoing colonialism. We describe a unique approach to understanding the production of inequality through disruptions to relationships among nature, emotions, and society. Grief, anger, shame, and hopelessness associated with environmental decline serve as signal functions confirming structures of power. The moral battery of fear and hope underpins environmental activism and resistance. More generally, we expand this concern to argue that neglecting the natural world as a causal factor for "generic" social processes has limited not only work on Native Americans, but also work sociology of emotions and theories of race and ethnicity, and has masked the theoretical significance of environmental

Reed and Norgaard have been working closely together since 2003, conducting policy-relevant research on tribal health and social impacts of environmental decline. Their 2008 report *The Impact of Altered Diet on the Karuk Tribe* was submitted to the Federal Energy Regulatory Commission as part of the opposition to the relicensing of the Klamath River dams. This action represented the first time a tribe had claimed that a dam had given their people artificially high rates of diabetes and other diet-related diseases. Since that time Reed and Karl have continued to work on policy-driven research projects including work that established Tribal Cultural and Tribal Subsistence beneficial use in the TMDL water quality process in California for the first time. Together they have co-supervised over a dozen undergraduates and Masters' theses and have several co-authored publications. They continue to work actively together on new projects.

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Ongoing influence of Karuk political savvy on Spring Chinook management

Political presence in dam
relicensing

(importance of other culturally
identified species such as
freshwater mussels)



The Washington Post

SUNDAY, JANUARY 30, 2005

NATIONAL NEWS

Diabetes and heart disease were rare among tribal members before World War II. Part of the reason was the super-abundance in their salmon-rich diet of omega-3 fatty acids, which research has linked with reduced risk of heart disease, stroke and diabetes.

"We do know that the nutritional values of subsistence fish are superior to processed foods and convenience foods," said William Lambert, an environmental epidemiologist at Oregon Health & Science University in Portland.

With subsistence fish all but gone from the Karuk diet, the percentage of tribal members with diabetes has jumped from near zero to about 12 percent, nearly twice the national average, according to the tribe. The estimated rate of heart disease among tribal members is 40 percent, about triple the national average.

A number of studies of Native Americans across the United States have shown that the loss of traditional foods is directly responsible for increasing rates of obesity-related illnesses.

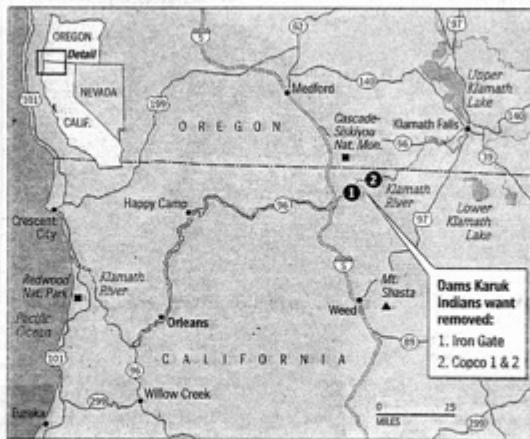
Steve Burns, a physician for three years in the tribal clinic in Happy Camp, said that diabetes and other obesity-related illness are "a huge and growing problem."

"What is happening to the Karuk people is like something you would read about in a book on the destruction of a minority group in the old Soviet Union," he said.

The change in the tribe's diet in



In October, Rod Reed fished in the Klamath River. The tribe's catch last fall was fewer than 100 chinook salmon.



Ron Reed said that if the dams were breached, new generations could grow up eating salmon, the traditional staple of Karuks.

the past generation has been so great that many Karuk concede that it will be difficult—even if the dams are knocked down and salmon runs are revived—for them to return to their traditional healthful diet.

"Of course, we won't be able to

eat salmon all the time like we did," said Ron Reed, a traditional fisherman and tribal representative to FERC hearings on the dams. But he said everyone in the tribe would eat vastly more than they do now and that children would once again be

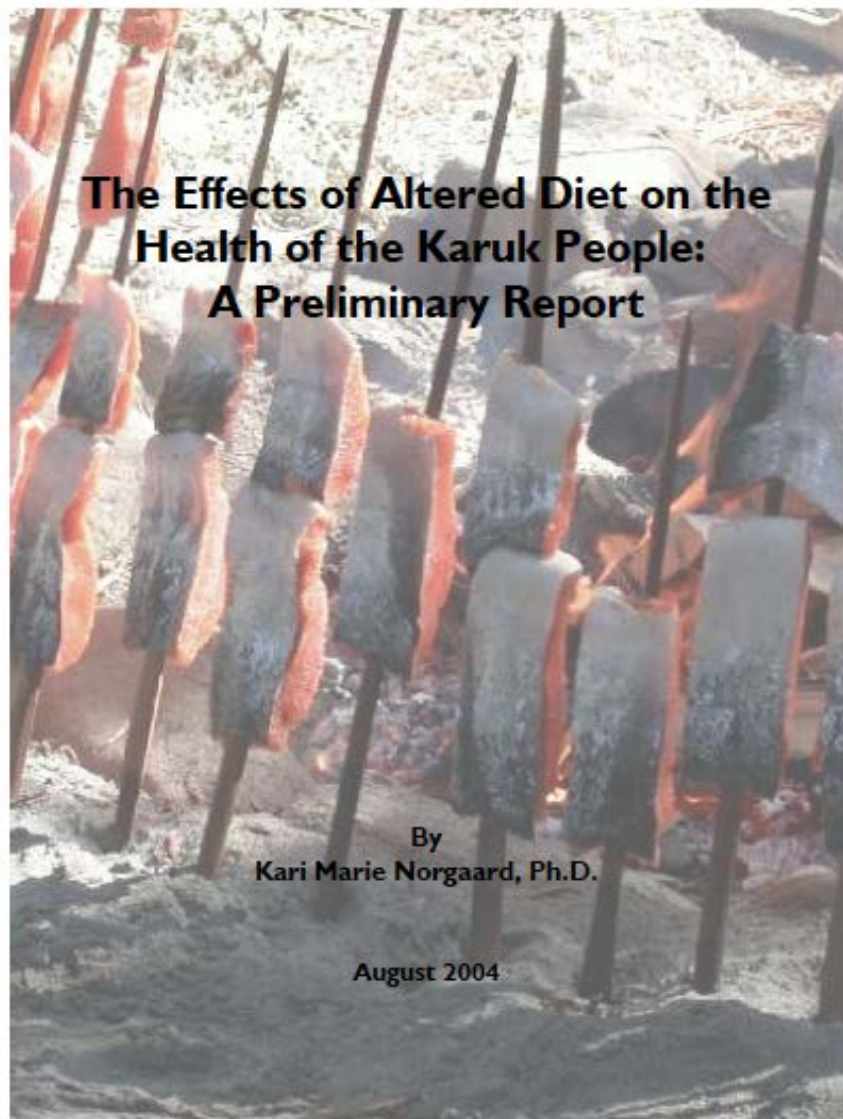
able to grow up with the staple food that has traditionally kept the bodies and spirits of the Karuk healthy.

Last year, because of the record-low catch, tribal elders did not have enough salmon for religious ceremonies. So they bought some.

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Kari Marie Norgaard, Ph.D.

August 2004



Setting Cultural and Subsistence Beneficial Uses for the Klamath River



All photos Karuk Tribe

Unique Approach in Karuk Climate Adaptation Plan

- Focus on wildfire
 - Fire as medicine
 - Need to return traditional management to landscape
- Species of Focus and Range of Issues
 - Traditional foods and cultural use species
 - Program capacity
 - Management authority, and sovereignty
- Combined Use of Indigenous and Western Science

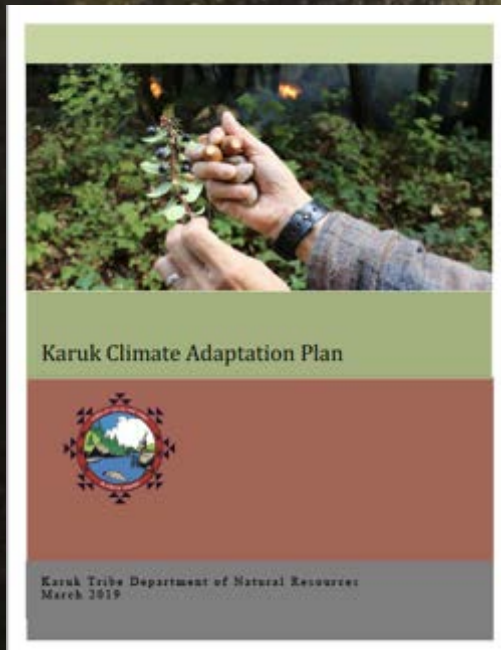
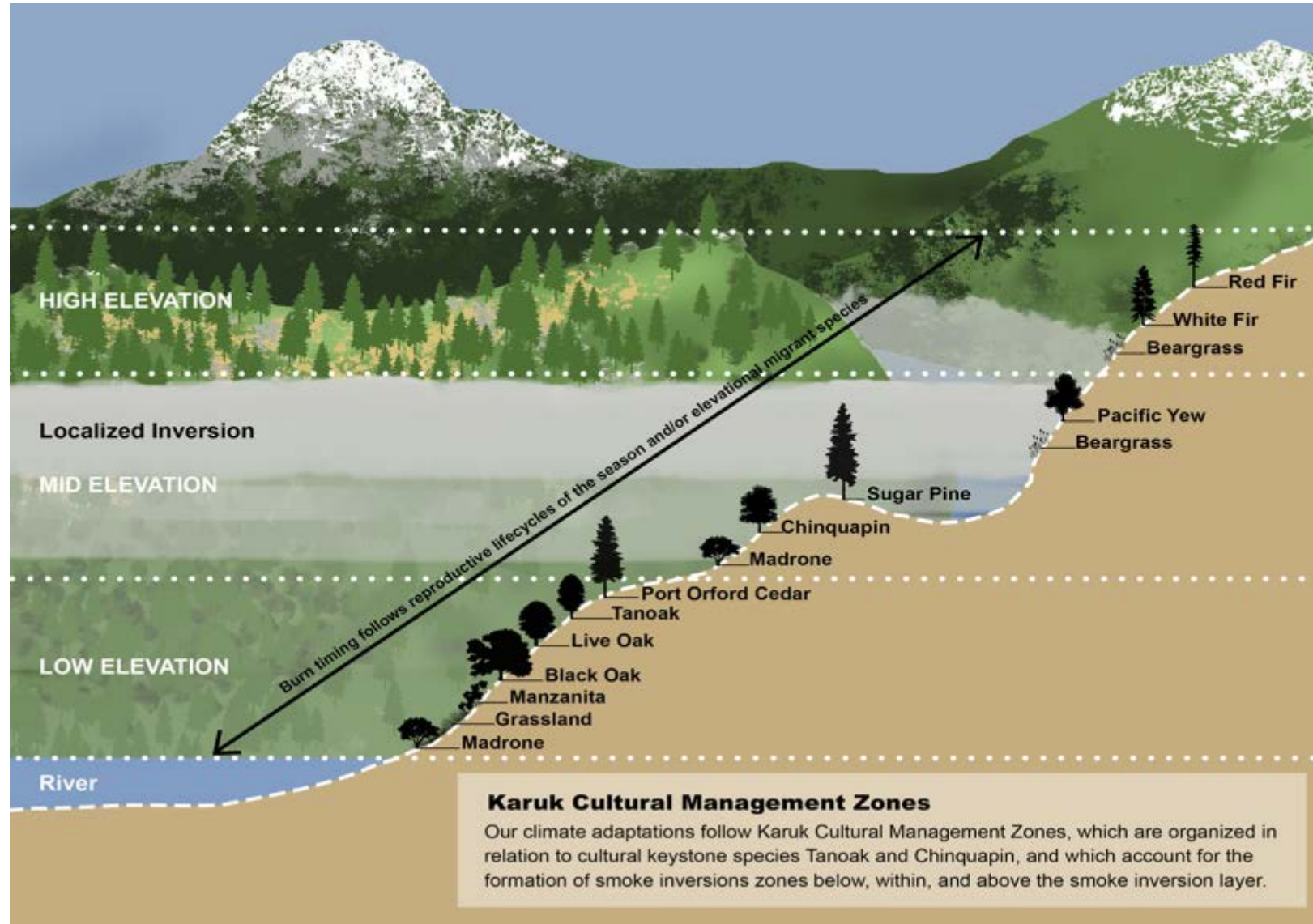


FIGURE 3.1 SEASONALITY AND ELEVATION DYNAMICS OF CULTURAL INDICATORS IN KARUK CULTURAL MANAGEMENT ZONES
(illustration courtesy of Kirsten Vinyeta)



Salmon and smoke shading

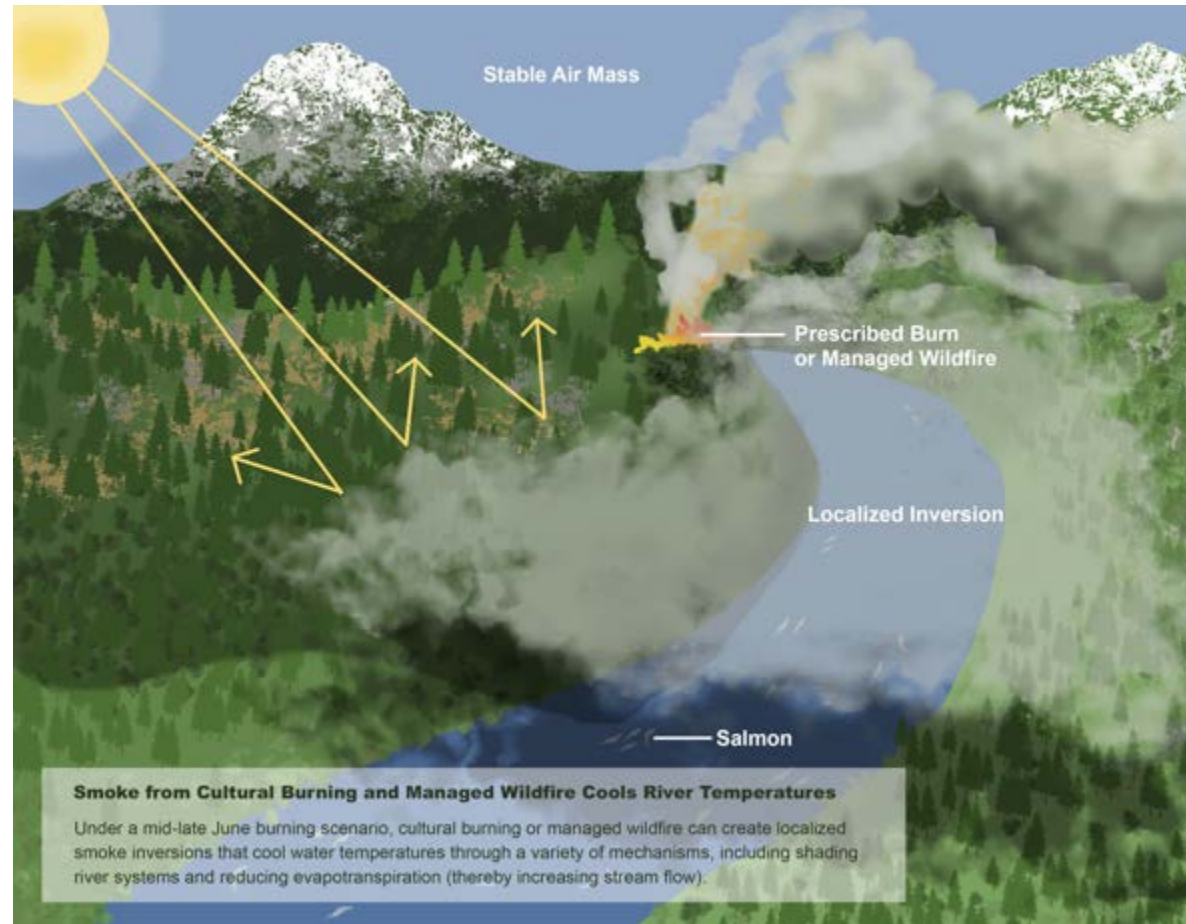


FIGURE 3.8 SMOKE FROM CULTURAL BURNING AND MANAGED WILDFIRE COOLS RIVER TEMPERATURES (ILLUSTRATION COURTESY OF KIRSTEN VINYETA)



Water Resources Research

RESEARCH ARTICLE

10.1029/2018WR022964

Key Points

- Wildfire smoke cools river and stream water temperatures by reducing solar radiation and cooling air temperatures
- For both air and water, smoke has a greater cooling effect on daily maximum temperatures than daily mean temperatures
- This smoke-induced cooling has the potential to benefit cold-water adapted species in fire-prone watersheds

Supporting Information:

- Supporting Information S1

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Citation:

David, A. T., Asarian, J. E., & Lake, F. K. (2018). Wildfire smoke cools summer river and stream water temperatures. *Water Resources Research*, 54, 7275–7290. <https://doi.org/10.1029/2018WR022964>

Received 18 MAR 2018

Accepted 20 AUG 2018

Accepted article online 21 AUG 2018

Published online 4 OCT 2018

Wildfire Smoke Cools Summer River and Stream Water Temperatures

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Abstract To test the hypothesis that wildfire smoke can cool summer river and stream water temperatures by attenuating solar radiation and air temperature, we analyzed data on summer wildfire smoke, solar radiation, air temperatures, precipitation, river discharge, and water temperatures in the lower Klamath River Basin in Northern California. Previous studies have focused on the effect of combustion heat on water temperatures during fires and the effect of riparian vegetation losses on postfire water temperatures, but we know of no studies of the effects of wildfire smoke on river or stream water temperatures. Wildfire smoke is difficult to quantify, but we successfully used a newly available daily high-resolution (1 km) data set of aerosol optical thickness (AOT) derived from satellite imagery to represent smoke density during 6 years with extensive wildfire activity (2006, 2008, and 2012–2015). Smoke reduced solar radiation by 121 W m⁻² per 1.0 AOT relative to clear-sky conditions. Linear mixed-effects models showed that on average, smoke cooled daily maximum and mean air temperatures by 0.98 °C and 0.47 °C per 1.0 AOT, respectively, across 19 remote automated weather stations. Smoke had a cooling effect on water temperatures at all 12 river and stream locations analyzed. On average, smoke cooled daily maximum and mean water temperatures by 1.32 °C and 0.74 °C per 1.0 AOT, respectively. This smoke-induced cooling has the potential to benefit cold-water adapted species, particularly because wildfires are more likely to occur during the warmest and driest years and seasons.

1. Introduction

Water temperature is a fundamental regulator of river ecosystems (Biltinger & Fitzpatrick, 1979; Beschta et al., 1987). Temperature influences ecosystem metabolism (Von Dürsch et al., 2012), growth rates (Armstrong et al., 2010), reproduction (Ward & Stanford, 1982), and species distributions (Shuter & Post, 1990). For example, the freshwater distributions of Pacific salmon and trout (*Oncorhynchus* spp.) are often constrained by high summer water temperatures (Dunham et al., 2007; Kelson & Rahal, 1996; McCullough, 1999). Indeed, human-induced increases in lotic (stream and river) water temperatures (Calsik, 2006; Poole & Berman, 2001; Webb et al., 2008) have contributed to declines of salmon and trout populations (McCullough, 1999; NAS [National Academy of Sciences], 1996). To guide the restoration of natural thermal regimes in rivers and streams for the benefit of salmonids and other cold-water adapted species, we need to understand the factors that create spatial and temporal thermal variation across the landscape. One phenomenon that can drive variation in lotic water temperatures is wildfire (Gresswell, 1999).

Here we evaluated whether wildfire smoke can reduce lotic water temperatures during the season of peak air and water temperatures within a climatically Mediterranean watershed. While wildfire is a distinctly seasonal phenomenon, fires can substantially influence aquatic ecosystems (Gresswell, 1999; Minshall et al., 1980; Rieman et al., 2012). Studies of wildfire effects on lotic water temperatures have focused on the effect of the heat of combustion on water temperatures during a fire and the effect of riparian vegetation losses on postfire water temperatures (Beakes et al., 2014; Dunham et al., 2007; Hitt, 2003; Isakk et al., 2010; Mahlum et al., 2011). Water temperatures can rise as a result of direct heating from a fire (Beakes et al., 2014; Gresswell, 1999; Hitt, 2003), although such increases are not ubiquitous and are often short-lived (Beakes et al., 2014; Hitt, 2003; Mahlum et al., 2011). More prolonged impacts have been documented following wildfires on summer water temperatures, which can increase as a result of reduced riparian shading and changes to channel morphology, sometimes for over a decade (Beakes et al., 2014; Dunham et al., 2007; Isakk et al., 2010; Mahlum et al., 2011).



“We are trying to get back to an intact world. Climate change can be a vehicle for that because of the awareness it brings to so many about limitations in the current management practices. We believe there is genuine interest in Karuk perspectives about how to care for the land. We offer these explanations in the hopes that this is true.”

- Ron Reed, Karuk Tribe Fisheries Program

Relevance of Karuk traditional knowledge in guiding how to move forward

“The spirit of life needs to be re-acknowledged and reassessed to accompany humankind on this path....”



- “Our story needs to be told to heal the physical and mental health atrocities that have been marginalized in the history of this place we call home.”



*Landscape change as colonial
ecological violence*



1905, Klamath National Forest

- Fire exclusion as official policy
- “There is also another source of fires, which I will call the renegade whites and Indians in the district . . . They set fires for pure cussedness or in a spirit of don’t care a damativeness, they have nothing at stake, and don’t care whether the fire damages others or not. . . In the “Pure cussedness class”, the only sure way is to kill them off, every time you catch one sneaking around in the brush like a coyote, take a shot at him”.
 - F.W. Harley, USFS District Ranger January, Klamath National Forest, Orleans, Calif. Jan. 30, 1918 letter to Mr. Rider



An underwater photograph showing several salmon swimming over a rocky riverbed. The water is clear and blue, and the scene is brightly lit, likely by sunlight filtering through the water. The salmon are in various positions, some swimming towards the camera and others away from it. The rocks are large and light-colored, with some smaller stones scattered around.

**Yôotva to all who shared information about
their lives via interviews and surveys.**

*** * ***

**Yôotva to our families. Yôotva to the Karuk Tribe
Department of Natural Resources, and to each of you
for your work in this world**

*** * ***

May the river and the people flourish