Paleofire and the Science-Policy Interface in Pacific Northwest Forest Management

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Conceptual Model

Wildfire policy and the science of paleofire exist adjacent but with few direct existing connections, excepting tree-ring research. This model illustrates linkages to be created and strengthened through new initiatives for paleofire research.

Questions of History

- **In what ways has the practice of fire suppression reproduced itself?**
- **What are the historical roots of pyrophobia?**
- **Is the move toward restoration of fire regimes more informed by historical fidelity or other priorities?**

Questions of Politics

- **How does past variability weigh against risks in the calculus of fire restoration management?**
- **How is fire regime restoration impacted by pressure from developers to facilitate Wildland-Urban Interface expansion?**

Wildfire Policy

Forest fire policy in the United States and Western States particularly is a milieu of social and political concerns which continues to prioritize fire suppression. Challenging spatial relationships between the built environment and wildlands, a settler-colonial association of fire with indigenous "mis-use" of lands and protection of natural resources have entrenched these policies. Depedence on NEPA process is a defining characteristic (Stevens and Ruth 2005).

A vast diversity of people and institutions are stakeholders in the management of wildfire in the West. Many of these actors are active users of fire science and likely have both interest in and ability to use paleofire perspectives on wildfire in a changing climate. Awareness of paleofire insight is a primary obstacle, but recognizing different needs and abilities as well as power relationships between actors is crucial (Meehan 2017).

Publics & Officials

Science-Policy

The existing passive influence of paleofire science on the policies that govern wildfire related activity are tightly associated with restoration of more frequent fire but are not integrated into other frames of reference such as changing biogeography.

Policy Practice

Interacting with publics and officials of wildfire policy requires understanding how individuals and collectives enact policy. The political pressure of resource- and home-owners, recreationists and environmentalists is pervasive.

Paleofire Practice

Leveraging existing knowledge to better serve the needs of resource managers may require revisiting core concepts and metrics of fire occurence to facilitate translation.

Relationship Building

Connecting Paleofire researchers and the people involved in managing forest resources is an opportunity. Future efforts may benefit from Fire Science Consortia and Fire Learning Networks and must be responsive to demands of both science and management.

Paleofire Science

Paleofire science is the study of fire over decades to millenia primarily from sedimentary proxies. While some areas of geoscientific knowledge - particularly climate science - have been focal areas of science-policy investigation (e.g. Meadow et al. 2015), there has only recently been interest in seeking "policy-relevant" products from the paleofire research community (GPWG2 2018). The potential for insights from past fire regimes is high, but depends on collaboration.

Training in paleofire science is predominantly biogeophysical, but a long tradition of discussing prehistoric human influence on the extent and severity of fire continues. This tradition, like other positivist sciences, assumes a linear model of science-policy knowledge transfer which is highly problematic (Jasanoff 1990). Tree ring researchers are better attuned to the management communities. Other paleofire researchers may benefit from this direct peer experience.

Paleofire workers

Questions of knowledge

- **Are paleofire data and techniques compatible with needs of fire management?**
- **How does the temporal uncertainty in Paleofire data change its utility?**
- **Long-term perspectives, like modeling, will only suggest outcomes, thus will monitoring and transfer functions be essential?**

Quesitons of Positionality

- **What issues of-trust will arise in paleofire and land managment collaboration?**
- **How does the framing of a long-term view present epistemic problems for management science?**
- **What epistemic commitments does paleofire have that will make compromising goals challenging?**

Model Study

Design inspired by transdisciplinary research in other fields adapted to Pacific Northwest paleofire and management

Identify Problem of Study

From the perspective of a researcher, this crucial step is a fundamental right-of-passage in science and preserving the integrity of open-ended inquiry is a high priority for the institution of science. In some cases this must be tempered with input from stakeholders and non-scientists to guide social priorities. **Our topic is understanding the openness of tree canopies in relation to fire regime through the Holocene.** This is known to present a restoration dilemma in light of climate change and fire suppression.

Conceptual Model and Collaboration

No two interfaces between science and policy are identical, so case-specific models like the one presented here (to the left) are essential. To accompany our paleofire investigation, **we are recruiting paleofire researchers and land management scientists and practioners to begin dialogue about paleofire applications in the lands surrounding study sites.**

Evaluate and Iteratively Collect Data

Recursive data collection and theory-building are essential to social research, and to reflect our commitment stages of paleofire data collection are interspersed with social data collection to promote iterativity. **Preliminary interviews, followed by a survey, and focus groups to distill findings are integrated into paleofire data collection and analysis.**

Questions to guide data collection are in grey boxes (left).

Report Project Narrative

While this includes natural science publishing norms, reporting in transdisciplinary research requires additional products and may include alternative forms of communication such as workshop materials and webinars. Fitting reporting techniques to participants' needs is a crucial component of 'success'. **In addition to paleofire articles, end-products include workshop materials for both paleofire workers and land management personnel.**

Study site at North Twin Lake, OR

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