Traditional Ecological Knowledge and Western Fire Science
Research Overview
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Public perceptions of fire on landscapes are dominated by images of destruction, fear, and havoc. These negative perceptions are invoked by TV images of catastrophic wildfire and the Smokey Bear icon, proclaiming in one of the world's most successful ad campaigns that "Only You Can Prevent Forest Fires." In the 21st century, managers of private and public lands have become almost singularly reliant on Western fire science as their source of knowledge about the relationship between fire and natural resources. However, are forest fires really a bad thing? Not always. In fact, the benefits of using fire to help address the cultural, social, economic, and ecological aspects of natural resource management are numerous, particularly for forests. This is demonstrated especially well by the traditional use of fire by Native Americans. For centuries, Native Americans have managed ecosystems with their traditional knowledge, with fire as one of their primary tools. It is clear that the New World was not a pristine wilderness when Europeans showed up; it was an environment that indigenous people had created, an environment in which they altered large expanses of land to their benefit, and often with fire. This perspective is drawn from and expanded on by many articles, conferences, and collaborative efforts. This overview provides descriptions of selected articles that contain information on theses two philosophies working together in ecosystem management. There are many other articles available; it was not our purpose to treat them all comprehensively, but rather to whet your appetite for more. In addition, we hope this publication will catch the interest of natural resource management professionals and encourage them to further extend this research and management arena through linking Western fire science and traditional knowledge of using fire on landscapes.

❖ **Selected Article Descriptions**

➢ *The Role of Indigenous Burning in Land Management* by Robin Wall Kimmerer and Frank Kanawha Lake. Journal of Forestry, November 2001. http://www.ingentaconnect.com/content/saf/jof/2001/00000099/00000011/art00008 ▪ This article describes the role of indigenous burning in land management in pre-European settled America. This article outlines more than 70 documented uses of fire by Native Americans. Of these uses, the most common included ensuring the enhanced growth of plant life, reducing in the amount of pests and invasive species, providing increased vegetation for fauna, attempting to influence wildlife migratory patterns, and to keep land clear for travel/hunting.

- In their view of using fire to burn the landscape, tribes viewed their relationship to the land as symbiotic. They believed that all the forces in nature are interdependent on one another; the relationships between the human and non-human components were viewed as reciprocal, and vice versa. The burning was something that benefited both inhabitants of the land.
- Western science is just recently starting to give credit to this indigenous knowledge in management practices, but tribes are very rarely viewed as having equal credibility in land management. The article notes that we are not trying to restore the landscape to what it was before European settlement. However, if wish to restore the biodiversity and ecosystem health that once existed on our lands, then perhaps we need to turn to the traditional knowledge of fire for landscape management.

➢ *Fire on the Land Project.* Salish and Kootenai Tribes of the Flathead Reservation. Germaine White, Spring 2007. http://www.wildfirelessons.net/Additional.aspx?Page=94

- Project design was inspired by the desires of combining the traditional views of fire ecological management practices with the more modern views of fire usage. It was designed to provide a more culturally grounded appreciation of fire. The project features are designed for a wide variety of audiences, ranging from fire professionals to elementary students. The article mentions that the project contains features such as traditional stories, historical photographs, interviews with elders and fire managers, as well as materials related to modern fire management.
- The National Interagency Fire Center – BIA awarded the Salish and Kootenai Tribes a grant to develop educational materials about the use of fire in the northern Rocky Mountains by Indians. One goal of this project was to restore an appreciation for the Salish, Kootenai, and Pend d'Orielle's use of fire. Another goal was to improve the public's knowledge of how fire had been used to shape the ecosystems of the Northern Rockies, thus improving the Tribes' and other land management agencies ability to used prescribed burn plans.
- The project is from extensive research on the history that the role fire has played in the history of Tribal ecological management. The project is also derived from interviews with tribal elders and reviewing existing oral history archives. Under the grant an integrated set of educational materials were produced, including a storybook, a storybook DVD, "an interactive DVD on the Indian use of fire, fire ecology, and modern-day fire management activities on the Flathead Indian Reservation; and a website." That website is http://www.cskt.org/tr/fire_firehistoryproject.htm

➢ *Linking Indigenous Peoples' Knowledge and Western Science in Natural Resource Management: Conference Proceedings.* Michel, H. and D. Gayton (eds.) 2002. http://www.forrex.org/publications/forrexseries/ss4.pdf ▪ ABSTRACT: This two-day event, held in March 2001, brought together 110 people to talk about both the practical and theoretical aspects of linking Indigenous Peoples' Knowledge (IPK) and Western science in natural resource management. Participants were from both native and non-native communities, and represented Indigenous knowledge keepers, scientists, resource managers, elders, and academics. The conference consisted of observing cultural protocol, presentations from diverse perspectives, structured workshops, and informal discussions.

- There are several subset articles within these proceedings.

➢ *The importance of traditional fire use and management practices for contemporary land managers in the American Southwest.* Carol Raish, Armando Gonzalez-Caban, Carol J. Condie. http://www.fs.fed.us/rm/pubs_other/rmrs_2005_raish_c001.pdf ▪ This article points out that anecdotal evidence suggests that there was a widespread "… occurrence of fire on the pre-European landscape…" It further points out that our current landscape was shaped by the fire practices used by our indigenous ancestors all over Australia and North America.

- The article also points out the current societal fear of fire, along with increasing population, decreasing land supply, and modern environmental concerns tend to clash with the uses of traditional fire.
- As presented in the article "fire use" refers to the "specific uses of fire such as encouraging wild seed production or clearing agricultural fields." On the other hand "fire management" is used to describe "the ways different cultures deal with both wild and intentionally set fires at a broader, landscape level."
- Purposeful fires differ from natural fires on several factors, including seasonality, frequency, and intensity.
- Of the documented uses for fire, the most common were the following: Clearing land for agricultural fields and pastures, replenishing soil nutrients in agricultural fields, killing woody

species in rangelands, encouraging grass growth, increasing wild seed production, stimulating shoot formation, improving growth of both wild and cultivated tobacco, driving and hunting game, and waging war.

➢ *Traditional Ecological Knowledge: The Third Alternative (Commentary).* Raymond Pierotti and Daniel Wildcat. Traditional Ecological Knowledge, October 2000. http://www.esajournals.org/doi/full/10.1890/1051-0761%282000%29010%5B1333%3ATEKTTA%5D2.0.CO%3B2

- Traditional ecological knowledge is strongly tied to spatial elements. Therefore, all of these elements can be considered part of the community, including plants, animals, and landforms. This traditional knowledge also suggests the belief that plants and animals exist individually on their own terms.
- The sense of individualism and place orientation leads to two concepts that the article discusses: "(1) all things are connected, which is conceptually related to Western community ecology, and (2) all things are related, which changes the emphasis from the human to the ecological community as the focus of theories concerning nature."
- By nature, TEK is a multidisciplinary because it links the human and nonhuman elements of the environment. This is not only true for the concepts of nature, but also for the concepts of indigenous politics and ethics. The understanding of this behavior could possibly help with conflict resolution over natural resource use, animal rights and conservation. It also may cover areas that are not specifically emphasized by Western science.

➢ *An Alaskan Cultural Confluence: Traditional Knowledge and Agency Management.* Fred P. Clark. 1997. http://www.fs.fed.us/spf/tribalrelations/documents/reports/AlaskaArticle.pdf

- The table below is from the article and summarizes generalized main differences between Traditional Ecological Knowledge and Western Science:

Western Science	**Traditional Ecological Knowledge**
Employs the written word	Is recorded and transmitted orally
Taught and learned in an abstract context	Learned through hands-on experience
Natural world is inanimate	Natural world is animate, spiritual
Humans can control nature	All life has kinship, is interdependent
Reductionist in approach	Holistic in approach
Analytical thinking mode	Intuitive thinking mode
Mainly quantitative	Mainly qualitative
Specialist/selective information	Inclusive/user-based information
Hierarchical/vertically organized	Reciprocity/community organized
Hypotheses/theoretical/general laws	Spiritual/cumulative/collective/annually validated

The article points out that another issue that arises is the use of different languages. Another is using the same language with different word meanings. The dominant society has a different organizational paradigm, a different world view, than traditional communities. These include differences in what are considered significant impacts, skepticism about the value of the kinds of information available, and political risk in changing course.

- This article points out that including Traditional Ecological Knowledge in large scale land management is essential in forming the link between human dimensions and ecological management. It further encourages managers, scientists and indigenous communities to acknowledge, accept, and

actively interact with each other to overcome the hurdles of language, perspective and organizational culture.

- *Now that Paiute Forestry is Respectable: Can Traditional Knowledge and Science Work Together?* Ronald L. Trosper, Ph. D. http://courses.forestry.ubc.ca/LinkClick.aspx?fileticket=Xm9ZeNZZTQo%3D&tabid=1338&mid=2404&language=en-US
  - This paper calls attention to five categories when bringing Western science and indigenous thought together: ontology, epistemology, morality, exchange, and power. These first three deal with ideas. The other two with action.
  - "These categories originate in the standard categories used in philosophy and social science. Philosophy draws sharp distinctions among ontology, (or metaphysics), epistemology, and morality. The social sciences separate economics from political science. Rather than attempting to reconcile differences in each category, this paper proposes a 'grading rubric' to use in assessing attempts to join the two knowledge systems."
  - The article also turns to a consideration provided by the Pikangikum elders and Bruno Latour, which explores the categories of Perplexity and Consultation under the question "How many are we?" and Hierarchy and Institution under the question "Can we live together?"
  - The table on page 29 of the article sums both of them up well.

- *An Aboriginal Criterion for Sustainable Forest Management*. National Aboriginal Forest Association. March 1995. http://nafaforestry.org/criterion/nafa_aboriginal_criterion.pdf.
  - This article is a piece of Canadian forestry literature written by the National Aboriginal Forest Association. The article states that "The National Aboriginal Forestry Association's concern is that there be an appropriate reflection of the rights and interests of Aboriginal peoples in Canadian criteria and indicators for sustainable forest management."
  - Furthermore, sustainable forest management is "a term used to describe the complementary goals of maintaining and enhancing the health of our forest ecosystems while providing environmental, economic, social and cultural opportunities for the benefit of present and future generations."
  - The association has been actively involved in the Canadian Criteria and Indicators Initiative which is supposed to identify criteria for sustainable forest management and the means of measuring whether or not the criteria are being met.
  - The criterion are the following • Conservation of Biological Diversity
• Maintenance and Enhancement of Forest Ecosystem Condition and Productivity
• Conservation of Soil and Water Resources
• Forest Ecosystem contribution to global Ecological Cycles.
• Multiple Benefits to Society
• Accepting Society's Responsibility for Sustainable Development
  - The indicators are the following
• Aboriginal Participation in Decision-making and Forest Management Planning
• Mutual learning
• Healthy Aboriginal Communities
• Trends in Rates of Aboriginal Participation in Traditional Activities and Use of Traditional Territories
• Person Days of Employment in Forest-Related Activities and Number of Aboriginal Owned and Managed Forest Related Businesses
• Aboriginal Access to Forest Resources

➢ *CRITERIA AND INDICATORS FOR NATURALIZED KNOWLEDGE.* Prince Albert Model Forest and the Naturalized Knowledge Working Group. Framework and Workshop Proceedings. Northern Lights Heritage Services & L. Larcombe Archaeological Consulting. December 1999. http://www.pamodelforest.sk.ca/pubs/PAMF1800.pdf

- These proceedings summarize that if forest-related industries wish to use and understand Naturalized knowledge, it requires a long-term commitment between them and the Aboriginal people. Not only does it require much cultural sensitivity and respect for the Aboriginal culture, but also a continued effort to listen and to share information.
- This Canadian context of this article can be applied in the United States; it says "the traditional ways of having 'meetings' or 'councils' varies from people to people across Canada but there are some common protocols that need to be respected and followed. Being knowledgeable about the protocols requires open communication between individual community members and individuals from industry."
- The proceedings also point out the industries are now recognizing the cultural differences and considering them when conducting business and interacting with people of diverse backgrounds. Also, these proceedings take note into public consultation in forest management planning. "The public consultation processes is the primary ways the forestry companies address the Criteria called "Societies Responsibilities" in which the elements of "Fair and Effective Decision-Making" and "Informed Decision-Making" have to be addressed.

❖ **Current Developments**

➢ *Listening and Learning from Traditional Knowledge and Western Science: A Dialogue on Contemporary Challenges of Forest Health and Wildfire.* Mason, L., G. White, G. Morishima, E. Alvarado, L. Andrew, F. Clark, M. Durglo Sr., J. Durglo, J. Eneas, J. Erickson, M. Friedlander, K. Hamel, C. Hardy, T. Harwood, F. Haven, E. Isaac, L. James, R. Kenning, A. Leighton, P. Pierre, C. Raish, B. Shaw, S. Smallsalmon, V. Stearns, H. Teasley, M. Weingart, and S. Wilder. 2012. *Journal of Forestry.* 110(4):187-193.

- The publication states, "Perhaps now as the need grows great and time becomes short, respectful partnerships can move beyond legacies of prejudice and misunderstanding and discover new opportunities for cross-cultural knowledge-sharing."
- Current collaborative efforts have taken place. Mason et al. offer insights from their experience:

• For two days in June 2010, 27 people from different realms of expertise and cultural backgrounds gathered together on the reservation of the Confederated Salish Kootenai Tribes for a workshop to explore cross-cultural integration of Native American stewardship practices, traditional knowledge and philosophies with western science. Participants included representatives from federal agencies, Indian tribes, and academia. It was shared concern about forest health and wildfire hazard that brought these people together but broader issues of cultural respect, humility, and knowledge-sharing quickly emerged. A key conclusion is that, given abuses of the past, greater communication will require enduring relationships forged in humility and respect.

❖ **Conclusion**

➢ With current environmental issues of increasing complexity becoming more prevalent with regards to land management practices, a new paradigm to deal with these issues is apparent. The ability to effectively and efficiently care for the land is often thwarted by differences amongst the groups, which commonly arise from varying opinions in goals and objectives. Agency and land management decisions based on Western science have often resulted in frustration due to the

compartmentalization and marginalization of their practices. Hopefully, as we continue to explore new frontiers of using Traditional Ecological Knowledge to better manage the land as it was in the New World, we can find means of collaboration and implementation of the indigenous practices into our current land management strategies and become better stewards of the land.