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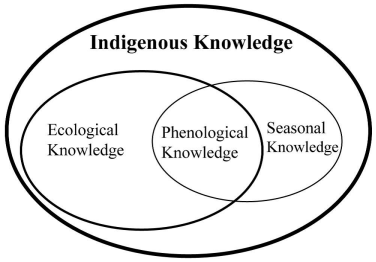
Opportunities to utilize traditional phenological knowledge to support adaptive management of social-ecological systems vulnerable to changes in climate and fire regimes



Keywords: climate adaptation, climate change vulnerability, ecosystem vulnerability, altered fire regimes, alternative fire management scenarios, adaptive conservation, seasonal behavior,fire seasonality, indigenous fire management, indigenous knowledge

Background & Management Issues: Through experiential learning, and long-term and respectful interaction with the natural world, indigenous peoples across the world have gained a robust body of knowledge regarding 'phenology', or the recurring biological life cycles of plants and animals as they relate both to one another and to the changes of the seasons. This knowledge is inextricably tied to traditional conceptions of time, and important day-to-day activities including spiritual practice and pursuit of sustenance. Fundamentally, adaptive management "acknowledges that environmental conditions will always change, thus requiring management institutions to respond to feedbacks by adjusting and evolving". This acknowledgement is also central to indigenous knowledge (IK) systems, which have been developed through flexible social networks; long-term interaction and respectful, sustainable relationship with the natural world; and iterative processes focused on learning-by-doing. Indigenous knowledge systems, built on experiential knowledge that is not static but constantly evolving can, therefore, potentially bolster resilience by improving natural resource management,restoration, and conservation, and developing strategies for adapting to modern environmental problems.

Project Objectives:

To document the opportunities that could be generated by greater integration of these fields and to promote expansion of the body of knowledge about traditional phenological knowledge (TPK).

Review North American and international literature that describes historic, contemporary, and potential future applications of TPK.

Describe opportunities to apply TPK to support adaptive management in the Western United States.

Project Description:

Today, humanity must adapt to a world in which social-ecological systems are threatened by accelerating changes in the environment. We argue that contemporary efforts toward adaptive management of natural systems threatened by these changes can be supported by awareness and application of TPK. The review of TPK literature related to fire management and climate, two of the most important environmental stressors in the western United States, revealed several potential opportunities to apply TPK to support adaptive management of socio-ecological systems (SESs). Better integration of the bodies of science and knowledge pertaining to adaptive management and TPK is likely to suggest innovative policies and practices to improve the resilience and adaptive capacity of SESs to human-caused changes in the environment.

Results:

The feasibility and effectiveness of applying TPK for adaptation to uncharacteristic fire regimes and climate change appear high in the western United States, where abundant public land encompasses traditional Native American homelands, and is often in close proximity to current reservations. The process of developing a deeper understanding of TPK and its potential applications in the western United States can help communities, both tribal and nontribal, and conservation agencies build relationships. Through these relationships, it may be possible to prepare future fire and forest management plans, and climate change adaptation strategies that are culturally relevant and capable of building more resilient SESs. Beyond the collaborative process of understanding TPK, the knowledge itself is particularly salient for adaptive management in the face of uncharacteristic fire regimes and climate change, because it can facilitate:

- Implementation of proactive fire management strategies such as prescribed burns.
- Restoration efforts through better understanding of reference conditions and environmental response.
- Identification of culturally significant natural resource values that can be protected, restored, and sustained by methods such as prescribed fire and mechanical treatments, thus, garnering support for proactive fire management.
- Protection of important livelihood practices such as agriculture, and hunting and gathering.

Management Implications:

- Protection of important human values through a better understanding of both the potential benefits of proactive fire management and the safest times to apply prescribed burns.
- Complement fire management and restoration efforts through better understanding of ecological reference conditions and the use of fire to conserve biological diversity.
- Enhanced resilience of important livelihood practices, i.e.,agriculture, hunting, and gathering, in the face of climate change.
- Compliance with the United States Government's Trust responsibility to tribes and indigenous peoples.

Publications / Products:

Armatas, C., Venn, T., McBride, B., Watson, A., & Carver, S. (2016). Opportunities to utilize traditional phenological knowledge to support adaptive management of social-ecological systems vulnerable to changes in climate and fire regimes. Ecology and Society, 21(1).

For additional information…

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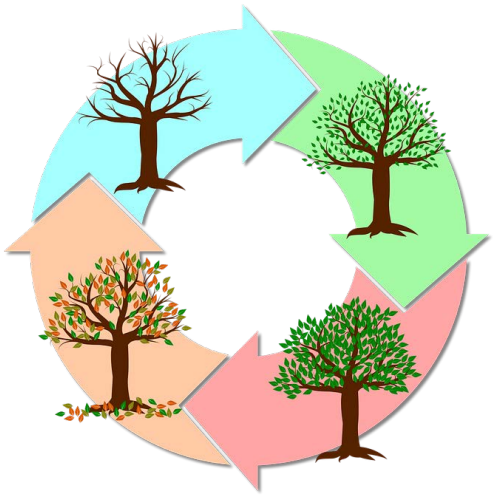

This summary prepared by M Snyder 04/2018.