Fire Management in the Face of Rapid Climate Change: A Case Study of the Yukon Flats National Wildlife Refuge

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Introduction

This research analyzes the content and process of a workshop: *Improving Wildfire Management Decision-Making for the Yukon Flats National Wildlife Refuge* held April 7-9, 2021- virtually due to Covid-19.

This research seeks to evaluate how effective the workshop was in communicating to and building meaningful relationships among a diverse group of participants in a virtual setting.

Research Need and Human Dimensions in Wildfire Management

Climate change is rapidly altering ecosystem structure and function across Alaska. Fire regimes have intensified, especially in the tundra and boreal ecosystems, as a result of warming temperatures, changes in precipitation patterns, and drying of fuels (Rutherford & Shultz, 2019). Changing fire regimes have the potential to impact human health.

Wildfire and climate change impacts on social-ecological systems are impacted by human and natural factors, therefore they must both be considered when analyzing fire regime impacts on a place (Fig 1).

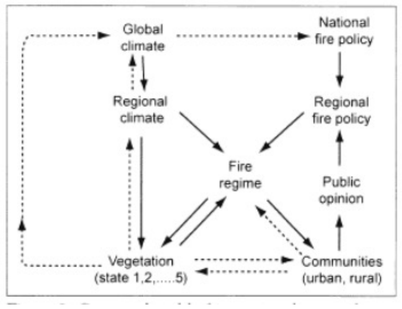

Figure 1. Framework of fire regimes and social-ecological interactions (Chapin III et al., 2003).

Managers of the Yukon Flats National Wildlife Refuge are interested in accounting for multiple perspectives when addressing the complex problems related to fire prediction and mitigation over time. This allows for managing in a holistic manner and provides a unique management opportunity.

The Yukon Flats National Wildlife Refuge

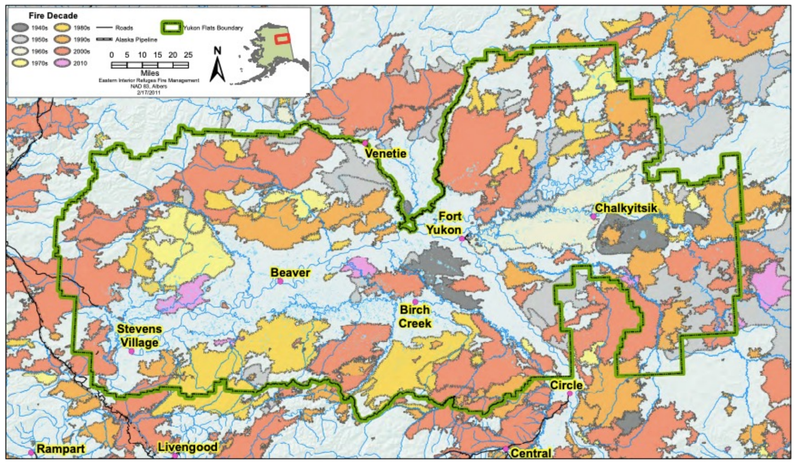

Fig2. Fire History Map (1942- 2010) of the YFNWR by US Fisheries and Wildlife. https://www.fws.gov/uploadedFiles/fire_history.pdf

Alaska has many remote communities with limited transportation routes. Managing fire can be difficult, as road access to wildfires is restricted and evacuation routes can be limited. The remote locations of many communities also impacts **broadband availability**, which can make incorporating local perspectives into wildfire management challenging. Wildfire management impacts **food security** as transportation routes may be limited and access to subsistence resources may be altered.

Methods and Evaluation Questions

The workshop was developed by the Refuge Manager, as he felt as though current wildfire management practices may not be meeting community and ecosystem needs. The Refuge Manager's primary question revolved around whether to resist, accept, or direct change, and under which circumstances these scenarios would work best (Thompson et al., 2020). The first two days included presentations of existing literature and model availability for managers and community members to use. The third day was reserved for discussions.

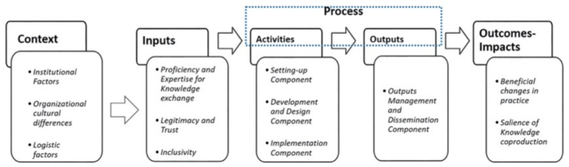

Fig 3. Co-production of knowledge variables Djenontin and Meadow, 2018).

Our evaluation of the workshop uses a qualitative approach rooted in co-production of knowledge (Djenontin and Meadow 2018; Fig. 3**). To evaluate workshop effectiveness, we distributed one round of surveys and two rounds of interviews will be held with workshop participants.** Surveys were sent out immediately after the workshop. The first round of interviews were conducted 1 month after the workshop and a second round will be conducted 9 months later, to assess impacts over time.

There were roughly 50 participants in the Workshop, and all of them were invited to participate in the survey/interviews. 15 participants completed the survey and 10 completed the first round of interviews.

Key survey/interview questions include:

- Was the workshop successful in guiding scientists towards research topics/needs that are more relevant to fire managers and community members? If so, what were the research topics/needs that were brought to light?
- In what ways was the workshop effective in presenting to a diverse group of stakeholders in a virtual setting?
- What can be learned by the workshop about building meaningful relationships and consultation in regard to wildfire management during times of rapid climate change, especially under circumstances such as COVID-19 in which travel and in-person contact is restricted?

Fig 4.Porcupine Fire. https://akfireinfo.com/2020/06/17/weather-helps-firefighters-on-yukon-flats-fires/

Results & Discussion

This research has the potential to help wildfire management decision-making by evaluating a workshop aimed at including diverse perspectives and discussing potential solutions in a collaborative and respectful way.

Preliminary results include:

- Participants appreciated the 3-day workshop structure with the third day reserved for discussions
- The Refuge Manager was transparent from the start about his goals and motivations for the workshop, which inspired participants to share their perspectives
- The workshop structure included time for participants to voice their research needs, which may allow future research outputs to be more relevant. Limitations in broadband connectivity meant that many people in rural areas were not able to participate fully in the workshop

Future workshop considerations:

- Virtual workshops are challenging as they do not allow for multiple arenas for conversations, discussions, and relationship building. Many communities in the YFNWR have limited broadband which limited community participation in the workshop.
- Many thanks to participants and organizers of the YFNWR Workshop! **To learn more please attend the presentation at Noon (ET) on Friday, December 3rd**: Improving wildfire management decision-making for the Yukon Flats National Wildlife Refuge that is part of the session, The Nexus of Climate Change and Fire: Taking Science to Action, Thursday Dec 2 and Friday Dec 3, 11:00am-2:40pm Eastern.

References

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