

North Atlantic Fire Science Research Needs

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Prepared for NAFSE

Executive Summary

To promote the mission of NAFSE, partners at Antioch University identified the following immediate research needs that directly address fire and land management questions in the region:

1. *Conduct region specific experimental prescribed fire and post-burn monitoring to inform prescribed burn implementation (e.g., fire frequency, management prescriptions).*
2. *Determine the gaps in public knowledge about wildland fire management, specifically the use of prescribed burning in the region to develop a knowledge base that allows stakeholder groups to determine effective strategies to influence public attitudes in a positive direction.*

Fire and land managers need science-based information in order to make ecologically sound and effective decisions about fire management activities. These identified research needs could be addressed strategically through targeted funding opportunities solicited in future funding calls.

Introduction

The North Atlantic Fire Science Exchange (NAFSE) is a center for fire science information. We strive to promote communication between fire scientists and fire managers within the North Atlantic region. We work with partners and agencies to develop and deliver science-based, region-specific information. To promote the mission of NAFSE, partners at Antioch University synthesized current research needs and management challenges for our region. This synthesis report provides a summary of current fire science knowledge, identifies research gaps, and presents findings in a way useful to federal, state and non-profit audiences. The purpose of this project is to encourage fire research and funding for proposals that address the identified needs, and stimulate communication among fire scientists and managers.

In the following sections we describe this project in more detail and the process used to determine the research needs and management challenges. Then we provide a discussion of

recommended future research arranged by priority focus areas. These are presented in general order of importance as determined by research scientists and managers.

Methods

Recommendations in this report were synthesized from three research documents produced by the North Atlantic Fire Science Exchange (source documents: 2013, 2014, 2016), in addition to feedback solicited by Antioch University from sixty-eight university-based researchers or fire management professionals who are part of the North Atlantic Fire Science Exchange Network.

We used HyperResearch, a qualitative data analysis program, to conduct a content analysis of the combined four source documents. First, we reviewed the source documents and developed a list of emergent research needs. Next, we used the following scoring approaches in tandem to determine which research needs should be highlighted in this paper:

1. *Intensity of Reference*: The number of times each research need was referenced in each source document was tallied by running a frequency report of codes in HyperResearch. The results are represented in Table 1 (Appendix). The numbers in the first four columns represent the number of times this research need showed up in each document. The total number of incidents for each research need across all four documents is represented in the “total” column. This is an unweighted measure.

2. *Universality within our sample*: We then counted the number of source documents in which each research need was referenced. If a research need was included in a source document at all, it received 1 point regardless of how many times it was referenced. This is represented in Table 1 (Appendix), column titled “Boolean Total.”

The topics selected for the white paper were both “intense” and “universal” within our sample, meaning they were both frequently cited and were noted in at least two out of four sources.

Results and Discussion

The following are the topics selected based on the intensity and universality in the analysis:

1) *Conduct experimental prescribed fire and post-burn monitoring*

There is a need to conduct region specific experimental prescribed fire and post-burn monitoring to inform prescribed burn implementation (e.g., fire frequency, management prescriptions). A content analysis of existing research on this topic identified that there exists studies of this type but they are minimal ($n < 10$). Quantitative assessments of experimental prescribed fire and post-burn monitoring are needed to provide effective management recommendations to our specific region. Further, the usefulness of prescribed fire as a tool for maintaining ecological function and fuel loads has not been adequately examined. Monitoring protocols exist and can be found within the FRAMES Resource Catalog. Future research that addresses this need could be used to directly assess the progress land managers have made in their efforts to restore and/or manage

the regions' fuel loads and fire dependent ecosystems (e.g., pine barrens). Gaps in this research could be addressed strategically through targeted funding opportunities.

2) Determine gaps in public knowledge about wildland fire management

There is a need to understand the gaps in public knowledge about wildland fire management, specifically the use of prescribed burning in the Northeast region to develop a knowledge base that allows stakeholder groups to determine effective strategies to influence public attitudes in a positive direction. A content analysis of existing research validated that there is a need for studies of this type. While studies exist which aim to understand public perceptions of fire risk, influences of public perceptions and tolerance, we were not able to identify any research which addressed gaps in public knowledge. Research which answers questions related to this topic are important for effective public communications related to building support and understanding of the role of forest fire management within our landscape and the resulting agency fire management decisions. It is important to build public support for fire management given the potential consequences of a changing climate on fire in this region in the near future. Identifying where the gaps exist in public knowledge would allow fire managers to build support for necessary future mitigation measures. This research need could be addressed strategically through targeted funding opportunities solicited in future funding calls.

In addition to the identified research needs, three major management challenges were identified, which in ranking order include: the absence of academic institutions conducting fire science research, a lack of capacity to conduct fire management, and smoke management (Table 1). These management challenges could be addressed through enhanced emphasis on the importance of fire in this region through creation of new fire science and management jobs at the federal, state, and private levels.

Conclusion

Findings from this work have provided important information that can help fire scientists and managers identify the most effective ways to begin to address the needs in this region. There is a clear need for additional research, to address existing gaps in our understanding and to address new and emerging fire-management challenges. Although fire itself is a biophysical process, fire management is essentially a social one. Having an accurate understanding of key dynamics whether before, during or after a wildfire event or prescribed burn is integral to ensuring that future fire management can most efficiently ensure safety and minimize negative effects on communities, while at the same time fostering both ecologically beneficial and cost-effective use and management of fire.

Source documents

North Atlantic Fire Science Exchange, 2013. *Sensing wrapup*. Notes from sensing sessions held in Amherst, MA and Columbus, NJ.

These were listening engagement sessions (Amherst, MA and Columbus, NJ) designed to inform and focus the direction of the exchange. The engagement sessions focused on soliciting input on three broad topic areas: 1) wildland fire management challenges and science needs; 2) communication and science delivery preferences; and 3) opportunities for collaboration. The intent was to encourage, categorize, and rank stakeholder input to inform NAFSE's plan of action.

North Atlantic Fire Science Exchange, 2014. *Individual interviews of Fire Scientists and Fire Managers*. Summary of challenges and hurdles, access to and use of resources, communication preferences, and opportunities for collaboration identified by fire scientist and managers unable to attend the sensing sessions.

Fire scientists and fire managers in the region were engaged in order to identify their perspectives and concerns regarding fire science and related resources in the North Atlantic region. We conducted interviews via telephone and email. Responses largely addressed challenges and hurdles to fire science and management, methods for effective delivery of information, accessibility and use of resources in the decision making process, and opportunities to collaborate with other fire managers and scientists in the region. These interviews provided important input into the design and focus of the consortium, and were one component of our needs assessment.

North Atlantic Fire Science Exchange, 2016. *JFSP Research Needs*. Summary of research needs identified by the North Atlantic Fire Science Exchange for Joint Fire Science Program RFP.

Charpentier, J. 2017. *Discovering current research projects in Northeastern fire science*. Antioch University and USDA Forest Service - Northern Research Station. FS Agreement No. 16-JV-11242306-024.

Consolidated feedback solicited from the North Atlantic Fire Science Exchange network of partners, including the USDA Forest Service, DOI National Park Service, University of Maine, Rutgers University, University of Massachusetts, Arcadia University, Antioch University New England, University of Vermont, Cornell University, Drexel University, Connecticut College, Forest Stewards Guild, The Nature Conservancy, Northeast Forest and Fire Management LLC, Canadian Interagency Forest Fire Centre, Harvard Forest, Brookhaven National Laboratory, Northeastern Forest Fire Protection Compact, Albany Pine Brush Preserve, NH Division of Forest and Lands, NH Natural Heritage Bureau, NJ Forest Fire Service, NJ Division of Fish & Wildlife, Maine Forest Service, VT Department of Forest, Parks, and Recreation - Forest Protection, NY Division of Forest Protection and Fire Management, MA Bureau of Forest Fire Control and Forestry, MA Division of Fisheries and Wildlife, MA Army National Guard, RI Division of Forest Environment, CT Division of Forestry, PA Department of Military and Veteran Affairs,

PA Game Commission, PA Prescribed Fire Council; Bureau of Forestry Forest Fire Protection, The Irland Group LLC, Woods Hole Research Center, NJ Geologic Survey, Audubon Society, Nantucket Conservation Foundation, Narragansett Bay National Estuarine Research Reserve, Trustees of Reservations, Nantucket Land Bank, and the Linda Loring Nature Foundation.

Reference

HyperRESEARCH 3.7.5. Computer Software. Researchware, Inc., 2017.
<http://www.researchware.com/>.

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Appendix

Table 1. Research needs and management challenges analysis table (highlighted needs are prioritized and discussed in this synthesis report).

Research Needs, coded from source documents	NAFSE partners meeting (sensing sessions) Amherst, MA & Columbus, NJ (2013)	Individual Interviews (2014)	JFSP Research Needs (2016)	Capacity Discovery (2017)	Total	Boolean Total (out of 4)
Need for place-based monitoring/experimental burns	2	1	1	2	6	4
Future threats (insects, climate, etc)	1				1	1
Public Education and Communication (understanding of gaps in public knowledge)	3		1		4	2
Burning for ecological restoration	1	1			2	2
Climatic, weather, and seasonality conditions which contribute to large fires			1		1	1
Fuel loading conditions			1		1	1
Management Challenges, coded from source documents	NAFSE partners meeting (sensing sessions) Amherst, MA & Columbus, NJ (2013)	Individual Interviews (2014)	JFSP Research Needs (2016)	Capacity Discovery (2017)	Total	Boolean Total (out of 4)
Absence of academic programs conducting fire science research	2	1		2	5	3
Geographic applicability	1		1		2	2
Lack of capacity	2			2	4	2
Regulations	1				1	1
Harmonize management goals/private lands obstacles	2				2	1
High concentration of people living along the wildland urban interface		1	1		2	2
Smoke Management	2			1	3	2
Lack of agency support and competition from other silvicultural practices		1			1	1
Restrictions to budgets, time, personnel, and travel		1		1	2	2