

ATTACHMENT 1 – PROPOSAL TEMPLATE

Title: Wildland Fire Science Delivery and Outreach in Alaska

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1. Statement of need

Alaska holds an unprecedented level of public responsibility for its land-based resources—70% of the state is under the jurisdiction of federal and state resource managers, including the nation's largest National Wildlife Refuges, National Parks, and National Forests. Fire management in Alaska is multifaceted as federal and state land managers seek ways to manage fuels and fire to both improve community safety and meet multiple natural resource objectives. Distribution of information to fire and land managers poses a major challenge to effective fire science delivery.

Current fire science delivery in Alaska occurs through a variety of methods, including in-person meetings, subject area workshops, collaboration on fire research and management projects, websites and teleconferencing/webinars. While there is some coordination between these methods, it is incomplete and would benefit substantially by a more formal integration of the approaches, and a review of the effectiveness of fire science delivery as a whole. One of the primary current venues for distributing information amongst the fire management community is through the Alaska Wildland Fire Coordination Group (AWFCG; <http://fire.ak.blm.gov/administration/awfcg.php>)

The AWFCG is a collaborative interagency (Federal and State) entity that coordinates fire suppression and fire management activities in Alaska across agencies with diverse missions and management strategies. The mission of the AWFCG is to provide a forum that fosters cooperation, coordination, collaboration and communication for wildland fire management and related-activities in the State of Alaska. Mechanisms in place to meet this mission include an annual Fall Fire Review where the fire management community debriefs the previous fire season and coordinates efforts – from smoke management to fire weather – in preparing for the next fire season.

The current most formalized mechanism for science delivery through the AWFCG is the Fire Research Development and Application Committee and its technical working group the Fire Effects Task Group (FTEG), which serve to (1) identify and prioritize fire research needs across the state, and (2) deliver relevant fire science information. The FETG typically hosts two meetings a year, and in recent years one of those has been designed specifically as a tech transfer workshop. The FETG has found their tech transfer workshops have been well-received by both researchers and managers, but they are limited to the time and resources donated by individual members and researchers, and lack a formal follow-up mechanism to evaluate workshop effectiveness. Similarly, the FETG relies on its fire program members to deliver information back to land and resource managers within their agencies, which often is impractical due to limited resources available to prepare and/or distribute materials.

The fire research and management community in Alaska needs a formalized consortium to: 1) coordinate current science delivery efforts; 2) create a formal outreach mechanism for two-way communication between fire scientists and diverse fire and land managers; 3) provide an organized, centralized arena for effectively delivering available fire science information to fire managers; and 4) work with fire managers in an on-going forum to ensure that the science delivery and outreach mechanisms are both useful and usable. This consortium would include representatives from all sectors of the fire research and management communities and technological service providers (those providing web, mapping and teleconferencing/webinar capabilities).

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2. Geographic region

We propose this fire science delivery and outreach consortium to encompass the state of Alaska – a geographically and biophysically distinct region from the lower 48 states. Wildfire is the dominant driver of ecosystem change in Alaska, with the majority of annual area burned occurring in the boreal forest of the interior (north of the Brooks Range and south of the Brooks Range) (Fig. 1).

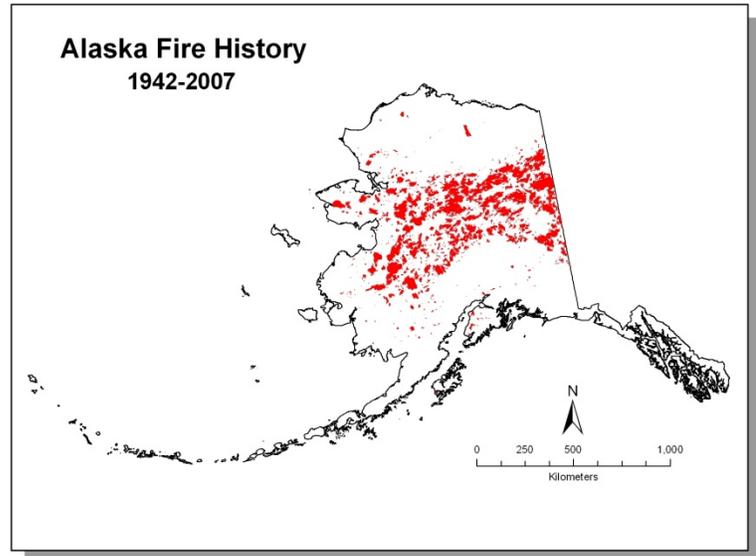


Figure 1. Map of Alaska showing fire scars 1942 – 2007.

The structure and function of Alaskan ecosystems (primarily boreal forest and tundra) and their associated fire regimes are fundamentally different than most fire-prone ecosystems in the United States. Consequently fire suppression and management strategy in Alaska follows a different model. For example, fire managers do not generally utilize the US fire behavior system, but instead use the Canadian fire behavior system because of its applicability to Alaskan ecosystems and fire regimes.

Global climate models agree that the effects of climate warming will occur first and most severely at high latitudes (IPCC 2007). Alaska has warmed significantly over the past several decades with an average increase in mean annual temperature of 3.4° F since 1950 and a 50% increase in the frost-free season in the boreal forest region during the past century (Karl et al. 2009). The amount of boreal forest in North America that burned annually tripled from the 1960s to the 1990s, and half of the severe fire years on record have occurred since 1990 (Kasischke and Turetsky 2006). Fire in Alaska is tightly linked to climate (Duffy 2005) and the average area burned per year in Alaska is projected to double by the middle of this century (Balshi et al. 2008). Therefore, with the coupled trajectories of future climate and demographics, direct, near-term threats to life and property from wildfire in Alaska are expected to increase (Trainor et al 2009).

Climate change is also likely to increase fire danger and occurrence in parts of the state that historically have had minor fire impacts. Alaska is now facing increased fire danger from extensive bark-beetle kill on the Kenai Peninsula resulting from direct climate impacts on insect life cycles. The Kenai Peninsula has experienced 5 Type I or Type II fires in the last 8 years. In addition, the 2007 Anaktuvik River Fire was the largest tundra fire on record north of the Brooks Range. Fires on the North Slope are expected to increase significantly – likely driven by changing sea ice dynamics and direct effects on fire season weather. Large-scale tundra fires on the North Slope would likely threaten caribou herds in this region as well as oil and gas and other industrial infrastructure.

Land and resource managers in Alaska are starting to consider how fire management practices may fit into future land management as climate changes bring changes to the ecosystems and the species that depend upon them. Many of the state and federal agencies are developing strategic plans for land management under changing climate conditions and options to manage fire are myriad depending on whether objectives are to reduce carbon emissions, maintain biodiversity or manage fire suppression activities under increasing fire frequencies.

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The Alaskan regional consortium proposed here will serve as a model for building strong, interagency science delivery networks in the face of rapid and dynamic climatic and demographic change. The consortium would target key organizations and institutions in fire management and research in Alaska including Alaska Department of Environmental Conservation, Alaska Department of Fish and Game, Alaska Department of Natural Resources, BIA, BLM - Alaska Fire Service, City of Anchorage Fire Department, NPS, Regional Native Non-profit Organizations, FWS, USFS, USGS and the University of Alaska Fairbanks (UAF). Additional research institutions with strong research and outreach ties to Alaska through existing cooperative partnerships and wildfire research at UAF's Bonanza Creek Long Term Ecological Research (LTER) site include the University of Maryland, Michigan Tech Research Institute, the University of Idaho, and the University of Washington.

3. Consortium partners

The following institutions will collaborate in partnership to create an Alaskan consortium for fire science delivery and outreach:

University of Alaska, Fairbanks (Sarah Trainor and Scott Rupp, leads). The University of Alaska, Fairbanks (UAF) is home to state-of-the-art science delivery and outreach organizations. The Alaska Center for Climate Assessment and Policy (ACCAP; www.uaf.edu/accap) is currently funding an experimental forecast for annual area burned utilizing the strong links between climate, teleconnection indices and fire in Alaska (P.Duffy). An interactive, internet-based tool is being developed in close collaboration with Alaskan fire scientists and managers.¹ ACCAP hosts monthly teleconferences/webinars that target a state-wide audience and can be utilized for science delivery and outreach both within the Alaskan fire management community and to a broader audience including congressional staffers, news media, local and regional governments and the general public. In addition, ACCAP has current partnerships with the Climate Assessment for the South West (CLIMAS) and the Desert Research Institute (DRI) to evaluate the effectiveness of outreach and communication materials related to the annual National Seasonal Fire Assessment Workshops and will draw on this partnership and experience to develop project and outreach evaluation tools and protocol that are tailored to the Alaskan fire management community yet also consistent with those used in other western regions.

The UAF Scenarios Network for Alaska Planning (SNAP), directed by Co-PI Rupp, (www.snap.uaf.edu) is the leading entity in Alaska for spatially explicit, scientifically credible projections of future conditions under climate change, including temperature, precipitation and growing season. Summary reports are currently available for NPS Parks and Preserves. Building on the Boreal ALFRESCO work (JFSP 01-1-1-02, 05-02-1-07, and 06-3-1-23) of Rupp, SNAP provides fire dynamics and vegetation modeling under climate change scenarios to fire management agencies in Alaska. Summary reports are currently available for Alaska FWS Wildlife Refuges (<http://www.snap.uaf.edu/reports>).

USGS (Crystal Kolden, lead). USGS is the national leader in spatial data distribution and the leading agency for natural resources research on public lands. At a national level, USGS directs and hosts the GeoMac Wildfire Information Portal, and leads the Monitoring Trends in Burn Severity program from the EROS data center in South Dakota. The USGS Alaska Science Center currently hosts the largest database of Alaska spatial data, and serves as a central portal to research being conducted in collaboration between USGS, federal, and state research scientists and land managers. Alaska Science Center is currently developing a Fire Science focus within the Geography Discipline for the state of Alaska, and has several ongoing research projects in collaboration with UAF, BLM, FWS, NPS, and UAF's Bonanza Creek LTER that are producing fire information and data products for state and federal land managers. Additionally, USGS Alaska Science Center is currently developing the WILDCAST program, a wildlife habitat forecasting tool that involves numerous agency partners across the state and is to be used to address climate change impacts on wildlife in Alaska. The components of WILDCAST that intersect with

¹ See http://www.uaf.edu/accap/wild_fires.html (S Trainor, P Duffy Co-PIs).

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wildfire research (i.e. wildfire effects on habitat) will be integrated into science information delivered through consortium products.

Alaska Interagency Coordination Center (Dave Curry, lead). The Alaska Interagency Coordination Center (AICC; <http://fire.ak.blm.gov/>) is the Geographic Area Coordination Center for Alaska and serves as the focal point for initial attack resource coordination, logistics support, and predictive services for all state and federal agencies involved in wildland fire management and suppression in Alaska. Existing information products include maps and geospatial imagery, fire weather, fuels and fire danger, air quality and daily and seasonal outlooks.

FRAMES, University of Idaho (Diana Olson, lead). FRAMES (the Fire Research And Management Exchange System; <http://frames.nbii.gov/>) utilizes web portal technology with the goal of making wildland fire related content, resources and technologies easy to find, access, distribute, compare and use. FRAMES provides access to information through a variety of ways: through the FRAMES Resource Cataloging System (where a user can search for information about fire research projects, tools, documents, data, and web pages), by browsing subject area pages and partner pages, and by browsing geographic area pages. The FRAMES Alaska Fire Portal is already available to the public, and would benefit greatly from the direction that could be provided by a regional consortium. FRAMES also provides logged-in users access to a suite of community collaboration services, including document management and sharing, calendars, discussions, and task management.

Additional Collaborators. This consortium will build upon the interagency partnerships already established within Alaska with collaboration from NPS, FWS, BLM and others. Over the next six months individual collaborators will be identified from additional agencies and research institutions. At this time, Jennifer Allen (NPS), Karen Murphy (FWS), and Eric Miller (BLM) have contributed to the project design and agreed to collaborate on this project. These individuals each hold fire ecologist positions within their respective agencies and frequently collaborate on projects. They are all active members of the interagency Fire Effects Task Group and are actively involved in coordinating fire related research activities in Alaska.

4. End-user communities

The intended beneficiaries of enhanced fire science delivery and outreach activities are all state and federal land and fire managers in Alaska. These include: Alaska Department of Environmental Conservation, Alaska Department of Fish and Game, Alaska Department of Natural Resources, BIA, BLM - Alaska Fire Service, City of Anchorage Fire Department, NPS, Regional Native Non-profit Organizations, USFWS, USFS. Enhanced science delivery and outreach to these state, federal, local and tribal entities will facilitate fire management, budget allocations for pre-suppression activities, and identification of research need and priorities. In addition local and regional governments and fire managers will benefit in their fire and emergency management planning and decision-making. As noted above fire ecologists, Jennifer Allen (NPS), Karen Murphy (FWS) and Eric Miller (BLM) have contributed to the design of this project and agreed to collaborate with UAF scientists to achieve the project goals. In addition to the letters of support attached, we have discussed this project with Rob DeVelise (USFS), Larry Adams (BIA), and Lee Koss (BLM). However, letters were not available from these end-users due to busy field season and active fire assignments. In addition, by utilizing the FRAMES infrastructure that is geared to provide information not only at regional levels but also at the national level, communities outside of Alaska will be able to benefit from the Alaska consortium's web-related activities.

5. Science delivery partnerships

Due in part to the small fire management community in a very large state, Alaska researchers and fire managers have developed progressive approaches to science delivery for fire and land management. As

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described above, the FIREHouse data collection and dissemination framework provide information on fire-related research, the Alaska Interagency Coordination Center website provides real-time fire information, forecasts and critical information to fire managers, and the FRAMES web portal hosts FIREHouse and ties Alaska data to national fire research efforts. From an outreach perspective, the unique AWFCG structure includes committees such as the Fire Research Development and Application Committee and the Fire Effects Task Group that include fire managers, agency fire ecologists, and university researchers. These committees meet twice yearly to discuss ongoing research needs for fire management, identify questions for upcoming RFPs (such as JFSP), disseminate new research information pertinent to fire management, look at fire season forecasts produced by UAF, and review the most recent fire season. UAF plays a central role in Alaska fire management and research by hosting regular workshops pertinent to the fire community, developing fire models and fire forecasts that work for Alaska, and developing products that are accessible and user-friendly for land managers. One such example of these products are the climate change projections developed from the Scenarios Network for Alaska Planning (SNAP) program, which are available to land managers as Google Earth-friendly files, and which are being utilized to assess potential climate impacts on wildfire for the state.

Previous JFSP projects in the state of Alaska have been highly collaborative and yielded important findings that continue to shape fire management in the state. These include development of Boreal ALFRESCO (JFSP 01-1-1-02, 05-2-1-07), assessment of fuels treatment effectiveness (JFSP 06-2-1-39), and reconstruction of paleofire regimes in tundra (06-3-1-23).

6. End-user interactions

Our goals in this 4.5 month pre-proposal stage are to: 1) Establish a base-line assessment of end-user knowledge and understanding of existing fire science information products; 2) Identify end-user community information needs and priorities; 3) Identify end-user preferences for and receptivity to diverse modes of science communication (i.e. web portal, email or paper newsletter, video-seminars, teleconference, webinar, in-person workshops, etc.).

These goals will be accomplished through direct interaction with land and fire managers in Alaska via a diverse array evaluative methods including: 1) written survey (paper and web-based), 2) semi-structured interviews, 3) facilitated end-user discussion groups and 4) an interactive tutorial workshop (Trainor, lead) (Briggs 1986; Feldman 1995; Fink and Kosecoff 1998).

Specific activities will include:

- **In-person scoping workshop for federal and state land managers and fire managers in Alaska.** This workshop will take place in conjunction with the Fall Fire Review, held annually in October. Fire managers from all AWFCG agencies and organizations across the state attend this meeting so it is an ideal opportunity to work with people in-person.
- **Teleconference/ webinar series to reach land and fire managers in remote locations.** In order to reach land and fire managers that are stationed in remote locations, we will initiate a teleconference series with webinar capacity, open to all land and fire management officers from key organizations and institutions in fire management and research in Alaska (listed in section 2.). This teleconference will provide opportunity for open discussion as well as for open-ended written feedback. We anticipate continuing this as a regularly scheduled event throughout the larger project (section 7.)

A short evaluative survey will follow up both the workshop and teleconference (see section 8.)

7. Intended focus of the consortium

A fire science delivery and outreach consortium in Alaska (to be detailed in the full proposal for two-year implementation) will have **two primary goals** that together establish strong two-way communication:

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- 1) **Communicating the results** of existing and on-going northern latitude and boreal forest fire science to federal and state land and fire managers,
- 2) Working with land and fire managers to **optimize modes and methods of fire science communication** so that the information is both useful and usable.

Many land managers in Alaska work in remote field offices with limited internet access. We will structure our science delivery and outreach strategy to target improving communication with land and fire managers in remote locations and work with these end-users to generate science communication strategies that are most effective given their technological capacity.

Specific methods for accomplishing these goals include:

- **Conduct annual, in-person Alaska-wide workshop for fire science delivery and outreach.** This workshop will include presentation of research results from boreal forest fire scientists. Beyond standard presentations, we will create hands-on sessions for testing new science communication strategies, establish break-out discussion groups for brain-storming and generating new ideas, and conduct evaluation surveys to monitor existing science delivery approaches. We will also plan field trips and demonstrations to existing fuels treatment research sites such as the one outside of Fairbanks on Nenana Ridge (JFSP 06-2-1-39 S.Rupp and R. Ottmar).
- **Establish and sustain a periodic Alaska fire science newsletter.** The goal of this newsletter will be to provide updates of research in progress and project contact including: fire behavior observations in the context of the fuel complex, opportunistic observations or measurements, effectiveness of fuel treatments, results and recommendations to date, product reviews, synopses of posters, papers and presentations recently given, program and staff updates and points of contact. By providing periodic updates on the research activities and results prior to the often extended period of peer-review publication, we envision this newsletter as an essential initial step in adaptive management.
- **Conduct information transfer workshops in remote hub-communities.** Another strategy for reaching land and fire managers in remote locations is to select one location each year outside of Anchorage or Fairbanks as the site for a technology transfer workshop. We will consult with land and fire managers during the September – January pre-proposal stage to identify the best locations for these workshops and develop draft agendas to meet end-user needs. Travel funds will be requested for land and fire managers located in more remote villages and fire scientists and consultants to congregate in a regional hub-community. By hosting a workshop in a hub-community such as Kotzebue, Bethel, McGrath, or Fort Yukon we can tackle technology and communication challenges in situ and will establish direct, face-to-face contact between scientists, end-users and community members.
- **Institutionalize a fire science teleconference/webinar series.** We envision this to be a continuation of the teleconferences held during the pre-proposal stage (see section 6.). This will be a regular opportunity to present scientific results, hear end-user feedback, and evaluate program performance.
- **Staff an Alaska fire science “help desk.”** We anticipate proposing to fully or partially staff an Alaska fire science “help desk” available by internet and telephone to match requests for information with subject matter experts and provide guidance for accessing information through internet portals. A primary function of this position will be to communicate input about future fire and fuels research needs to the JFSP governing board.
- **On-going updates and coordination of existing fire science delivery products.** Throughout the project period we will work closely with Diana Oleson, FRAMES Project Manager, to

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coordinate existing fire science information products and to ensure that new delivery and outreach products are integrated in a comprehensive and logical way. For example, existing fire science delivery products such as FRAMES, FIREhouse and the Alaska Fire and Fuels Research Map (<http://afsmaps.blm.gov/imf/imf.jsp?site=firehouse>, JFSP 03-4-2-06 and 05-4-2-03) will be integrated with fire science products from ACCAP, SNAP, and the USGS Alaska Science Portal (<http://alaska.usgs.gov/portal/>). We will analyze where these products overlap and work with end-users to provide logical, coordinated, and easy access.

- Development of innovative fire science delivery tools.** Designed in collaboration with land and fire managers and fire ecologists in Alaska, the first quantitative fire prediction tool for Alaska is currently under development (P. Duffy) and funded by the Alaska Center for Climate Assessment and Policy (ACCAP; http://www.uaf.edu/accap/wild_fires.html#forecast). Based on end-user feedback to date, we expect to propose that the consortia fund the continued development and evaluation of this tool, which enhances the existing partnerships between the University of Alaska, AWFCG partner agencies and the Fire Research and Applications Committee by working together to provide scientifically innovative forecasts that are pragmatically useful on-the-ground.

Each of these proposed activities will include short, evaluative surveys to monitor and assess program effectiveness (see section 8.).

8. Program effectiveness

In our final product to JFSP (full proposal submitted in January 2010 for two-year implementation), we will describe a program to solicit and analyze end-user feedback, incorporate this feedback into the design and implementation of science delivery and outreach tools, and evaluate program effectiveness through written survey and direct semi-structured interview. To help establish and test a standard for national fire science delivery evaluation, assessment of consortia effectiveness will be modeled after and occur in conjunction with the social network analysis protocol being used to evaluate fire products from the National Seasonal Fire Assessment Workshops, a current collaborative project between S. Trainor (ACCAP), G. Garfin and D. Ferguson at the Climate Assessment for the South West (CLIMAS) and Tim Brown at the Desert Research Institute (DRI).

Program effectiveness for this short, pre-proposal stage (4.5 months, 9/1/09 through 1/15/10) will be measured by the number of end-user contacts, the diversity of organizations and institutions represented in end-user contacts, and through a short survey evaluating the process and effectiveness of the scoping workshop (described in section 6.) to be administered to workshop participants immediately following the workshop.

9. Budget

Table 1. Budget Summary for Period of Funding (9/1/09 through 1/15/10)

	Requested	Contributed	TOTAL
LABOR	\$116,617	\$19,405	
TRAVEL	\$2,799		
Materials and Supplies:	\$750		
Other Costs (see Budget Detail for itemized list)	\$3,140		

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Total Direct Costs	\$123,306		
Indirect Costs: 17.5% UAF, 10% USGS	\$36,068		
Total Contributed Funding all years		\$19,405	\$19,405
Total Requested Funding all years	\$159,374		\$159,374

10. Roles of investigators and associated personnel

Table 2. Roles and Responsibilities of Associated Personnel

Personnel	Role	Responsibility
Sarah F. Trainor UAF	Principal Investigator	Research lead. Design, implement, and analyze survey, interviews, focus groups, workshop, teleconferences and program evaluation (sections #6 & 8).
T. Scott Rupp UAF	Co-Investigator	Coordinate the involvement of fire scientists, especially those with past and current JFSP funded research.
Crystal Kolden USGS	Federal Cooperator	Coordinate with PI, the grants and agreements, budget/finance staff on administrative activities.
Christina Cady USGS	Federal Fiscal Representative	Review and approval of project budget. Fiscal point of contact.

11. Literature cited

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