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on Behalf of the State of Alaska

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Good morning, Ms. Chairman Murkowski, Ranking Member Cantwell, and Members of the Committee. My name is Chris Maisch, State Forester and Director of the Alaska Department of Natural Resources, Division of Forestry (DOF) and past President of the National Association of State Foresters (NASF). I appreciate the opportunity to speak with you today and submit written testimony as the Committee explores the benefits and challenges of incorporating new technology into wildland fire fighting operations and to examine real world examples of various types of fuel breaks and how they can mitigate risk to firefighters and the public.

The mission of the DOF is to proudly serve Alaskans through forest management and wildland fire protection. The DOF is the lead agency for wildland fire management services on 150 million acres of land with a primary goal to protect life and property (That is almost as much forest land as is in the National Forest System in the lower 48 states). The Division works closely with two key partners in Alaska, the USDA Forest Service (Forest Service) and the Department of Interior (DOI), Alaska Fire Service (AFS) with the latter being our main partner and lead agency for the other DOI agencies in Alaska. This interagency approach is reflected in the Alaska Interagency Wildland Fire Plan, in our suppression activities, and in our fuels mitigation and risk reduction work throughout the state.

Community and Individual Planning for Wildland Fire Incidents and Cross Boundaries Fuels Work

I'm very excited and pleased that the Committee is interested in proactive measures to assist communities and individual home and business owners in reducing the risk to their property and lives thru advanced planning and implementation of a suite of risk reduction measures that will achieve this objective. As with most worthwhile projects, advanced planning is a key component that will direct funds and energy toward the highest return projects; this is frequently accomplished thru the State Action Plan and a Community Wildfire Protection Plan (CWPP) process[1]. A plan can be scaled to a community, neighborhood or other logical jurisdiction where a cross section of people, local, state and federal governments and agencies work together to address needs of the participants. Typically, a fuels map is produced from the analysis of vegetation types; this data is combined with topographic and cultural datasets to produce "risk" maps or zones of concern for the area the plan is addressing. Agency staff provide insight to the types of fuel treatments and methods to accomplish the objectives of the plan. This can range from a landscape scale fuelbreak (Figure 1), to shaded fuelbreaks (Figure 2), or pruning and removal of understory vegetation. Each area of the country has different approaches based on

[1] For more information on CWPPs see this link: https://www.forestsandrangelands.gov/communities/cwpp.shtml

their local situation and what a community deems socially acceptable. At times, there can be a conflict or disagreement about a proposed treatment, often because of how it will look or people's perception of how it will impact their slice of the world!

Photo: State of Alaska DOF.
Figure 1- Masticated fuelbreak completed with heavy equipment by DOF with funding from USFWS.

Photo: USFWS.
Figure 2- Firing from a shaded fuel break, Funny River fire Alaska 2014.

Often in concert with this larger planning effort, work will also be accomplished at the neighborhood and individual level via Firewise USA[2] or other similar program that educates the public on actions they can take to reduce the risk of wildland fire to their property, business or

[2] For more information on Firewise, see this link: http://www.firewise.org/

home, while improving both their safety and firefighters safety if a fire threatens their property. Once again, this is a suite of recommendations and activities that reduce fuels in the home ignition zone, ensure safe egress and ingress to a property, identify water sources and make other specific recommendations to a property owner. In Alaska, interest in the Firewise program often spikes in an area following a nearby wildland fire incident or during years of high fire activity in the state. These "teachable moments" are when we can accomplish significant work, especially if staff are available to meet with neighborhood groups and individuals to explain the program, inspect properties and to write-up specific recommendations to implement. The Forest Stewardship program, which is a component of the Forest Service State and Private Forestry program area that is administered by State Foresters, is our main interface with landowners. Stewardship foresters are already experts at working with small, private landowners and incorporating Firewise work into stewardship planning. It is a natural fit. In Alaska, my agency has been the recipient of several competitive grants via the S&PF Redesign Program that allow us to offer a cost share program to individuals that implement Firewise recommendations on their property, approximately a 50/50 match in most situations.

The strategy we are employing is essentially a defense in depth, where the outer ring of fuel reduction treatments compliments individual treatments that provide a much higher potential for structure survival and safety of residents should their property be threatened by wildland fire. As you can imagine, much of this work also involves educating people on the real risks they face and being prepared to deal with this type of situation. Another aspect of these efforts is the Ready, Set, Go[3] program that teaches residents what to expect and how to prepare for a possible evacuation in a wildland fire event. This type of program can go a long way to reducing panic and stress for everyone involved and once again demonstrates that pre-planning and preparations are key components of a holistic approach to dealing with wildland fire. Together, this can be summed up by the goals of the National Cohesive Strategy: Resilient Landscapes, Fire Adapted Communities, Safe and Effective Wildfire Response.

Fuel Reduction Projects - Case Studies That Worked!

Funny River Fire Alaska 2014: The Kenai National Wildlife Refuge has been creating fuelbreaks – these are large landscape level projects that were part of an interagency and multi-landowner (cross boundary) effort to design and construct fuelbreaks that would protect homes, businesses and other values at risk should a fire start on the refuge and move toward the community. The DOF was a key partner and completed the on-the-ground treatments over the course of several years. At the same time, individual fuel mitigation projects were pursued with homeowners, utilizing the Firewise program, as part of the overall implementation of the community's CWPP. These advanced preparations paid off when in the spring of 2014, a lightning initiated fire threatened the outskirts of the town of Soldotna in an area called the Funny River Road.

Thick plumes of smoke dominated the skyline as firefighters dispersed through subdivisions and prepared for dealing with the advancing fire. Some residents had already been evacuated and the

[3] For more information on Ready, Set, Go see: http://www.wildlandfirersg.org/

entire area was now under an evacuation order. People streamed out the one highway that leads into the area. The community was sandwiched between the approaching fire and the Kenai River, with only one-way in and out. It was also the start of the Memorial Day weekend and this was the last thing most people had on their minds a few days earlier. Now they were wondering if they would have a home to which they could return. Moving fast on multiple fronts, firefighters were looking for any break they could get. The fuelbreaks made all the difference.

The call came in around midnight that the fire was going to hit the Funny River Road. By the time crews arrived, there was not much time to start a burn-out to rob the approaching fire of fuel. For the Incident Commander, the question was where to start? "Suddenly I realized I was in an area that was thinned of trees; they had built a fuelbreak!" he said. "The fuelbreak slowed the fire down enough for crews to safely and successfully light the burnout" (Figure 3). Over 2,400 structures were protected with an assessed value of more than $250 million.

Photo Chena IHC- BLM/AFS.

Figure 3- Burn out operation along the masticated fuelbreak as the main fire approaches.

Eagle Trail Fire Tanacross Alaska 2010: This was a joint project conducted by the Alaska Fire Service and the village of Tanacross to reduce wildland fire risk to the community. A shaded fuel break was constructed on village lands by local labor. The local EFF Type II Crew and newly trained members of the community participated in the layout and construction of the fuel break, which was along the back edge of the community where a very flammable coniferous forest ran right up to, and into the community. Wood removed in the project was utilized to heat homes during the winter in a place that commonly sees some of the coldest temperatures in Alaska, -50F and colder. However, on the day that the fuelbreak was used to protect the community form the advancing Eagle Trail fire, is was hot and smoky when crews burned out from the break. The treatment reduced risk and improved the safety profile for the crew conducting the operation; they had access, water and could see the advancing fire and each other in the shaded break, as opposed to working in the dense fuels that once occupied the site.

Examples from Arizona:

Mayer Arizona 2015: Using state monies, treatments were made on 275 acres on the west side of Mayer, Arizona. Treatment masticated 60% of the chaparral fuel type creating a mosaic pattern leaving 40% uncut. In 2017, the Goodwin Fire was burning towards Mayer and stopped at the treatment area and did not enter the community of Mayer.

Yarnell Arizona 2015: Using WHFH grant funds, a 100ft fuel break was placed along the east boundary line of the community of Yarnell in 2015. The 2016 Tenderfoot Fire ran down the hill from the east toward Yarnell, and the operations folks were able to use the fuelbreak to burnout. This operation was successful in keeping the fire from burning structures.

Here is an example of a completed treatment but not tested … yet:

Mazama Washington Fuels Reduction: The desire to reduce the threat of catastrophic wildfire in Washington is significant. The 2012-2014 Mazama Fuels Reduction project was a coordinated effort across private and federal lands within the Wildland Urban Interface (WUI) of the Mazama community in Northeast Washington. The project area was identified as being in a high priority landscape for fuels reduction in DNR's Statewide Forest Resource Assessment & Strategy. The project focused on prioritized non-federal lands in the Okanogan County & Methow Valley CWPPs which funded the development of strategically located fuel breaks and defensible space treatments to lessen fire behavior, size and intensity thereby reducing risk to lives, homes, community infrastructure and natural resources. The project was funded through a Forest Service WUI Community Assistance grant ($200k) and matching state, CWPP and landowner funds ($200k). Partners completed 400 acres of thinning, chipping, pruning & hand pile burning.

These case studies are a small sample of projects being conducted nationwide and are all good examples of efforts that have made a difference or are improving the odds that a community will survive a wildland fire incident. It is worth mentioning that last year 82% of wild fires and almost 50% of acreage burned were on state and private lands including the ignition points for some particularly costly federal fires. Funding for wildland fire fuels mitigation planning and projects, along with stable or increased funding for State Fire Assistance and Volunteer Fire Assistance programs to the states via the State and Private Forestry program is the best investment for continued success. Through state forest action plans, CWPPs and joint state/federal efforts we can increase the scope, scale and pace of this type of work.

Technology Advances in Wildland Fire Operations or the Age of the Drone

Most firefighters call them "drones" but the more common term is Unmanned Aerial Vehicle (UAV)[4], at least in polite circles! The development of new applications that make use of innovated and advanced technology is a hallmark of many U.S. companies and agencies. The

[4] Note both UAV- Unmanned Aerial Vehicle and UAS- Unmanned Aerial System are common terms used to describe these types of systems.

fire community is no different and UAV technology is rapidly finding its way to the fire line, especially in state and some federal wildland fire agencies (Figure 4).

Following the lead of the Bureau of Land Management –AFS, the DOF Wildland Fire and Aviation program started its own UAV program. The state is mirroring the AFS, which is at the forefront of the use of small UAV for direct fire crew support, infrared, mapping and reconnaissance missions on wildland fires. Prescribed fire and resource management projects are among the additional missions flown and planned for both agencies in Alaska. UAV derived data and imagery empowers incident personnel to make informed decisions based on real-time information. Data gathered from UAV is unique due to the ability of the aircraft to fly low and slow while collecting high-resolution imagery and sub-centimeter data.

Photo Texas A&M Fire Service

Figure 4- Texas A&M Forest Service deploys a small UAV on the 4,500-acre Aeromotor Fire, Don Hannermann pilot.

The standard platform that DOF uses is a 3DR Solo quadcopter with a variety of sensors that can include the GoPro 4, Forward Looking InfraRed (FLIR), and the Ricoh digital camera. The 3DR Solo is the ideal platform for quick and easy situational awareness, mapping, small photo missions and surveys. The UAV utilized by DOF are all equipped with a GoPro4 camera. The next advancement will be a FLIR infrared camera that can detect and map residual hot spots on small sections of fires.

The primary mission of the quadcopter is small-scale data collection and situational awareness. Because the 3DR Solo is limited by range and battery life, it will not replace the helicopter for heat-seeking or reconnaissance flights on an entire wildfire. However, it has proven to be valuable to crews because the quadcopter can quickly deploy to distinguish type changes, natural barriers, and aid in fireline route selection. A FLIR camera can be utilized to detect and map hot spots.

Operation of the quadcopter requires a UAV pilot and a visual observer. The remote pilot or observer must maintain line of sight with the drone at all times, therefore it can only be flown during the day and is limited on the amount of ground it covers.

UAV Use in Alaska:

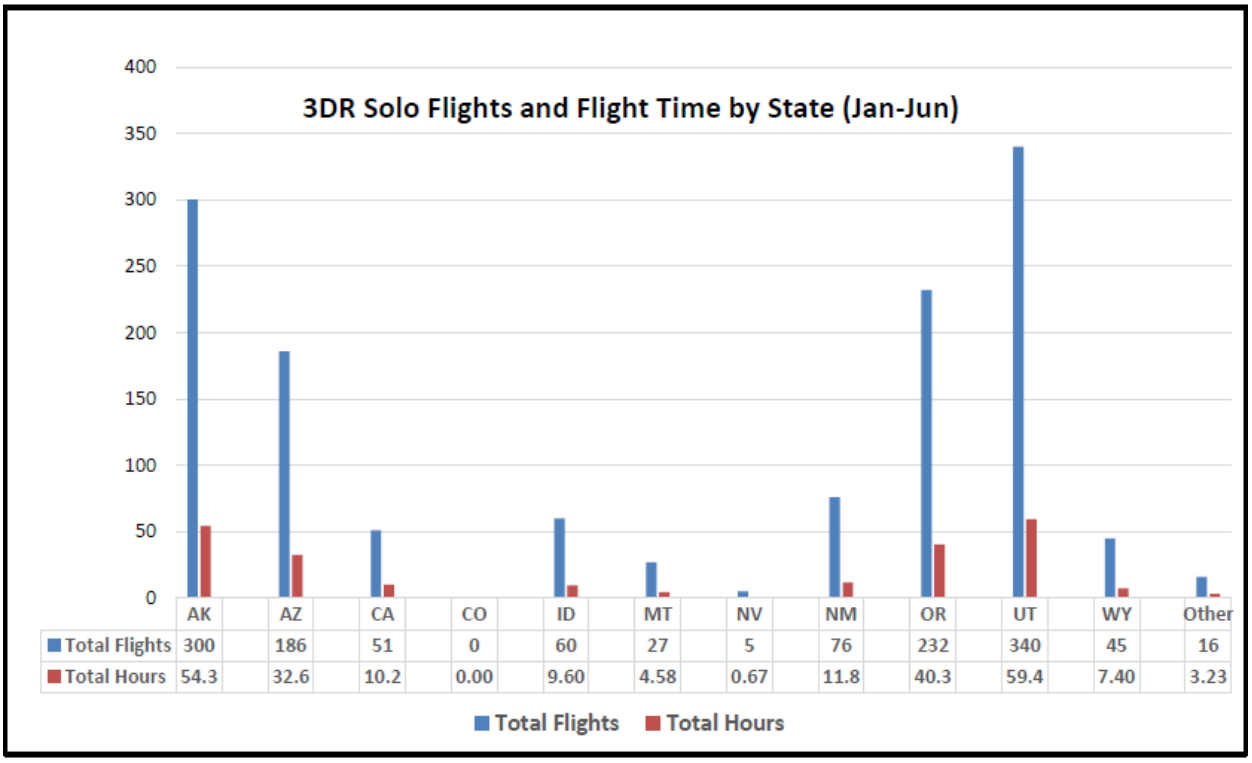
- This spring, State of Alaska/DOF trained two pilots, two data collectors and two observers. The AFS certified 17 remote pilots. Each pilot is certified as a remote pilot under Part 107 by the Federal Aviation Administration (FAA).
- The State of Alaska/DOF owns six 3DR Solos and AFS owns 17.
- Each drone costs about $400, plus the sensor package. A GoPro 4 is the common sensor, while a FLIR camera is $2000. This contrasts with a contracted light helicopter that costs $1,500-$2,100 a day for availability and $400-$585 per hour to fly. The IR sensor package costs approximately $2,000.
- UAV flights limit exposure and reduces risk to pilots and wildland firefighters.
- 3DR Solos are quickly deployed and provide real-time situational awareness.
- The 3DR Solo falls into the small-sized quadcopter category weighing less than 55 pounds. It has a range of a half mile and maximum endurance of 20 minutes. Batteries take two hours to recharge.

As of June 30th, DOF personnel have used the 3DR Solo for panoramic photo and video missions on prescribed fires as well as situational awareness missions on four wildfires in Alaska. DOF and the AFS remote pilots have flown 221 flights for a total of 42 flight hours (Figure 5). Alaska's UAS program notables include:

- Alaska DOF employee Cal Maki was the first regular wildland firefighter in Alaska to deploy a small UAS on a wildfire.
- Midnight Sun Interagency Hotshot Crew (IHC) was the first out of 113 national IHC to deploy a small UAS on a wildfire.
- Two sets of missions using the IR camera have been performed on wildfires and shown that the IR application is highly effective for finding hot spots and very low impact to other aerial operations.

UAV Use in Texas:

- Texas A&M Forest Service (TFS) recently entered the UAV world after three employees attended the Texas A&M University System supervisory training for UAV operations in Corpus Christi. Following that training, 13 TFS employees participated in a TFS-led FAA Remote Pilot Test training course and so far 10 personnel have successfully passed the pilot test and are able to fly under FAA Part 107 rules.
- Texas A&M Forest Service deployed its first UAV on two wildfires on July 25, 2017 in the Texas Panhandle. Planning and Preparedness Department Program Leader Don Hannemann utilized a UAV on the Gibson Ranch Fire, a small initial attack fire, in Cottle County to assist TFS ground crews in analyzing terrain and checking for active fire behavior along the fireline.
- The second deployment later that day was on the 4,500-acre Aeromotor Fire near Matador where the UAV completed reconnaissance on a small spot fire outside the line, assisted with perimeter mapping and checked for smoke in inaccessible terrain.



Source- Alaska Fire Service.

Figure 5- Federal fiscal year 2017 (January to June only) statistics on BLM UAV use by location.

Next Steps:

- Continue to evaluate the 3DR Solo and develop the UAV program in a gradual approach working directly with the AFS.
- Increase the number of UAV pilots within the Division's firefighting ranks. Expand the number of pilots in the resource management ranks that can assist firefighters.
- Cultivate the infrared camera capabilities and adapt supporting equipment to make data collection easier while on a wildfire.
- Mitigate limitations created by short battery life, recharge time, and recharging in remote locations.
- UAVs can be utilized on future wildfires to help firefighters determine the most efficient path for constructing dozer line, provide situational awareness as to structures or civilians threatened and assist with firefighter safety in the event of an entrapment.
- Continue to improve data collection and data sharing.

Other Key Programs that Advance Technology Development and Implementation

The Joint Fire Science Program is funded by the Department of the Interior and Forest Service and since its inception in the mid-90s has become a key program for developing new technology and applications of current knowledge to address the need of wildland fire agencies. The mandate of

the program is to focus on the development and applications of tools for managers and one of the key areas of work is in the effectiveness of various fuel mitigation treatments. Once a fuel treatment is in place, there are long-term maintenance needs and potentially a different set of vegetative conditions will develop over time. This is an evolving area of science and having a program focused on this topic will help agencies develop guidelines and treatment prescriptions to ensure the effectiveness of a fuel break over time. Funding for this program has been significantly reduced in the current budget process and I hope that funding can be maintained at the FY16 levels. This is a good program that provides tools and information wildland fire mangers can use every day!

Conclusion

In closing I would like to stress the importance of cross-boundary fuels work – on federal, state and private lands - for protecting communities as well as the increasing value and safety benefits of new technology such as UAV's in fire suppression. The Forest Service State and Private Forestry program area is a critical funding source to the states for these types of activities and as demonstrated in today's panel, states and their rural fire departments are at the forefront of the nation's wildland fire problem. Our agencies are more nimble and able to adapt rapidly to new technology and ways of conducting operations, and are a cost effective and efficient way to get in front of this problem. In addition to the activities discussed, there is an urgent need to increase the amount of active forest management taking place on federal lands throughout the country. There are good examples of federal land managers that are rising to the challenge, but too often the administrative appeal process or litigation of NEPA documents delay needed fuel mitigation projects on federal lands. Reform is needed to address this problem.

Another helpful tool is the Good Neighbor Authority (GNA) which allows state agencies to partner with the Forest Service to get work done on the ground. Improvements in this authority can also be made based on the experiences of the 95 GNA agreements currently in place with 29 states throughout the country.

Thank you again for the opportunity to discuss these important issues and topics, this concludes my testimony and I would be happy to address any questions the Committee may have.