



Do Wildfires Encourage Invasive Weeds?

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A recent [webinar](#) by ACCAP (Alaska Center for Climate Assessment & Policy) explored this question. Three scientists working at UAF shared the results of their research in the field since the fires of 2004 as well as follow-up studies in greenhouse experiments. Dr. Katie Spellman took up the question of invasive plants and wildfire nearly 20 years ago when she heard that Alaska land managers needed to know more about this issue. She and her team, including researchers Taylor Seitz and Dr. Christa Mulder have now completed extensive studies to see if burning increases susceptibility to noxious weeds. In 2005, Spellman’s team had conducted field surveys along the Dalton, Taylor and Steese highways after massive wildfires in 2004. They added a set of plots near Delta burns dating from 1987 to 1999 to see if older-aged burns showed more weed colonization. In 2006, they added a systematic survey every ¼ mile along all highway-side burns.

Key Point: Barriers to noxious weeds establishing after fire include getting there, and then surviving the physical and the biotic environment. The presence of nearby established weed populations was the biggest factor determining whether weeds were found in a burn. Competition from native plants, mosses and liverworts can help keep out invaders. Burned boreal forest is resilient to invasive plants, with low persistence from 2006 to 2023 on infested survey plots (26%).

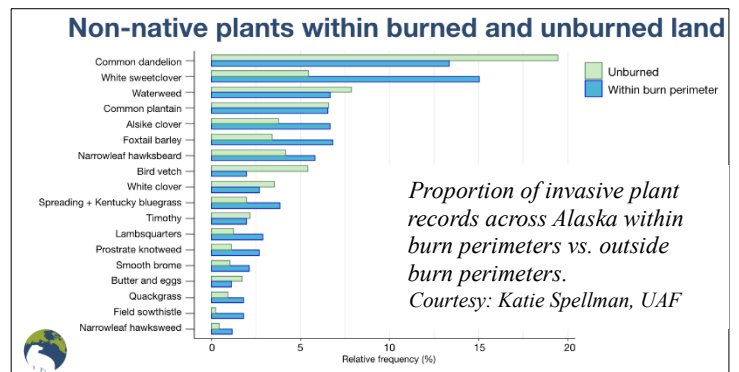
WHAT WERE THE PROBLEM WEEDS?

At least 349 non-native plant species have been found in Alaska, up from 154 that were first documented in 1941. However, just 8 species make up about half of the observations across Alaska, including clovers, grasses, waterweed (*Elodea* sp.), and the familiar dandelion. Three primary species stood out in burned areas though: white sweetclover (*Melilotus albus*), bird

vetch (*Vicia cracca*), and narrowleaf hawksbeard (*Crepis tectorum*).



Do the infestations persist beyond the early years after a fire? During the 2023 surveys, Spellman and Seitz, along with undergraduate Jessie Skalisky, revisited 27 previously infested burned sites along Parks and Dalton highways. *Roadside* infestations—burned or not--had persisted, since 100% of the sites still had some weeds. But no mass invasions of burned areas were observed and typically weeds were in small quantities near the road. Those sites also tended to have more other types of disturbance in addition to fire. In burned areas, just 26% of sites still had invasives persisting and these were mostly white sweetclover and a few bird vetch. In fact, at a statewide scale, white sweetclover is one of the few non-native plant species which has been observed more frequently within burn perimeters than outside them.



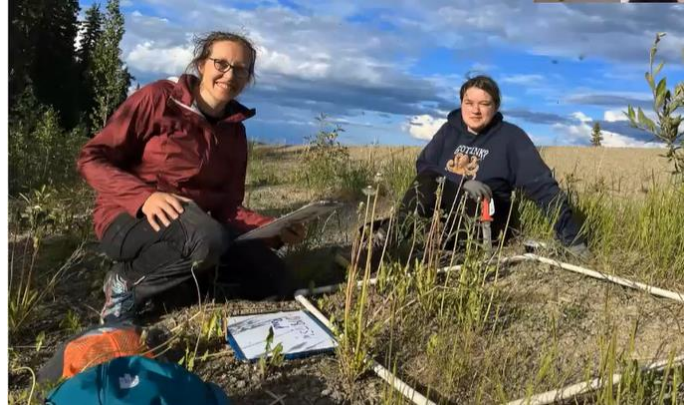
QUESTIONS FOR THE LABORATORY:

A remaining question was—are the seedbanks for these invasive species already present in the soil, or are they dependent on re-introduction after a fire? Early results from greenhouse experiments with soil plugs from burns and nearby areas suggest that there are a few weed seeds present in the soil waiting for the right conditions, but the native plant seedbanks emerge with much higher density. This may be due to the dispersal mechanisms of the native plants (think fireweed) which have evolved in boreal ecosystems.

Although the team has not turned up evidence for persistent infestations, it's important to remember that the seeds of some of these plants last a long time. White sweetclover, for example, has a hard seedcoat that protects them so well they can be viable for up to 80 years.

WHAT ABOUT RE-BURNS?

Would repeat disturbance make an area more vulnerable to invasive plants? Or, conversely, could prescribed burning be used as a weed control strategy? There is no definitive answer for these questions yet, but the team did find more invasives in a few areas that had burned more than once. The research team notes that these areas also had a lot of human disturbance (like military lands) so that may be a contributing factor along with fire. Prescribed burning has been used in areas outside Alaska, but the risk would be in suppressing native seedbanks and reducing the competition in the post-fire biome.



Katie Spellman and Jessie Skalisky examine a plot for weeds (2023).

TAKE-AWAYS:

Boreal forest burn sites appear to have high resilience to non-native plant infestation. Proximity to established infestations of invasive weed, such as road corridors, developments, or military training areas dramatically increases the risk of post-fire infestations. Multiple disturbance events affect forest resiliency and vulnerability to invasion.



Narrowleaf hawksbeard in a recent burn along with aspen seedlings (Photo: K. Spellman).

View the recorded webinar online at the ACCAP website: <https://uaf-accap.org/event/wildfire-invasive-plants/>



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