Restoring Native Ecosystems and Ecological Services through Control of Winter Annual Invasive Grasses

By Joe Swanson, CWMA Board Member, Invasive Plants Supervisor, Boulder County.

Let's get specific and talk about Winter Annual Invasive Grasses. I say specific, because the more common, generic name is cheatgrass. As I am sure most of you reading this know, Downy Brome (*Bromus tectorum*) and several other annual grasses are generally inferred when we say, cheatgrass. Downy Brome is the most widespread of our invasive grass species in the U.S. You may know the plant by how it provides those annoying little seed burrs that get caught in your dog's toes or sticks in your socks and shoes. Those little burrs that relentlessly poke and prod you making you uncomfortable as you stroll across the landscape on your favorite public or private trail. But, as time progresses, to just refer to annoying cheatgrass may not be comprehensive enough.

Thus, I prefer the term winter annual invasive grasses. As my 6th grade English teacher might say, it is the more "exact" term for what I want to talk about. I might add, she had other thoughts about on my writing skills……but we won't go there today.

Here in Colorado along the front range or out on the western slope you could encounter any of the several species that collectively are called cheatgrass. Downy Brome (Bromus tectorum), Japanese Brome (*Bromus japonicus*) or Feral Wild Rye (*Secale cereale).* They are all species that are classified as winter annual invasive grasses and found in Colorado. Meanwhile, if you find yourself heading north into Wyoming, or further out into the Pacific Northwest, you may encounter other newer winter annual invasive grass species such as, Medusahead (*Taeniatherum caput-medusae)* or even Ventanata (*Ventanata dubius*). It seems our list of winter annual invasive grasses are growing which also means, so are the threats to our grassland ecology, native ecosystems, and forests.

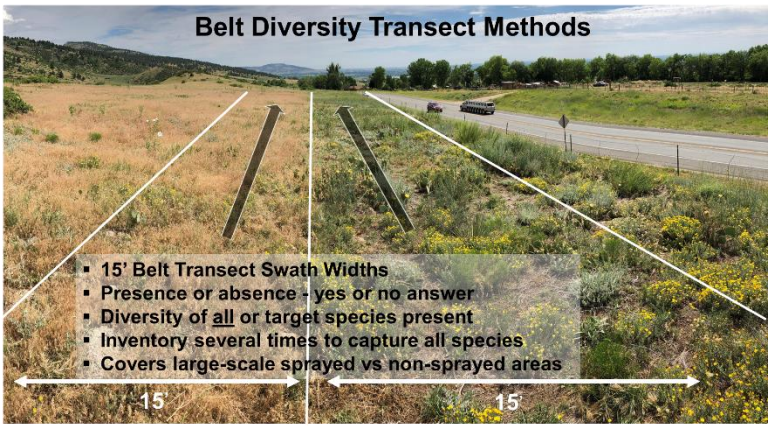
Cheatgrass has been in the United States for over 100 years. Some parts of history say it came into the United States as ballast from ships coming from Europe. Established plants were discovered in Pennsylvania in 1861. Others notes in history say it was a seed contaminate or even planted on purpose In Washington state in hopes of finding another grass for the area in the mid to late 1800's. Regardless, it has steadily been increasing its range despite our best efforts to stop it.

Some of its largest impacts is its ability to displace our native ecosystems, putting our native ecology in peril. It does this in part, by intensifying wildfires and their frequency on the landscape. Because of its growing cycle, germinating in the fall, and actively growing with warming temperatures in late winter and early spring, it can dominate the landscape. Cheatgrass easily suppresses our native vegetation, especially warm season perennial plants and native annuals. As cheatgrass continues to grow, it selfishly utilizes the nutrient and moisture that is available, keeping our native plants highly suppressed. As we reach late June, early July, we start to see the plant mature, dry out, and drop copious amounts of seed. Those seeds then continue the cycle for the next year. With the sheer number of seed it produces, it guarantees its perennial existence on the landscape, even though it is annual plant.

For decades land managers have tried to fend off cheatgrass utilizing timed grazing or prescribed fire to no meaningful control. Herbicide technology was lacking as well, finding only a year's control, maybe two in some locations but still not enough to stem the tide. Today cheatgrass inhabits an estimated 55 million acres or more and continues to invade more acres.

In the last 12 years a new active ingredient has landed on the market. Indaziflam found in Esplanade 200SC labeled for industrial rights of way and non-crop areas, and now Rejuvra labeled for grazing on rangelands, pastures and natural areas are demonstrating results that have not been seen before in past control efforts for cheatgrass.

At Boulder County we are currently in our 8th growing season on some sites post treatment. One application has provided the necessary control to eliminate winter annual grass seed from the seed bank and allow the continual release of native species.

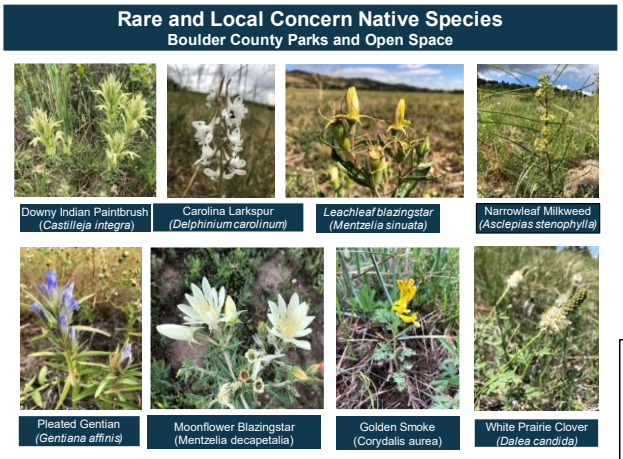


As our treatments have expanded, we have expanded monitoring sites. We are now up to 16 sites over the last 8 years.

As a result of monitoring, we are seeing a consistent response across all sites. That response is an increase in native plants returning once the cheatgrass is removed. As an example, one treatment site (Rabbit Mountain Pollinator Site) established 2018, with the initial year of monitoring in 2019, has seen a steady increase in year over year native species, while the side-by-side control (cheatgrass area) has seen a loss of native species. Those numbers are respectively presented in the table below.

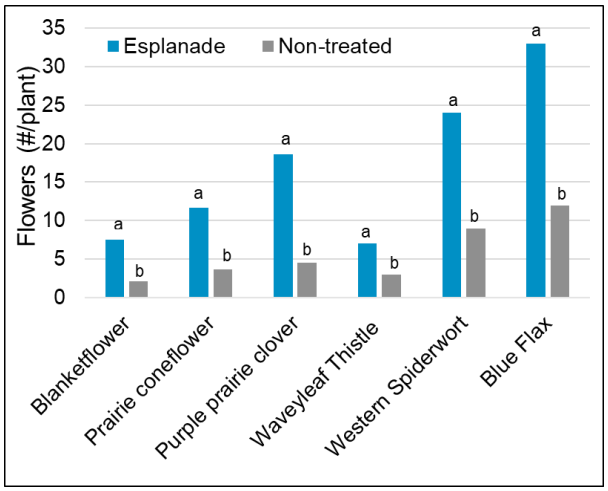
2019		2020		2021	
No. of Native Species		No. of Native species		No. of Native Species	
Treated	Untreated	Treated	Untreated	Treated	Untreated
96	76	102	64	114	63

Furthermore, we are also seeing an increase in annual, biennial, short lived perennials, and monocarpic species, as well as return of plants considered rare or species of concern in Boulder County. This is all very exciting data as we continue to see improvements across our native sites.



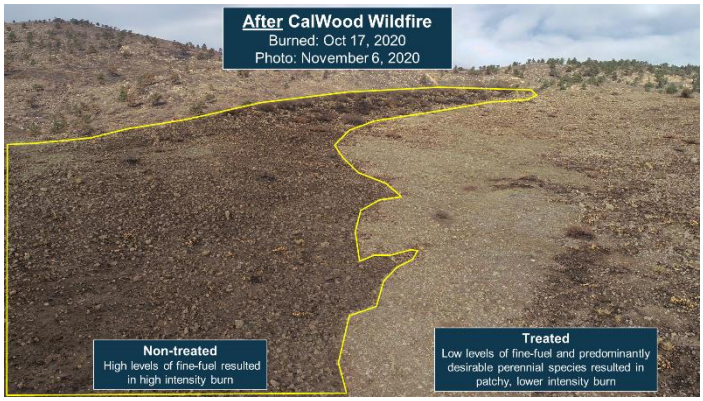
Along with our native plant diversity monitoring we are also looking at other elements of the treatments.

We have conducted monitoring on side-by-side treated vs. untreated sites looking at, biomass production of shrub species post treatment. We have also looked at mule deer utilization of shrub species post treatment and flower production per plant. All of these monitoring efforts are showing positive results.



Colorado State University has conducted a pollinator study which has since been peer reviewed and published; Pollinator-friendly flora in rangelands following control of cheatgrass (Bromus tectorum): a case Study. Arathi H. and Janet Hardin, Colorado State University, 2017. This study highlights the improvement in native pollinator habitat in floral and nesting resources. And we are working on others.

We are also seeing benefits in the world of wildfire.



The 2020 season of wildfire across Colorado allowed us to see how wildfire interacted with some of these treatments. As you can clearly see in the picture to the left, the yellow line demonstrates the untreated versus the treated area prior to the Calwood fire of 2020. It is easy to see the difference in the intensity of the burn across the site between cheatgrass infested areas and native vegetation areas. This scene was replicated along the front range at other treated sites as well.

We have also conducted prescribed fires on some treated sites as well. Areas where native vegetation has been re-established on the sites have created a more natural burn pattern with less damage to the ecosystem. Here on left we can see prescribed fire conducted in 2018 with dense cheatgrass across the site.

We incurred shrub mortality, and with a timely rain, cheatgrass re-erupted on the site. In the photo on the right, we can see the results of a prescribed fire in 2022 where cheatgrass was removed and native vegetation had been re-established. The differences are notable, especially with plant and shrub morality.

While our experiences have been highly positive so far, we still have things to learn in the battle against cheatgrass. But perhaps, just maybe we have found something that can help turn the corner in restoring the ecology and resilience of some of our most precious lands.

(Treated Critical Mule Deer Winter Range)