The Problem: Tall Oatgrass

Tall Oatgrass (*Arrhenatherum elatius*), a cool season, perennial bunch grass native to northern Europe, has become an increasing threat to native prairies in the western United States. Historically grown as livestock forage and used for soil retention, tall oatgrass has now invaded healthy native communities, forming large monotypic stands and impacting native species. In Boulder County, it’s presumed tall oatgrass was introduced near NCAR during historical
ranching operations in the 1950’s and has dramatically increased in cover over the past 20 years. Vegetation surveys conducted between 2007 and 2016 confirm tall oatgrass occurrences have increased from 250 to roughly 327 acres. Without aggressive management, expanding populations of tall oatgrass will further impact the diverse and unique foothill grasslands and prairie ecosystems that occur on City of Boulder’s OSMP properties including tallgrass prairie, considered imperiled globally and one of the most endangered vegetation types in the world. Southern Boulder County and northern Jefferson County may have the largest xeric tallgrass communities remaining in Colorado and provide habitat for several Colorado Natural Heritage Program-tracked species (OSMP Grassland Ecosystem Mgt Plan 2010).

Historically, the Open Space and Mountain Parks Department has used a strategic approach to manage tall oatgrass. Various mechanical controls for tall oatgrass have been employed including annual whipping since 2009 and grazing since 2015. Both scientific literature and OSMP monitoring results indicate that this short-lived perennial is susceptible to these types of treatments although it takes 7-9 years to see results. Other tested treatments include removing individual plants with shovels, although this treatment has not been successful due to our rocky soils. Limited herbicide use has occurred on outlying populations in combination with seeding to contain and control the spread of outlying occurrences. Recent surveys of additional outlying areas are detecting new occurrences. Therefore, staff is expecting to intensify treatment efforts in these outlying areas to further limit expansion into unoccupied habitats.

To better understand the ecological attributes and potential management options for this species, OSMP contracted with EnviroPlan Partners Inc. to develop an ecological impact study and risk assessment on tall oatgrass in 2017. The project goals include: 1.) A comprehensive review of tall oatgrass ecology and potential management options 2.) Ecological niche and dispersal models to determine potential spread on OSMP lands 3.) The development of an integrated management plan to guide management and monitoring efforts for the next 10 years. The three reports are available online. The consultants’ literature search and personal communication revealed “Managers in Oregon and Washington have documented tall oatgrass spread from a few individuals to widespread infestations across the landscape in 5-7 years” (Management Plan 2018). Ecological niche and dispersal models generated by the consultants for OSMP
estimate tall oatgrass could spread into 18,520 acres of grassland ecosystems at an average annual rate of 30 - 70 acres per year with an increasing rate of expansion over time (Figure 1). Tallgrass and Foothills grassland ecosystems currently represent the highest risk for additional spread.

**Management Strategy:**

Three management zones (figure 2 below and Page 7, Management Plan 2018) have been identified across OSMP which help guide treatment and monitoring efforts. Each zone is defined by tall oatgrass density and size of infestations and will require different treatment strategies based on definitions and feasibility of implementation. Zone boundaries aren’t meant to be stagnant and will be adjusted as various management phases are complete.
**Containment Zone:** The containment zone is the “epicenter” or area of highest tall oatgrass concentrations where eradication may not be feasible. The Shanahan/NCAR area makes up the bulk of this zone. The management objective is to contain existing tall oatgrass populations and prevent further spread by using integrated techniques. Control strategies are predominantly non-chemical such as cattle and weed whipping with monitoring to measure success. Herbicides may be used following a prescribed burn if warranted. Further scientific research on tall oatgrass phenology, ecology and management techniques will also occur within this zone.

**Management within the Containment Zone:** Cattle grazing has been shown to be a useful management tool within the containment zone. In 2015, a 72-acre grazing enclosure was built south of Bear Canyon Creek to examine how cattle influence tall oatgrass and native vegetation. Monitoring plots were established within the enclosure at the onset of grazing. Although preliminary, three years of data show a reduction in tall oatgrass cover while having no effect on native species composition. Weed whipping plots established in 2009 are also showing positive results although 7-9 years of treatment were needed to see results.

**Eradication Zone:** The eradication zone are areas outside the containment zone where smaller tall oatgrass populations occur and have potential to quickly expand. These sites include intact native foothills and grassland communities that support rare plant and wildlife communities and riparian areas (figure 3). The management objective is to eradicate tall oatgrass populations using integrated techniques and monitoring treatment efficacy. Control strategies include herbicide applications, seeding and limited mechanical controls.
Management within the Eradication Zone: Isolated occurrences of tall oatgrass outside the containment zone are important to control before they become monotypic stands. Since 2016, spot applications of herbicides have been used to control small occurrences while larger sized occurrences, those estimated to be .01 acre in size are being whipped to prevent spread and monitored until management can occur. Spring cattle grazing, if available is also a useful tool to prevent tall oatgrass from seeding until other strategies can be employed.

Early detection Zone: The early detection zone includes areas not currently occupied by tall oatgrass but are at risk of invasion due to their proximity to tall oatgrass populations and presence of suitable habitat. Systematic trail corridor and watershed level surveys occur yearly to prevent establishment of tall oatgrass in the zone. The management objective for these areas is to implement early detection/rapid response protocols to identify new tall oatgrass populations in currently unoccupied areas.

Education and collaboration are key to the management and containment of this species. Natural resource agencies, landowners and recreationalists along the Front Range must work together to prevent further spread and preserve Colorado’s natural resources and beauty. OSMP will spearhead a tall oatgrass working group comprised of partners and collaborators to accomplish management, ecological, social and research goals. These goals will be assessed on a biennial basis as awareness grows and adaptive management will be applied. A 5-8-year strategic tall
oatgrass management plan is planned for 2019. Site specific implementation plans will be developed by OSMP staff with consideration to annual budgets. The development of a public outreach plan is also key in achieving containment and support for various management scenarios.