Why Noxious Weeds Should be Eliminated.

Noxious weeds are weeds which are non-native to Colorado, have no natural predators, and outcompete native plants, altering local ecosystems. They are not part of any natural successional cycle.
Advantages of Noxious Weeds

- Mobility: the ability to spread rapidly
- Found in agricultural products like seed packets, hay, and in nursery stock
  
  Oxeye Daisy: AKA field daisy, Marguerite, moon daisy, moon-penny, poor-land penny, poverty daisy and white daisy

- Spread by underground stems (rhizomes) or by seed dispersal and a large number of seeds
- Many germinate earlier in the year than natives, giving them advantage.
- Some have allelopathy: the organism produces a biochemical that influence the germination, reproduction and survival of other plants
- Seeds of noxious weeds can remain viable in the soil for many years!
- Seeds of noxious weeds can remain viable after passing through the digestive tracts of animals, if the animal eats the weed at all.
Invasive weeds

- Degrade and destroy wildlife habitat, change feeding behaviors of wildlife
- Reduce productivity of land and reduce land values
- Reduce plant and animal diversity
- Obstruct waterways, and diminish water supplies. Contribute to low dissolved oxygen causing mortality to invertebrates and fish
- Contribute to soil erosion, and increase fire hazards
- Reduce livestock production, poison animals, and reduce their growth rates
- Restrict recreational activities, and cause values of recreational areas to decline
- Contribute to costly restoration activities
- Deplete nutrients
- Contribute to the endangerment of Threatened and Endangered species
- Can have sap which is irritating or toxic to humans and or domestic animals
- Some produce biochemicals which inhibit the growth of other plants
- Compete for pollination services and diminish the availability of native fruits for subsistence resources
- Decrease yield of crops on agricultural farms
Issues With Noxious (Invasive) Weeds

• “Invasive plant species have already infested more than 125 million acres of land in the U.S.,” National Invasive Species Council 2011 (In USDA Forest Service 2011).

• “An estimated 3.5 million acres of National Forest Service lands are infested with invasive weeds.” (USDA Forest Service 2001)

• “As of 2017, there were over 1.4 million acres of national park units infested with invasive plants, of which only approximately 43,000 acres are controlled.” (National Park Service) https://www.nps.gov/subjects/invasive/plants.htm

• “Tamarisk was introduced to the Southwest; it has since established itself firmly -- and tragically. It crowds out native species; and it is very successful at reaching low water tables with its very deep roots. And, of course, as is true of all non-native species, Tamarisk changes the relationship of animals to plants, i.e., those animals which found food and habitat in Willows (frequently the losers in their confrontation with Tamarisk) now must either be able to survive on the new food and habitat of Tamarisk, or perish. Many perish.” (Southwest Colorado Wildflowers) https://www.swcoloradowildflowers.com/Tree%20Enlarged%20Photo%20Pages/tamarix.htm
Invasive weeds and the Environment
Invasive Weeds and Pollinators

- Treatments of noxious weeds like Chinese privet (Ligustrum sinense) had a major impact on butterfly abundance and community composition. Treatment of other invasive shrubs would also contribute to a more abundant understory with more larval host plants and adult nectar sources. (Hanula and Horn 2011)
- Woody exotics, which displaced willows, are detrimental to bees in particular, and to a lesser extent the pollinator community. (Pendleton et al 2011)
- One study suggested that invasive species, if abundant, can actually provide some nutritional value to bee species which collect pollen and nectar, and may aid in rearing progeny. Tepedino 2008.
  1. Effects of competition by invasives for pollination is not clear.
  2. Invasive species attract generalist bees. Specialists do not benefit

Quick Facts

- There are 946 native bee species in Colorado.
- Studies have shown that native plants are four times more attractive to native bees than introduced ornamentals.

(CSU) https://extension.colostate.edu/topic-areas/insects/attracting-native-bees-landscape-5-615/
Invasive Weeds and Wildlife

• Removal of invasive weeds promotes more basking opportunities, because of a more open midstory and increases lizard abundance. (Bateman et al. (A) 2008)
• All lizard populations in New Mexico either stayed the same or increased after removal of non-native plants. (Tamarix and Russian Olive) (Bateman et al. (B) 2008)
• Lower midstory areas also increase bat abundance and activity. (Bateman et al. (A) 2008)
• Birds which nest in the lower 2/3 of vegetation decreased in abundance. (Bateman et al. (A) 2008)
Invasive Weeds and Livestock

- In pastures with Leafy Spurge cattle will be deterred by dense stands and will not graze due to the latex content of leafy spurge.
- Russian Knapweed, Yellow Starthistle, Houndstongue and Locoweed are all toxic to horses.
- Leafy Spurge can cause blisters on horses feet and colic if consumed.

https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=25226
Montana Weed Control Association https://www.mtweed.org/weed_id/houndstongue
https://www.americansouthwest.net/plants/wildflowers/oxytropis-lambertii.html
Invasive Species and the Environment

“Aquatic, invasive plants alter environmental conditions, ecosystem processes, plant and animal communities and biological diversity.” (Mayfield III et al. 2021)

“Invasive plants alter the base of the food chain and thereby key processes like primary productivity and nutrient cycling.” (Mayfield III et al. 2021)

Invasive weeds influence carbon and nitrogen cycles by consuming more water than native species, changing evapotranspiration rates and contributing to lower soil moisture. (Miniat et al. 2021)

Changes in evapotranspiration result in negative changes to

1. Stormwater mitigation (makes this harder to achieve)
2. Groundwater recharge
3. Streamflow
4. Stream channel morphology
5. Water quality
Facts (Invasive Weeds and Water)

“In the past 200 years nearly every major river system has been regulated.”

“Regulation of flows regimes of rivers often disconnects the river from its floodplain”

“Physical disconnection of rivers from floodplains also can promote establishment of non-natives.”

Bateman et al. (B) 2008
Examples of Invasive Issues

Cheatgrass

- Has invaded over 5 million acres in western North America
- Germinates at lower temperatures and in drier soils than native grasses
- Develops roots in fall and winter
- Depletes soil moisture
- Reduces forage for livestock and wildlife
- Changes soil nutrients
- Increases fire frequency
- Massive seed producer. 1900 seeds per square foot per year
- Seed bank bounces back quickly
- 4 cheatgrass seeds per square foot will hinder perennial grass establishment

Source: CPW 2020

https://www.minnesotawildflowers.info/grass-sedge-rush/cheatgrass Photos by K. Chayka and Peter M. Dziuk

Increases fire frequency = higher fire frequency = higher soil erosion
Oxeye Daisy

- “Not palatable to cattle and affects pastoral lands by reducing carrying capacity.” (McConnachie, A.J et al. 2015)
- Not eaten by wildlife
- “Dense infestations exclude other plant species leading to soil erosion and depletion of soil organic matter.” (McConnachie, A.J et al. 2015)

University of Wisconsin-Madison
https://wimastergardener.org/article/ox-eye-daisy-leucanthemum-vulgare/

Washington State Noxious Weed Control Board
https://www.nweb.wa.gov/weeds/oxeye-daisy
Oxeye daisy in 2021 about 23 acres. From Adams Ranch Road to Benchmark Drive East of 145
Uncontrolled Oxeye Daisy in Grand County
Yellow Toadflax

- Infestations of this pose a risk to crops such as canola, wheat and mint. The Cucumber mosaic virus overwinters in Yellow Toadflax
- There is little evidence that Yellow Toadflax is used by livestock or wildlife.
- In humans Yellow Toadflax is a moderately allergenic species.
- Seeds ingested by animals (deer, elk, cattle) can remain viable even after passing through the digestive system. Seeds can be viable up to 8 years.
- Has an extensive root system, with a taproot that can extend more than 3 feet deep.
- “Yellow toadflax is highly attractive to bumblebees and halictid bees, and may alter pollination of native berry species within the foraging distances of these insects.” (Spellman and Swenson 2012)
Leafy Spurge

- Infested pastures decrease plant and grass production by as much as 75%. (Fenner 2008)
- Cattle will avoid grazing pastures with as little as 20% cover of leafy spurge. It irritates the mouth and digestive tract in cattle. (Fenner 2008)
- The sap will cause blistering and hair loss on horses feet. (Fenner 2008)

Kale Van Bruggen
https://www.ndsu.edu/pubweb/chiwonlee/plsc211/student%20papers/articles06/kalevanbruggen/kvanbruggen.html
Leafy Spurge distribution in the U.S. 2021

Saltcedar (AKA Tamarix)

- Mature plants can produce 600,000 seeds per year. Even though seeds are only thought to be viable for 45 days.
- Develops a deep taproot that can tolerate extended periods without water. (Possibly 16 feet or more)
- Has displaced native cottonwood and willows.
- Threatens the continued survival of the Southwestern Willow Flycatcher: an endangered species.
- Uses water heavily! Not good for a state with a drought.
- Increases salinity in the soil making the soil unusable for native vegetation.
- Alters stream channels and floodplains.
- In Colorado’s major rivers and tributaries an estimated 98,000 acre feet per year of water is consumed by two invasive species. (Tamarix and Russian Olive)
  (Tamarix Coalition 2008)
• Takeaways
  • Invasive plants affect multiple environmental processes like water quality and quantity, and increase sedimentation rates.
  • Invasive plants do not provide native species with the resources to survive, and can contribute to the need to list more animals on the Endangered Species list.
  • Invasive plants are not successional because they were brought here accidentally or intentionally, and would not have occurred here otherwise.

• Future Challenges (Kerns et al. 2021)
  • Collaborative agency wide efforts
  • Understanding effects of invasive species on multiple trophic levels, and how those species can effect carbon and nutrient cycles.
  • Improvement of data quality, and increased surveys
  • How climate change will impact invasive species
  • How multiple environmental changes will impact the spread of invasive species
  • Approaches for restoration
References


References


Spellman, Katie, and Nicole Swenson. 2012. “Assessing the vulnerability of Western Alaska ecosystems and subsistence resources to nonnative plant invasion.” University of Alaska Fairbanks, Resilience and Adaptation Program


References


USDA Forest Service GSD Update: Rocky Mountain Research Station, Grassland, Shrubland and Desert Ecosystems Science Program September 2011.