Invasive Annual Grasses in Canada

Vicki Maloney

Solution Development and Tech Services Manager – Envu Canada vicki.maloney@envu.com





Agenda

- What are invasive annual grasses and where are they in Canada?
- How do they affect IVM practices?
 - Ecological and operation impacts
 - Fire risk management
- Integrated control strategies





Downy brome, Ventenata, and Japanese brome are the three worst invasive annual grasses in Canada



❖ Downy brome/Cheatgrass (Bromus tectorum)



Medusahead (Taeniatherum caputmedusa)



Ventenata (Ventenata dubia)



Feral rye



Jointed goatgrass (Secale cereale) (Aegilops cylindrica)



Japanese brome (Bromus japonicus)



Understanding the Lifecycle of Annual Grasses



Germination: Occurs in early fall or spring, **depending on species and environmental conditions**. Moisture and temperature trigger seed germination.



Establishment: Seedlings emerge rapidly, competing with native vegetation for resources like water, nutrients, and light.



Vegetative Growth: Fast-growing root systems develop, allowing annual grasses to establish before perennial plants. Leaves and tillers expand to maximize energy capture.



Reproductive Stage: Most annual grasses produce flowers and set seed in late spring to early summer. Some species, like downy brome, can flower early to avoid competition or environmental stress.

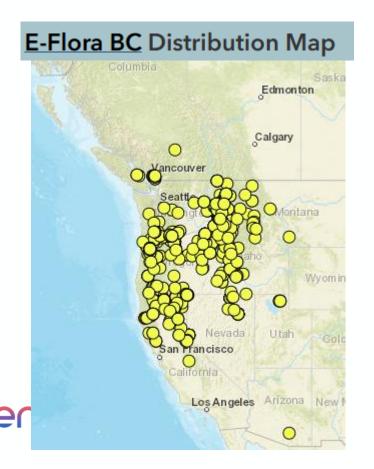


Seed Production & Dispersal: High seed production (often thousands per plant) ensures persistence. Seeds spread through wind, animals, and human activity (e.g., machinery, hay, vehicles).



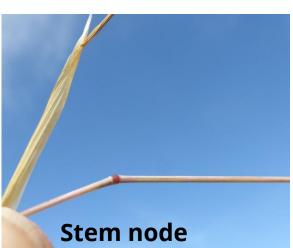
Senescence & Dormancy: Plants die off after setting seed, leaving a dry, flammable biomass that increases fire risk. Seeds enter dormancy, remaining viable in the soil seedbank for years.

Ventenata distinguishing characteristics







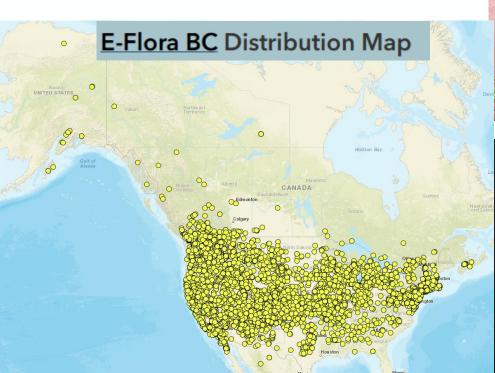


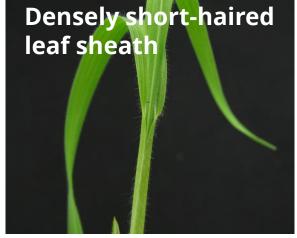




RESTRICTED

Downey brome – distinguishing characteristics before senescence

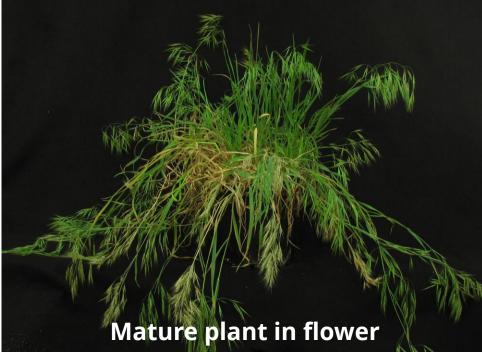












Downey brome – distinguishing characteristics after senescence













Japanese brome – distinguishing characteristics

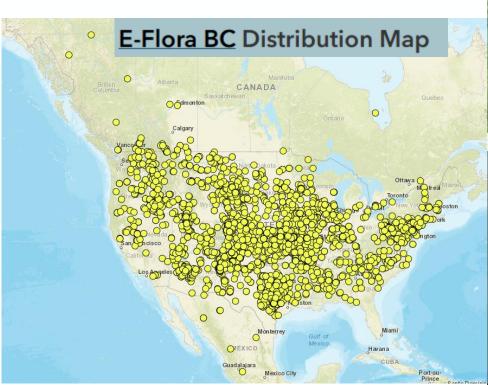












Hard to identify and distinguish from each other





Picture this

Google Lens

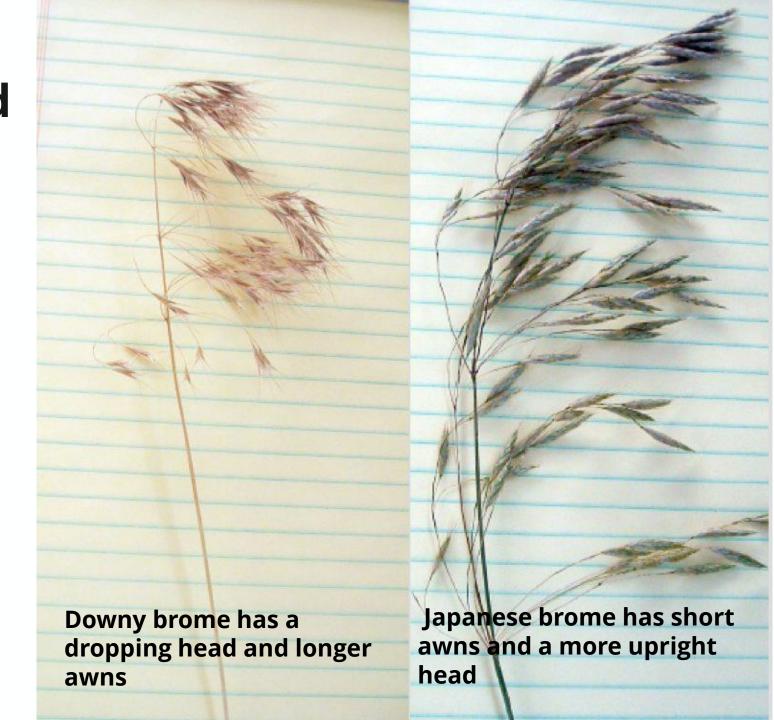




iNaturalist

PlantSnap





Scale of the invasion in the US

- •Invasive annual grasses now cover >100 million acres in the western U.S.
- •Cheatgrass alone occupies >50 million acres of rangeland and roadsides.
- •Expanding by ~1–2 million acres per year, especially in the Great Basin and Columbia Plateau
- •.Roads and energy corridors drive spread, forming continuous fuel lines.
- •USGS (2024): Annual grasses now make up 10–40% ground cover in dry western basins.

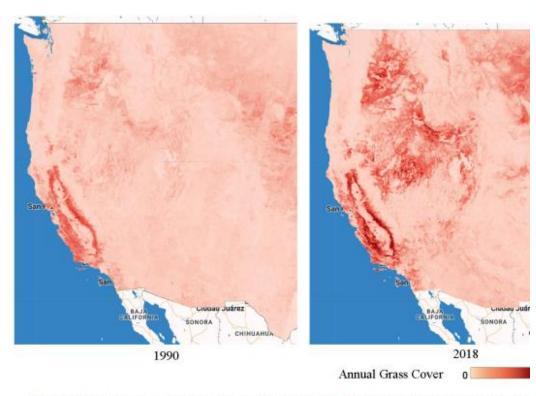
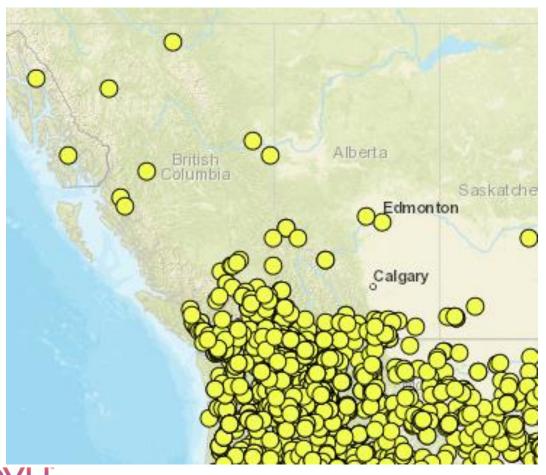


Figure 5. Difference in annual grass cover between 1990 (at left) and 2018, demonstrating expansion of cheatgrass. Reproduced from the USDA Rangeland Analysis Platform.





Infestations in Canada are spreading quickly



- •The northern edge of the U.S. invasion (Washington, Oregon, Idaho, Montana) continues expanding northward into British Columbia and Alberta.
- •BC Interior hotspots: Thompson-Okanagan, East Kootenay, and southern Cariboo grasslands
- •Regional mapping (USGS EROS 2024 + BC Invasives Council 2023) shows **continuous cross-border invasion fronts** along transportation and powerline networks.
- •Estimated coverage: >200 000 ha (500 000 acres) in southern BC, expanding 10–20 % annually in high-risk corridors.



Reporting a sighting in BC

- If you spot downy brome or another invasive annual grass on a roadside or other public area in British Columbia, you can report it to help manage its spread.
- Mobile App: Download the free "Report Invasives BC" app.
- Online: Use the online reporting form at the Invasive Species Council of British Columbia website.
- Regional Contact: You can also contact your local invasive species committee for reporting and advice.





Environmental Effects



Fire Regime Alteration: Fine fuels cure early, increasing fire frequency up to tenfold in invaded regions.



Biodiversity Loss: Native perennials, forbs, and sagebrush communities are displaced, causing >70 % reduction in native plant diversity in heavily invaded sites.



Soil & Water Impacts: Reduced infiltration and increased erosion degrade rangeland productivity and downstream water quality.



Wildlife Habitat Loss: Conversion to annual-grass monocultures threatens species dependent on native shrub-steppe (e.g., greater sage-grouse).



Industry & Economic Impacts



Rangeland & Livestock: Reduced forage quality and shorter grazing seasons; estimated >\$200 million annual loss in forage value across western states.



Transportation & Utilities: Increased fire ignition and spread risk along roads, railways, and powerline corridors, raising maintenance and liability costs.



Energy & Infrastructure: Utility companies face rising vegetation-management costs to mitigate corridor fire hazards.



Restoration & Control: Long-term control and reseeding programs exceed \$100 million per year across federal and state agencies.



Insurance & Communities: Wildfire-related property and suppression costs escalate as grass-fire seasons lengthen and spread into the wildland—urban interface.

Roadsides, Powerlines & Fire Risk



- Human activity causes ~40 % of BC wildfires (10-yr avg, BC Wildfire Service).
- Ignitions cluster near roads and valleys, aligning with major travel and transmission corridors (2006–2020 ignition-cluster analysis, Natural Hazards 2023).
- No public % for roadside/powerline starts, but provincial datasets show the densest ignition zones follow Highway 1, Highway 97 and major hydro corridors.

Invasive grasses increase fire occurrence and frequency

- •Ecosystem transformation: native shrub—steppe replaced by flammable monocultures, altering fire behavior and management priorities and extending the fire season by weeks compared to native vegetation.
- •Continuous fuel beds of annual grasses promote sustained fire spread.
- •Post-fire recovery favors annuals, creating a self-reinforcing grass—fire cycle.
- •Higher ignition probability along roadsides, powerlines, and industrial corridors due to dry, uniform fuels.
 - •Much of the estimated >200 000 ha of invasive grass in southern BC extends into transportation rights-of-way, increasing ignition potential.
 - •California example: cheatgrass covered ≈ 60 % of the area burned in roadside + powerline fires in 2023, despite < 15 % statewide cover showing how cheatgrass amplifies fire spread.
- ❖ Roadsides and transmission corridors act as invasion pathways and ignition zones, justifying priority control and early-season fuel breaks.







What tools do we have for invasive winter annual grass control?

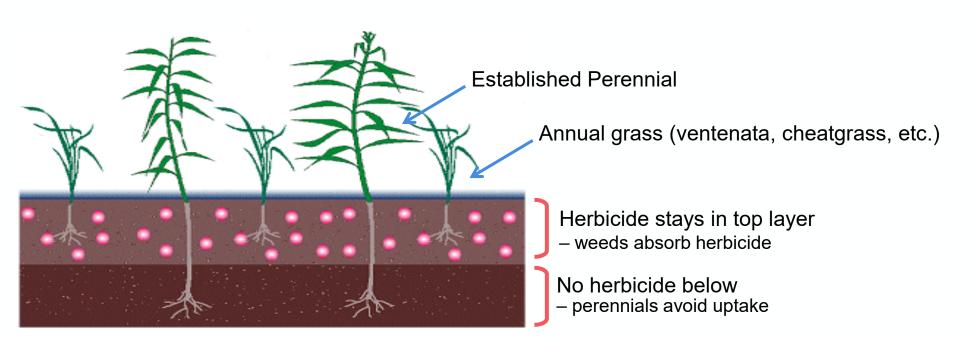
- There are several tools that can be used to manage annual grasses, including:
 - Herbicides*
 - Manual removal (i.e. mowing, discing)
 - Grazing
 - Prescribed burning
- Many of these options are labor intensive, costly, or only provide short-term benefits.

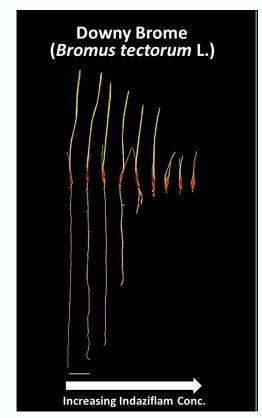


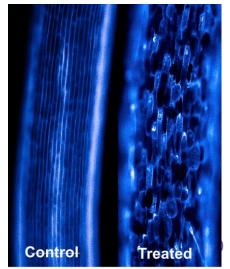


Long-term invasive annual grass control on ROWs

- Active ingredient: Indaziflam
- Group 29 herbicide (Cellulose Biosynthesis Inhibitor)
- Inhibits weeds germinating in the top soil profile, leaving desirable perennial species unaffected.
- Must reach soil and be activated by rainfall (~1/2") in order to be absorbed by weeds.







Keys for application success with Esplanade (indaziflam)

- •Apply **pre germination** to control invasive annual grasses and annual broadleaf weeds while allowing **desirable perennials** to remain.
- •Use **Esplanade® alone** or **tank mix with Navius® Flex** for broader-spectrum, longer-lasting control.
- •Add **glyphosate** if targeting existing and germinated annual grasses at the time of application.
- •Apply as a **uniform broadcast** to the soil surface before germination
- •Remove excess debris for consistent soil contact and coverage.
- •Limit soil disturbance after treatment to preserve the herbicide layer and reduce reinvasion.





The Keys to Longterm Success

Timing

For Pre-emergence Go Out Early!

Coverage

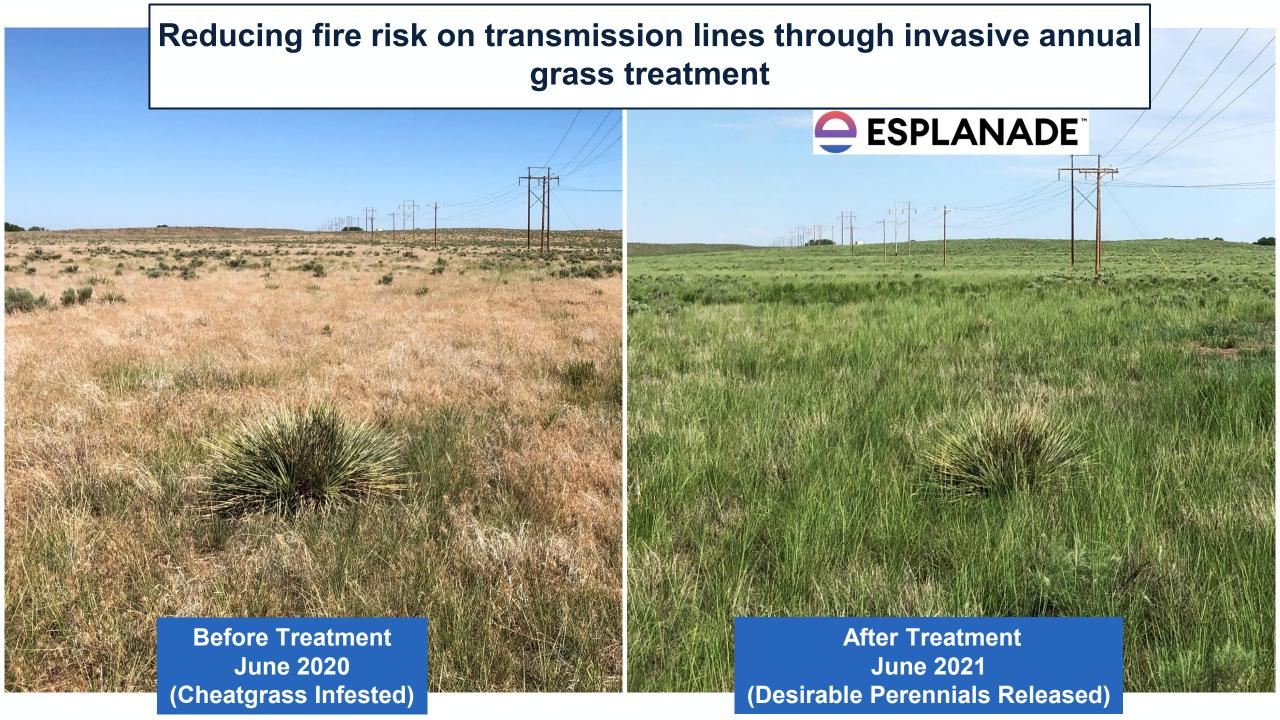
Highest water rate possible Uniform application

Calibration

Do not under apply

Herbicide Incorporation into soil

Long-Term Control







Selective Roadside Treatments

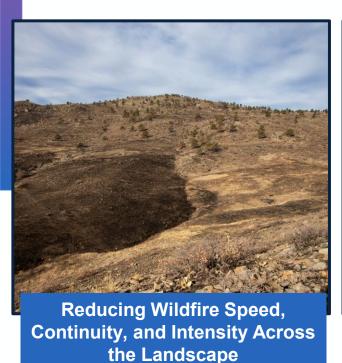
Applied February 2019 During Dormant Season



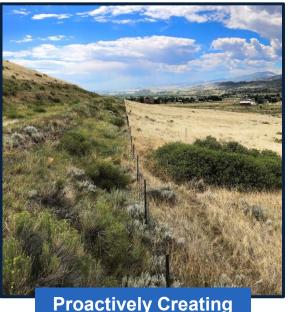


Key Learnings

- Invasive annual grasses are a growing concern in Canada
- Controlling invasive annual grasses reduces wildfire risk and can lessen the impacts experienced during a fire.
- Indaziflam (the active ingredient in Esplanade) can control invasive annual grassed for up to four years
- Planned treatments on ROWs (utility transmission lines, roadsides, pipelines) can serve as fire breaks and reduce the risk of wildfire starting in these areas.







Reducing Overall Fine-Fire Breaks Fuel Loads (Wildfire Risk)

Thank You

Vicki Maloney
Solutions Development and Tech Services
Manager
Envu Canada
vicki.maloney@envu.com



