Weeds and Seeds and Fire, Oh My!
Weed Management Lessons from Montana

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The Next 15 Minutes

- Managing the seed bank
- Revegetation following wildfire
- Long-term outcomes of revegetation
MANAGING THE SEED BANK
Ventenata (Ventenata dubia)

- Annual grass
- Rapidly spreading across Montana
- Herbicide options
- Short-lived seeds (<4 years)
Ventenata Herbicide Trial
5 Years Running

• Treatments
  – Indaziflam (Esplanade, 7 oz)
  – Imazapic (Plateau, 7 oz)
  – Rimsulfuron (Matrix, 4 oz)
  – Propoxycarbazone (Lambient, 1.2 oz)
  – Glyphosate (12 oz)
  – Indaziflam + other 4 herbicides

• Sprayed November 2016
Year 3—Indaziflam still controlling ventenata

Treatment
- Non-sprayed
- Indaziflam
- Propoxycarbazone-sodium
- Rimsulfuron
- Imazapic
- Glyphosate
- Indaziflam + Propoxycarbazone-sodium
- Indaziflam + Rimsulfuron
- Indaziflam + Imazapic
- Indaziflam + Glyphosate
Ventenata Cover, Years 4 and 5

Mangold et al, unpublished data

(severe drought)
Seed Bank Assay
Are there any seeds left?

Collected seed bank samples August 2021
Grew in greenhouse fall/winter 2021
Emerged Seedlings
REVEGETATION FOLLOWING WILDFIRE
Revegetation is expensive and it *doesn’t* work more often than it *does* work. After wildfire, must determine whether revegetation is necessary.
Is Revegetation Necessary?

“To seed, or not to seed, that is the question”
Is Revegetation Necessary?

“To seed, or not to seed, that is the question”

Weed abundance prior to fire

Fire severity
### Is revegetation necessary?

<table>
<thead>
<tr>
<th>Degree of Weed Cover</th>
<th>Burn Severity</th>
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<tbody>
<tr>
<td></td>
<td>Low</td>
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<tr>
<td>Absent to low (up to 20%)</td>
<td>Revegetation not necessary; natural recovery within 1-2 years</td>
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<tr>
<td>Moderate (20-80%)</td>
<td>Natural recovery within 1-2 years with weed management</td>
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<tr>
<td>High (over 80%)</td>
<td>Natural recovery within 1-2 years, but intense weed management needed; revegetation likely needed</td>
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High Priority Areas

- Fuel breaks/fire lines
- Equipment staging areas
- MSU Red Bluff Research Ranch
- Norris, MT
- 2012 wildfire
- Monitored cheatgrass post-burn
Cheatgrass Cover 1-3 Years Post-Fire

Focus Efforts Here First

• Locations
  – Fuel breaks/fire lines
  – Equipment staging areas
• Actions:
  – Monitor
  – Treat weeds (herbicides, targeted grazing, other)
  – Revegetate
LONG-TERM OUTCOMES OF REVEGETATION
Long-Term Outcomes of Revegetation

• Re-sampled 3 published seeding studies 15 years after seeding
• Wildlife management areas in southwestern Montana
• Invaded by spotted knapweed
Seeded Grass Reduced Invader
Highest seeding rate decreased spotted knapweed biomass by ~86%.

Seeded grass biomass increased from ~26 lb/A in Year 2 to 1760 lb/A in Year 15.
Leafy Spurge-Invaded Rangeland

- Southwestern Montana
- Integrated herbicide and seeding
- Sampled 3 and 14 years post-treatment

Seeded grasses increased over time, especially bluebunch wheatgrass
Leafy spurge declined over time, regardless of treatments.

Seeding grasses, especially bluebunch wheatgrass, reduced “secondary invaders” (cheatgrass, Japanese brome, bulbous bluegrass, Canada bluegrass, spotted knapweed, western salsify).

Thank you! Questions?
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Ventenata infestation in southeastern Montana