



# Brome Conversion and Long-term Grassland Management

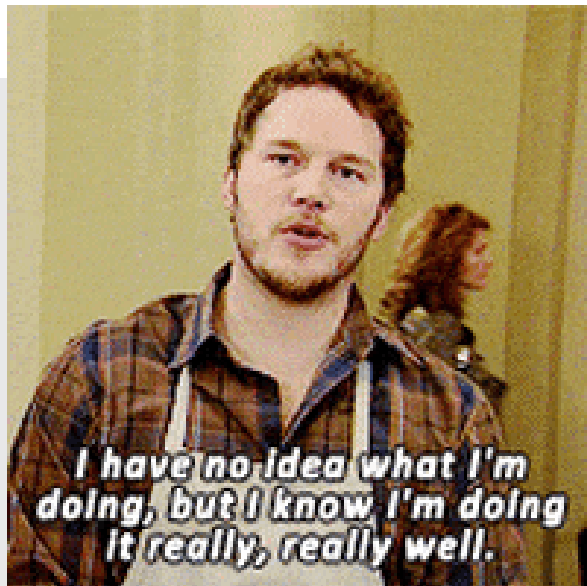
Sara Reagan | Easement Programs Coordinator

Kevin Roth | Easement Programs Coordinator

# Introductions

## Sara Reagan

- BWSR Easement Programs Coordinator



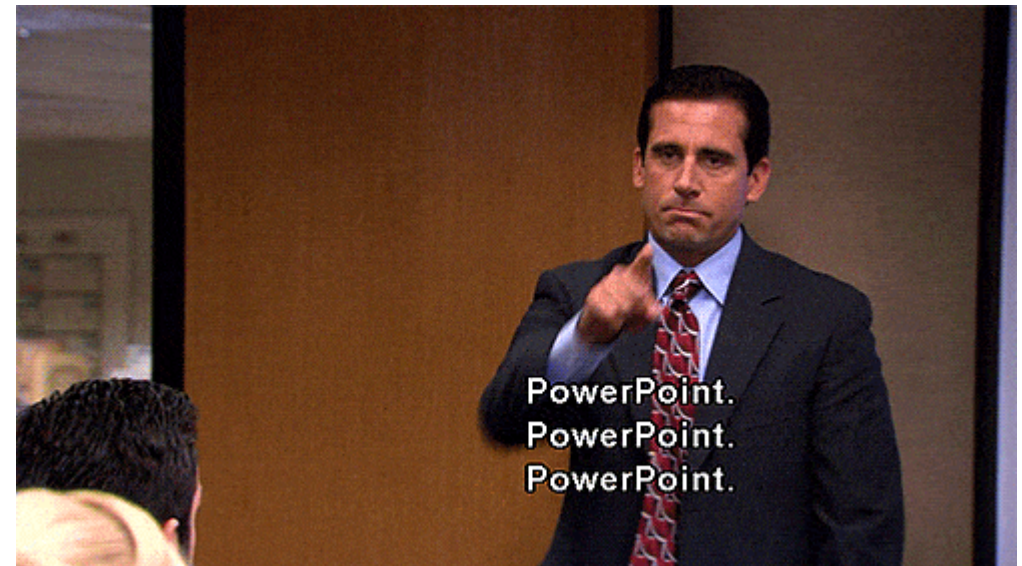
## Kevin Roth

- BWSR Easement Programs Coordinator



# Agenda

	Topic
SAR/KR	Introductions
SAR	Brome conversion methods: Tillage & Herbicide
KR	Brome conversion methods: Cropping systems, cover crops
KR	Grassland Management: Prescribed Fire
SAR	Grassland Management: Grazing
SAR	Grassland Management: Haying
KR	Grassland Management: Mowing
KR	Grassland Management: Herbicides
SAR/KR	Summary



# Definitions

- **Restored grassland:** Grassland that was once cropped and at one time seeded into native perennial grass/forb cover
- **Remnant native prairie:** Grasslands dominated by native prairie vegetation, usually occurring where the sod has never been broken.
- **Brome conversion:** Completely start over by removing smooth brome with the intent to establish a diverse restored grassland
- **Prairie enhancement:** Encompasses a brome conversion. May be used more specifically in reference to inter-seeding existing native vegetation with the intent to add diversity

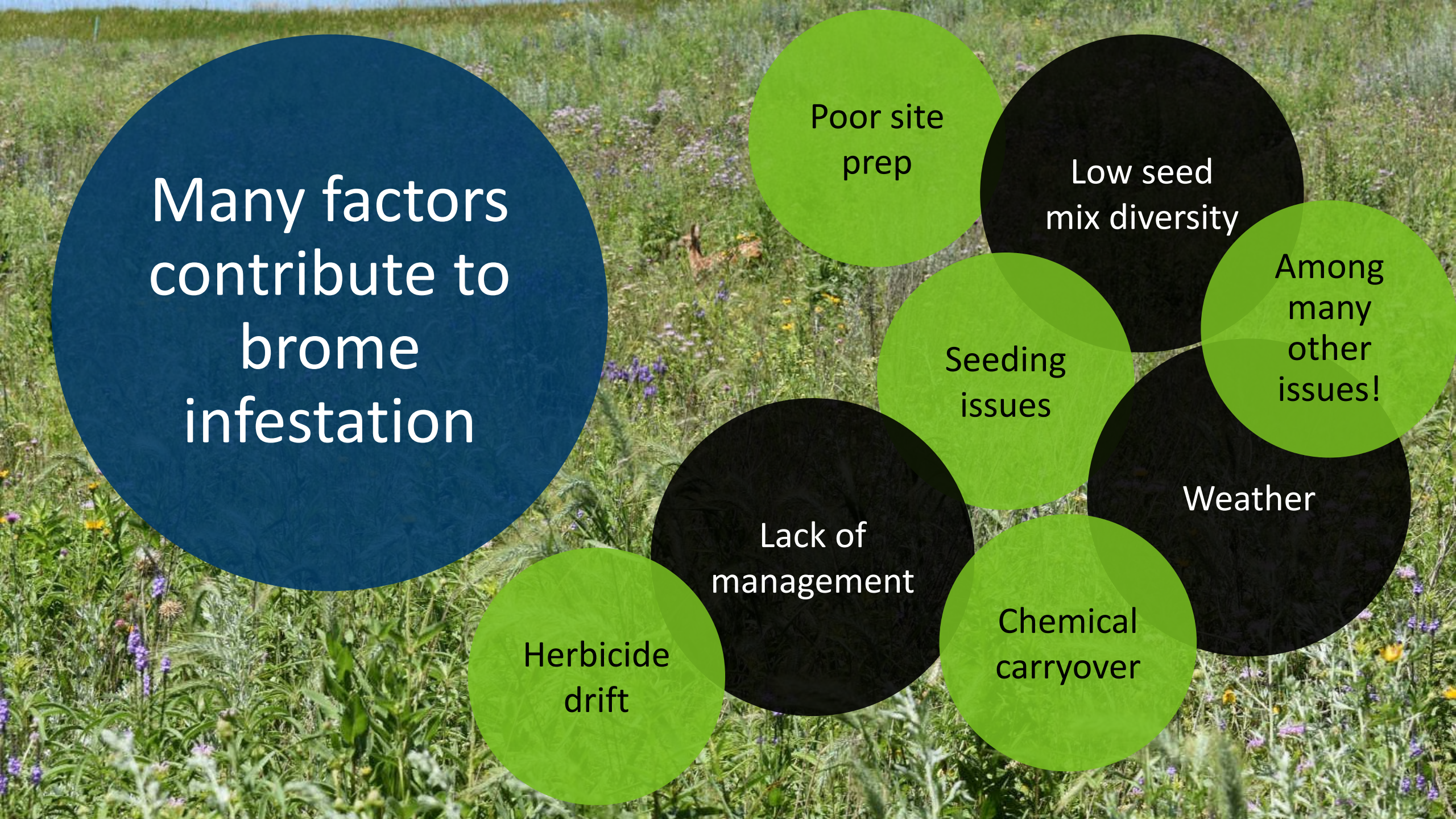
# Programs



# What makes smooth brome such a problem?

- Smooth brome (*Bromus inermis*) is an invasive, cool-season grass that spreads aggressively through an extensive underground rhizomatous system
- Historically introduced for erosion control and forage production
- If the above and below ground systems aren't stressed enough, it will continuously come back





Many factors  
contribute to  
brome  
infestation

Poor site  
prep

Low seed  
mix diversity

Among  
many  
other  
issues!

Seeding  
issues

Weather

Lack of  
management

Chemical  
carryover

Herbicide  
drift



# Fulfill the guilds

Warm-season  
grasses

Sedges  
and  
rushes

Legumes

Cool-season  
grasses

Non-  
legumes  
forbs



# When to start over entirely...

- The cover has been taken over by aggressive, non-native vegetation and anything previously seeded cannot be salvaged through management
  - Consider original seed mix
- Program requirements dictate cover must be upgraded within a short time frame
- Funding for the project is available for a limited time



# Considerations

- Easier to burn or hay?
- Landowner equipment/abilities
- Contractor availability
- Landscape
- Program requirements
- Time
- Funding
- Does the site flood, is it super dry, is it on a slope that is prone to erosion?
- Original seed mix
- Landowner wants to hunt it this fall



# Have an inventory!

Get to know your local operators and vendors

Site prep work

Seed vendors

Haying operators

Prescribed burn vendors

Grazing operators

# Questions?



March 28, 2024



# Brome Conversion

# General guidance



- Brome conversion on **former** cropland
- What we're describing works when there is limited resources and time
  - Program constraints
  - Availability of funding
- We **would not** recommend these strategies on remnant, unbroken prairie
  - Megan Howell, MN DNR Prairie Specialist
    - [megan.howell@state.mn.us](mailto:megan.howell@state.mn.us)

# Methods for success

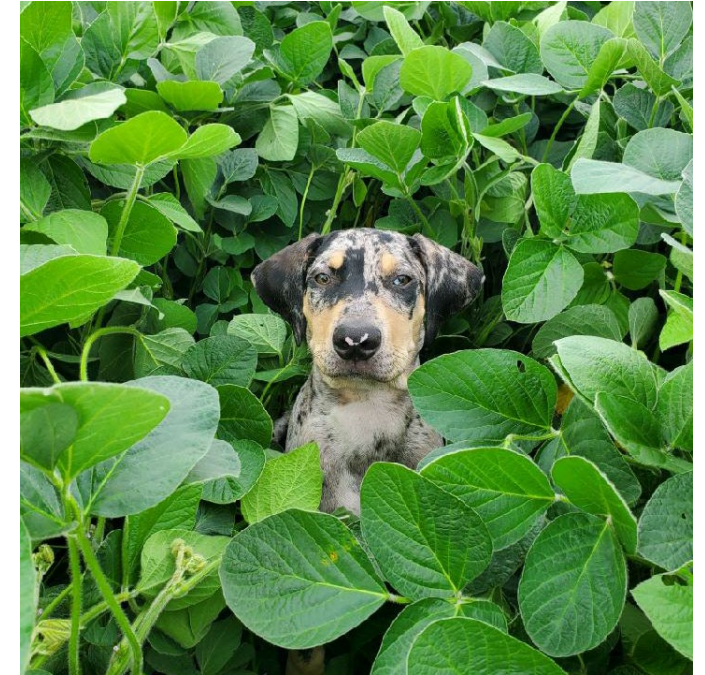


Tillage + Herbicide

Repeated  
herbicide/tillage



Cropping systems



# Tillage + Herbicide

<b>ASAP after nesting season</b>	<b>August/September</b>	<b>October</b>	<b>Spring</b>	<b>(optional) Before seeding</b>	<b>Before seeding</b>	<b>May 15 to June 30</b>
Burn/graze/hay	Tillage x 2	Herbicide	Herbicide	Herbicide	Pack/roll	Seeding



# Tillage + Herbicide

ASAP after nesting season	August/September	October	Spring	(optional) Before seeding	Before seeding	May 15 to June 30
Burn/graze/hay	Tillage x 2	Herbicide	Herbicide	Herbicide	Pack/roll	Seeding

- Remove existing residue through burning, grazing, or haying (or wishful thinking?)

# Tillage + Herbicide

ASAP after nesting season	August/September	October	Spring	(optional) Before seeding	Before seeding	May 15 to June 30
Burn/graze/hay	Tillage x 2	Herbicide	Herbicide	Herbicide	Pack/roll	Seeding

- Disk rip or chisel plow once to break up the root system
  - Disk ripper: Deep tillage mixes soil and residue
    - Depth 6 to 10 inches
  - Chisel plow: Breaks and shatters the soil, leaving it rough with residue on or near the surface
    - Depth 6 to 12 inches
- Field cultivate or disk 5 to 10 days later
  - Field cultivator: Light tillage and field finishing. Used for secondary tillage to prepare seedbed and cut weeds
    - Depth: 3 to 6 inches
  - Disk: Turns soil and buries residue
    - Depth: ¼ of the disk diameter

# Tillage + Herbicide

ASAP after nesting season	August/September	September/October	Spring	(optional) Before seeding	Before seeding	May 15 to June 30
Burn/graze/hay	Tillage x 2	Herbicide	Herbicide	Herbicide	Pack/roll	Seeding

- Herbicide treatment with a high rate of glyphosate in September/October
  - The grass will have started to green up again after initial tillage
  - 2 quarts/acre (active ingredient 41%)
  - This will stress the vegetation before winter

# Tillage + Herbicide

ASAP after nesting season	August/September	October	Spring	(optional) Before seeding	Before seeding	May 15 to June 30
Burn/graze/hay	Tillage x 2	Herbicide	Herbicide	Herbicide	Pack/roll	Seeding

- Herbicide again with a high rate of herbicide (glyphosate)

# Tillage + Herbicide

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- Pack/roll the site before seeding to create a firm, smooth seedbed
  - Cultipacker: Firms the seedbed. Contributes to better seed to soil contact

# Tillage + Herbicide

ASAP after nesting season	August/September	October	Spring	(optional) Before seeding	Before seeding	May 15 to June 30
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- Seeding May 15 to June 30 (generally)
- Broadcast seeding
  - Follow with cultipacker or roller
- Seed drill
- Maintenance mowing within the first and (possibly) second season

# Repeated Tillage/Herbicide

- Similar to previous strategy, but works with a longer timeline
- Three round of herbicide paired with aggressive tillage





# Questions?





**Cropping Systems as Tools for Brome Conversion**

# 1-Year Cropping System Considerations

- Herbicide (2–3-quart Roundup/Acre) to kill the existing vegetation
- Add Liberty if woody veg & weeds are a problem instead of 2-4D
- Hay/Burn site
- Deep tillage + finishing tillage for crop seeding prep
- Plant: Roundup ready Soybeans
- DO NOT TILL following harvest
- Dormant Seed Natives



# 2-Year Cropping System Considerations

- Consider if site has excessive woody vegetation or weed pressure
- 2-years of crops help offset cost of site-prep
- Year 1: Corn
- Year 1 Fall: Cover Crop
- Year 2: No-till beans
- DO NOT TILL following harvest
- Dormant Seed Natives



# Season-Long Cover Crop

- Same site prep with burn/hay, herbicide and tillage combination
- No-till season-long cover crop
- Mow cover crop
- Seed into site
- Species to consider: Oats, Annual Ryegrass, Crimson Clover, Lentil, Oilseed Radish, Sorghum

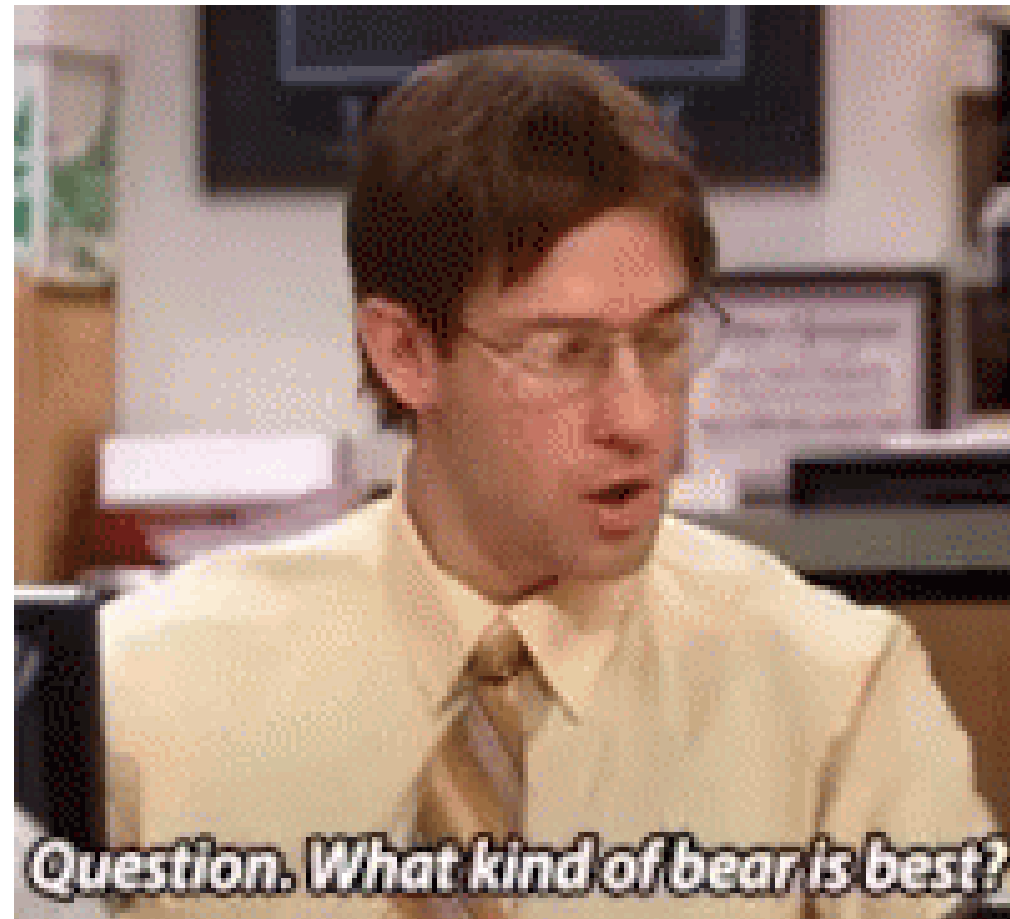


# Brome Conversion Methods for Long-term FAILURE

- Burn, spray, spray, inter-seed
- Hay, spray, spray, inter-seed
- Burn, inter-seed, spray at green-up
- Often fail within the first several years. Spring management and diverse seeding needed



# Questions?





# Long-term Grassland Management




# Have a goal

- Don't just manage for the sake of management
  - What are you trying to achieve with the management?
  - Pyromaniacs...
- Remember to alternate timing and type of management. Don't repeat the same scenario over and over

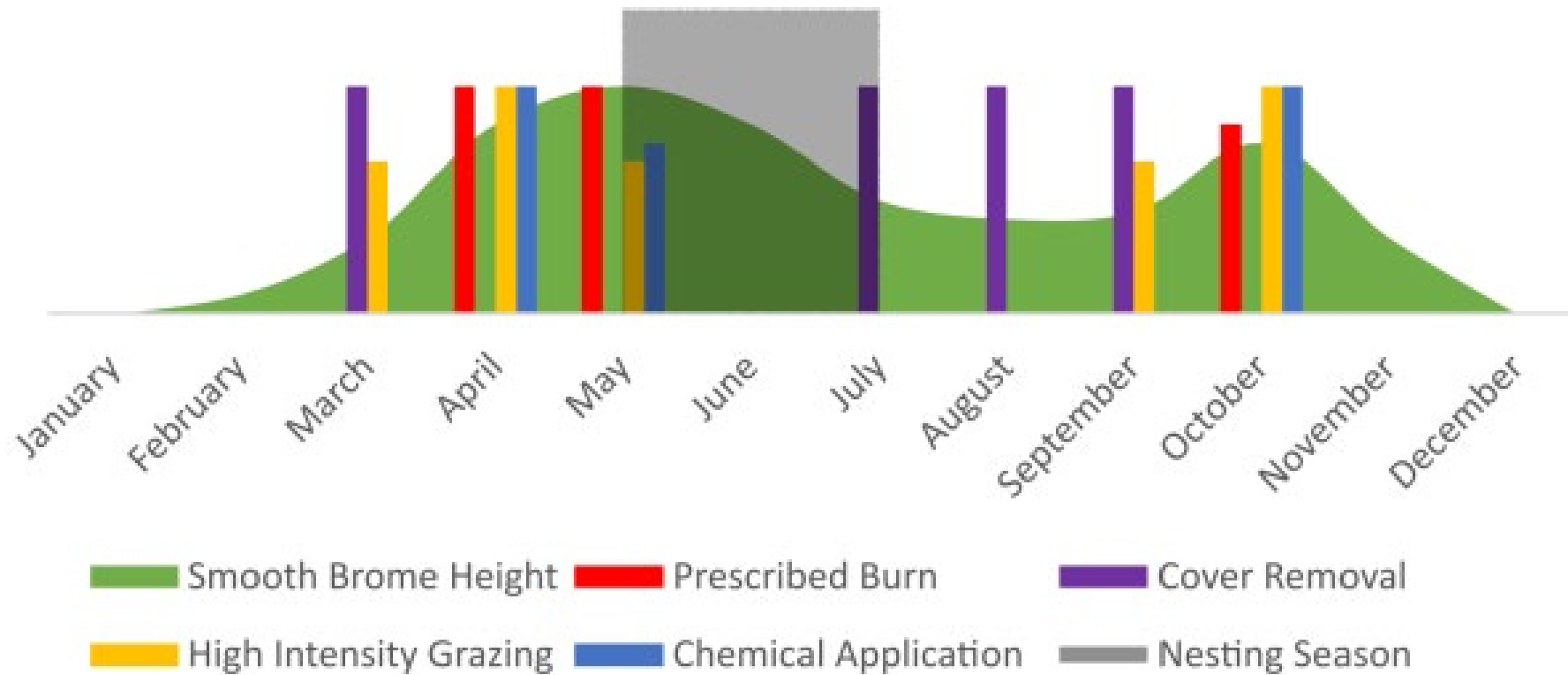


# Identify your goals for management!

	Suppress cool-season grasses	Suppress warm-season grasses	Enhance forb diversity	Brush management	Reduce litter layer	Establishment
Prescribed fire	Late spring Fall	Summer	Fall	Summer	Any time	X
Grazing	Early spring Late spring Early fall	Summer	Summer Fall	(multiple seasons) 	Any time	X
Haying	Spring Fall	Summer	Late summer	Active growth stage	Any time	Before weeds seed out
Mowing	X	X	X	Summer	X	Before weeds seed out
Herbicide	Spring Fall	X	X	Active growth stage	X	X

# Nebraska PF Model (longer growing season)

Approximate Timing of Smooth Brome Growth in Relation to Management Activities






# Prescribed fire as a management tool

# Prescribed Burning

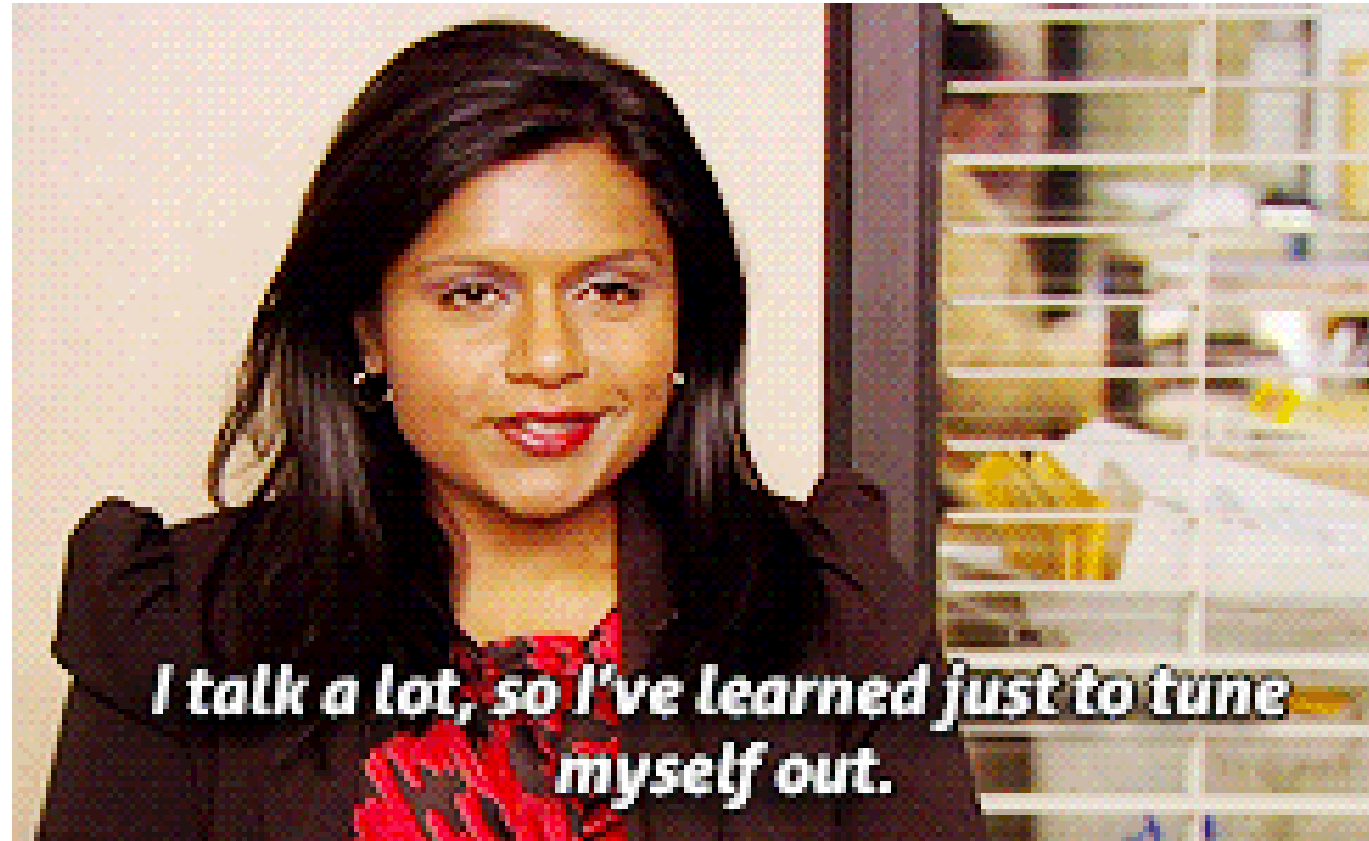
- Identify goals to decide on when a burn will be more effective
- Suppress woody vegetation
- Release nutrients bound in plant litter
- Stimulate new growth
- Improve flowering plant growth
- Promote early successional habitat



A man with a mustache, wearing a red t-shirt, is shown in a dark, industrial environment. He has a look of intense concern or fear. The background is dark with some faint lights and structural elements. The overall tone is dramatic and somber.

**OH, GOD! PLEASE DON'T LET THE  
INVISIBLE FIRE BURN MY FRIEND!**

# Questions?





# Grazing as a management tool



“Managing the harvest of vegetation with grazing and/or browsing animals with the intent to achieve specific objectives”

*NRCS CPS 528 Prescribed Grazing*

# Conservation grazing

- Succession, invasive species control, stimulate soil, add fertilizer
- Grassland management goals may not always line up with producer goals
- Stocking rates will depend on what animals are available and what the habitat goal is
  - Morgan Kauth, NRCS Area Grazing Specialist
  - [morgan.kauth@usda.gov](mailto:morgan.kauth@usda.gov)


# Grazing considerations

- Sensitive areas
- Limitations for use (additional resources)
  - Fencing, water, time
- Consider species and their behavior
  - Cattle – Prefer young green grass
    - Forage relatively close to the ground
  - Goats and sheep
    - More inclined to browse (woody species) than graze (grass)
    - Well-adapted to steep terrain
    - More intense fencing requirements



# What goes into a grazing plan?

- Goal
- Vegetation height (before and after)
- Species
- Type
- Herd size
- Sensitive areas
- Fencing
- Water source
- Contingency plan


 United States Department of Agriculture

### GRAZING PLAN DETAILS

Township:

Section(s):

Acres:

Objectives (Describe in the box below):

Grazing Season

Start Date:  End Date:

Animal Inventory

Kind/Class of Animals	Number of Animals	Average Weight	Daily Forage Intake (4% of Total Herd#)	Daily Water Intake (2% of Total Herd#)
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Planned Grazing Period (days):

Planned Rest Period (days):

Type of Grazing System:

Minimum Stubble Heights (in inches):

Key Forage Species:

MN NRCS Page 2 Grazing Plan:  Producer's name July 2019

USDA is an equal opportunity provider, employer, and lender.



# Haying as a management tool

# Haying

- Maintain diversity levels
- Provide sunlight for establishing native species
- Remove weed growth and thatch
- Control woody plants
- Forage for livestock



# Haying considerations

- Haying is the mechanical cutting and removal of forage that can mimic burning or grazing activities
  - It's not the same as mowing
- Access to equipment
- Equipment limitations
  - Terrain
- Program limitations



\*straw



# Mowing as a management tool



# Mowing as a Management Tool

- Grassland establishment, not management
- Rotary, flail mowers
- Forestry mulcher - \$\$\$
- Weed patches - overseed
- Mow in the summer to control woody vegetation encroachment - overseed
- CRP mid-contract maintenance mowing is a BAD deal
- If mowing is the only option, mow in the spring to a height of 6-10"



# Mowing: Rotary Mower ("Brush Hog" / "Bat Wing")



# Mowing: Rotary Mower



March 28, 2024

# Mowing: Flail Mower



March 28, 2024

# Mowing: Flail Mower





# Herbicides as a management tool

# Herbicides for Woody Vegetation Control

- Cut stump treatment
- Low volume basal spray on base of the tree
- Plan to repeat frequently
- Re-establish native veg to out compete
- Buckthorn, Siberian Elm, Cottonwood, Box Elder, Elm, Cedar
- Native succession in floodplains, historically treed areas



# Herbicides as a Management Tool: Thistle Control

- Avoid herbicides during establishment if possible
- Hot day when thistles are flowering
- Immediately following first frost
- Spot spray
- Weed Wiper







**Weed Wiper**

# Weed Wiper



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# Liberty instead of 2-4D



GETTING THE MOST OUT OF LIBERTY

AgPhD

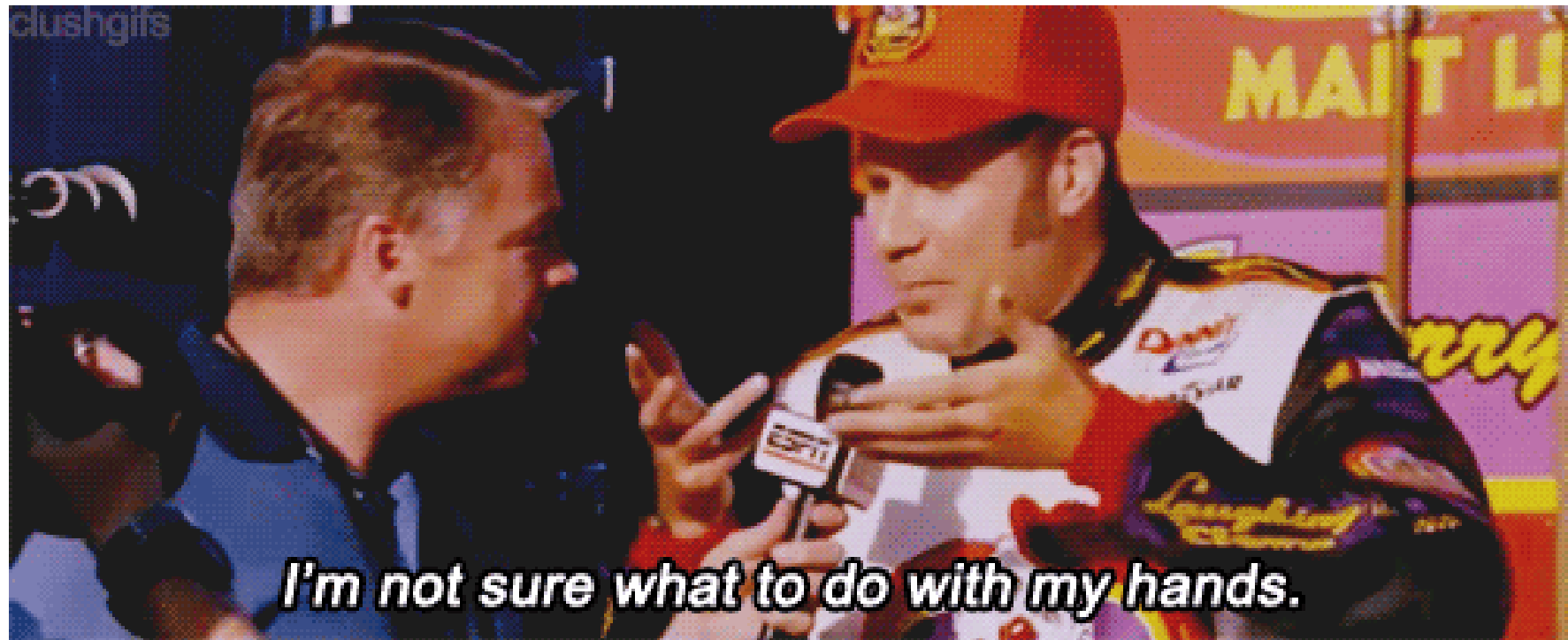


# To tie it all in - Project Example:

- Landowner goals: enhance site for deer and pheasant habitat, easy long-term maintenance, keep volunteer trees out, hunt this fall
- Site conditions: prone to flooding, light soil: poor for farming, susceptible to erosion
- Plan: Burn late April, Roundup, Roundup, season-long diverse cover crop,
- Seed native mix with HEAVY cool-season component following spring



# Questions?



# References

- Conservation Grazing Technical Guidance Document (MN BWSR)
- Haying for Wetland and Buffer Management (MN BWSR)
- Interseeding Wildflowers to Diversify Grasslands for Pollinators (The Xerces Society for Invertebrate Conservation)
- Invasion as a Function of Species Diversity: A Case Study of Two Restored North Dakota Grasslands (DiAllesandro, Kobiela, and Biondini)
- Iowa Native Prairie Planting Guide: Planting Native Prairie Into Cool season Sod (NRCS)
- Native Vegetation Establishment and Enhancement Guidelines (Dan Shaw, MN BWSR)
- Prairie Restoration Diversity – Planting and Seed Mixes (MN DNR)
- Rangeland Management and Pollinators (The Xerces Society for Invertebrate Conservation)
- Restoring Your Degraded Grassland to Utility Prairie (Laura Phillips-Mao, University of Minnesota)
- Tillage Equipment Pocket Identification Guide (NRCS)

# Contacts

- Remnant prairie management
  - Megan Howell, MN DNR Prairie Specialist
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- Conservation grazing
  - Morgan Kauth, NRCS Area Grazing Specialist
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  - Gemma Kleinschmidt, PF Area Wildlife Biologist
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# Thank You!



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