

Leafy Spurge Management

Sheridan County Weed and Pest

SHERIDAN COUNTY



WEED & PEST

“Empowering people in the pursuit of their land management goals by providing science-based education, coordination, and resources.”



Today's Agenda

- 10:00 – Welcome / SCWP overview
- 10:30 – Herbicide choices, timings
- 11:00 – Biocontrol
- 11:30 – Goat grazing
- 12:00 – Lunch
- 12:30 – SCWP Programs
- 01:30 – Questions
- 2:00 – Finish up



Sheridan County Weed and Pest overview

- State noxious species list

- 31 weeds and 6 pests

Designated Noxious Weeds .S. 11-5-102 (a)(xi) and Prohibited Noxious Weeds W.S. 11-12-104

1. **Field bindweed** (*Convolvulus arvensis* L.)
2. **Canada thistle** (*Cirsium arvense* L.)
3. **Leafy spurge** (*Euphorbia esula* L.)
4. **Perennial sowthistle** (*Sonchus arvensis* L.)
5. **Quackgrass** (*Agropyron repens* (L.) Beauv.)
6. **Hoary cress/Whitetop** (*Cardaria draba* & *Cardaria pubescens*)
7. **Perennial pepperweed/Giant Whitetop** (*Lepidium latifolium*)
8. **Ox-eye daisy** (*Chrysanthemum leucanthemum* L.)
9. **Skeletonleaf bursage** (*Franseria discolor* Nutt.)
10. **Russian knapweed** (*Centaurea repens* L.)
11. **Yellow toadflax** (*Linaria vulgaris* L.)
12. **Dalmatian toadflax** (*Linaria dalmatica* (L.) Mill.)
13. **Scotch thistle** (*Onopordum acanthium* L.)
14. **Musk thistle** (*Carduus nutans* L.)
15. **Common burdock** (*Arctium minus* (Hill) Bernh.)
16. **Plumeless thistle** (*Carduus acanthoides* L.)
17. **Dyers woad** (*Isatis tinctoria* L.)
18. **Houndstongue** (*Cynoglossum officinale* L.)
19. **Spotted knapweed** (*Centaurea maculosa* Lam.)
20. **Diffuse knapweed** (*Centaurea diffusa* Lam.)
21. **Purple loosestrife** (*Lythrum salicaria* L.)
22. **Saltcedar** (*Tamarix spp.*)
23. **Common St. Johnswort** (*Hypericum perforatum*)

24. **Common tansy** (*Tanacetum vulgare*)
25. **Russian olive** (*Elaeagnus angustifolia* L.)
26. **Black henbane** (*Hyoscyamus niger*)
27. **Common mullein** (*Verbascum Thapsus* L.)
28. **Medusahead rye** (*Taeniatherum caput-medusae*)
29. **Ventenata** (*Ventenata dubia*)
30. **Yellow starthistle** (*Centaurea solstitialis*)
31. **Palmer Amaranth** (*Amaranthus Palmeri*)

Designated Pests W.S. 11-5-102 (a)(xii)

1. **Grasshoppers**
2. **Mormon Crickets**
3. **Prairie Dogs**
4. **Ground Squirrels**
5. **Mountain Pine Beetle**
6. **Beet Leafhopper**

- County noxious species list

- 11 weeds and 4 pests

WEEDS:

1. **Buffalobur** (*Solanum rostratum* Dunal)
2. **Common cocklebur** (*Xanthium strumarium* L.)
3. **Curly dock** (*Rumex crispus* L.)
4. **Puncturevine** (*Tribulus terrestris* L.)
5. **Wild licorice** (*Glycyrrhiza lepidota* Pursh)
6. **Poison hemlock** (*Conium maculatum*)
7. **Western waterhemlock** (*Cicuta douglasii*)
8. **Sulfur cinquefoil** (*Potentilla recta* L.)
9. **Japanese brome** (*Bromus japonicus*)
10. **Downy brome** (*Bromus tectorum* L.)
11. **Ripgut brome** (*Bromus rigidus*)

PESTS:

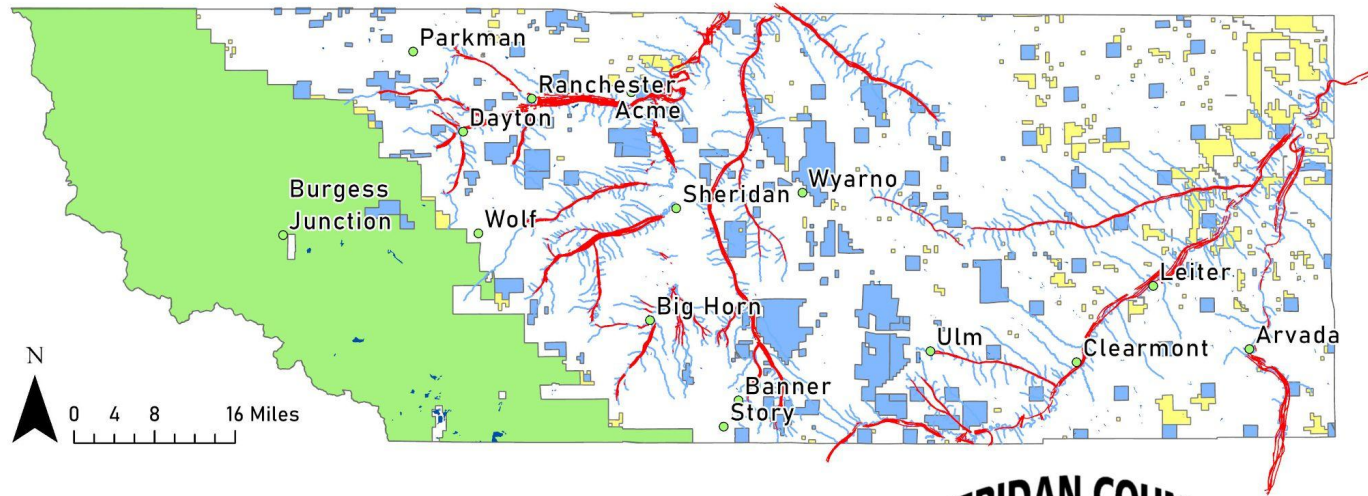
1. **Mosquito** (*Culicidae spp.*)
2. **Plains Pocket Gopher** (*Geomys bursarius*)
3. **Alfalfa Weevil** (*Hypera postica* Gyllenhal)
4. **Bee Mite** (*Varroa Destructor*)

SCWP General program

- Weed-free hay cert
- Free consultations
- Mosquito
- Rental equipment
- Cost share 50/50 product
- Annual grass



2023 Sheridan County Weed and Pest Mosquito Program



 2023 Aerial Larvicide
 Impacted Waterways



BOLO – Invasive annual grasses

- Ventenata

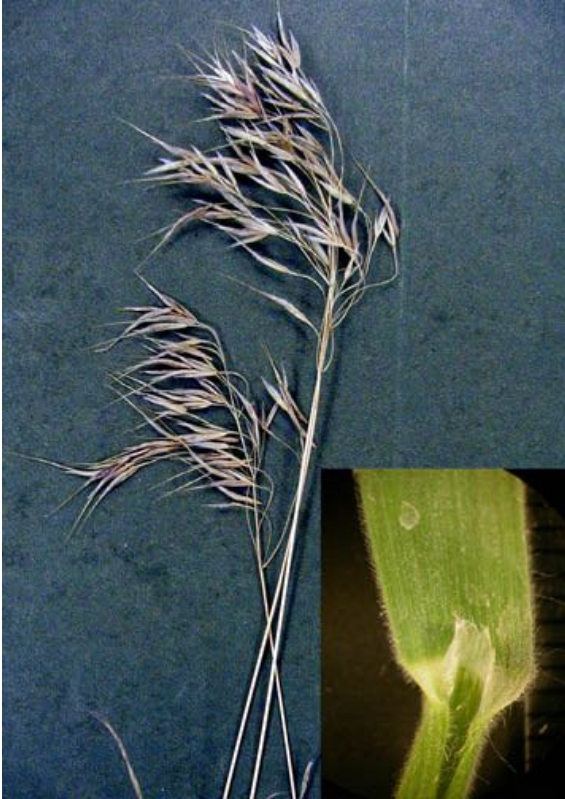


- Medusahead



Look-alikes

- Cheatgrass



- Bottlebrush squirreltail



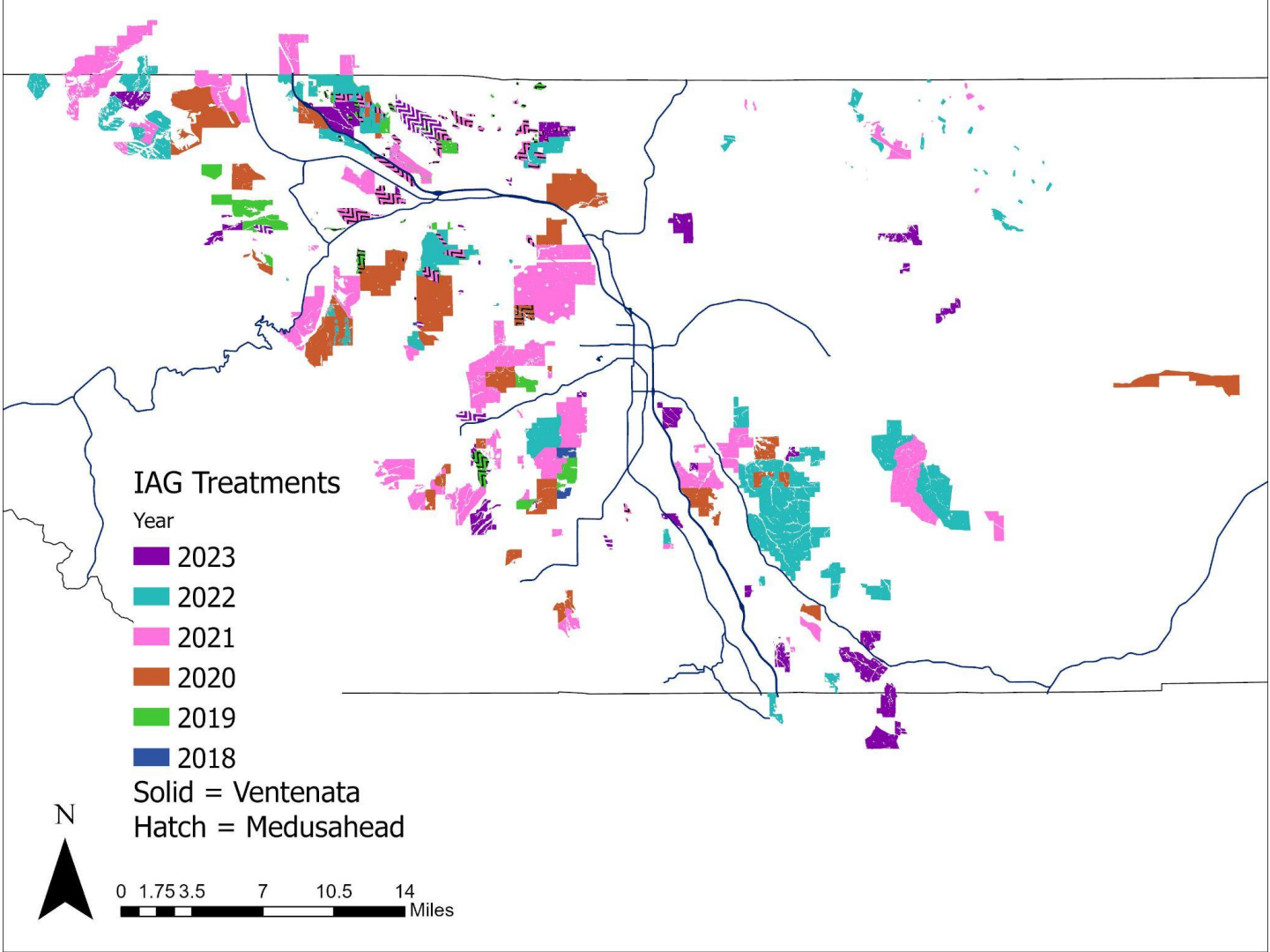
BOLO – Invasive annual grasses

- Ventenata



- Medusahead





SCWP Special Management Program





Leafy Spurge

“BASICS”

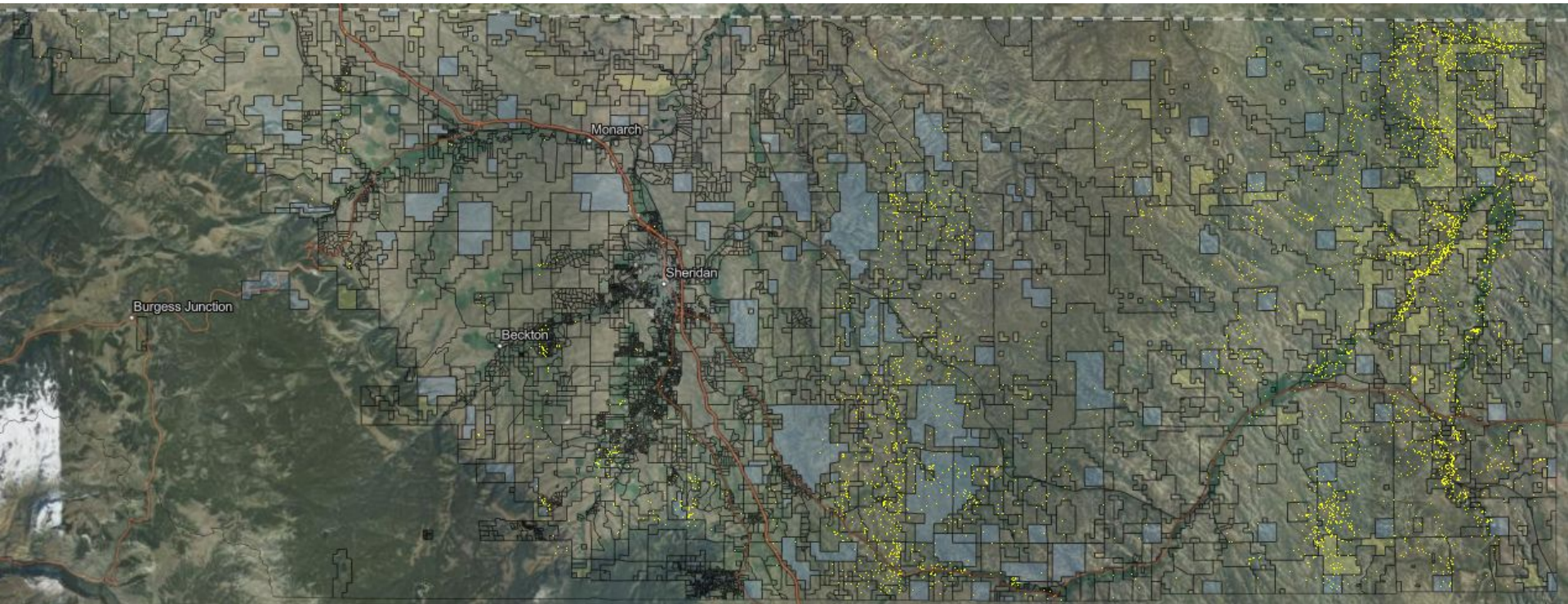
- Perennial
- Reproduces from seeds and roots
- One of the first weeds to emerge in spring (from roots buds) April?
- Seeds germinate in May
- Plants grow 1-3 feet tall
- Leaves are narrow and long with smooth margins
- Root system is extensive and can be 15 feet deep
- Lateral roots produce buds
- Root system provides extensive nutrient storage
- Average of 140 seeds per shoot
- Seed pods rupture, sending seeds up to 20 feet
- Seeds viable up to 8 years
- Seeds float, aiding dispersal along waterways
- All parts of plant produce a milky white latex, toxic to humans and most animals
- As much as 75% reduction in rangeland capacity

Leafy spurge

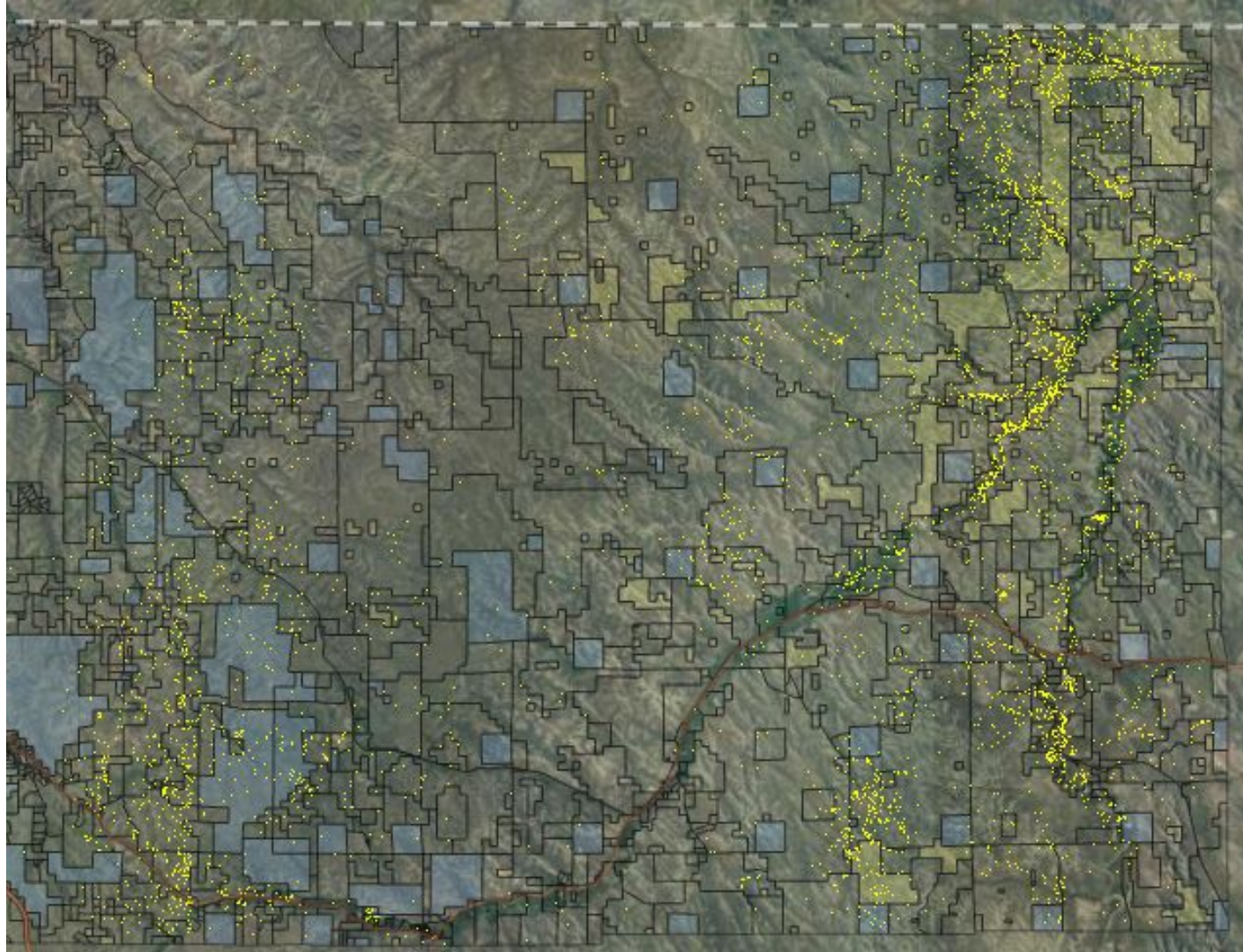


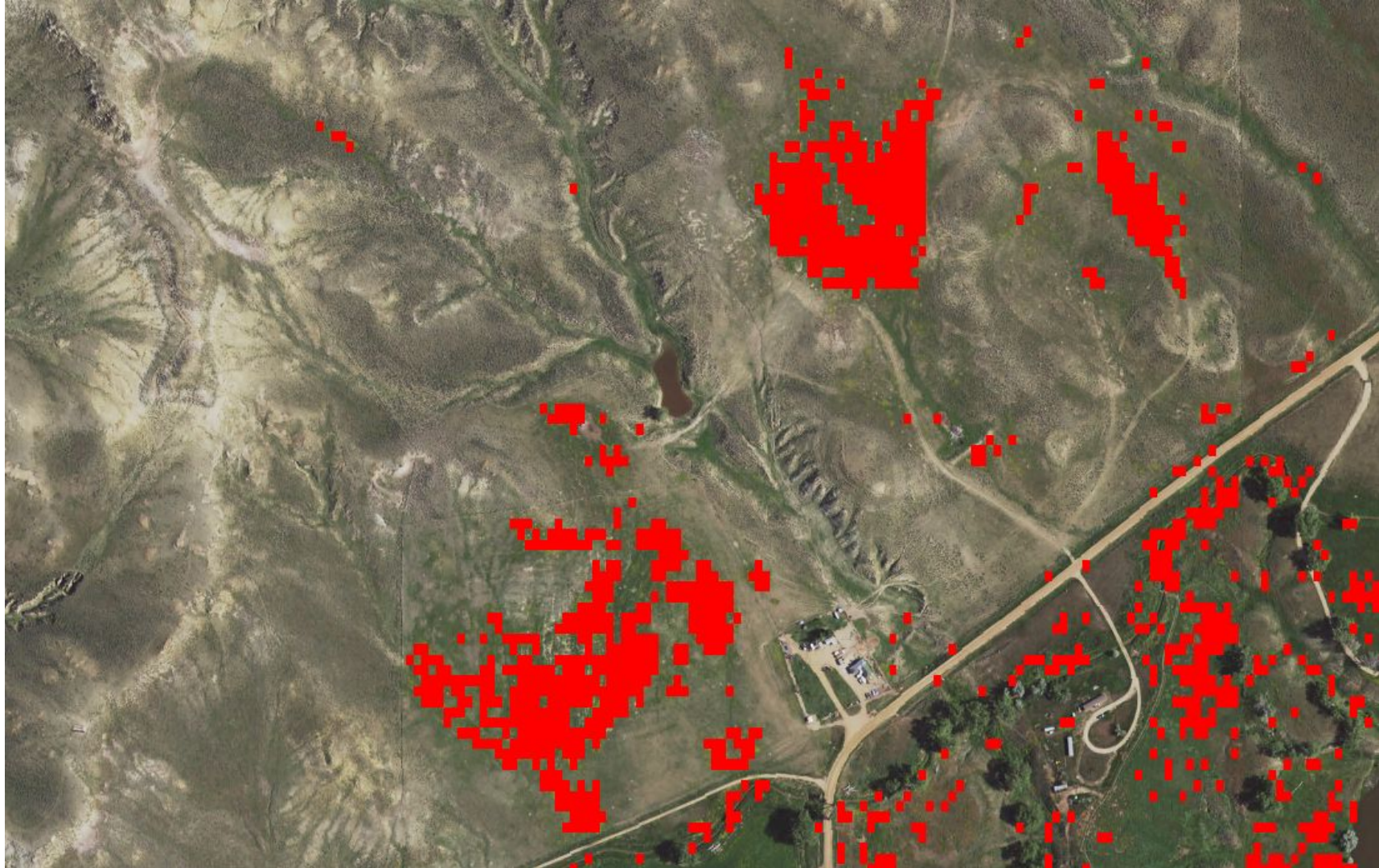
Leafy spurge













Leafy spurge management - Preface

- Let's work together



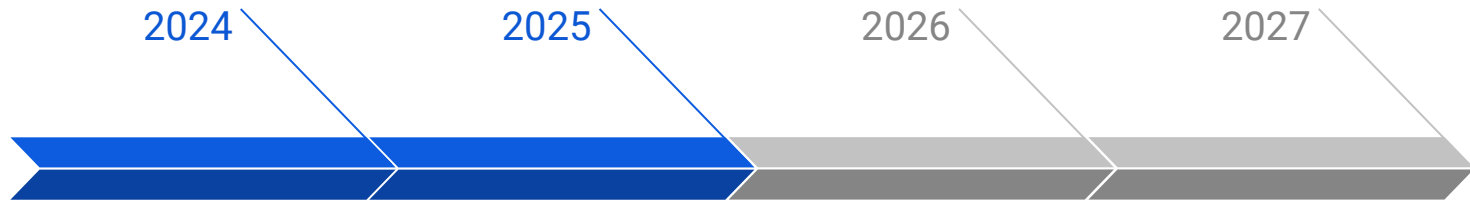
Expectations

- Perennial weed
- Long-term problem
- Treating and walking away is a waste of time and money



Long term stewardship

Repeat applications



Year 1

- 100 acres
- 30 hours
- \$300

Year 2

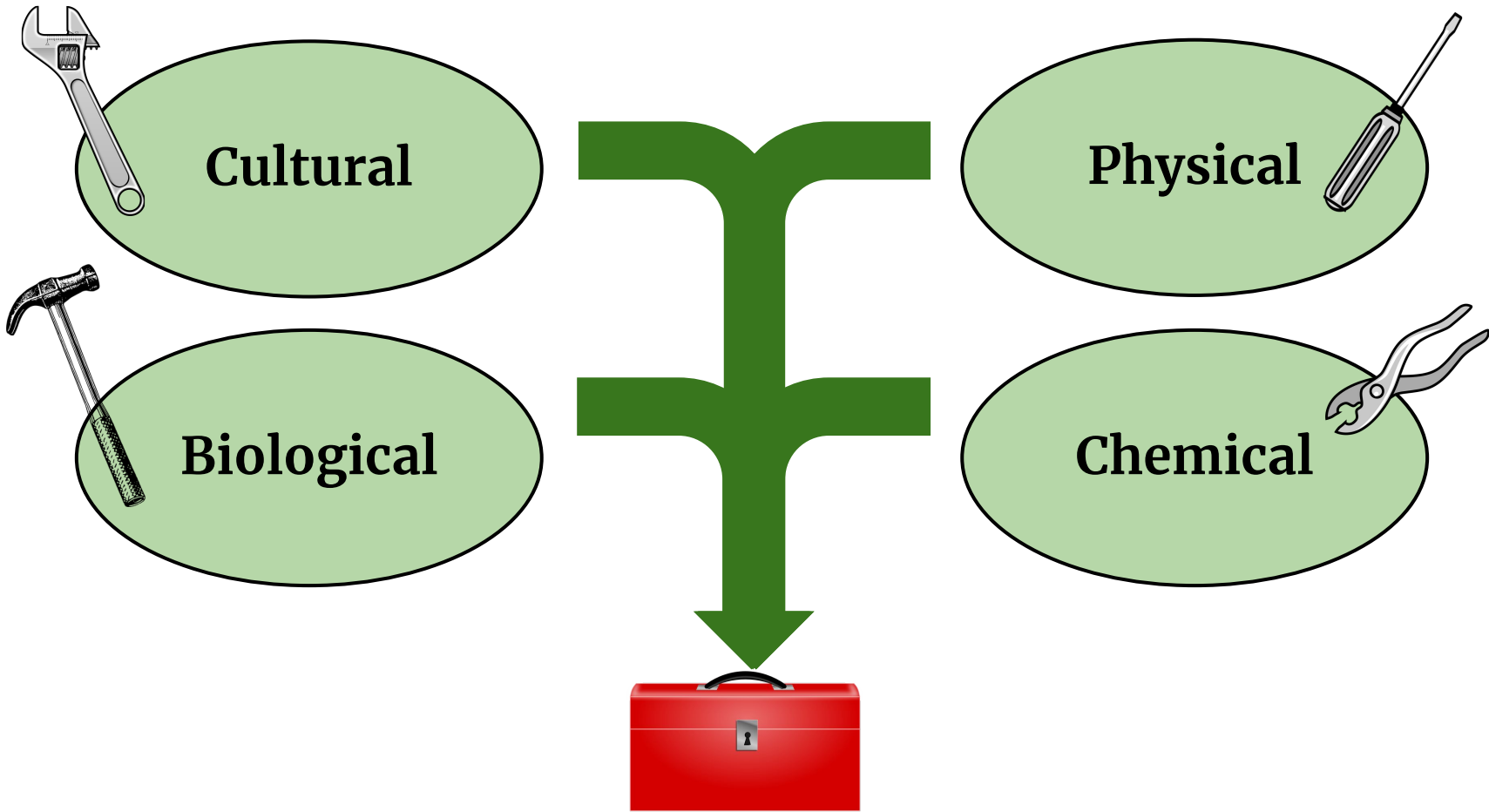
- 50 acres
- 15 hours
- \$100

Year 3

- 25 acres
- 6 hours
- \$20

Year 4+

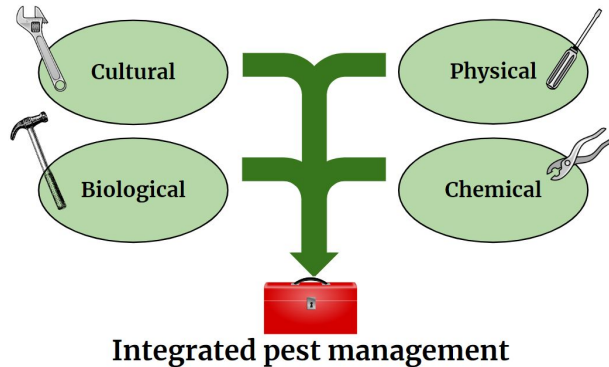
- 5-10 acres
- 2-5 hours
- \$20



Integrated pest management

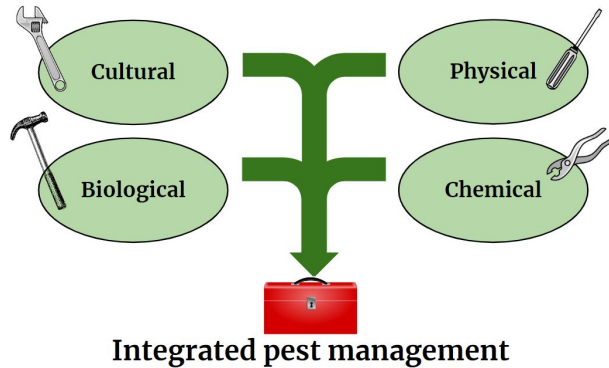
Leafy spurge cultural control methods

- Prevention
- Early detection
- Competitive planting



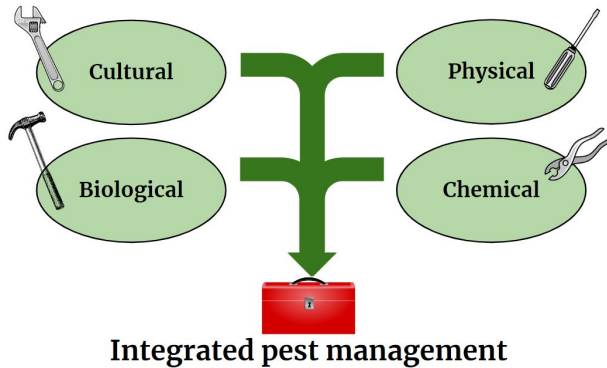
Leafy spurge physical control methods

- Not the best for leafy spurge
 - Long term mowing can work (?)



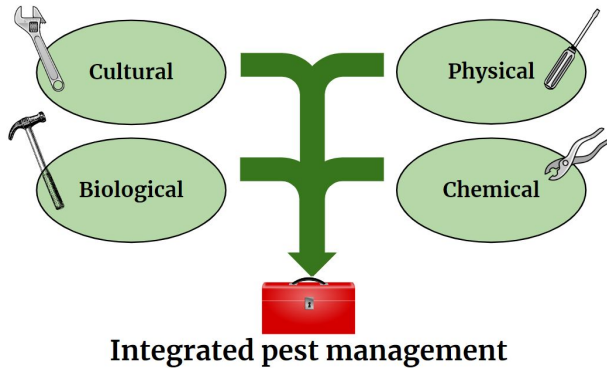
Leafy spurge biological control methods

- Leafy spurge beetles
 - *Aphthona lacertosa*
 - *Aphthona nigricutis*

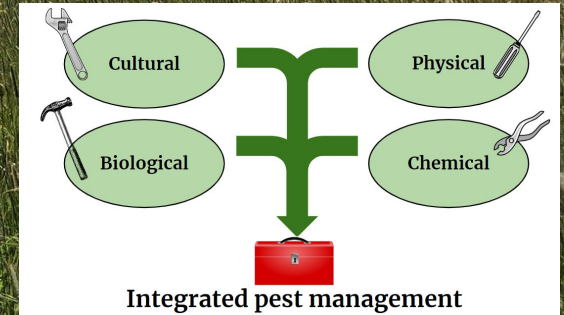


Leafy spurge biological control methods

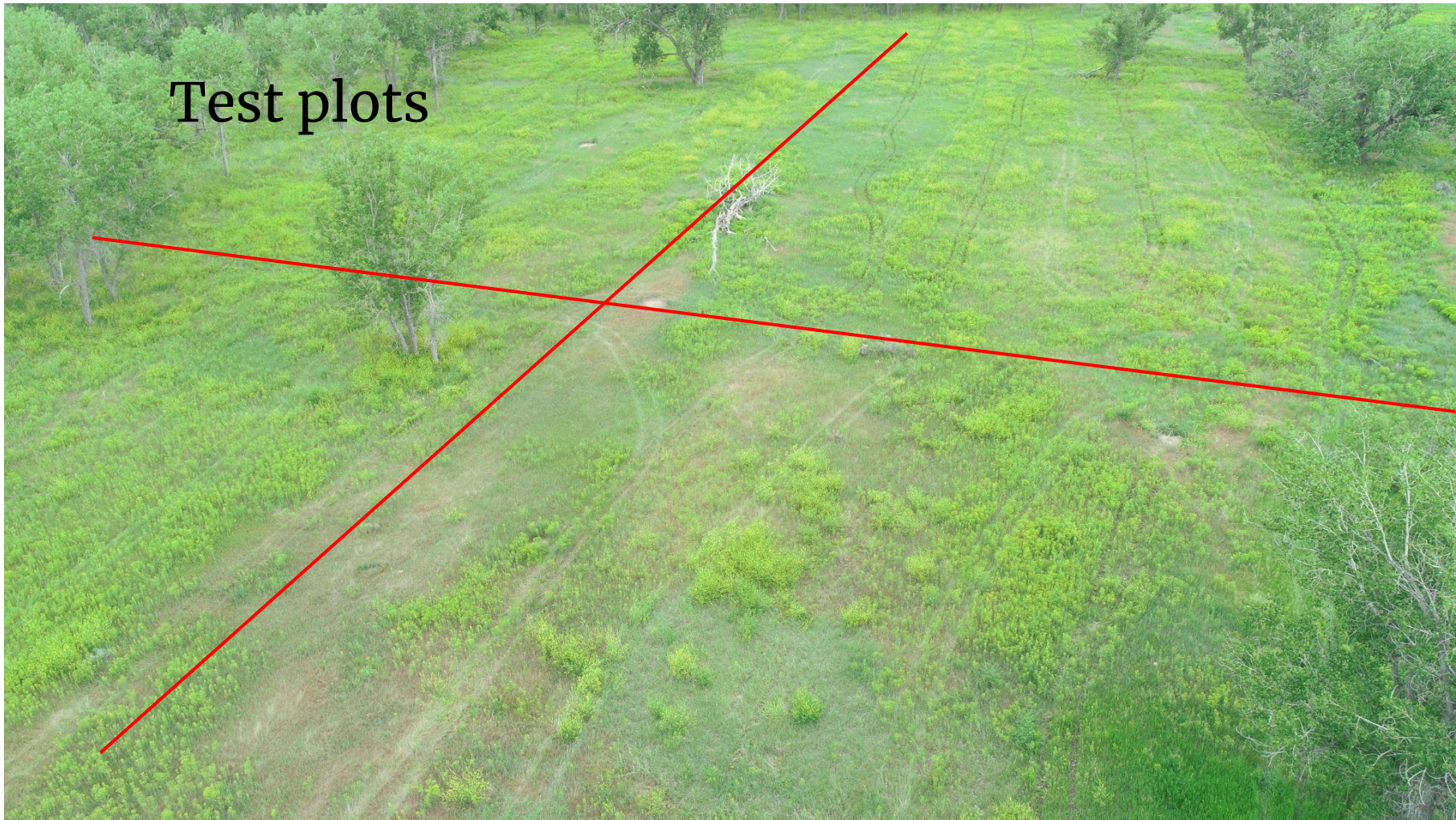
- Goats or sheep
 - Selectively graze leafy spurge
 - Digestion destroys seeds (goats may be better here)
 - Economical



Leafy spurge chemical control methods - Beth



Test plots

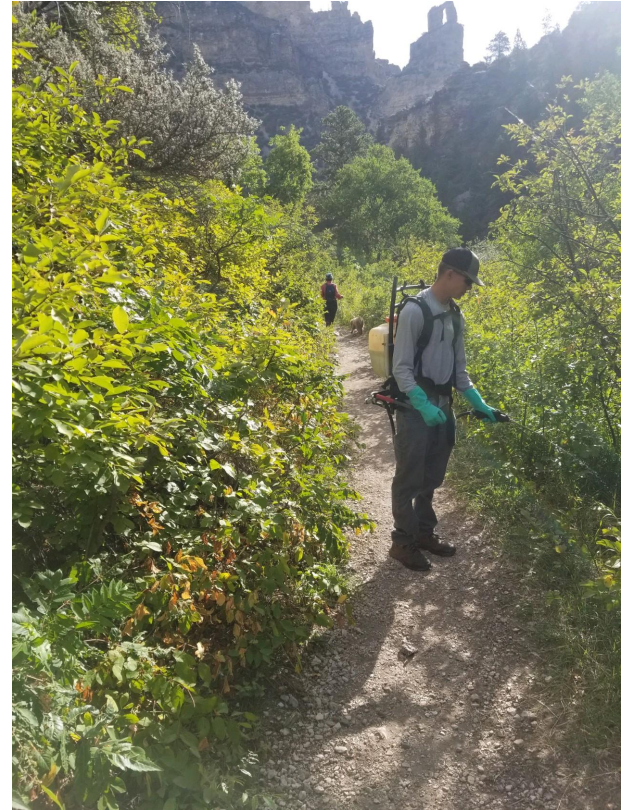


An aerial photograph of a large, open field with a mix of green and brown vegetation. A blue car is parked in the lower right quadrant. The text "Quinstar + COC" is overlaid in white in the center of the image.

Quinstar + COC

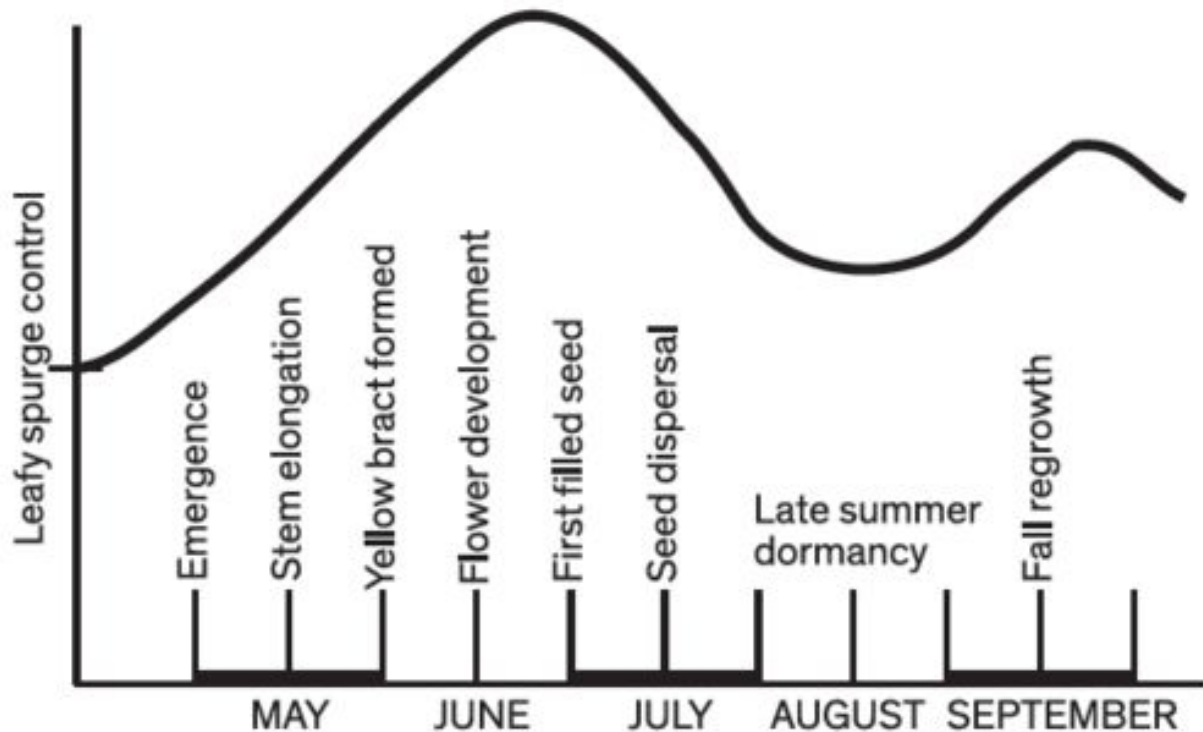
Leafy spurge chemical control methods

- Considerations
 - Timing
 - Calibration
 - Use site
 - Safety
 - Herbicide resistance

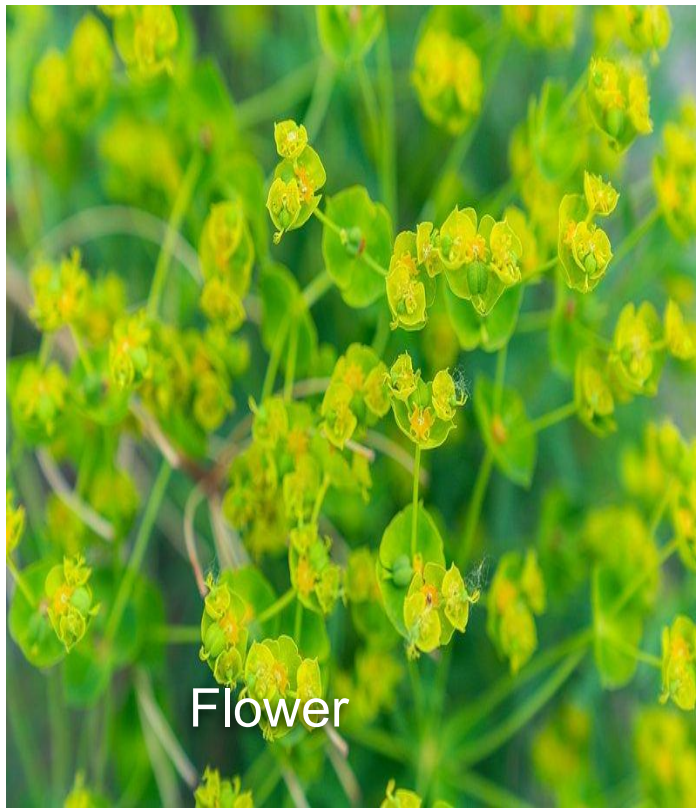


Leafy spurge chemical control methods

- Timing



Leafy spurge timing



Leafy spurge chemical control methods

- Calibration

www.scweeds.com

- Resources
- Tools, chemical info, & permission
- CALIBRATE SPRAYER

Equipment Calibrated	Ounces Collected	Collection Time (seconds)	Spray width (feet)	Spray Speed (MPH)	Gallons per acre
Example: Four Wheeler	96	15	11.5	5	25.82608696
Big green tractor	128	30	16.5	3	20
					#DIV/0!
					#DIV/0!

Leafy spurge chemical control methods



Leafy spurge chemical control methods

- Surrounding environment



Leafy spurge chemical control methods

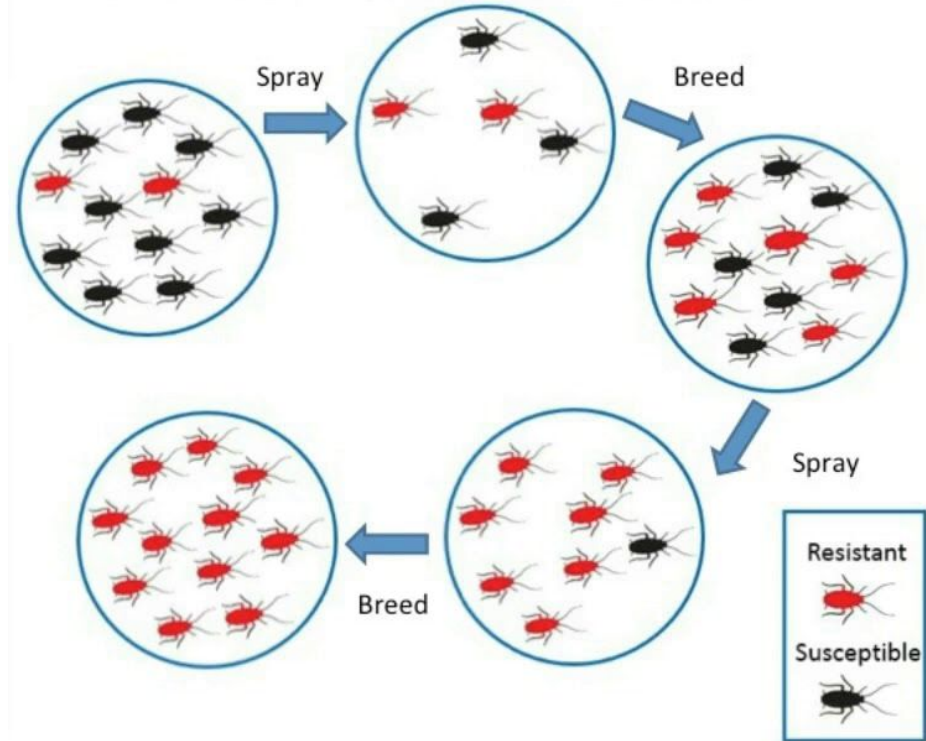
- Read the label
 - “The label is the law”
- PPE



Leafy spurge chemical control methods

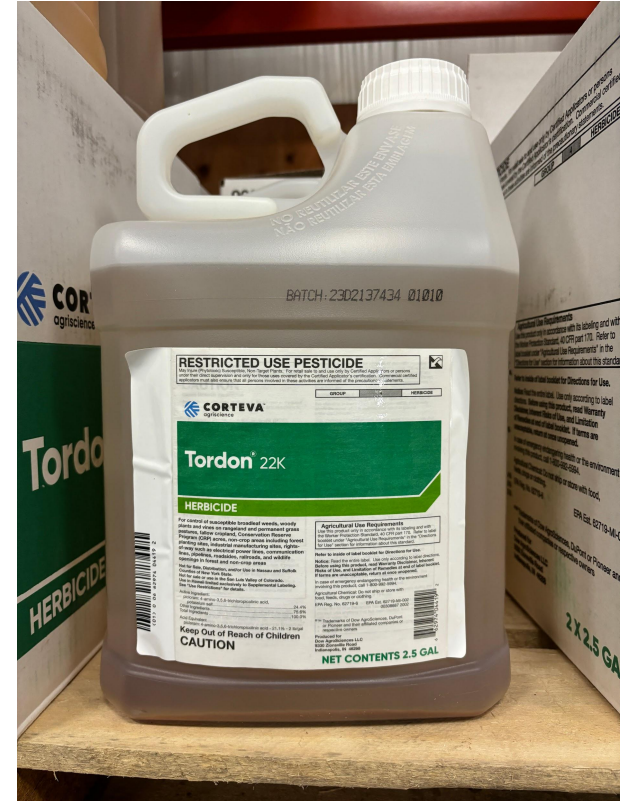
- Resistance
 - Repeated application can eventually lead to resistance
 - Herbicide resistance not common in rangeland weeds
 - Should still be considered

How Does Resistance Occur?



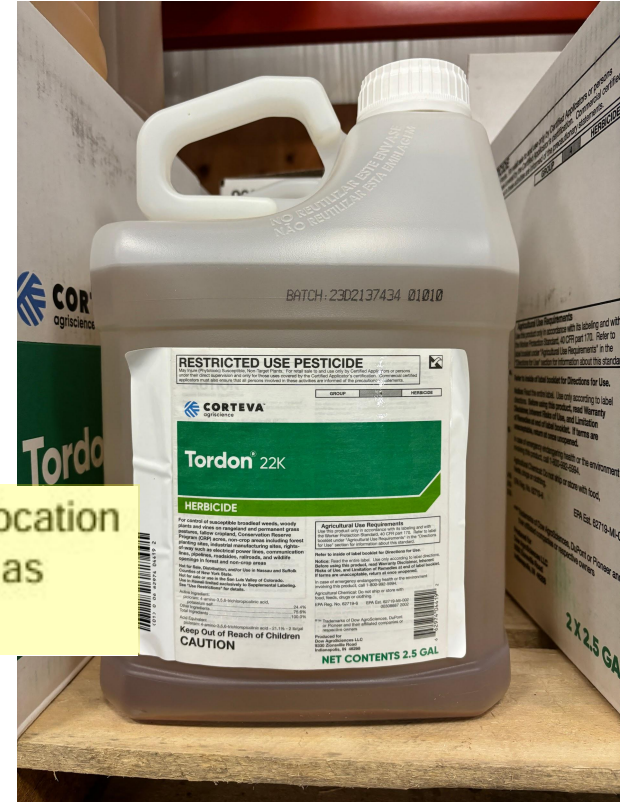
Leafy spurge chemical control methods

- Tordon (picloram)
 - Restricted use pesticide
 - Beware of water
 - Beware of trees
- “Ol’ Reliable”



Leafy spurge chemical control methods

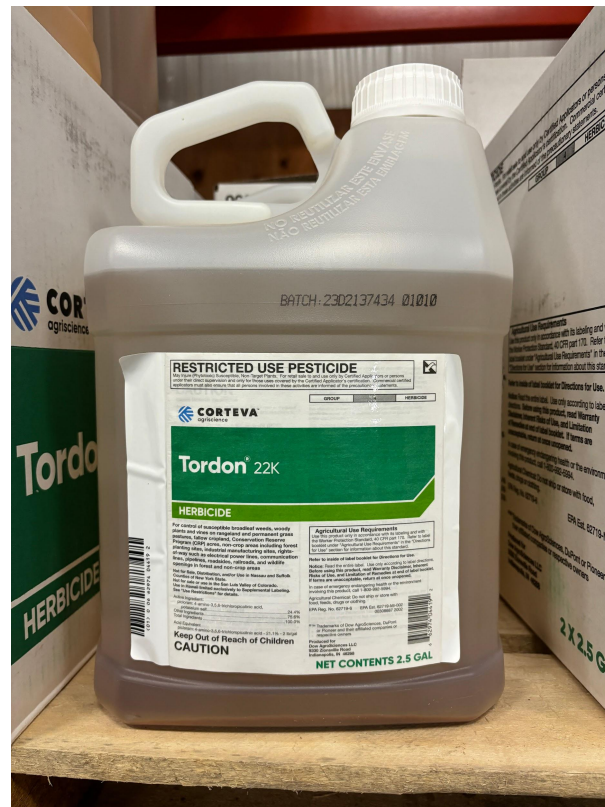
- Tordon (picloram)
 - 1qt / acre
 - Can be mixed with 2,4-D to prevent seeding*
 - Mix with wetting agent



improve efficacy. However, if foliar burn occurs too rapidly, translocation of Tordon 22K will not occur and control of perennial weeds, such as field bindweed, may be reduced.

Leafy spurge chemical control methods

- Tordon questions lately
 - Herbicide resistance
 - Color changes



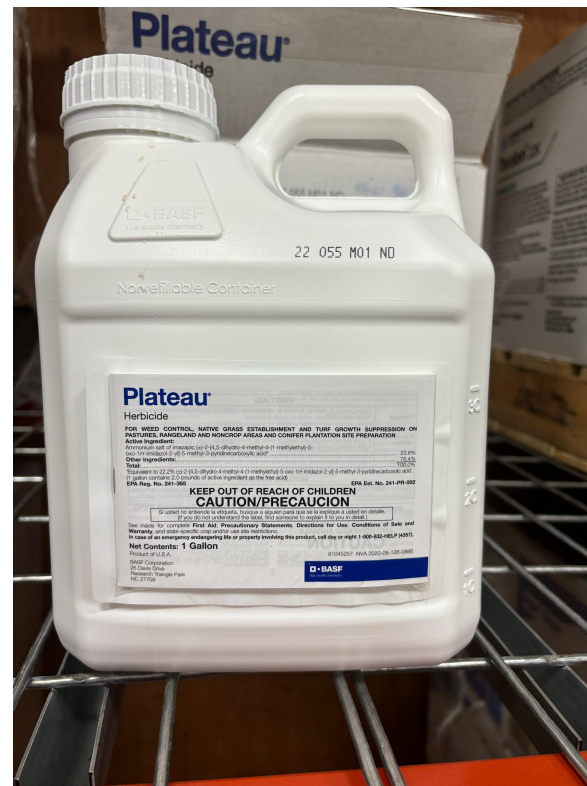
Leafy spurge chemical control methods

- Quinstar (quinclorac) +
Overdrive (dicamba +
diflufenzopyr)
 - 20oz / acre - Quinstar
 - 4oz / acre - Overdrive
 - Mix with crop oil concentrate
as a surfactant
 - Early summer or fall



Leafy spurge chemical control methods

- Plateau (imazapic) + Sharpen (saflufenacil)
 - 6oz / acre Plateau
 - 1oz /acre Sharpen
 - **Grass damage**
 - Handgun v. broadcast
 - Timing important
 - Perennial grass should be dormant
 - Use crop oil concentrate as surfactant
 - Good choice in wooded areas



Leafy spurge chemical control methods

- 2,4-D + Banvel (dicamba)
 - 1qt / acre 2,4-D
 - 1qt /acre Dicamba
 - Non-restricted
 - No residual
 - Use with wetting agent



SCWP chemical sales

- Typically start at the beginning of May



Biocontrol



Biocontrol

Definition: Using an organism to control a pest.

Examples: Hawk moth, Goats, Beetles



Many biocontrols are brought in from the pests native habitat

Biocontrol

Beetles

Aphthona nigriscutis (Brown flea beetle)

Likes sun

Dry to moderate moisture

Semi-open canopy

Survives very cold temperatures

Established populations in Wyoming

Brown beetle with black dot on their back

Aphthona lacertosa (Black flea beetle)

Likes sun even more

Dry, well drained soils

Flowering spurge stems less than 70 cm tall
and fewer than 60 stems per meter

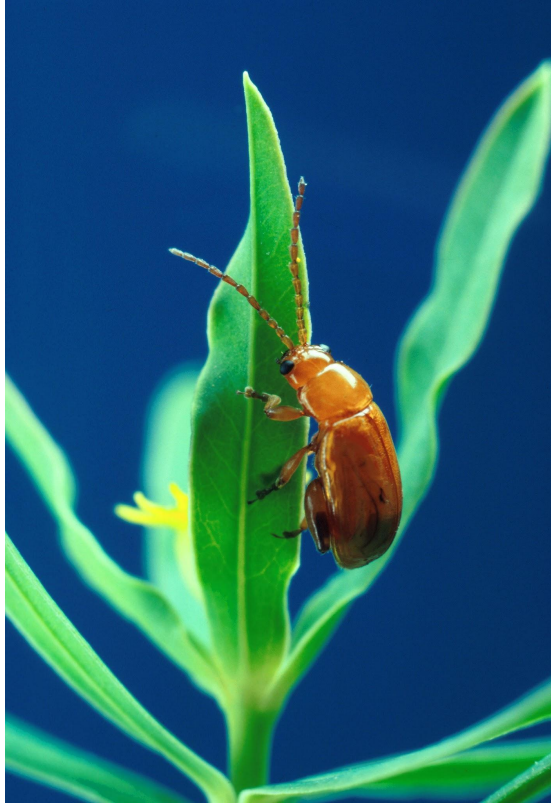
Survives very cold temperatures

Established populations in Wyoming

Black beetle with brown legs

***Spurge beetles don't fly, they hop!!**

Biocontrol



ICONOGRAPHIA COLEOPTERORUM POLONIAE
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Biocontrol





Biocontrol

Beetles have been brought into Sheridan County since the 1985

- McCormick Creek, Story, and Clear Creek (Johnson County)

Over 1 million beetles a year distributed for the last several years

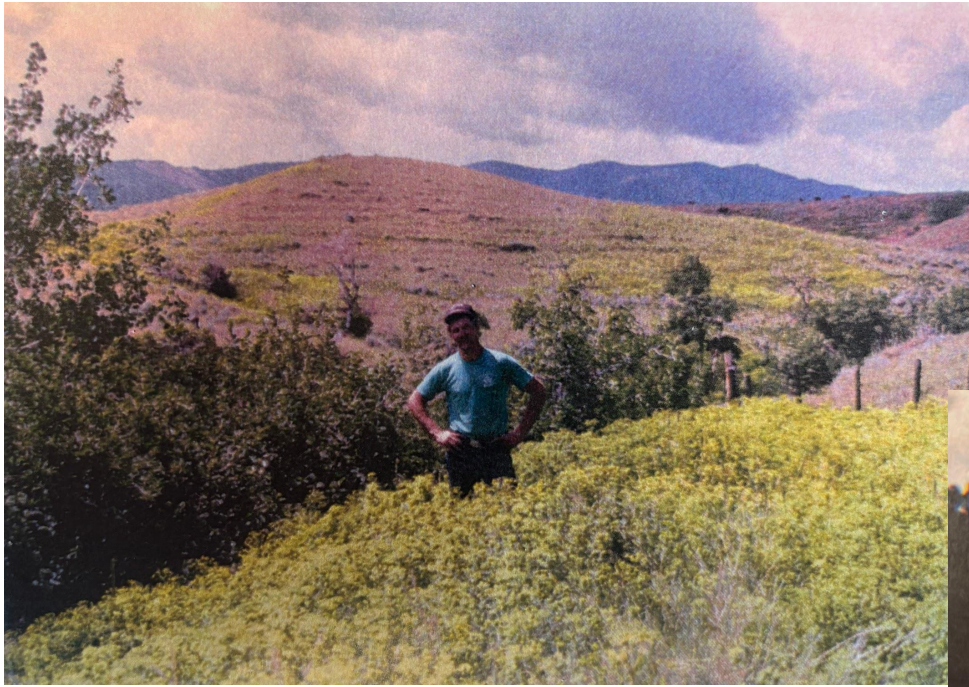
100% cost share

Insectaries have been established **but** must be maintained

Beetles are not the cure, but rather a component in an IPM strategy



Before



After



Biocontrol

Distribution

- Soils with low levels of organic matter (3-9%)
- Dry to mostly dry soils
- Not subject to flooding (larval drowning)
- Good sun exposure
- 60 stems per meter of Leafy spurge (Not too dense or sparse)
- Concentrate beetles in a smaller area of a larger spurge infestation (150 beetles per square meter)
- Distribute beetles on the perimeter of a dense infestation
- Beetles don't fly so they must be within hopping distance of their potential mates

Biocontrol

How beetles work

- Adult beetles feed on leafy spurge leaves
- Beetles must mate and can produce as many as 200 eggs per season (15-20 at a time)
- Eggs are laid near the soil surface around the root crowns of leafy spurge plants
- Larvae migrate to leafy spurge root hairs and feed within 5 cm of the soil surface
- Larvae overwinter in the soil near leafy spurge plants
- Larvae feed again in the spring and pupate
- Adult beetles emerge in May-June and begin feeding on leafy spurge leaves
- 1- generation per year

Expect beetle populations to take 3-5 years to establish and produce significant results that can be observed in the field

Biocontrol



Biocontrol

Beetles should be collected and moved once populations become established

Sunny afternoons when beetles are active

Identify suitable relocation sites early

Collect as many beetles as possible and move same day

Keep beetles cool during collection and transport

A release is 1000 beetles, 2-3 releases per area is a minimum

Don't worry about depleting existing beetle populations. There are many eggs and larva to replenish the population

If left unmanaged, beetles will die from starvation



Biocontrol







Biocontrol



Biocontrol + Herbicide

Treatment ^a	Rate	Year evaluated								
		1992	1993	1994	1995	1996	1997	1998	1999	2000
	kg ha ⁻¹	stems m ⁻²								
Leafy spurge evaluation ^b										
Picloram + 2,4-D (spring)	0.28 + 1.1	220	208	134	16	22	13	15	17	3
Picloram + 2,4-D (fall)	0.56 + 1.1	194	10	11	0.5	0.5	12	11	9	2
<i>Aphthona</i> spp. alone		187	150	99	5	13	17	17	7	2

Biocontrol

- Combining beetles and herbicide meant 3–5x faster control
 - 3–5x cheaper
- Herbicide applied to established beetle populations provides fastest and cheapest control
- Fall herbicide application does not reduce beetle populations
 - Spring application does

Biocontrol

SCWP goal is to establish sufficient insectaries within Sheridan County to maintain biocontrol

SCWP will track and map beetle releases for the 2024 season

Landowners/managers will be given guidance on best practices for releases and successful establishment of beetle populations

SCWP will assist land managers with establishment of insectaries and future distribution of beetles

\$25 per release offered

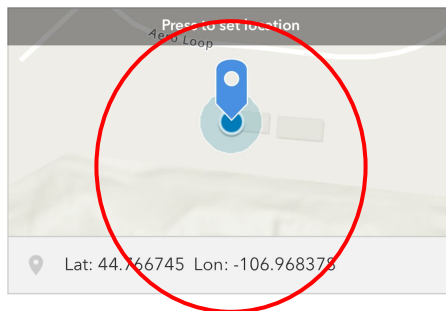
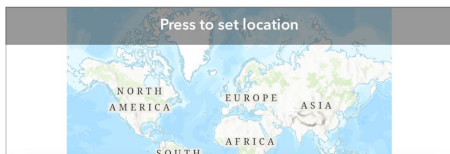
Please fill out this survey at your beetle release site.
This helps Sheridan County Weed and Pest maintain records of beetle release sites and success.

Name

Contact phone number

Date and Time*

Release location*



Number of releases*

1 release = 1 cup containing 1,000 beetles. How many cups?

Photo of release site*



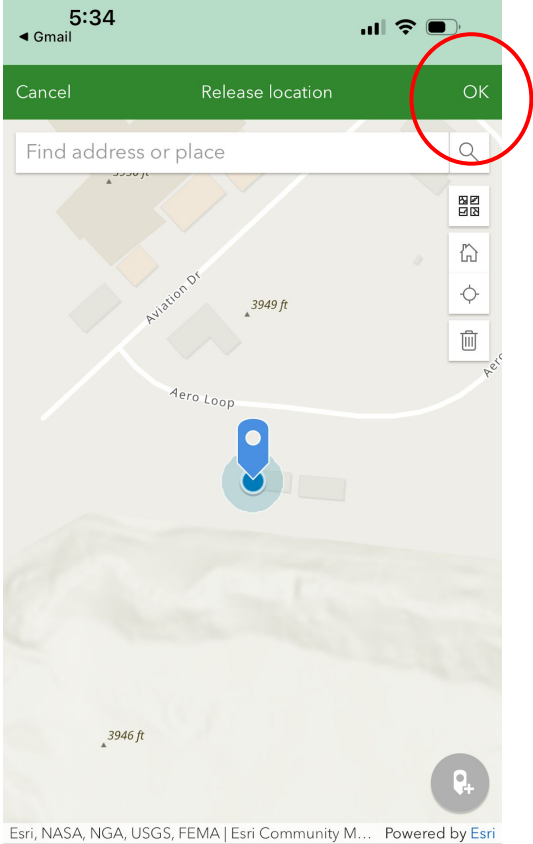
Notes?

Find address or place

"survey123.arcgis.com" would like to use your current location.

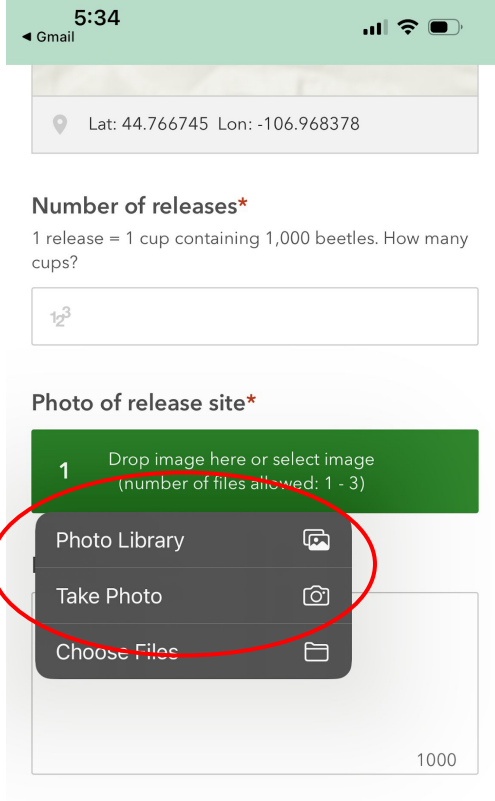
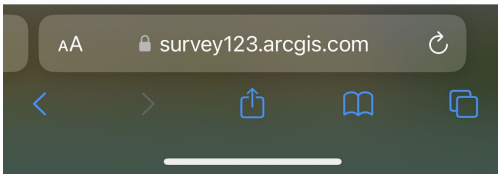
This website will use your precise location because "Safari" currently has access to your precise location.

Don't Allow **Allow**



Esri, NASA, NGA, USGS, FEMA | Esri Community M... Powered by Esri

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Number of releases*

1 release = 1 cup containing 1,000 beetles. How many cups?

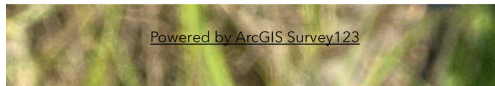
Photo of release site*

1 Drop image here or select image
(number of files allowed: 1 - 3)

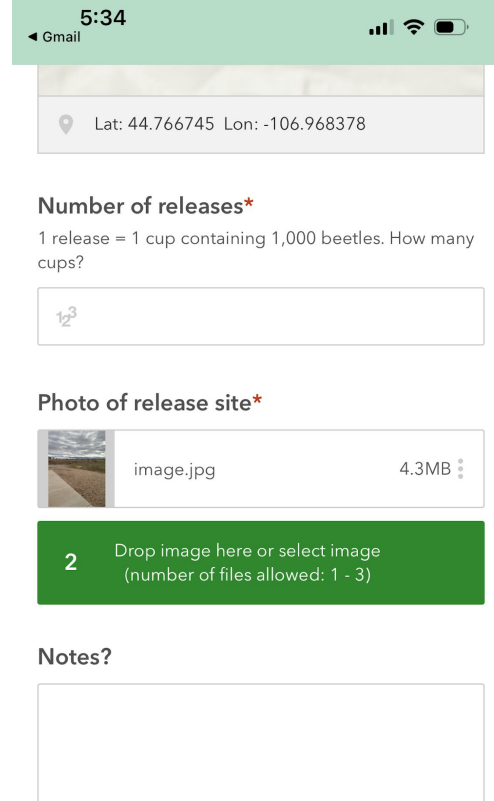
- Photo Library
- Take Photo
- Choose Files

1000

Submit



survey123.arcgis.com



Number of releases*

1 release = 1 cup containing 1,000 beetles. How many cups?

Photo of release site*

2 Drop image here or select image
(number of files allowed: 1 - 3)

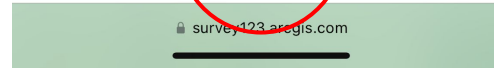
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Notes?

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Submit

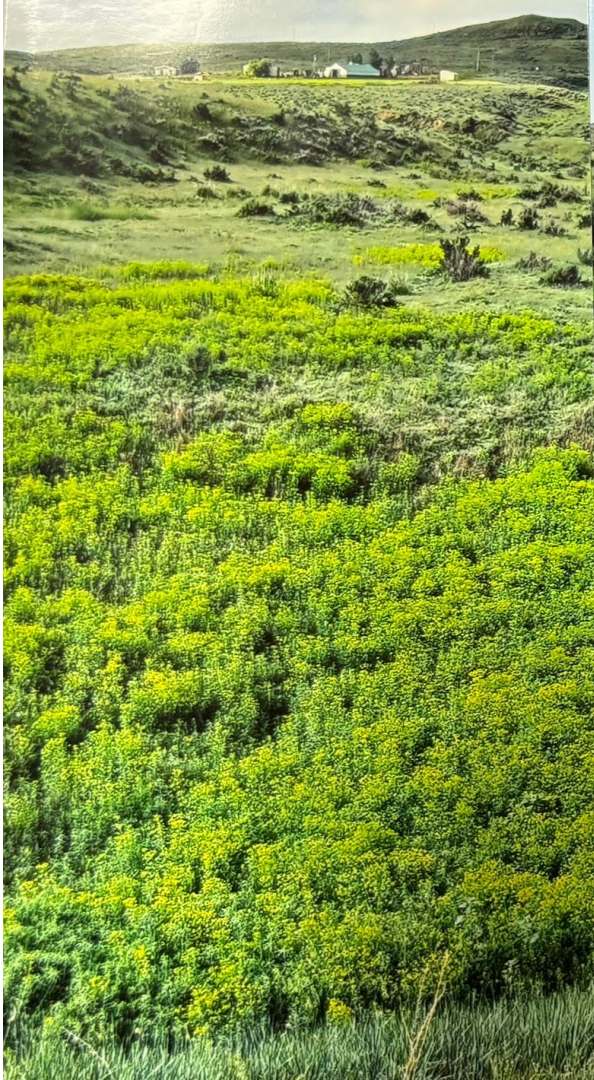


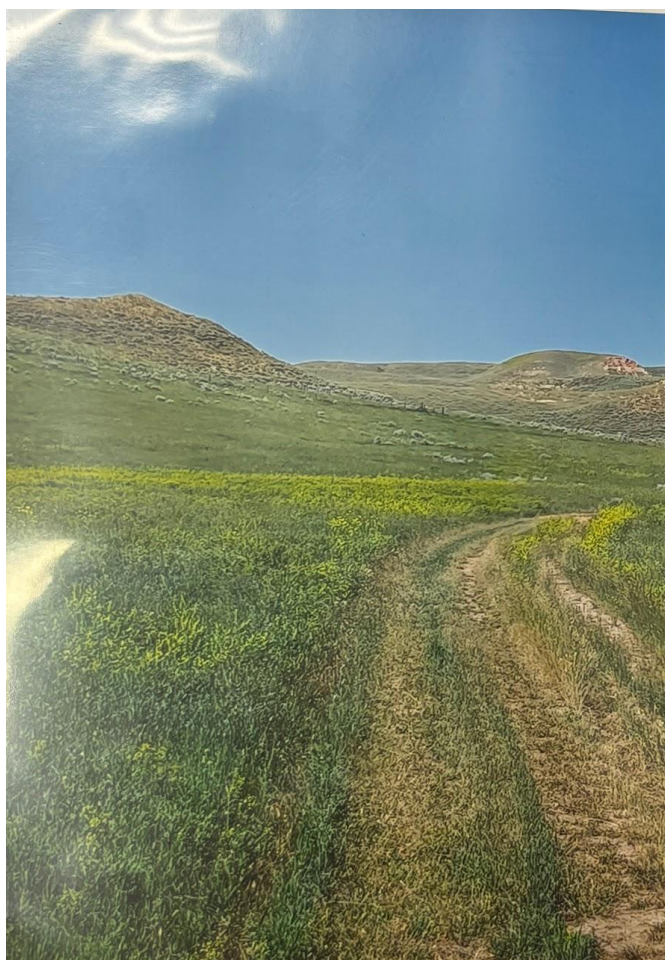
survey123.arcgis.com

Goat grazing

- Leafy spurge is toxic to cattle* but not goats
- Goats can select for leafy spurge
- Goat digestion destroys seed
- Annual grazing can provide control







Goat grazing

- SCWP contracts goat-runner
- Availability extremely limited



Got goats?

- May be an opportunity for summer feed
- Potential cost share for targeted grazing projects



SLAUGHTER GOATS

Got goats?

Billings auction report

KIDS - Selection 1 (Per Cwt / Actual Wt)

<u>Head</u>	<u>Wt Range</u>	<u>Avg Wt</u>	<u>Price Range</u>	<u>Avg Price</u>	<u>Dressing</u>
80	50-57	56	325.00-335.00	330.45	Average
64	60-66	62	325.00-335.00	329.81	Average
27	70-78	74	305.00-325.00	321.98	Average
1	80	80	305.00	305.00	Average
7	90	90	300.00	300.00	Average
1	90	90	280.00	280.00	Average Yearlings
1	110	110	295.00	295.00	Average
15	118	118	267.50	267.50	Average Yearlings

KIDS - Selection 2 (Per Cwt / Actual Wt)

<u>Head</u>	<u>Wt Range</u>	<u>Avg Wt</u>	<u>Price Range</u>	<u>Avg Price</u>	<u>Dressing</u>
217	53-59	57	300.00-320.00	305.52	Average
22	60-67	66	300.00-320.00	313.52	Average
7	63-65	64	270.00-290.00	284.41	Average Yearlings
2	73	73	300.00	300.00	Average Pygmies
2	90	90	290.00	290.00	Average

KIDS - Selection 3 (Per Cwt / Actual Wt)

<u>Head</u>	<u>Wt Range</u>	<u>Avg Wt</u>	<u>Price Range</u>	<u>Avg Price</u>	<u>Dressing</u>
1	25	25	152.50	152.50	Average Pygmies
9	53	53	190.00	190.00	Average Yearlings
7	60-65	61	225.00-242.50	227.68	Average
4	68	68	205.00	205.00	Average Yearlings

Goat grazing

- Herding
- Pen at night and during day



Goat grazing

- Integrated pest management
 - Combine grazing with herbicide
 - Graze in the summer and spray in the fall



Lunch



SCWP program – past

- Cost share 100% of herbicides
- Cost share 80% of aerial herbicide application
- Internal spurge crews 80% cost share
- Leafy spurge beetles 100% cost share

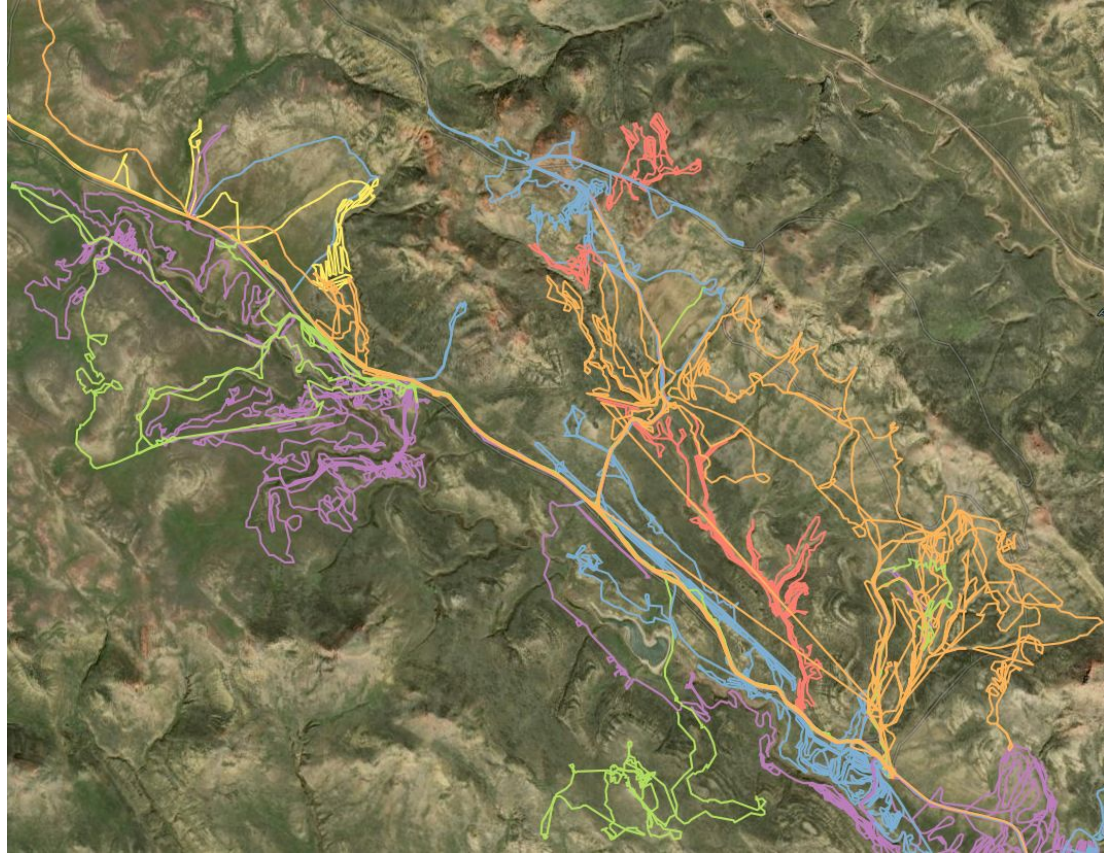


SCWP program – pilot program

- Cost share 100% of herbicides
- Internal spurge crews 80% cost share
- Leafy spurge beetles 100% cost share
- **External spurge contractor 80% cost share**
 - **Ground or aerial**

Why the program is changing

- SCWP capacity
- Landowner buy-in
- Long-term plan



SCWP program

- Spurge management plan in place for **all** cost share
 - 5 year agreement
 - Comprehensive plan needs to be in place for commercial application cost share



SCWP program

- New paperwork
 - Leafy spurge agreement
 - Management plan
 - Project proposal



SCWP program

- New paperwork
 - Leafy spurge agreement
 - Management plan
 - Project proposal



Sheridan County Weed and Pest Control District

2667 Aero Loop
Sheridan, WY 82801
(307) 672-3740

Leafy Spurge Management Agreement

THIS AGREEMENT made and entered on this _____ day of _____, 20____
Between _____ and SHERIDAN COUNTY WEED &
PEST CONTROL DISTRICT, hereinafter referred to as the "District".

WITNESETH:

WHEREAS the Wyoming State Legislature by Legislative enactment effective June, 8,
1989, provides for a Weed and Pest Control Program and,

WHEREAS the County Commissioners are authorized to make available funds for
control of Leafy Spurge,

WHEREAS it would be to the mutual benefit of the State of Wyoming and the individual
landowners to forthwith enter into a cooperative program for the control of Leafy Spurge.

NOW, THEREFORE, it is agreed:

I.

The Operator will, with the assistance of the District, participate in a treatment program
which will implement an integrated management system prescribed by the District Board or the
Board's designated representative. The program will be executed annually, providing for control
of Leafy Spurge as needed to contain the spread and reproduction of Leafy Spurge. During the
term of the agreement, the Operator will furnish at least twenty percent (20%) of the cost of the
treatment program. Subject to the conditions stated herein, the District may pay up to eighty
percent (80%) of the cost of the treatment program. Herbicides or materials used and their rate
per acre will be determined by the District with consultation of the Operator. The application of
all herbicides shall be done by a person or persons properly licensed by the State of Wyoming,
whether the Operator or a qualified commercial applicator.

II.

The Operator will allow District personnel access to the land that is owned and controlled
by the Operator for the purposes of inspecting, surveying, appraising the results of treatments,
and to provide technical assistance in the application of herbicides. All District personnel, when
entering upon the Operator's land, shall show due respect for the land.

III.

The Operator will maintain control of the infestation to the satisfaction of the district.
The Operator shall not move Leafy Spurge infested products to areas that are not infested by
Leafy Spurge.

Management Plan

Landowner

Acres owned

Estimated Acres infested

Plan duration

Map:

Notes:

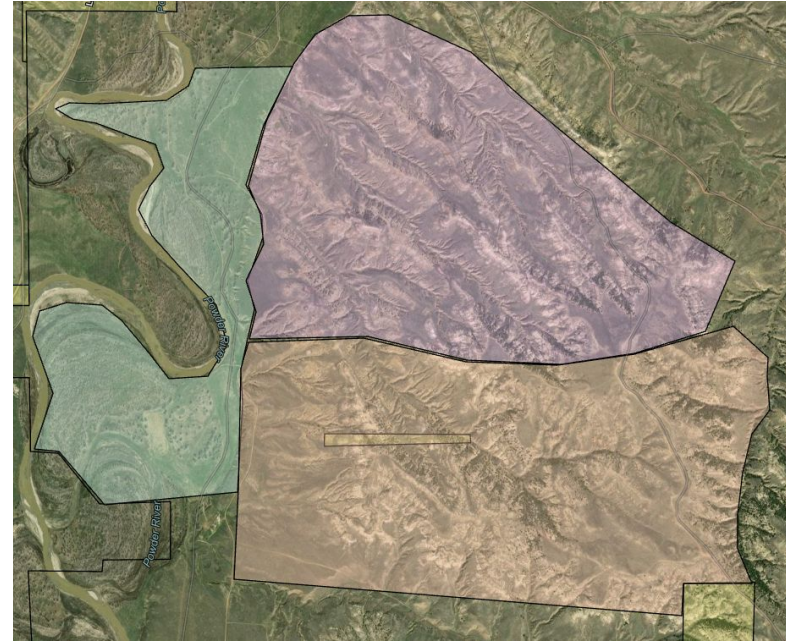
Integrated Management Plan:

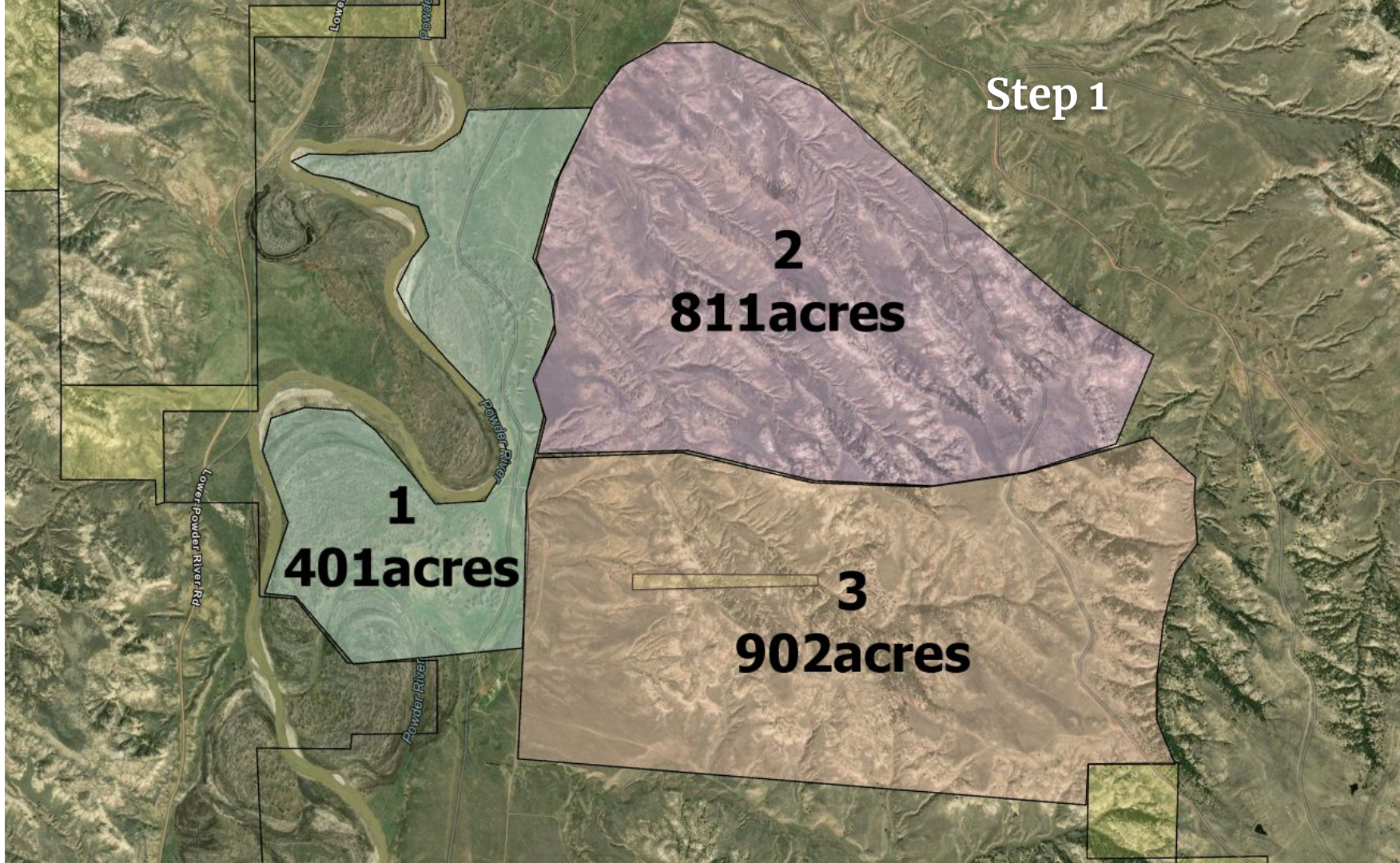
Management plan

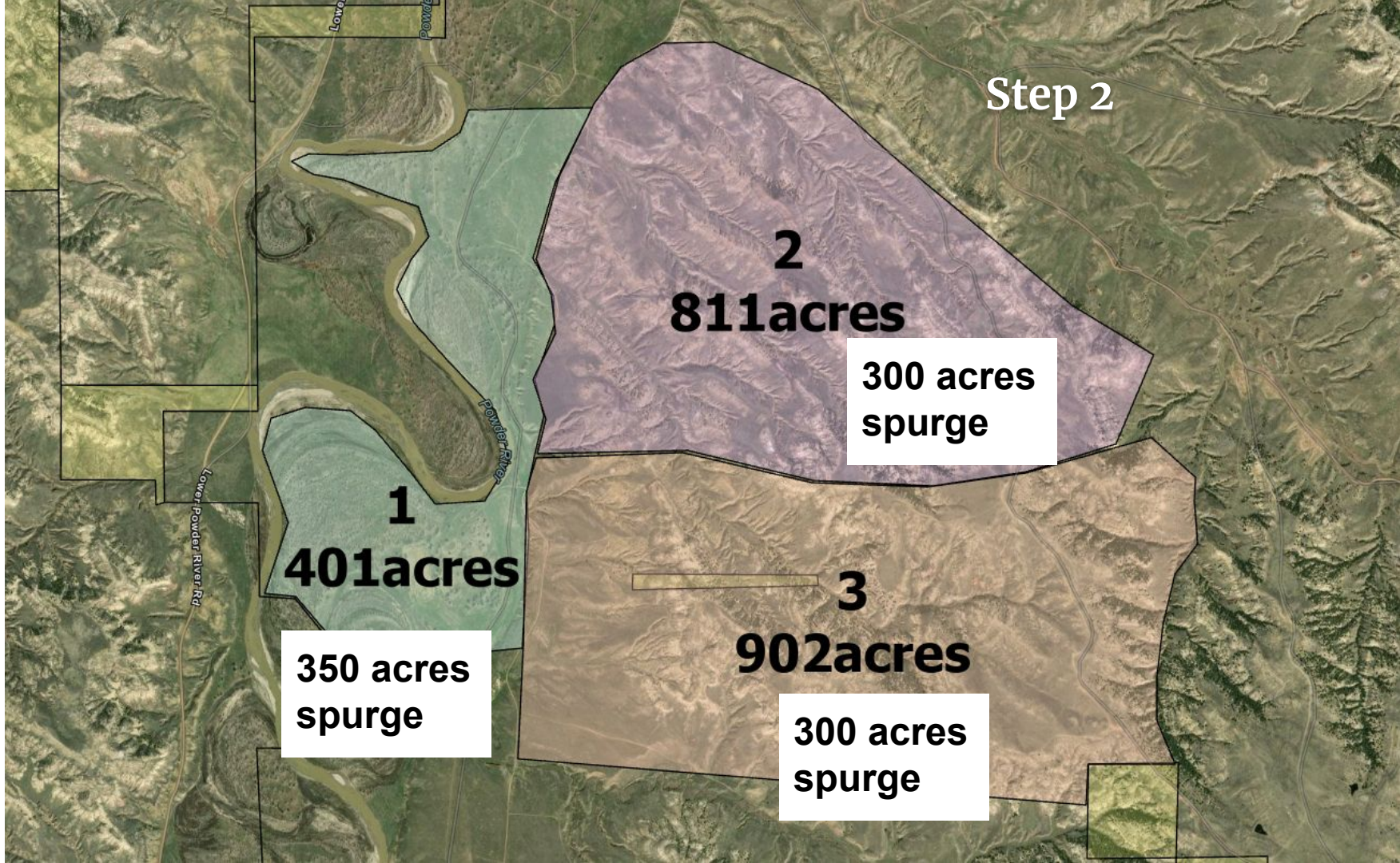
- 5 year treatment plan
- More robust for commercial application cost share
- Can be short for chemical purchase

Management plan

- Why?
 - Strategic treatment plan
 - Follow-up treatment is necessary
 - “Chasing our tail”







Step 2

2
811 acres

**300 acres
spurge**

1
401 acres

**350 acres
spurge**

3
902 acres

**300 acres
spurge**

Lower Powder River Rd

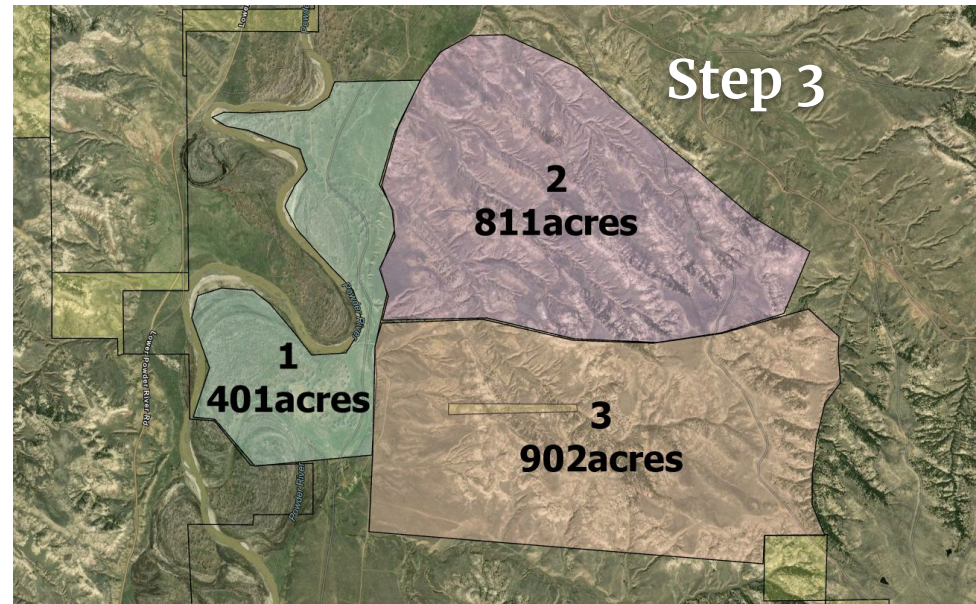
Powder River

Lower

Powder

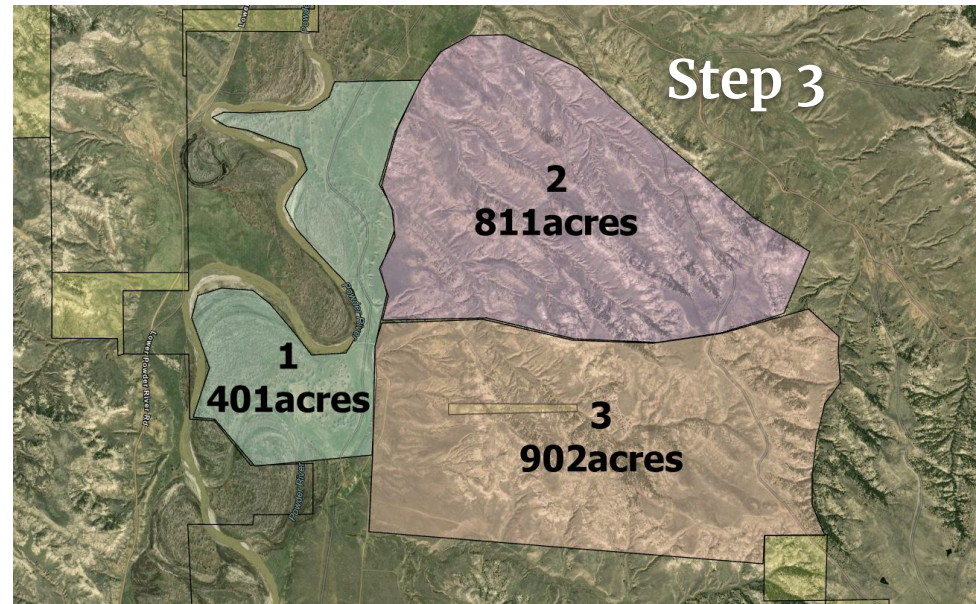
Management plan

- Year 1
 - Focus on area 1
 - Release beetles in area 2 and 3
 - Spray quinstar in the spring and fall by ground



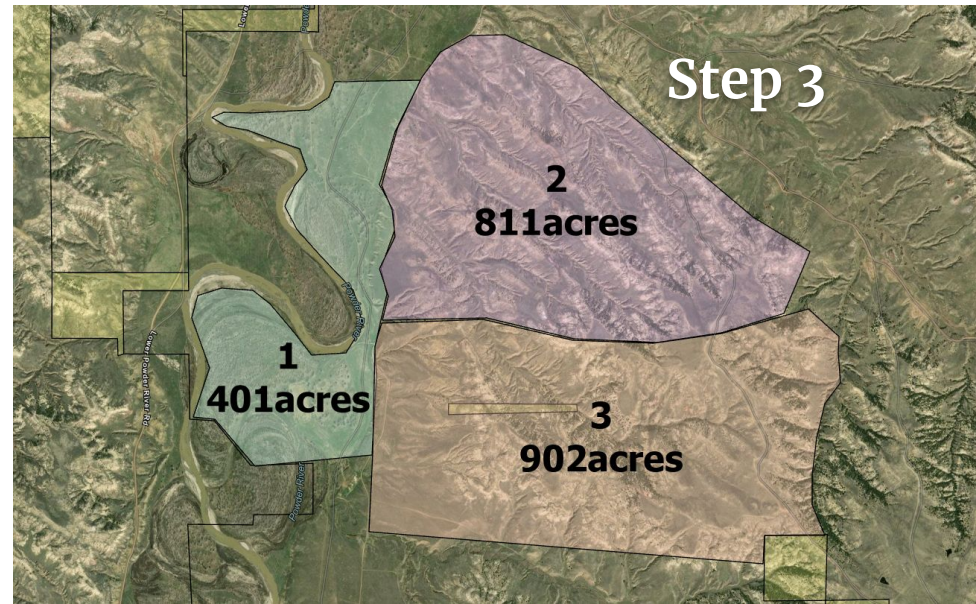
Management plan

- Year 1
 - Focus on area 1
 - Release beetles in area 2 and 3
 - Spray quinstar in the spring and fall by ground
- Year 2
 - Retreat area 1
 - With leftover resources, focus on area 2
 - Treat with Tordon aerially in the fall
 - Continue releasing beetles



Management plan

- Year 1
 - Focus on area 1
 - Release beetles in area 2 and 3
 - Spray quinstar in the spring and fall by ground
- Year 2
 - Retreat area 1
 - With leftover resources, focus on area 2
 - Treat with Tordon aerially in the fall
 - Continue releasing beetles
- Year 3
 - Clean up areas 1 and 2

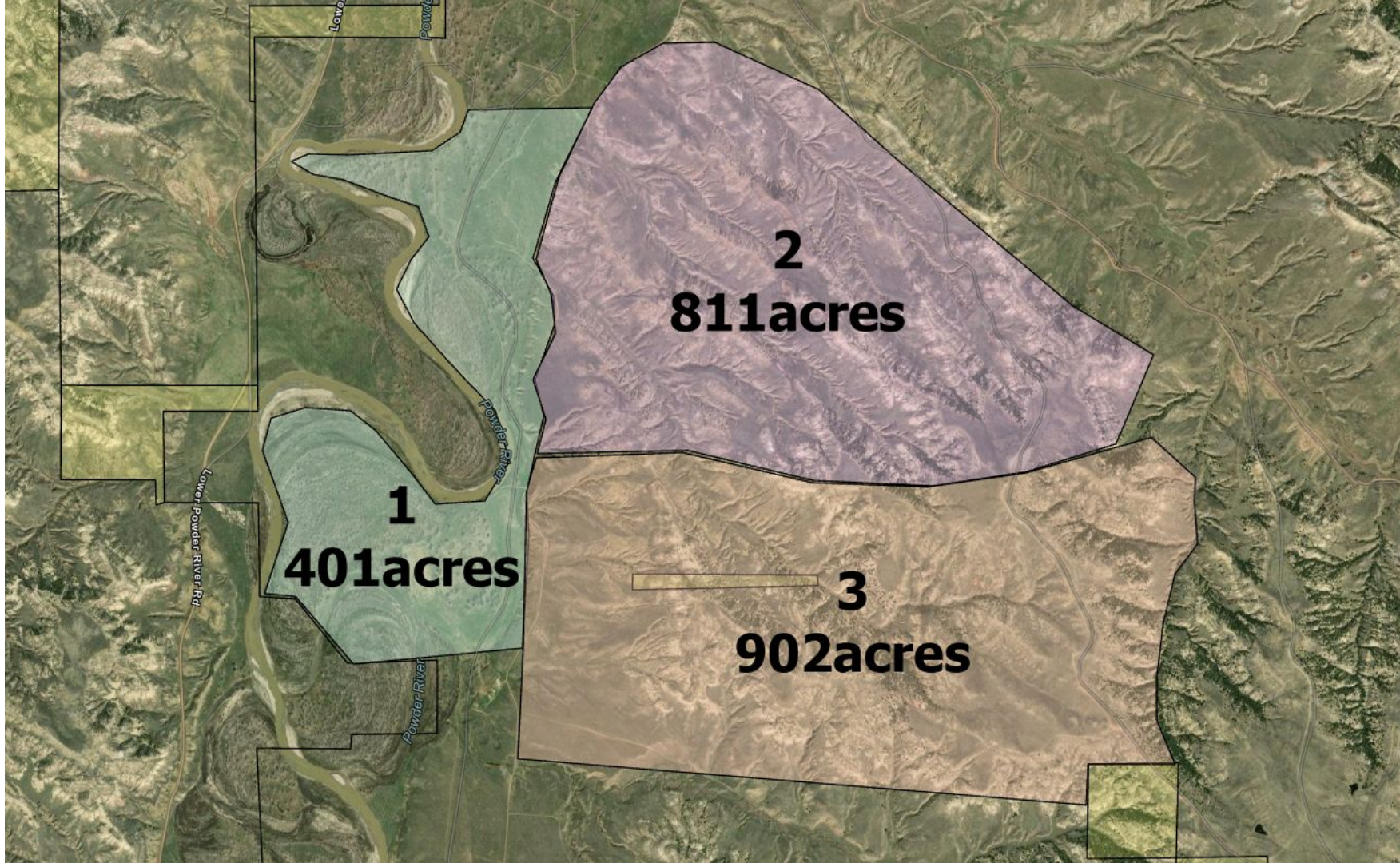


Management plan

- Year 1
 - Focus on area 1
 - Release beetles in area 2 and 3
 - Spray quinstar in the spring and fall by ground
- Year 2
 - Retreat area 1
 - With leftover resources, focus on area 2
 - Treat with Tordon aerially in the fall
 - Continue releasing beetles
- Year 3
 - Clean up areas 1 and 2
- Year 4
 - Clean up areas 1 and 2
 - Focus on area 3
 - Monitor for beetles
 - Redistribute
 - Treat with Tordon aerially in spring
 - Clean up regrowth with tordon in fall by ground

Management plan

- Year 1
 - Focus on area 1
 - Release beetles in area 2 and 3
 - Spray quinstar in the spring and fall by ground
- Year 2
 - Retreat area 1
 - With leftover resources, focus on area 2
 - Treat with Tordon aerially in the fall
 - Continue releasing beetles
- Year 3
 - Clean up areas 1 and 2
- Year 4
 - Clean up areas 1 and 2
 - Focus on area 3
 - Monitor for beetles
 - Redistribute
 - Treat with Tordon aerially in spring
 - Clean up regrowth with tordon in fall by ground
- Year 5+
 - Spot spray regrowth
 - Distribute beetles



Management plan, chemical only

- Subdivision
 - “I plan to get Tordon from SCWP annually to apply during the spring and fall to leafy spurge in my horse pasture using a backpack sprayer.”



Project proposal

- Project proposal for commercial application cost share
 - Should follow 5 year management plan
- Proposal requirements
 - Estimated acres + map
 - Estimated cost
 - Treatment plan
 - Pre-treatment photos
- Report requirements
 - Post-treatment photos
 - Map
 - Itemized budget

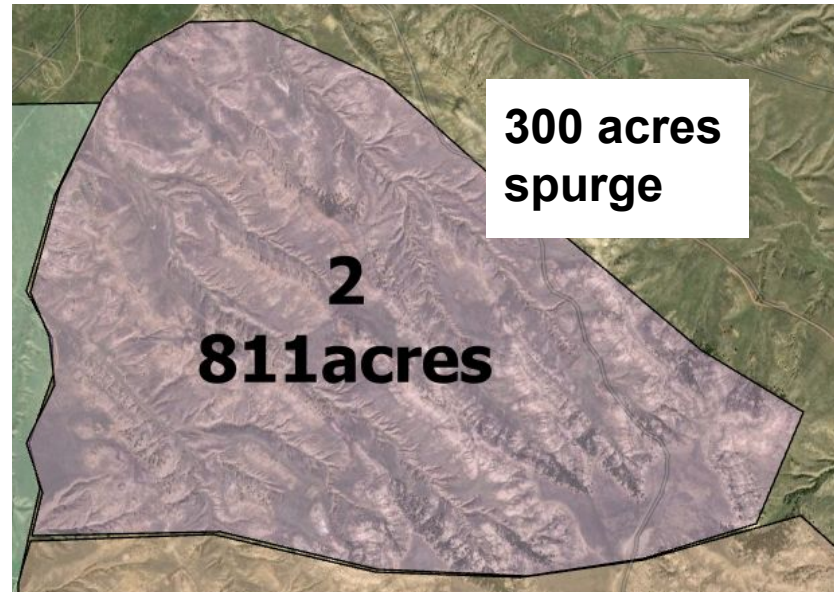
SCWP program

- Project proposal
 - Collaboration between SCWP, landowner, applicator



Project proposal

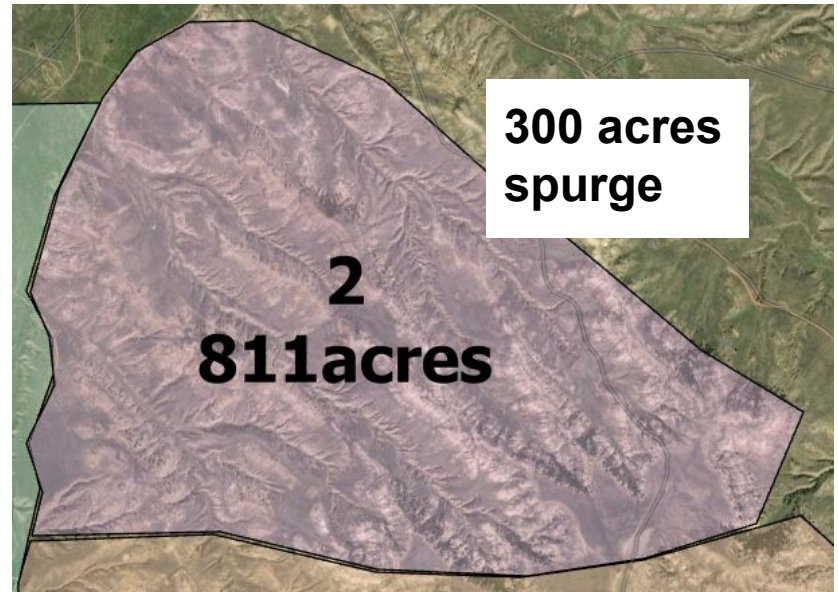
- Budget
 - Work with your applicator
 - Estimate
 - SCWP board will approve project budget once proposal is submitted



Project proposal

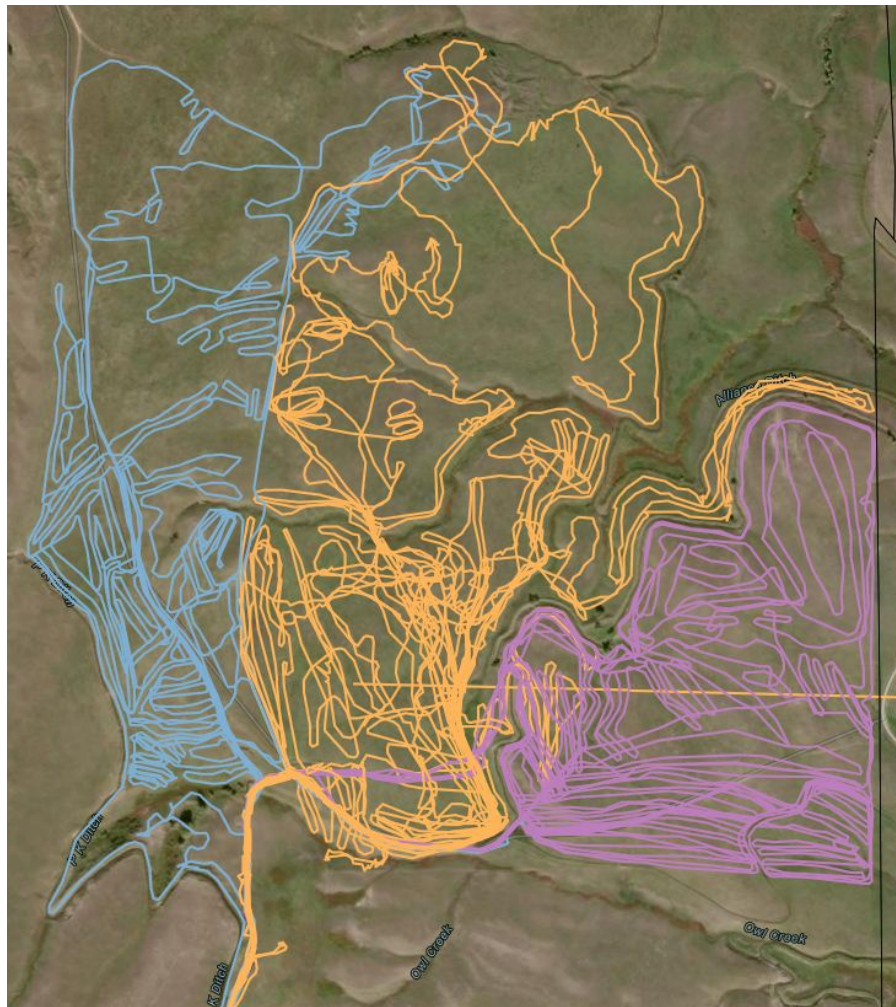
- Treatment budget and plan
 - Fall Tordon application
 - \$21/ac* application
 - \$11.50/ac Tordon
 - \$1.35/ac 2,4-D
 - \$0.15/ac surfactant

$\$34/\text{ac} \times 300\text{ac} = \mathbf{\$10,200}$



Project report

- Billing
 - SCWP receives bill, then bills landowner 20%* of chemical + labor
 - Treatment map
 - Project itemized budget
 - Post-treatment photos



SCWP program – pilot program

- Cost share 100% of herbicides
- Cost share 80% of aerial herbicide application
- Internal spurge crews 80% cost share
- Leafy spurge beetles 100% cost share
- **External spurge contractor 80% cost share**
 - **Ground or aerial**

SCWP program

- Rental trailers
- Chemical sales
- Weed consultations
- Help to make management plan
- Leafy spurge beetles
- More!



Questions?

Walker Billings

Office: 307-672-3740

Direct: 307-675-5707

walker@scweeds.com

