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Tackling Russian Knapweed Biocontrol with New Tools in Riparian Areas

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Overview

- The problem
  - Secondary invasions following riparian species control
  - Russian knapweed (*Rhaponticum repens*)
- Control options
  - Biological
    - Gall wasp (*Aulacidea acroptilonica*)
    - Gall midge (*Jaapiella ivannikovi*)
    - Potential future agents
- Impacts

Secondary Invasions

- Several studies
  - Canada thistle
  - Downy brome
  - Russian knapweed
- Soil composition and litter
  - High salinity
  - Germination time lengthened for natives
- Invasives are likely to perform better in restoration efforts

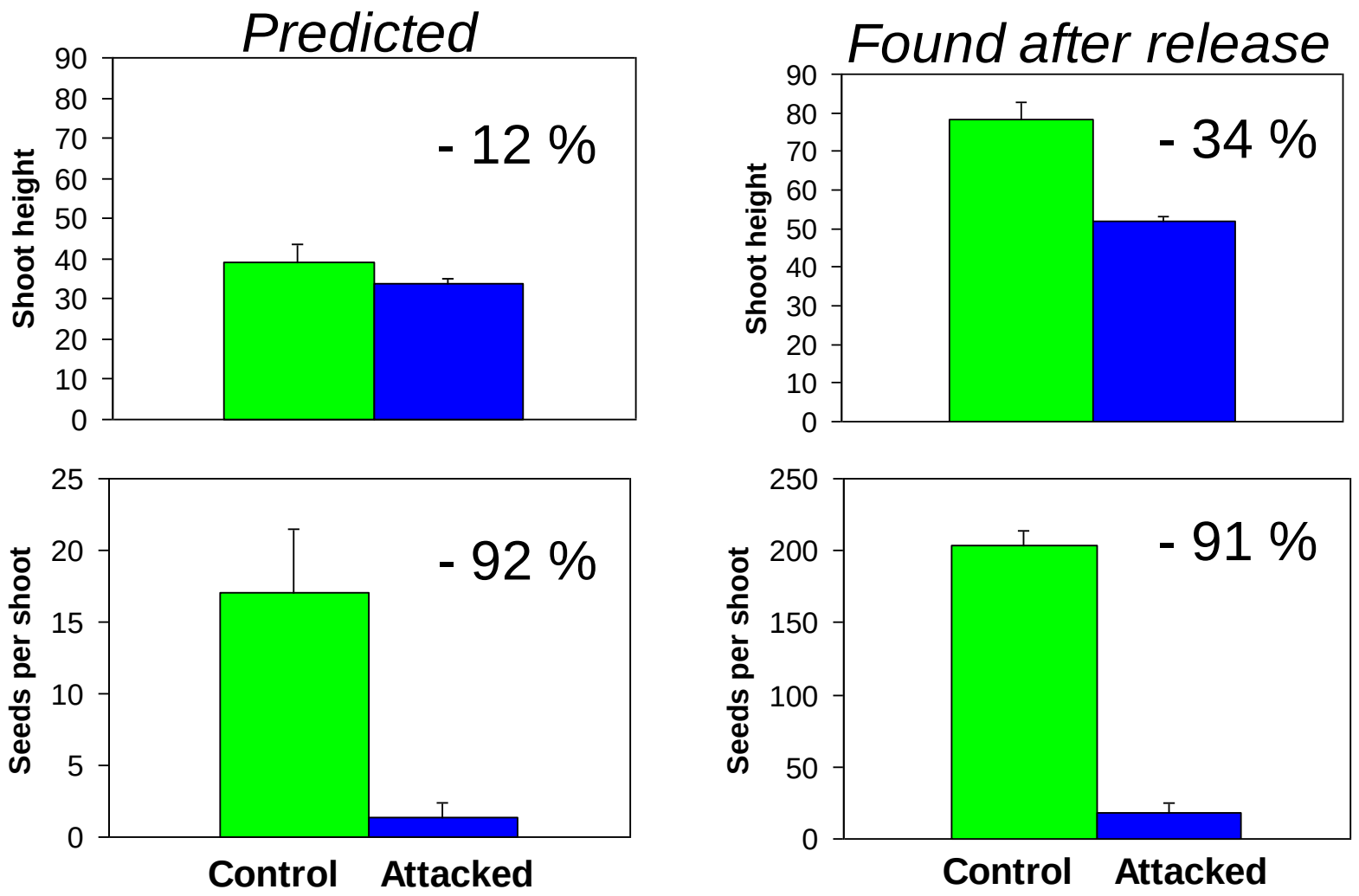
Gall wasp – *Aulacidea acroptilonica*

- Only became collectible in large numbers in 2018
- Time-consuming to rear, but might be necessary due to parasitism rates
- Builds up quickly once initially established
- Slow to disperse until large populations establish
- Impact still unclear
- Less restrictive sites than *J. ivannikovi*
- Spring releases are best
- Looks like the best biocontrol agent for Russian knapweed
- Field collections on-going

Gall midge – *Jaapiella ivannikovi*

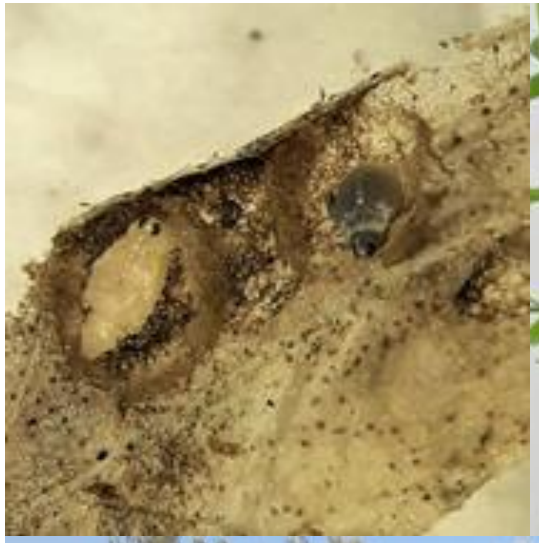
- Only established in areas with moisture available throughout the season
- No established for long
- Good disperser in a short amount of time
- Recovers quickly following fire
- Mowing and grazing will help establishment
- *A. acroptilonica* may be a better competitor
- Established at several sites
- Field collections are on-going

Impact of *Jaapiella ivannikovi*

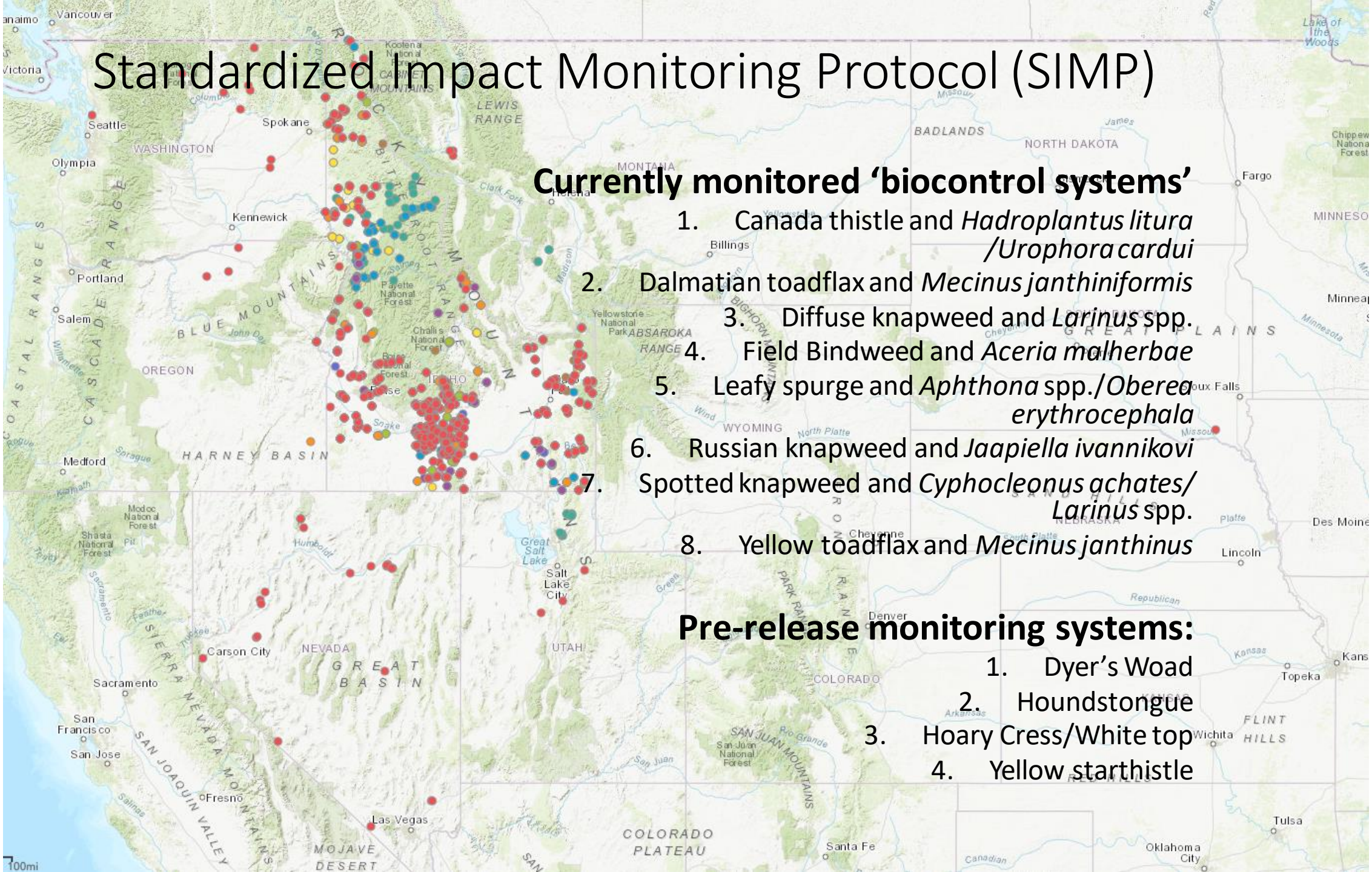


Future Biological Control Agents

- *Aceria acoptiloni* – Russian knapweed mite
  - Host-range testing in Iran
  - Long-term establishment on control plants under experimental conditions difficult
  - Open-field host range testing over two years failed to show establishment
  - Work currently suspended
- *Pseudochestes distans* – Russian knapweed jumping weevil
  - Collected in Kazakhstan and transported to CABI
  - Studying biology
    - Highly fecund
    - Fast development
    - Larval mining usually kills leaf
    - Adults feed voraciously on Russian knapweed



Standardized Impact Monitoring Protocol (SIMP)



Currently monitored 'biocontrol systems'

1. Canada thistle and *Hadroplantus litura /Urophora cardui*
2. Dalmatian toadflax and *Mecinus janthiniformis*
3. Diffuse knapweed and *Larinus* spp.
4. Field Bindweed and *Aceria malherbae*
5. Leafy spurge and *Aphthona* spp./*Oberea erythrocephala*
6. Russian knapweed and *Jaapiella ivannikovi*
7. Spotted knapweed and *Cyphocleonus achates/ Larinus* spp.
8. Yellow toadflax and *Mecinus janthinus*

Pre-release monitoring systems:

1. Dyer's Woad
2. Houndstongue
3. Hoary Cress/White top
4. Yellow starthistle

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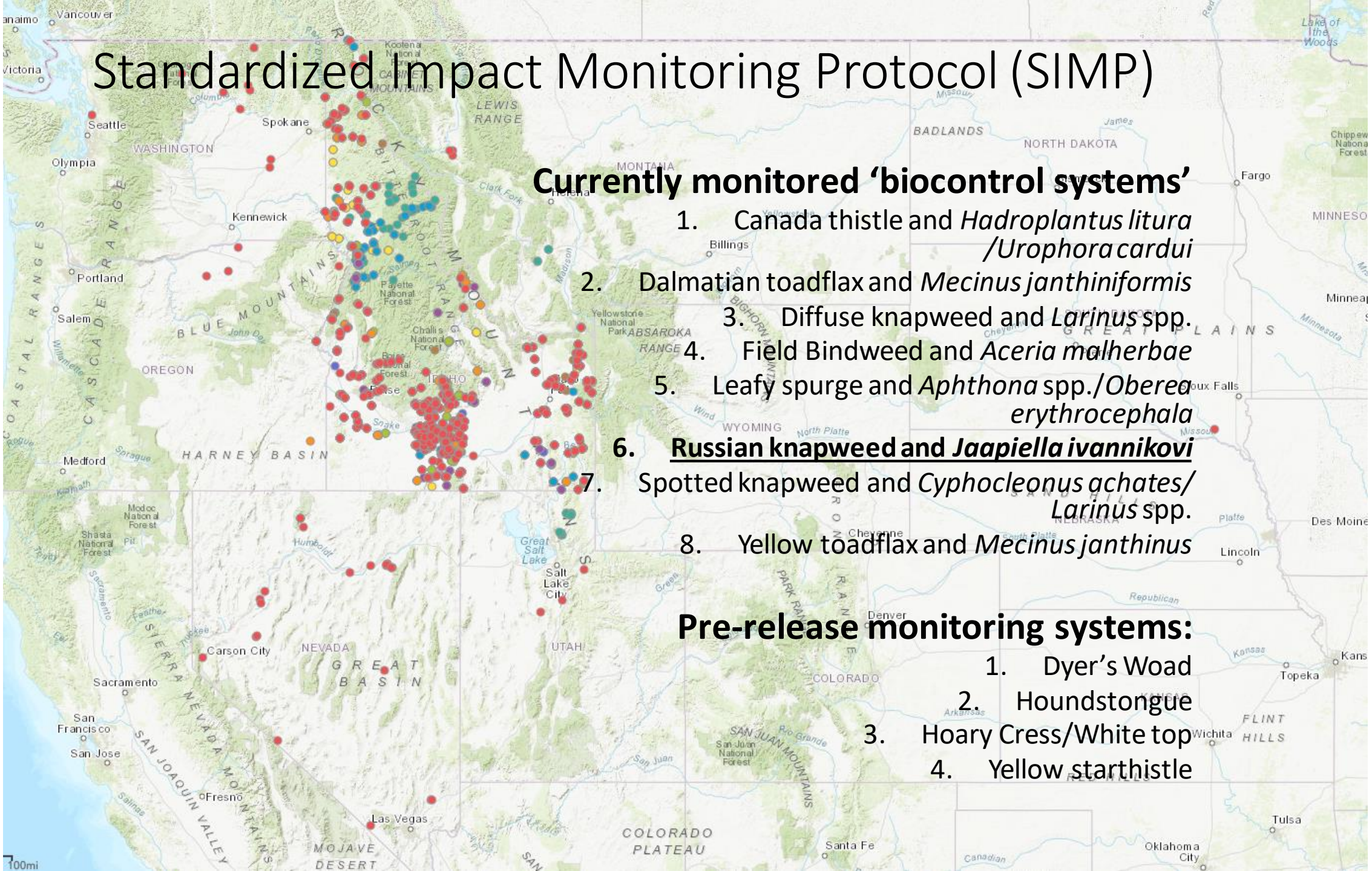

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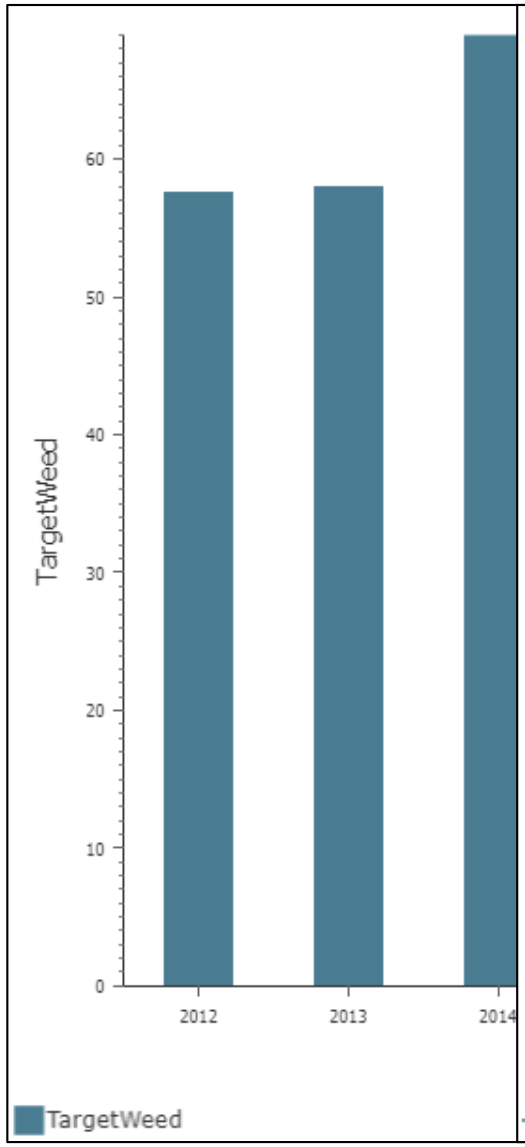
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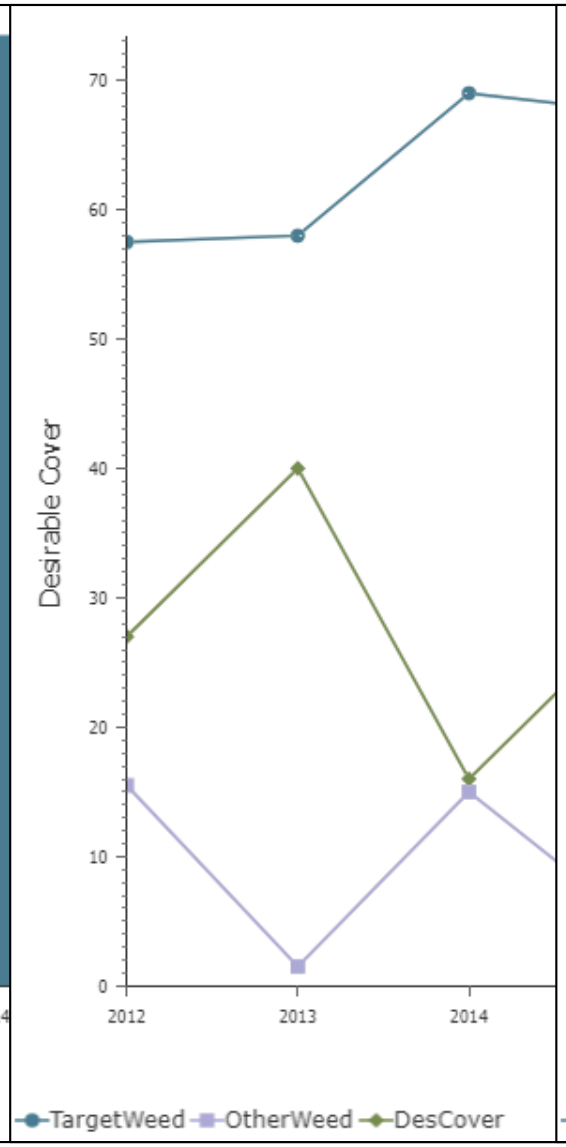
TargetWeed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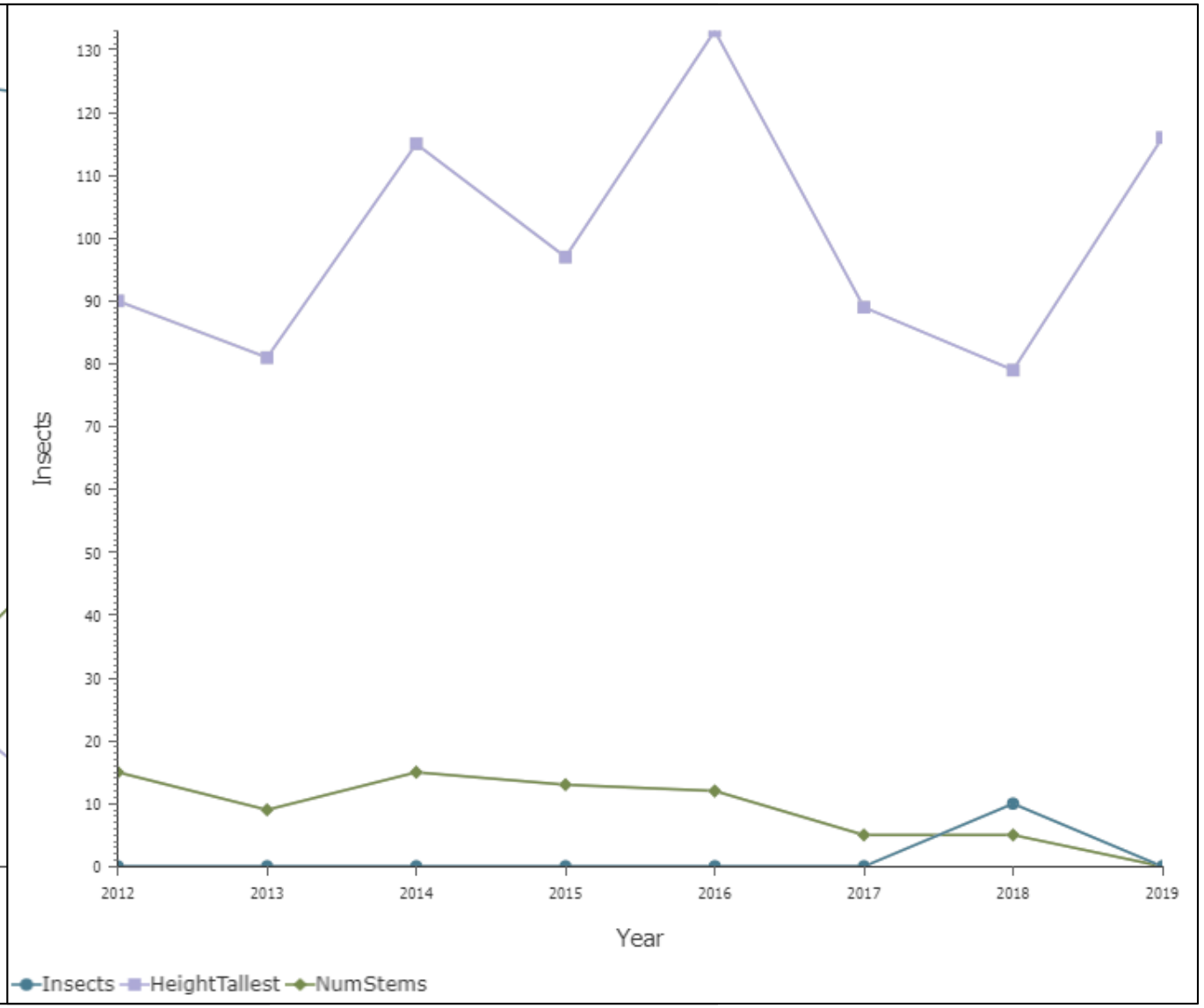
Insects
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110
120
130
2012
2013
2014
2015
2016
2017
2018
2019
Year
Insects
HeightTallest
NumStems

Questions?

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