Treating alpine invaders: prioritizing high elevation non-native species to protect Yosemite’s alpine meadow ecosystems

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High elevation meadows—high value habitat

- Support systems of the region
- Small segment of the land, big impact
- Protecting an intact system

(Kuhn et al. 2015; Moore et al. 2000)
Wildlife Habitat

Left to Right: Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*), Yosemite toad (*Anaxyrus canorus*), Sierra Nevada yellow-legged frog (*Rana muscosa*)

(NPS 2016, Stebbins 2003)
High elevation weeds—It’s a problem?!

- Short growing season
- Low propagule pressure
- Low resource availability

(Alexander et al. 2015, Pauchard et al. 2009)
Rising threats—Increased visitation

Yosemite wilderness visitor and use-night trends from 2005-2015

- Permits (calculated)
- People (calculated)
- Use Nights (calculated)
Rising Threats—Climate Change

(Griffith & Loik 2010)
Why Choose 7000 feet?

Number of populations of non-native plants in Yosemite National Park by elevation

Acres of each elevation range and total acres surveyed from 2008-2016 in Yosemite National Park

- Acres of each elevation range
- Total survey acres 2008-2016
Why 7000 feet continued

Number of non-native species & gross infested acres in Yosemite National Park by elevation

Elevation (feet)

No. Species

Total GIA
The most effective part of weed treatment—early detection—rapid response

BEFORE
• 84 high elevation species
• 29 had only one population

AFTER
• 11 species reduced to one population
• 32 species eradicated?
 Significant Findings-Holcus lanatus treatment

Before

After
Significant Findings—Never ending dandelion

- Dandelion
  - 2014 8.17 Acres
  - 2015 10.75 Acres
  - 2016 24.66 Acres
Where do we find weeds

- Stock corrals
- Stock grazing areas
- Gravel pits
Where we didn’t get there early enough

Populations of each Species

- *Taraxacum officinale*-749
- *Rumex acetosella*-142
- *Spergularia rubra*-90
- *Bromus inermis*-84
- *Lactuca serriola*-74
- *Bromus tectorum*-70
- *Tragopogon dubius*-69
- *Lepidium virginicum*-56
- *Poa annua*-44
- *Phleum pratense*-35
Not just a local problem—Species found in other alpine habitats

- 10,000 feet
  - *Phleum pratense*
  - *Poa annua*
  - *Rumex acetosella*
  - *Taraxacum officinale*

- 8,000 feet
  - *Capsella bursa-pastoris*
  - *Dactylis glomerata*
  - *Holcus lanatus*
  - *Plantago lanceolata*
  - *Poa pratensis*
  - *Polygonum aviculare*
  - *Sonchus asper*
  - *Stellaria media*
  - *Trifolium repens*

(Alexander et al. 2016)
Lessons learned

• High elevations are vulnerable
• Start survey and treatment now!
• You can be effective at EDRR and prevention
• Follow stock if you want to find weeds
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- Yosemite Conservancy
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- Yosemite resource management staff
- Hardworking volunteers
Questions?
Sources

- Seipel, T et al., 2012. Processes at multiple scales affect richness and similarity of non-native plant species in mountains around the world. *Global Ecology and Biogeography, Volume 21*, pp. 236-246