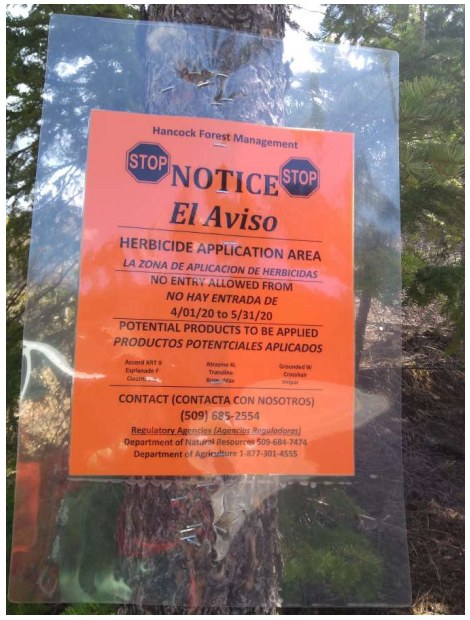
Site Prep Treatment Effects on Seral Vegetation and Ungulate Use: 2016-2020

Syringa Ecological Consulting

Adam D Gebauer M.S.

UCUT
UPPER COLUMBIA UNITED TRIBES



Background

- Industrial forestry practices concerns
  - Herbicide: suppression of native and,forage species
  - Land clearing
- Improve wildlife browse and forage
- Native species regeneration
- Lack of regional study

Study Objectives

- Primary
  - Forestry best management practices
    - Crop tree survival
  - Native plant regeneration
    - Shrubs & Forbs
  - Cervid browse preference
    - Utilized in different treatments
- Secondary
  - Soil temperature & sub straight

Study Timeline

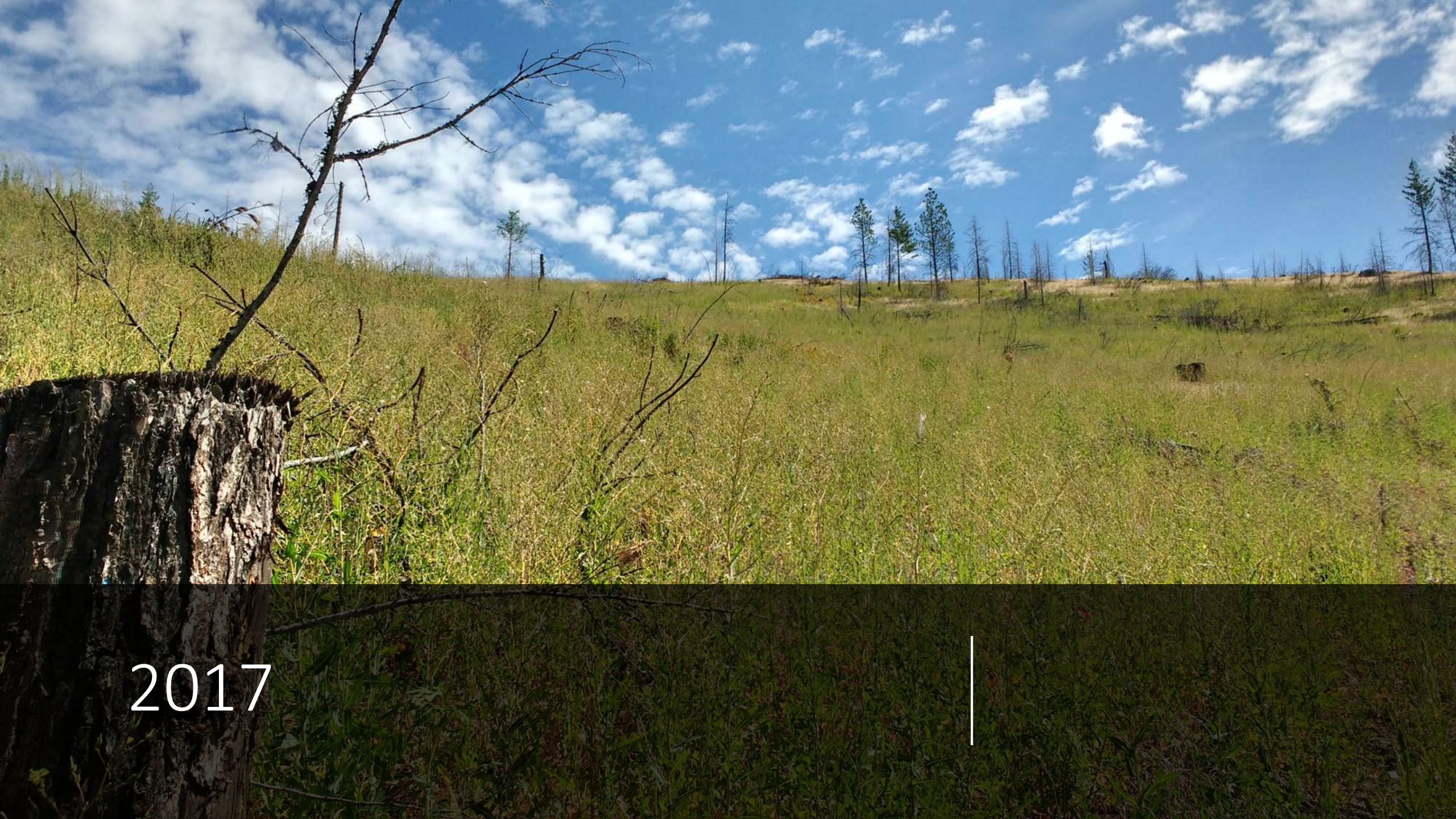
- 2016-2017
  - Background research & study design
  - Engage first study site with CDA
  - Locate industry sites & start photo documentation
  - First season of data collection at 1 site
  - Additional soil biota data taken
  - Engaged 4 other sites on CDA, 2 CCT, and Kalispel
- 2018-2020
  - Gathered data at all sites
  - Cameras deployed at all sites and treatments
  - Temperature loggers at treatments at 3 sites

Tracking Industrial Practices

- Photo document regional industrial sites
  - Clear cut
  - Aerial herbicide application
  - General vegetation composition
- Sites sprayed from 2012-2016
- Sites monitored from 2016-2020


NOTICE
HERBICIDE APPLICATION AREA
NO ENTRY ALLOWED FROM
7/11/16 to 8/31/16
POTENTIAL PRODUCTS TO BE APPLIED:
Rotary 2 SL or Polaris SP
Imazapyr 4 SL or Polaris AC Complete
Glyphosate 5.4 or Aqua Neat
SFM 75 or Spyder
MSM 60DF
Syl-Tac EA or S 172
Crosshair or Enhance Pro
CONTACT:
Hancock Forest Management

2016



2017

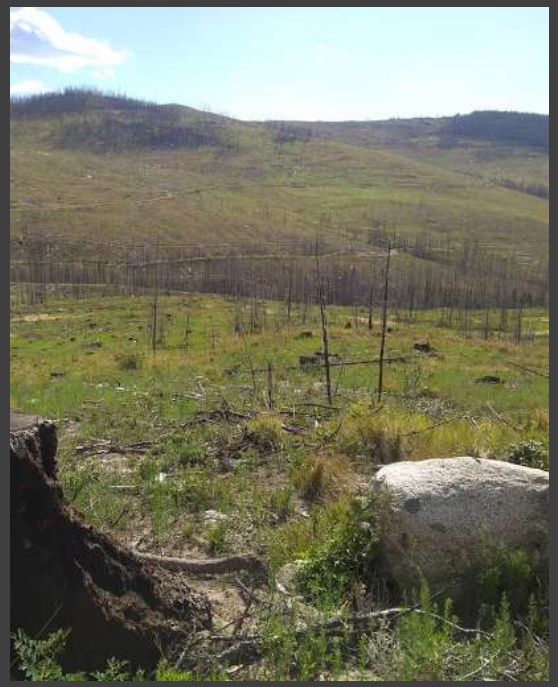
2018

2020

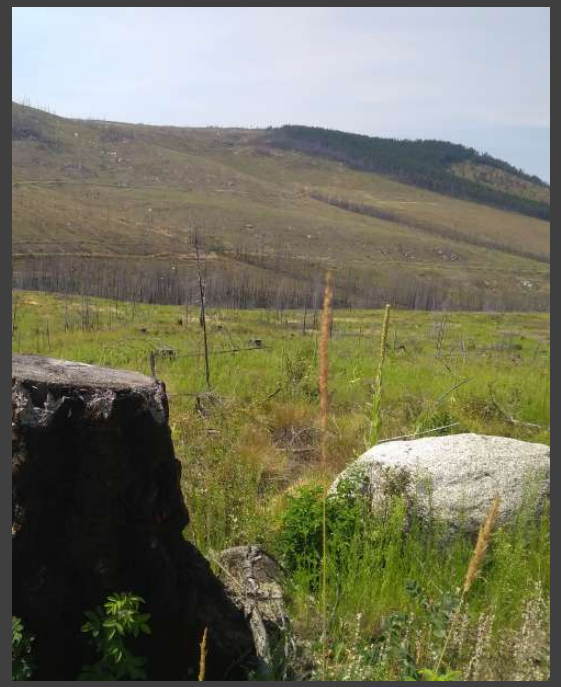
Natural Regrowth

2017

2018



2019

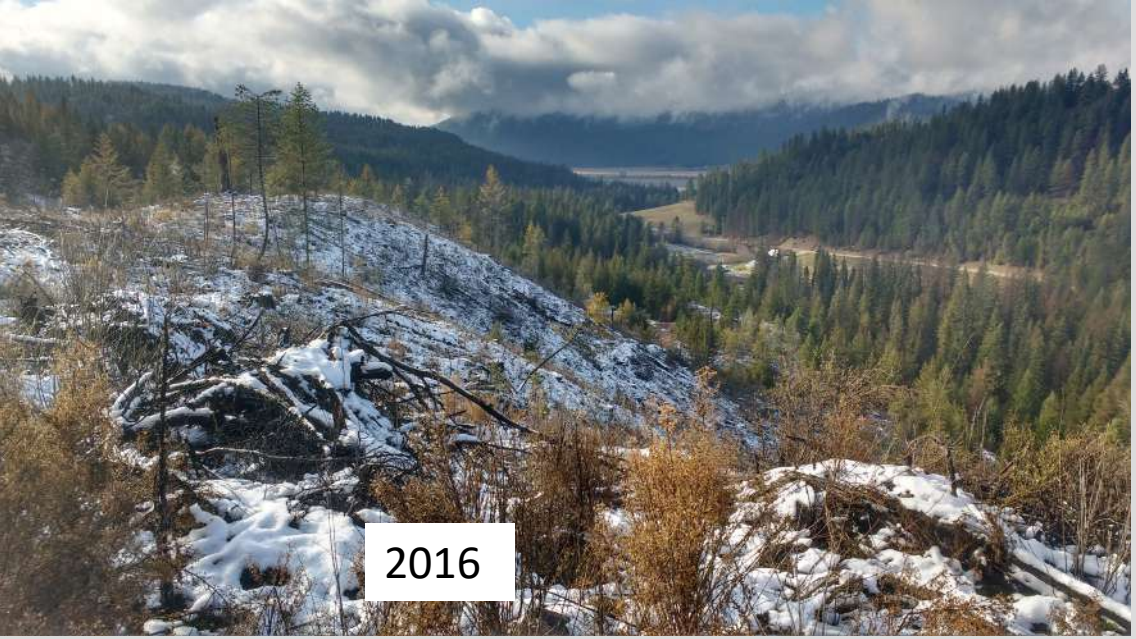


2020

2015 Burn, 2016 Salvage & Herbicide

2015 Fire, Federal and State

2015 Herbicide Treatment



2014 Herbicide Treatment

2016

2019

2017

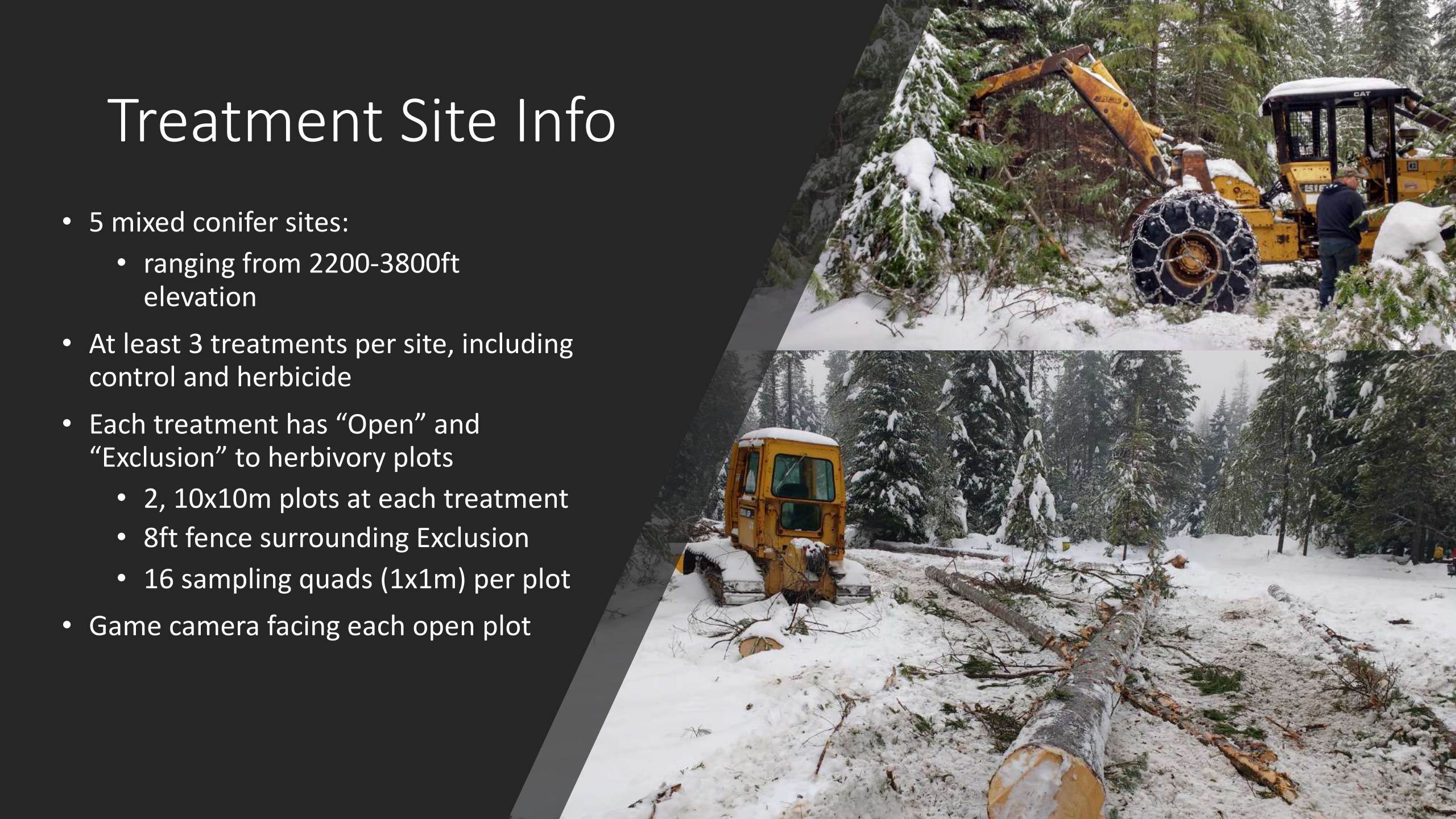
2020

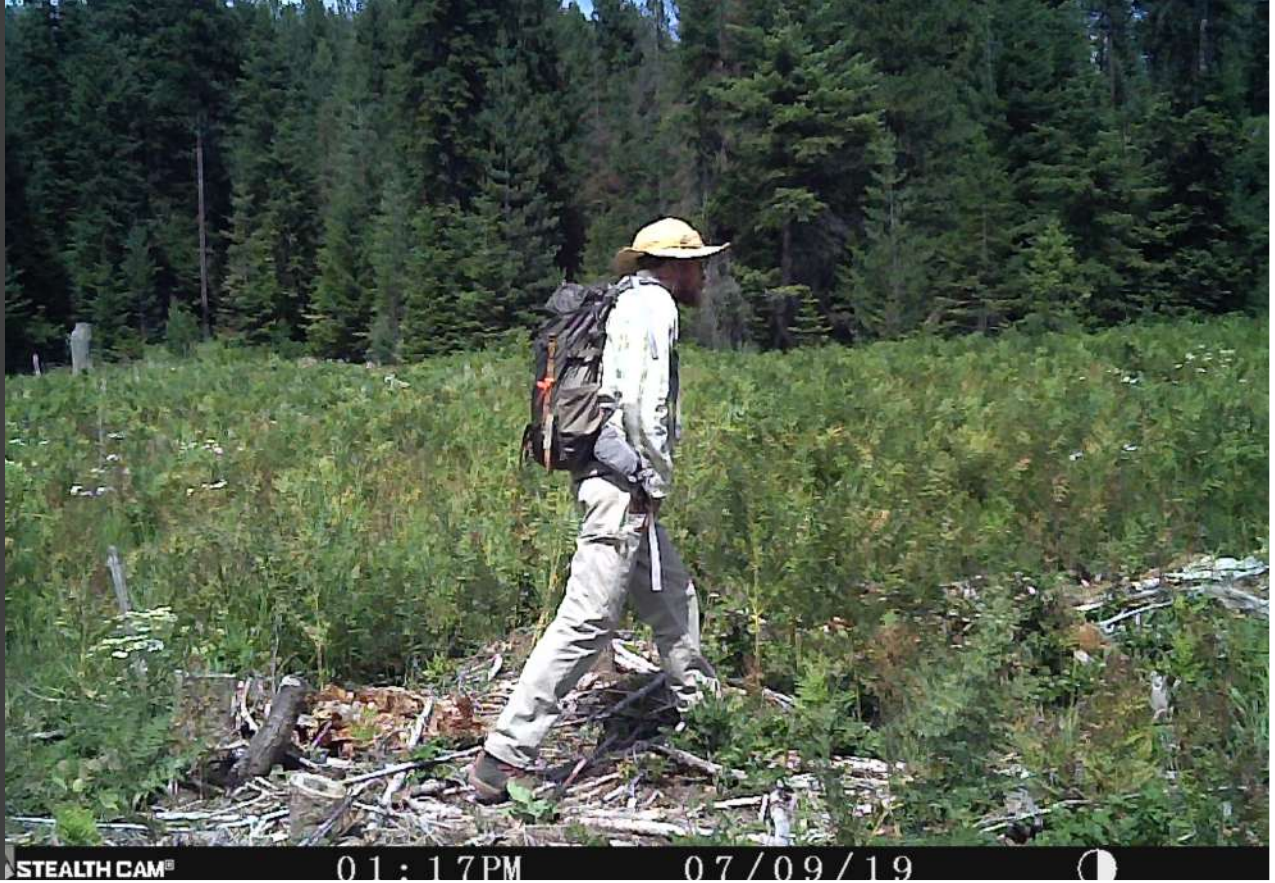
Site Location

- CCT
  - Lynx Creek
  - 6 Mile
- Kalispel
  - Indian Creek
- CDA
  - A567
  - Chet5

Treatment Site Info

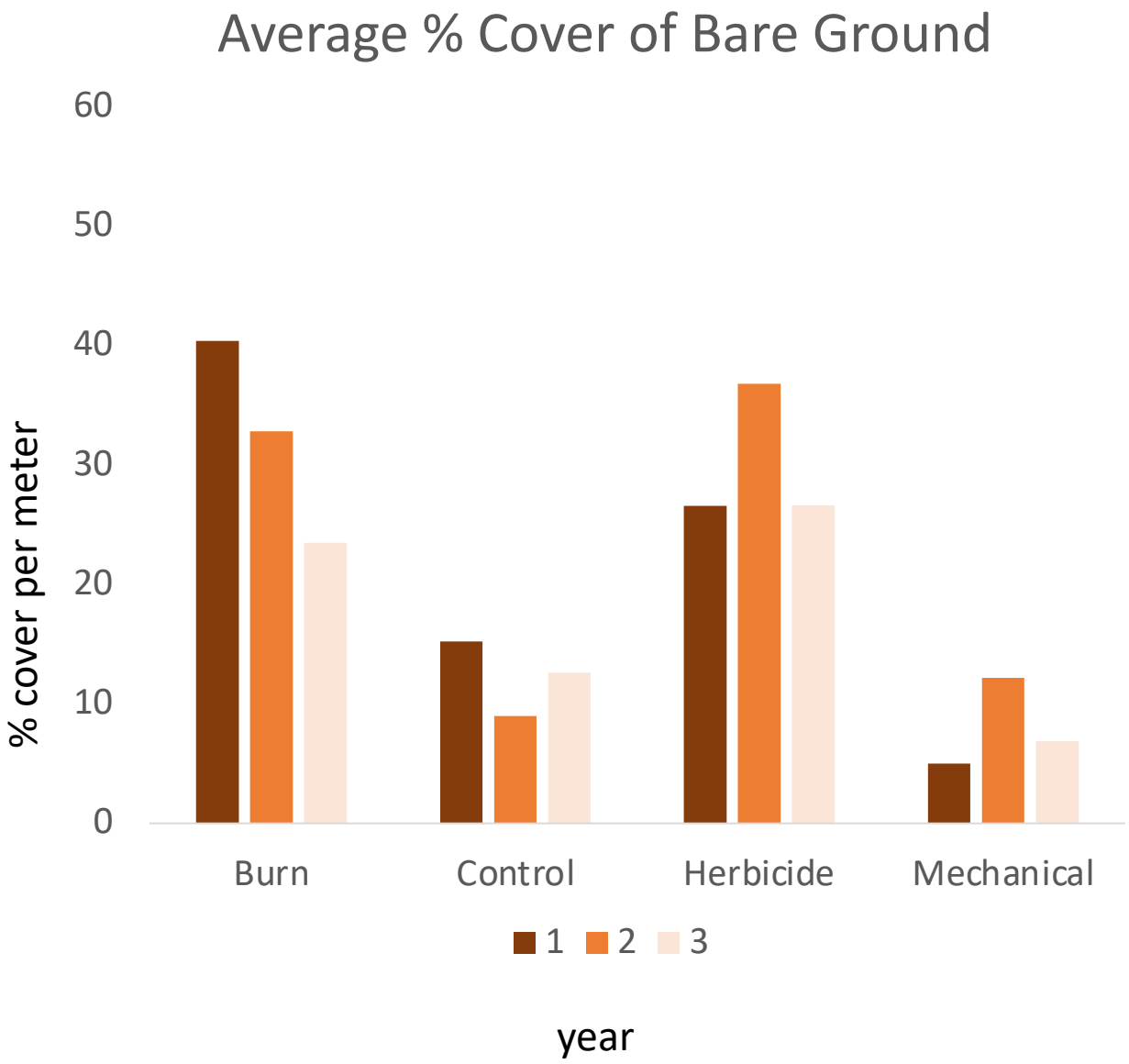
- 5 mixed conifer sites:
  - ranging from 2200-3800ft elevation
- At least 3 treatments per site, including control and herbicide
- Each treatment has “Open” and “Exclusion” to herbivory plots
  - 2, 10x10m plots at each treatment
  - 8ft fence surrounding Exclusion
  - 16 sampling quads (1x1m) per plot
- Game camera facing each open plot

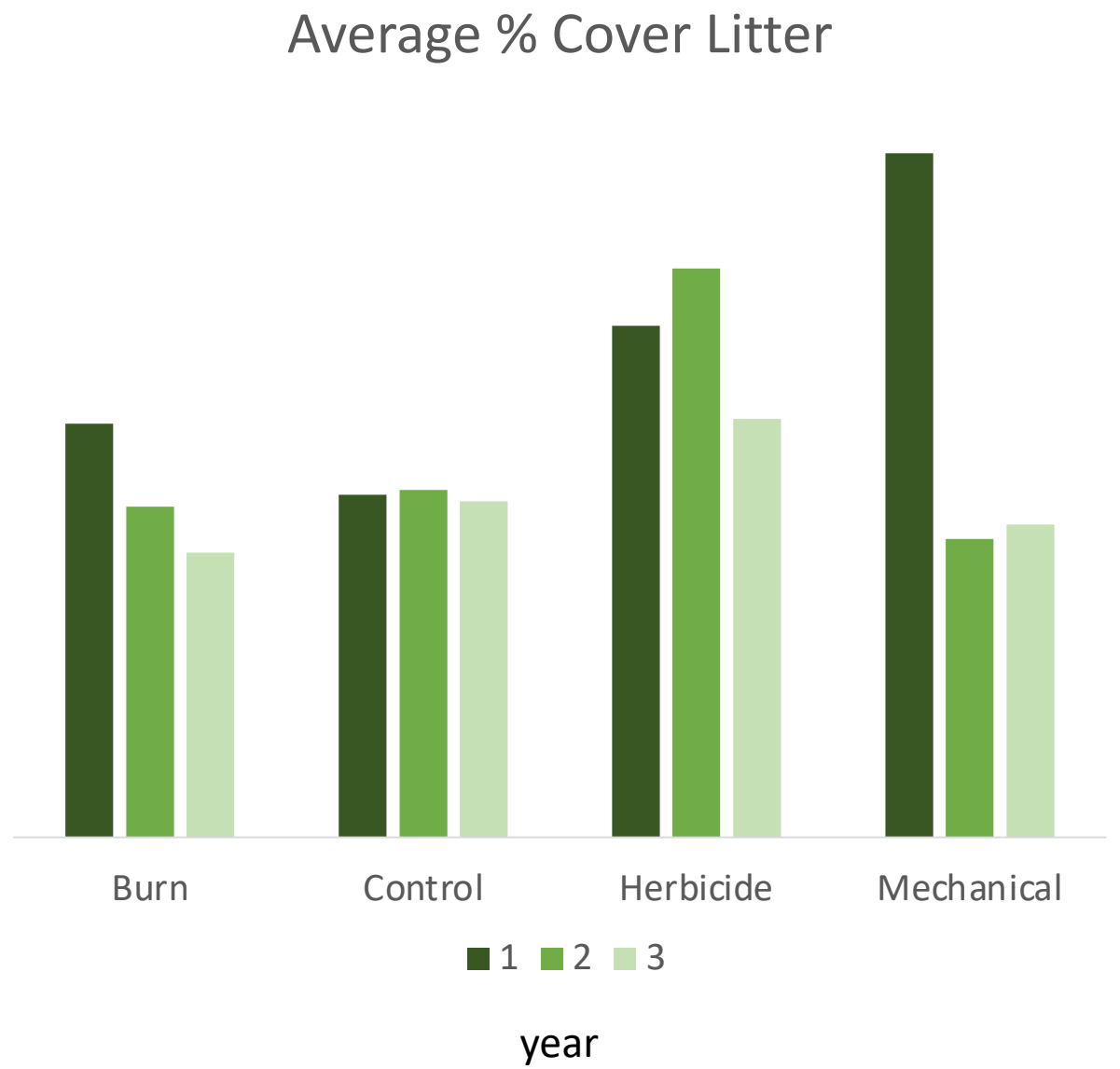


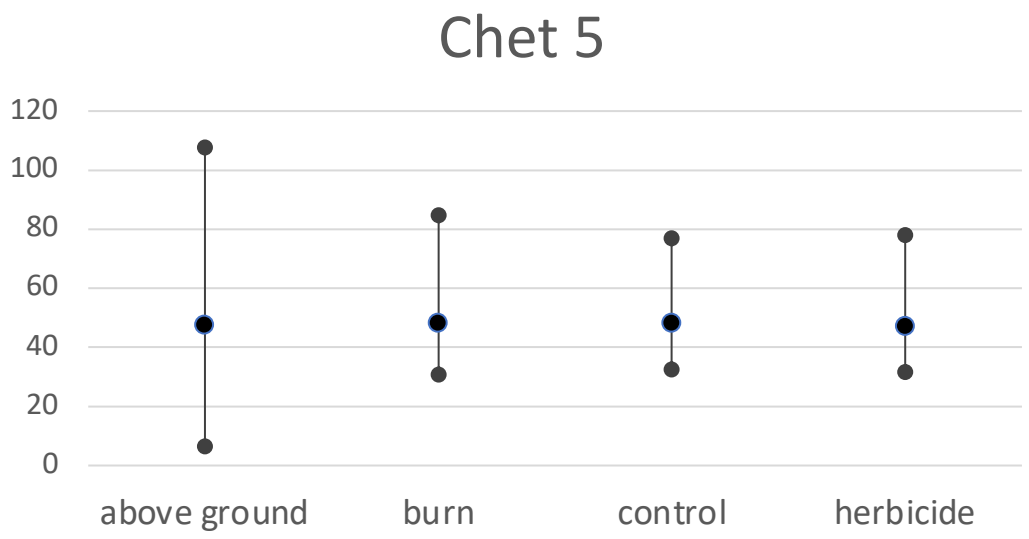


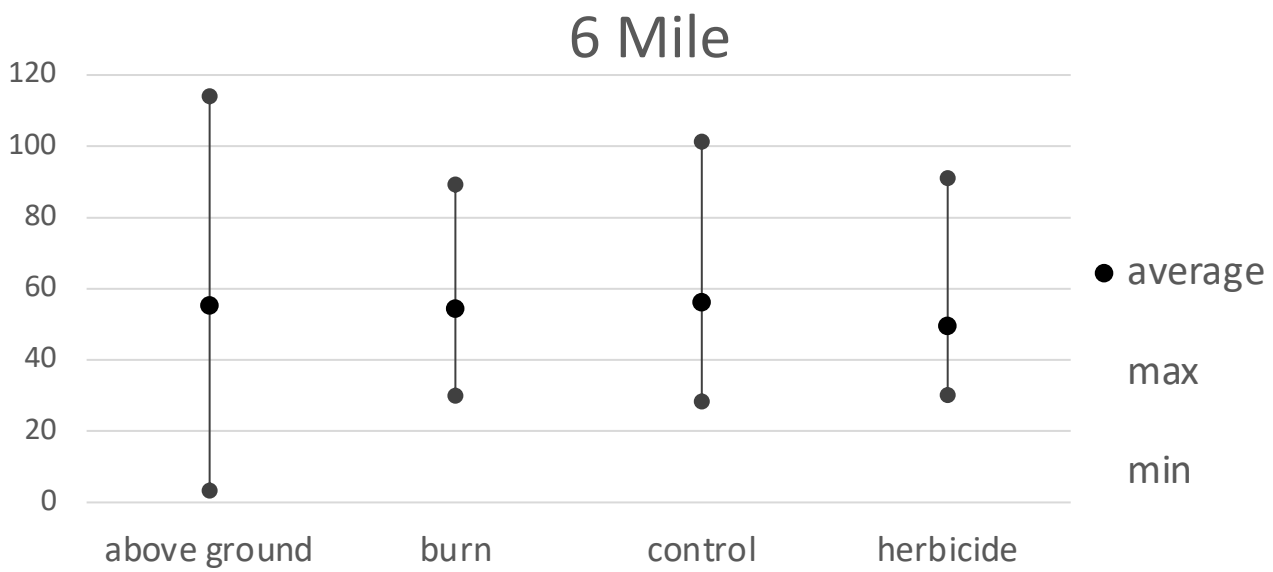
Soils Temperature and Sub Straight

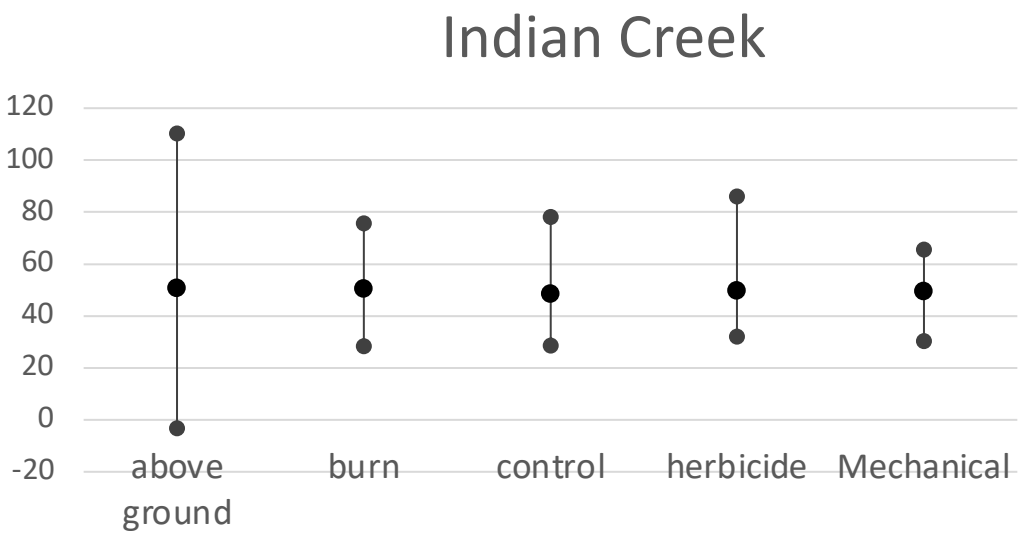
Sub Straight Cover







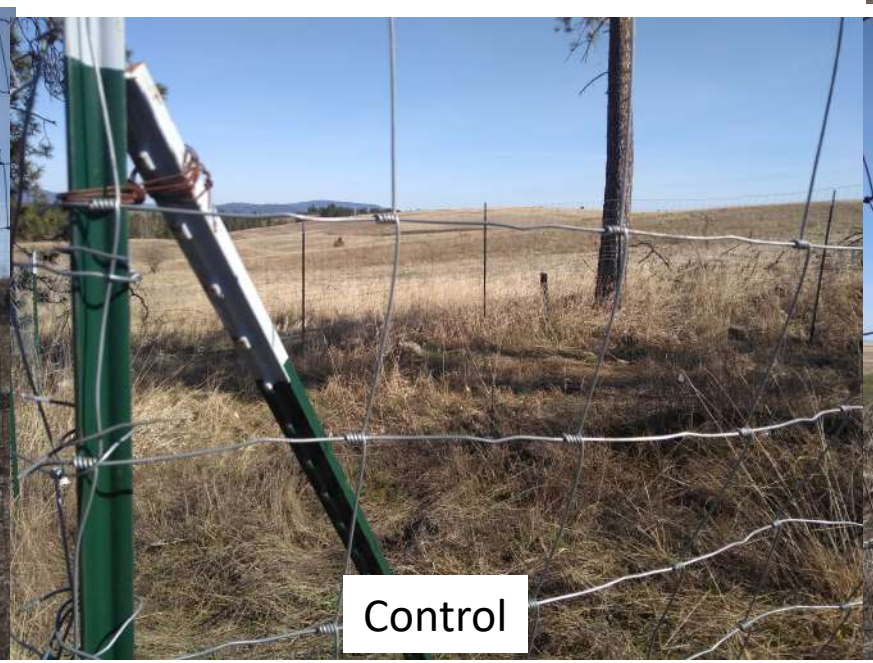




Average, High and Low Temperature per Treatment

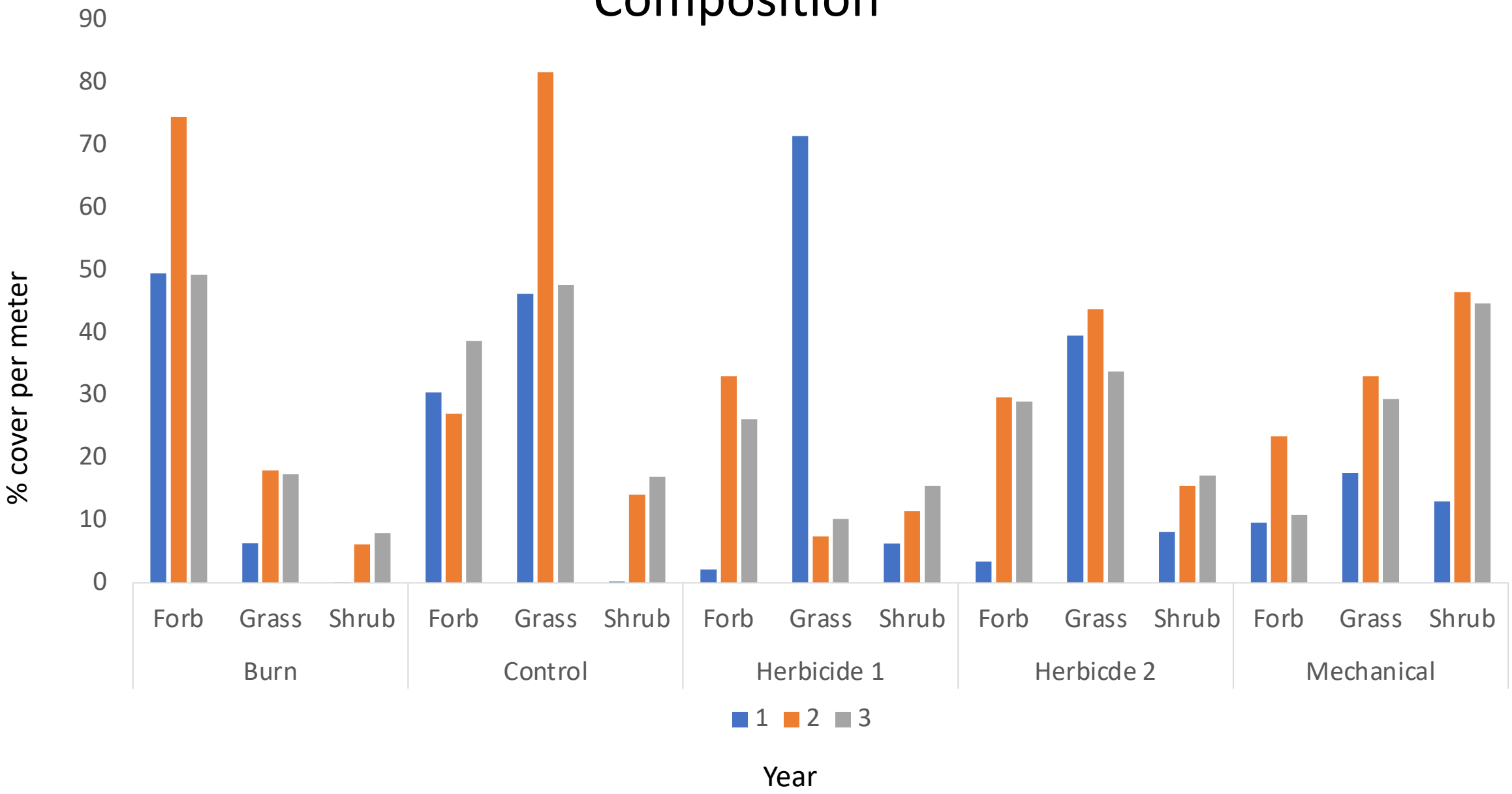
6/19-9/20

Average Vegetation % Cover



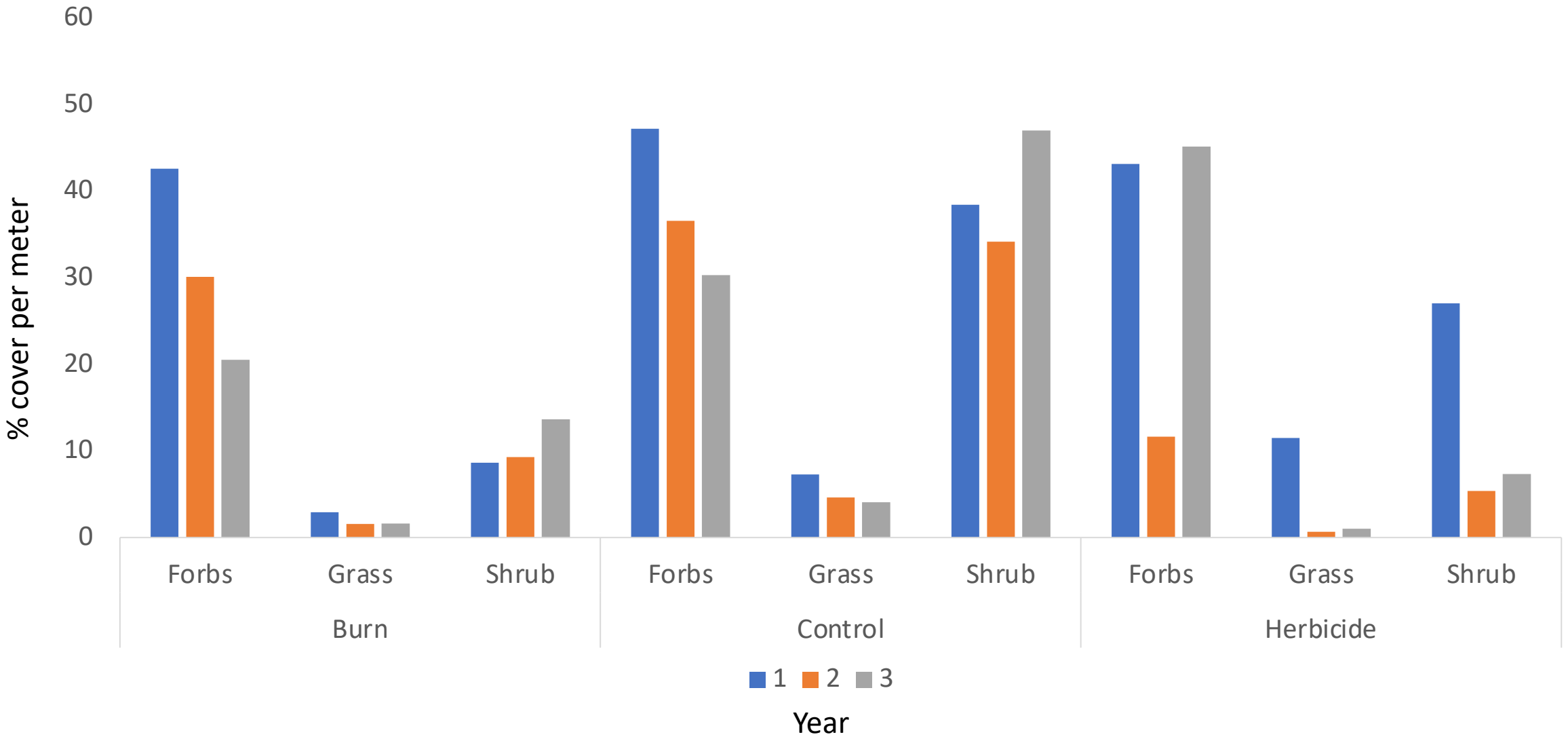
A567 Herbivory Exclusion and Open Plots 2020

A567 Vegetation Composition



Chet 5 Treatments with Herbivory Open and Excluding Herbivory 2020

Chet5 Vegetation Composition



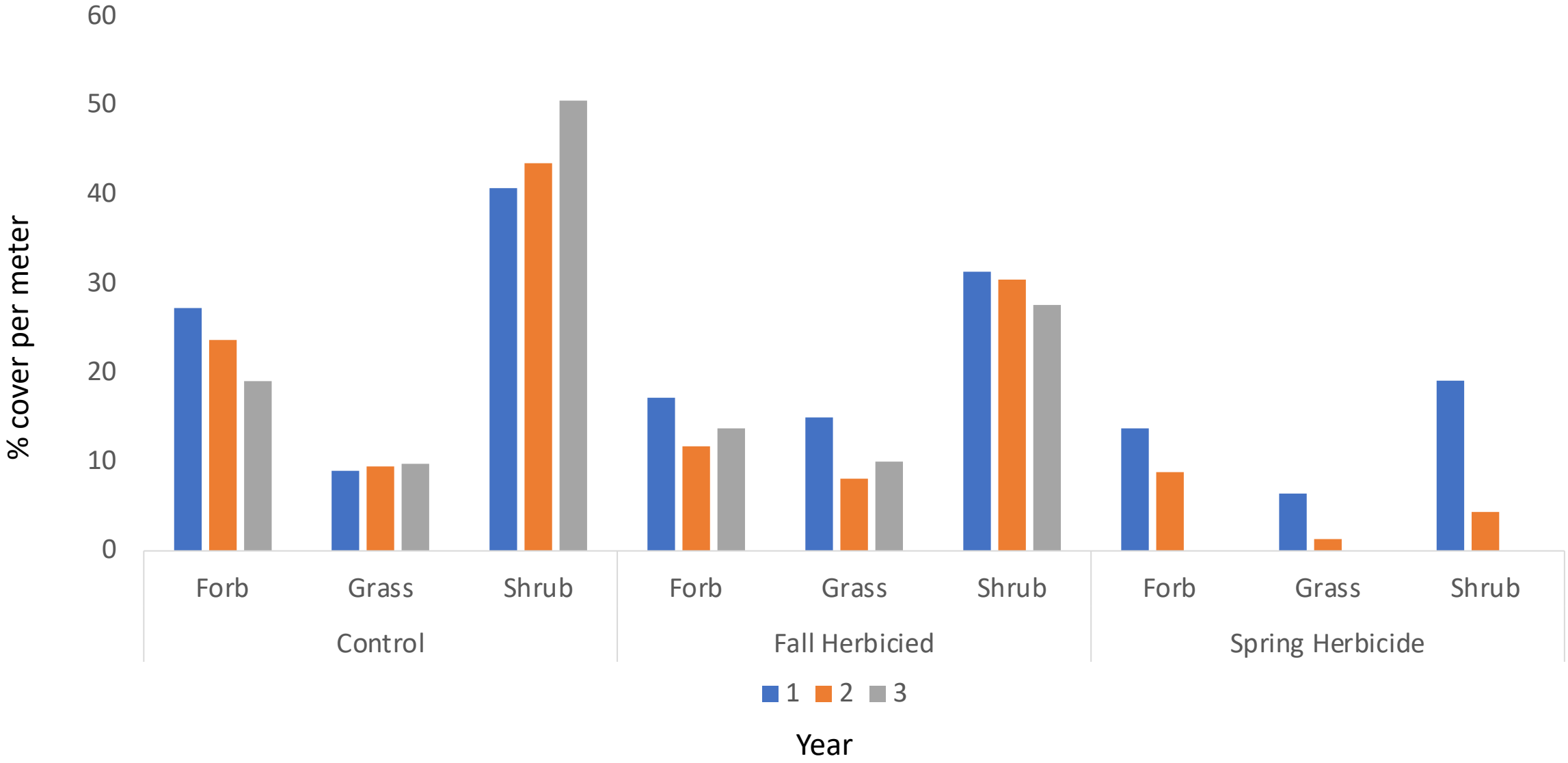
Fall Herbicide

Control

Spring Herbicide

Lynx Creek Treatments with Open vs Excluding Herbivory 2020

Lynx Creek Vegetation Composition



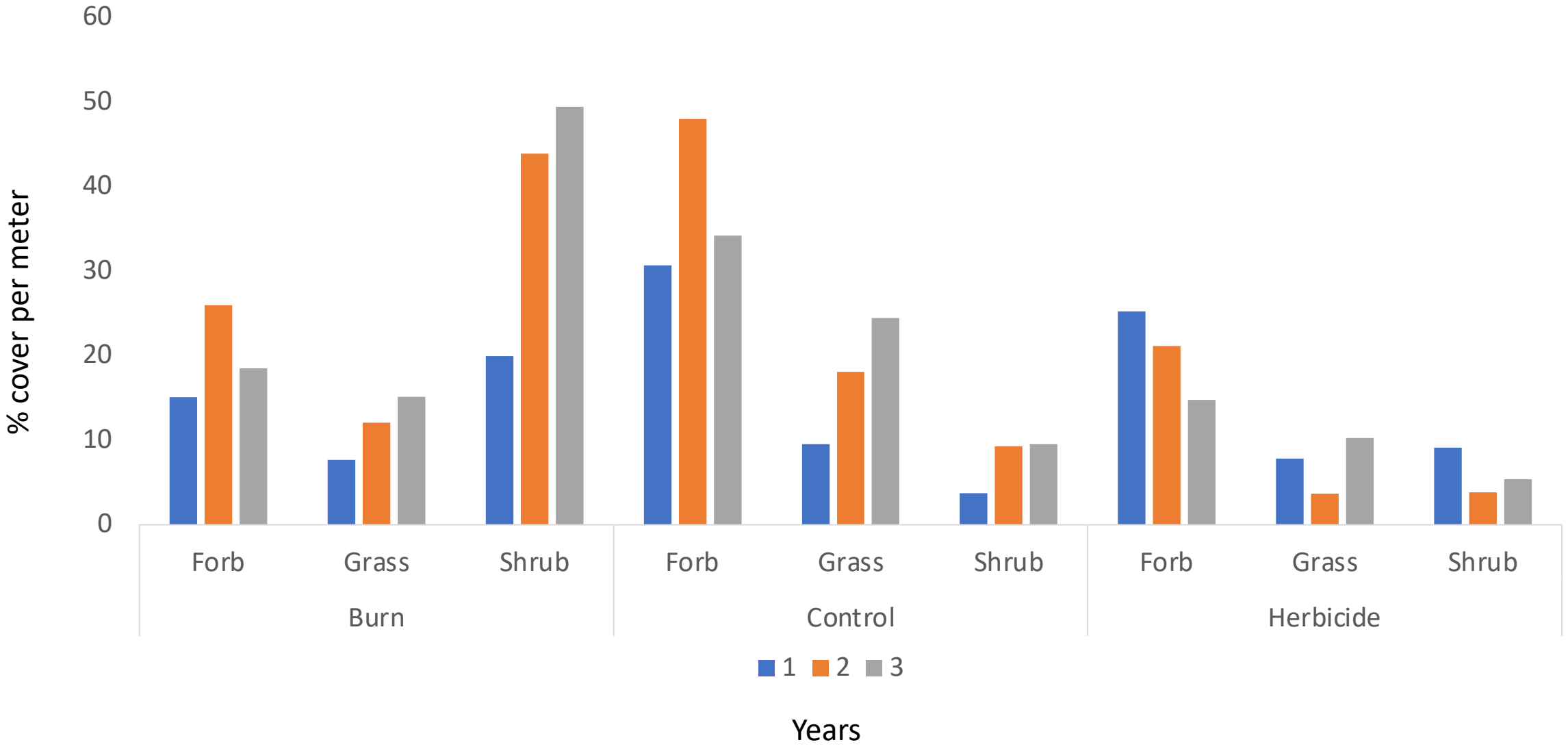
Herbicide

Control

Burn

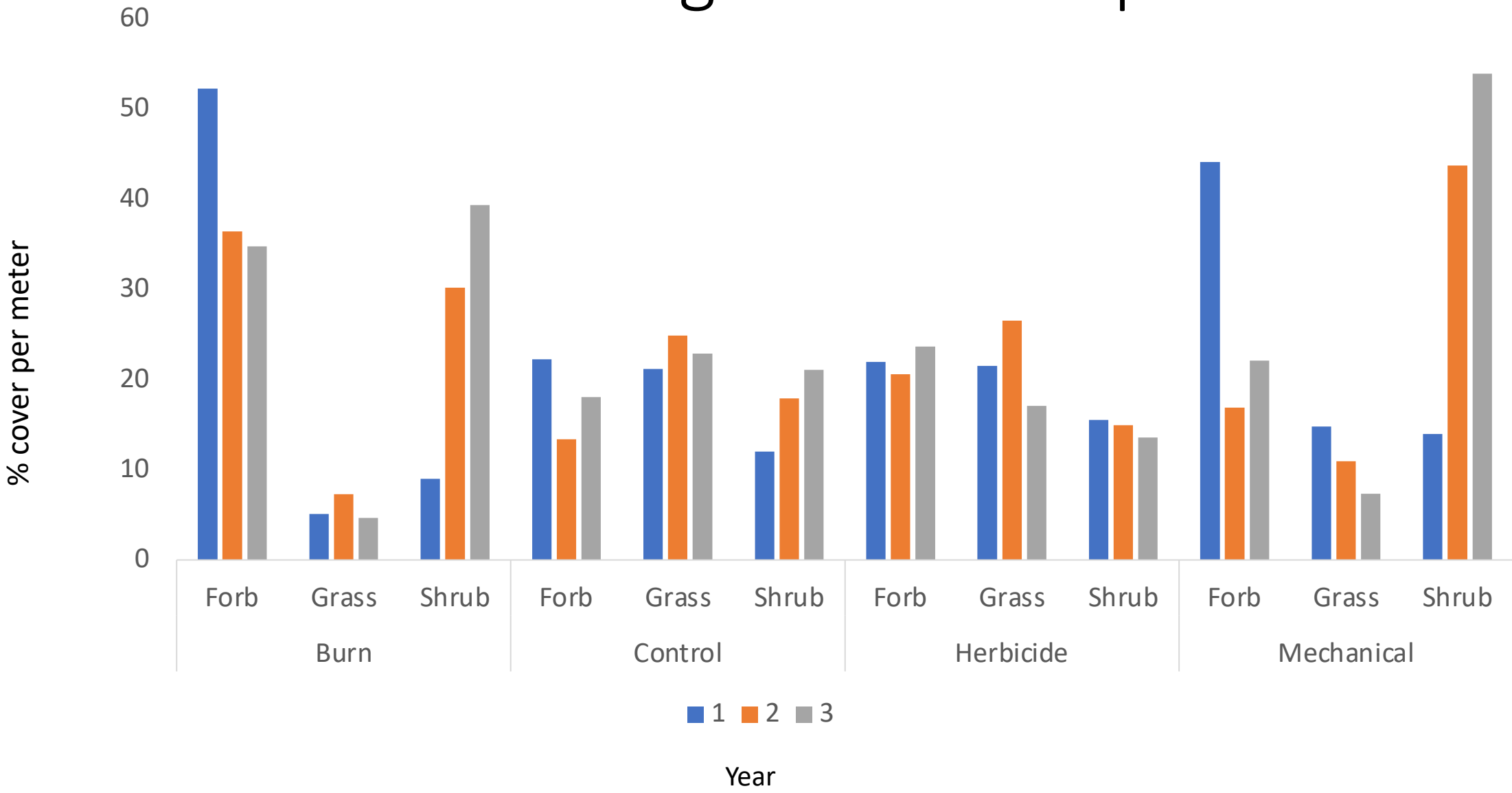
6 Mile Treatments with Open vs Exclusion Herbivore 2020

6 Mile Vegetation Composition

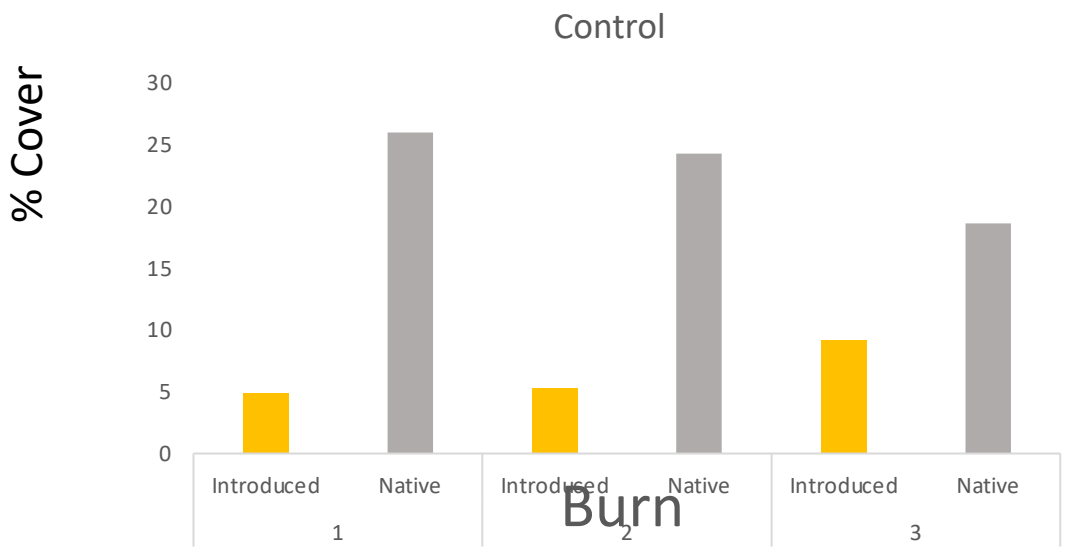


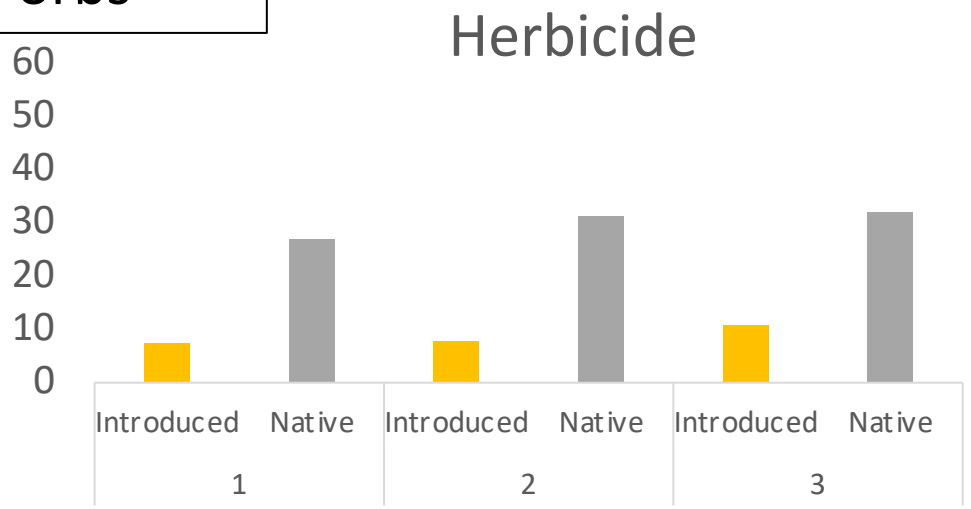
Indian Creek Herbivory Open and Excluding Herbivory Treatments 2020

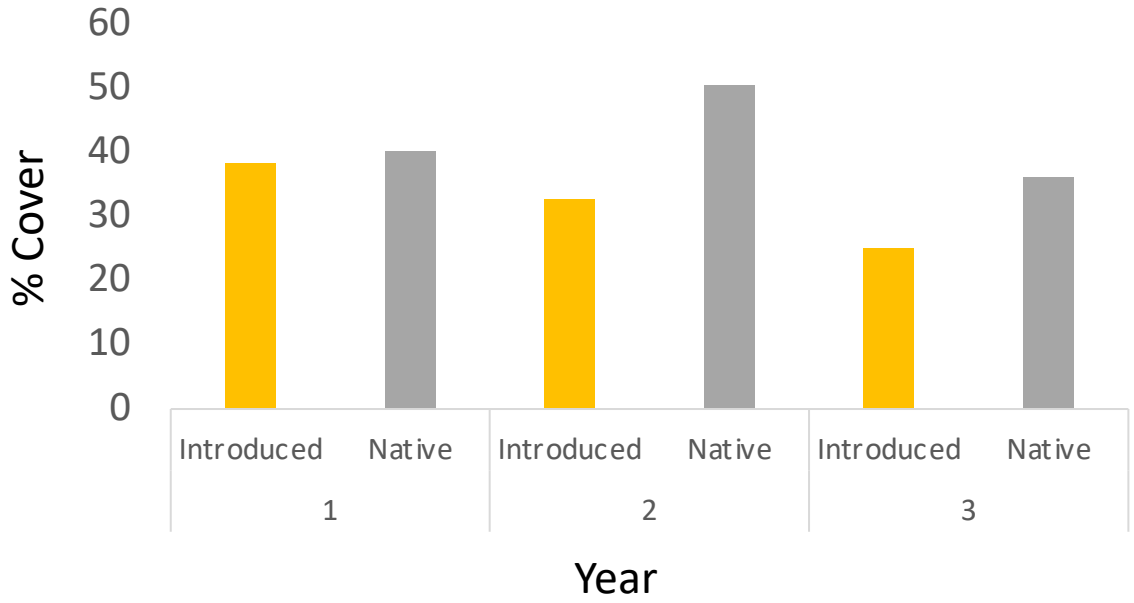
Indian Creek Vegetation Composition

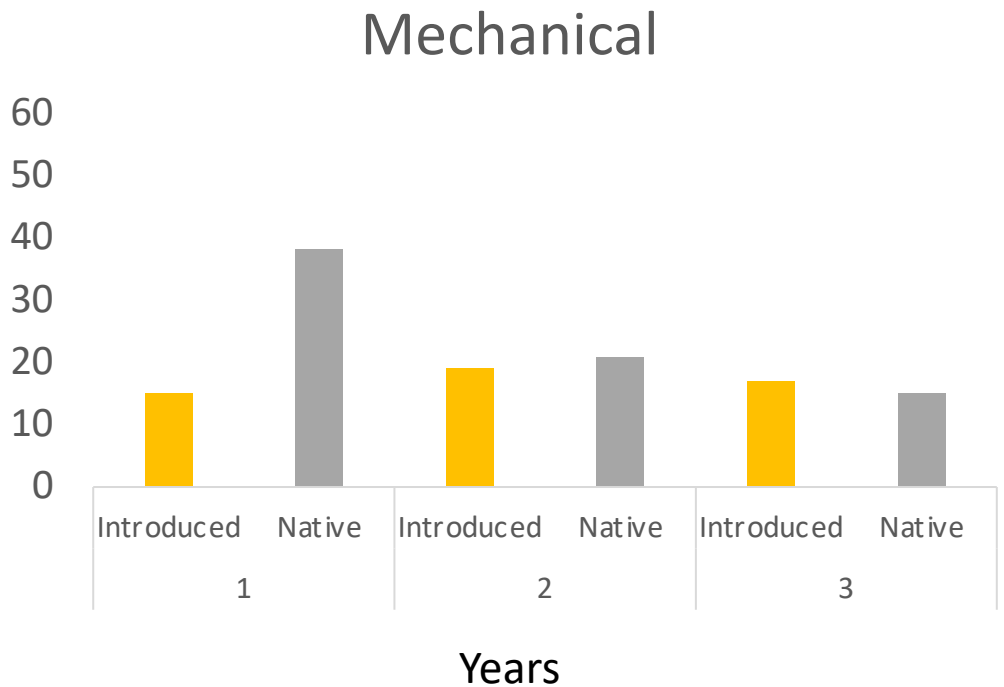


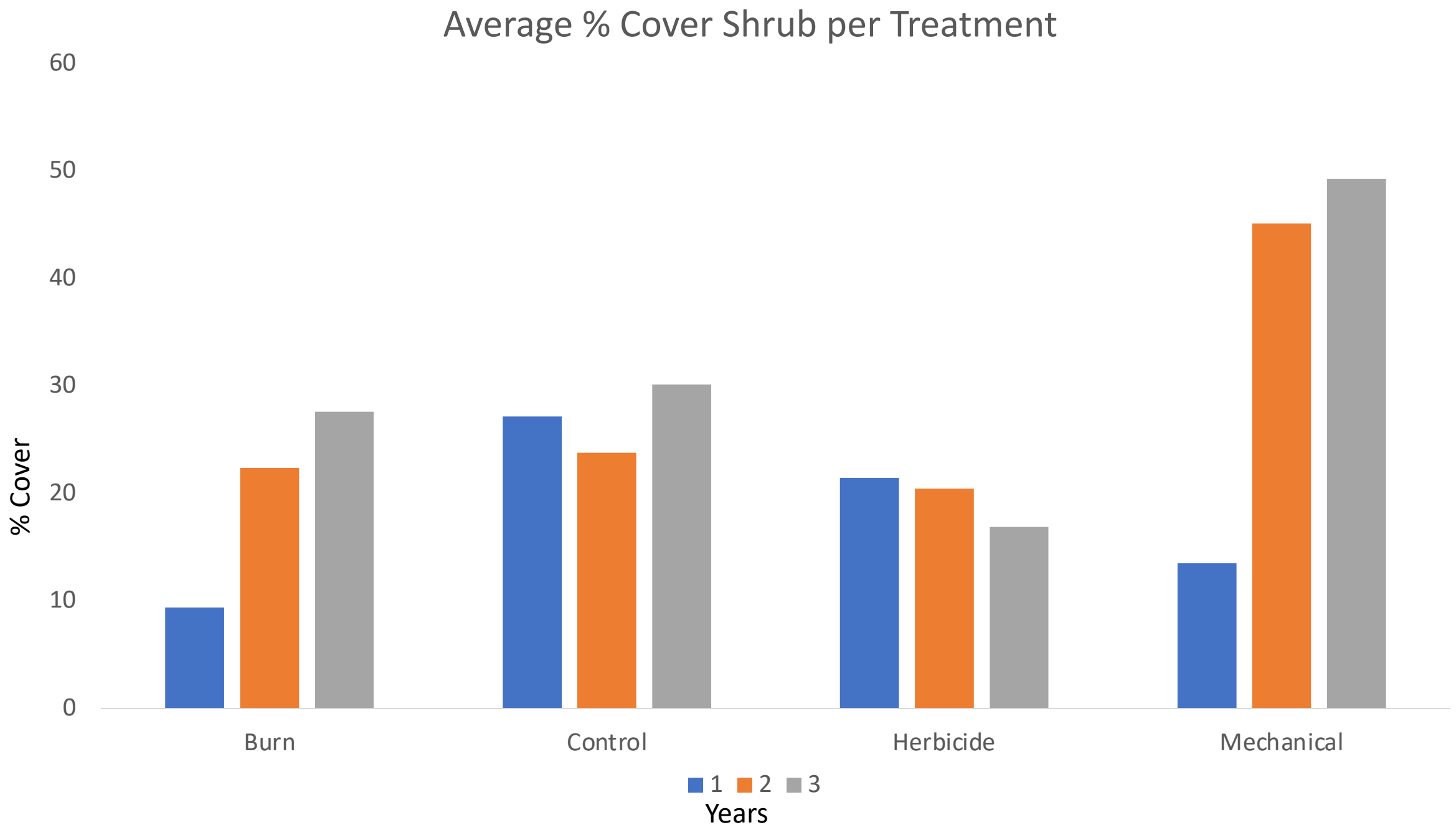
Average % Cover by Treatment
Native & Introduced Forbs



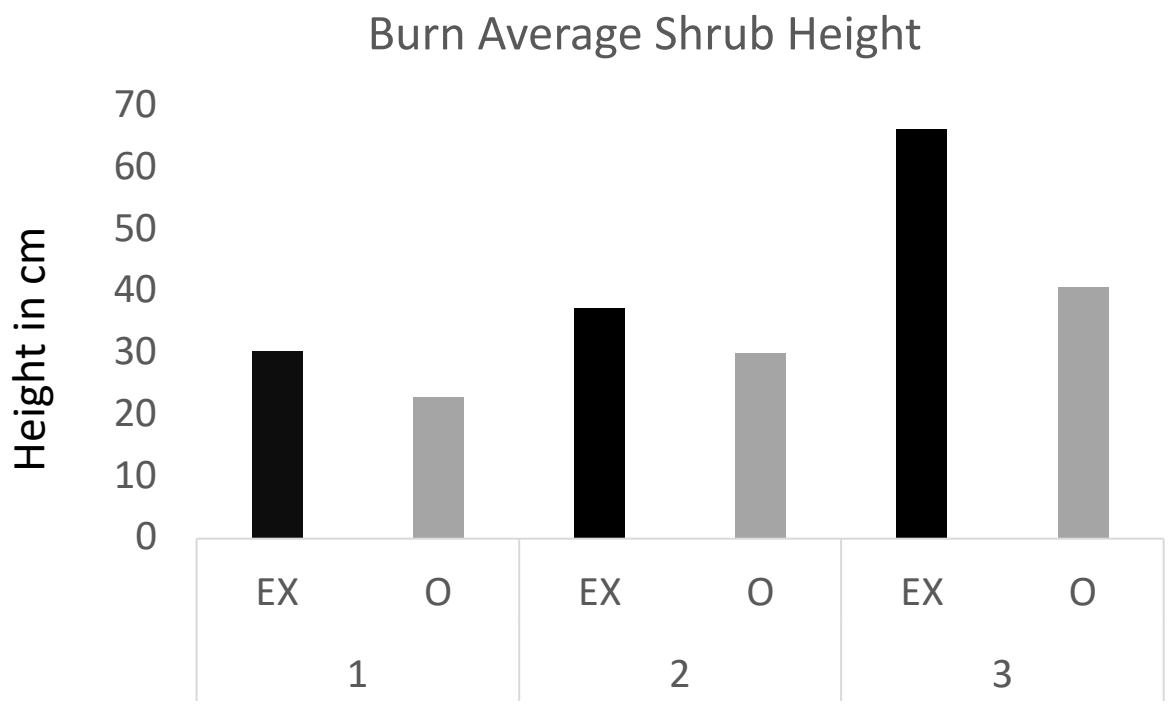


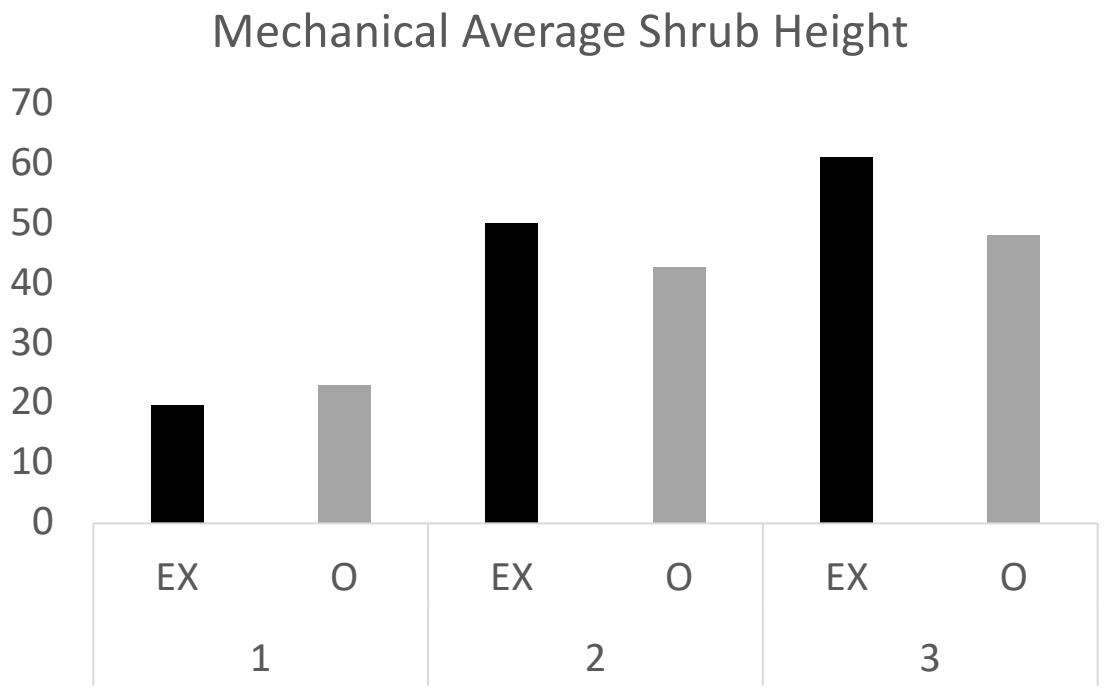


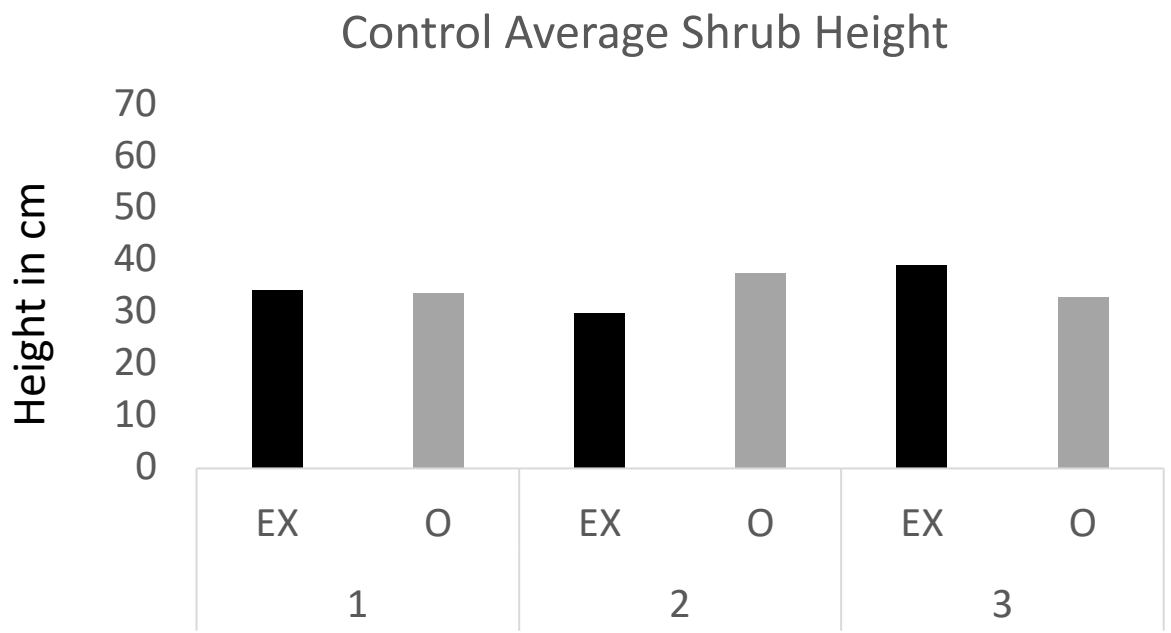


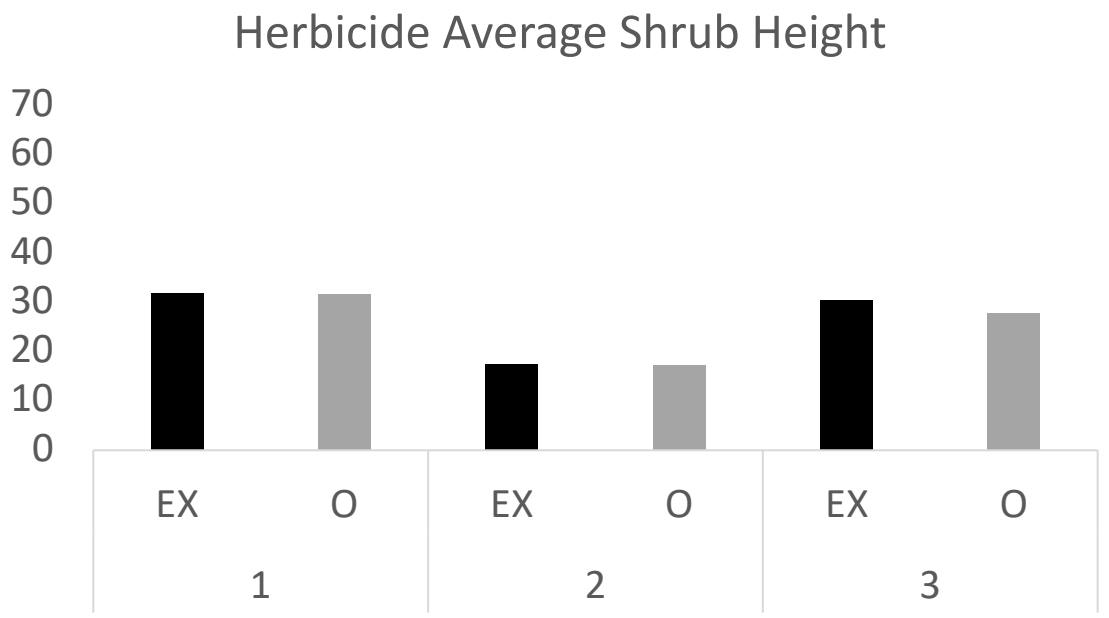

Average % Cover Shrub per Treatment
60
50
40
30
20
10
0
% Cover
Burn
Control
Herbicide
Mechanical
1
2
3
Years

Shrub Height Open vs Exclusion Herbivory

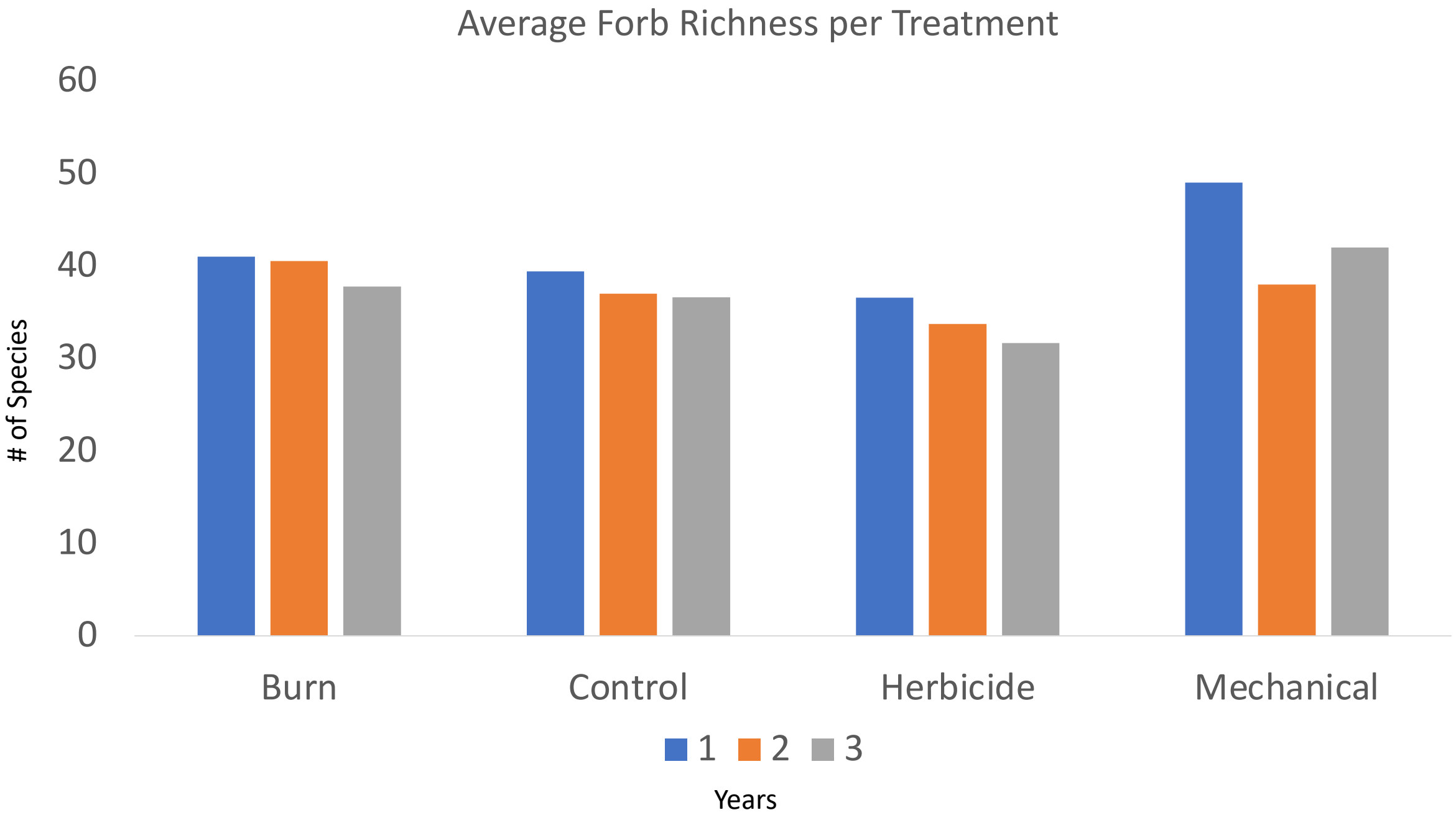

Burn Average Shrub Height
Height in cm
70
60
50
40
30
20
10
0
EX
O
EX
O
EX
O
1
2
3

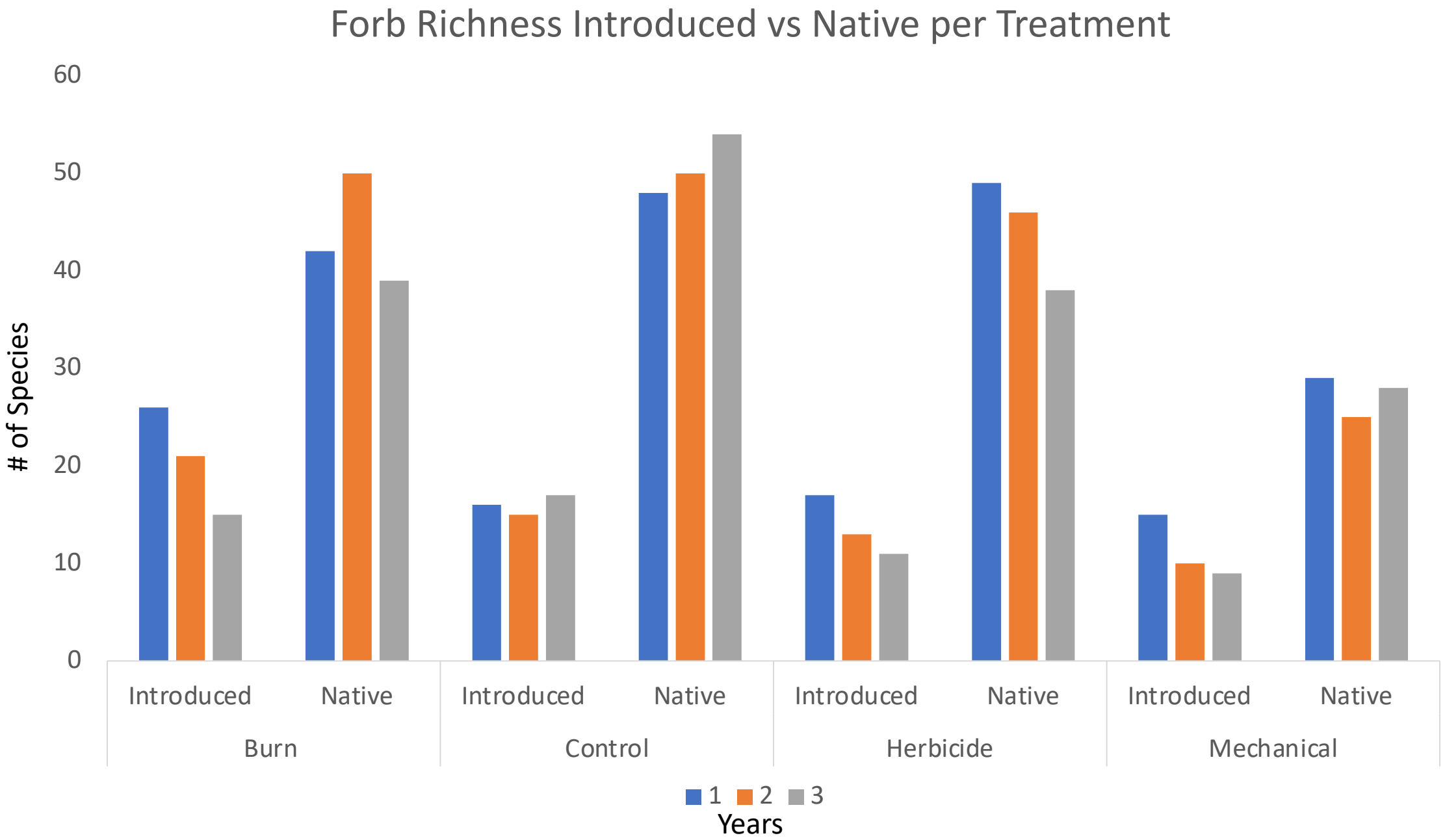

Mechanical Average Shrub Height
70
60
50
40
30
20
10
0
EX
O
EX
O
EX
O
1
2
3

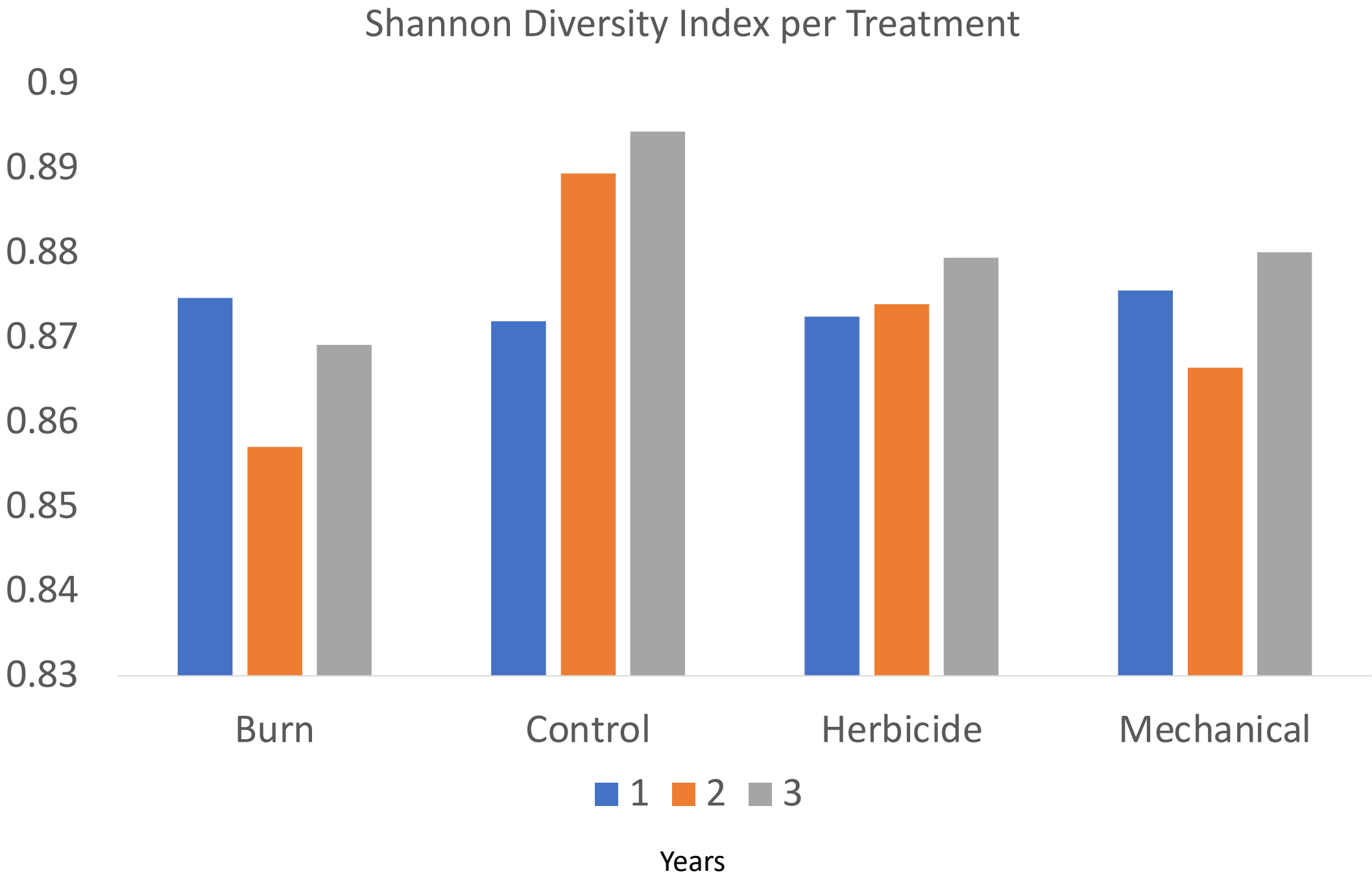

Control Average Shrub Height
Height in cm
70
60
50
40
30
20
10
0
EX
O
EX
O
EX
O
1
2
3


Herbicide Average Shrub Height
70
60
50
40
30
20
10
0
EX
O
EX
O
EX
O
1
2
3

Richness & Diversity


Average Forb Richness per Treatment
60
50
40
30
20
10
0
# of Species
Burn
Control
Herbicide
Mechanical
1
2
3
Years


Forb Richness Introduced vs Native per Treatment
60
50
40
30
20
10
0
# of Species
Introduced
Native
Introduced
Native
Introduced
Native
Introduced
Native
Burn
Control
Herbicide
Mechanical
1
2
3
Years


Shannon Diversity Index per Treatment
0.9
0.89
0.88
0.87
0.86
0.85
0.84
0.83
Burn
Control
Herbicide
Mechanical
1
2
3
Years

Game Camera Data: Ungulate Use per Treatment

6 mile Control


07:07PM 03/31/2019


Wildgame
INNOVATIONS
06:45PM 04/08/2019


Wildgame
INNOVATIONS
04:31PM 04/03/2019 0020

CCT 6mi Burn

Indian Creek Herbicide

Indian Creek Herbicide

Lynx Creek Spring Herbicide

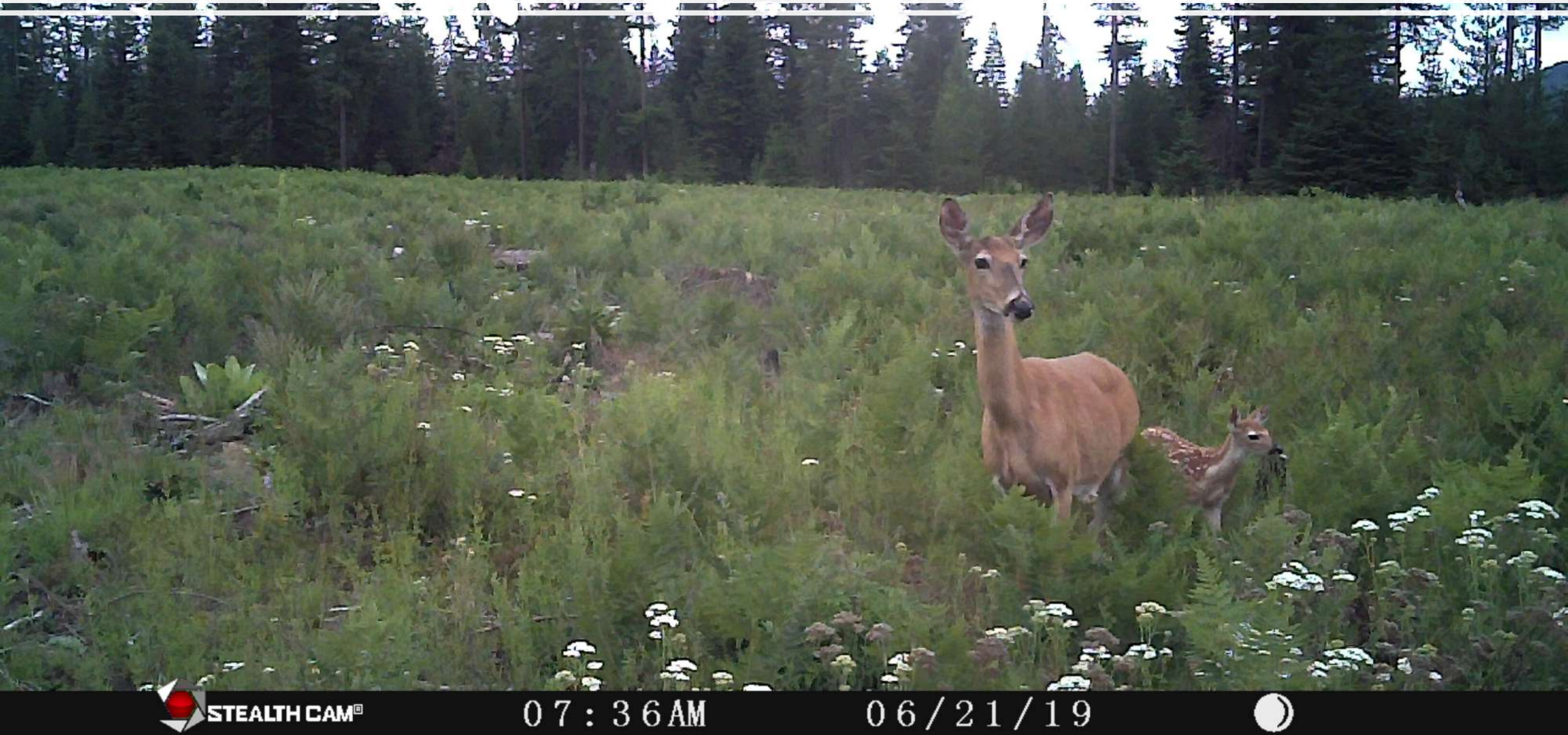
Chet5 Burn

CDA A567 Mechanical


STEALTH CAM®
05:15AM
08/13/19


Wildgame INNOVATIONS
09:29AM 06/14/2019 0104

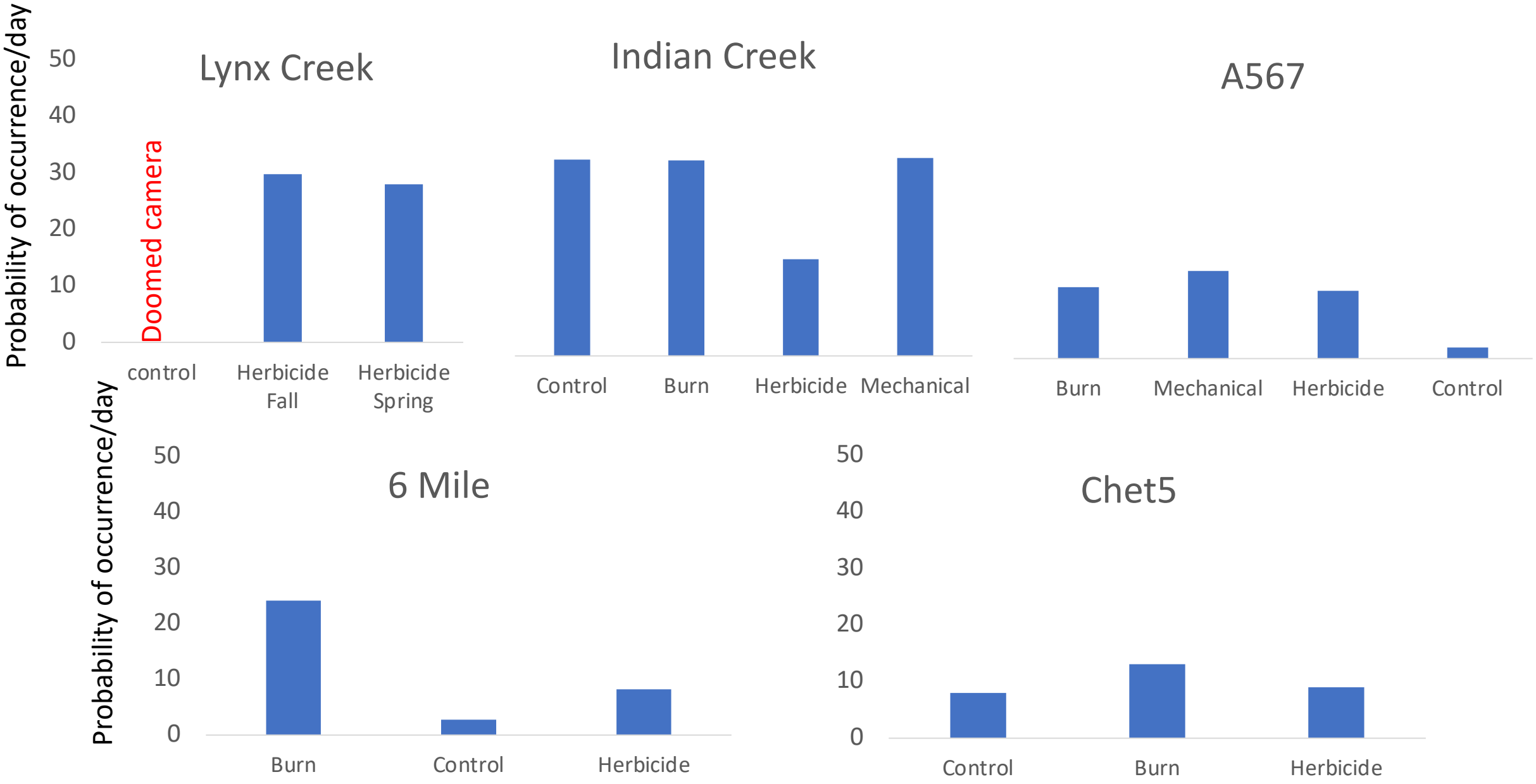
Indian Creek Burn



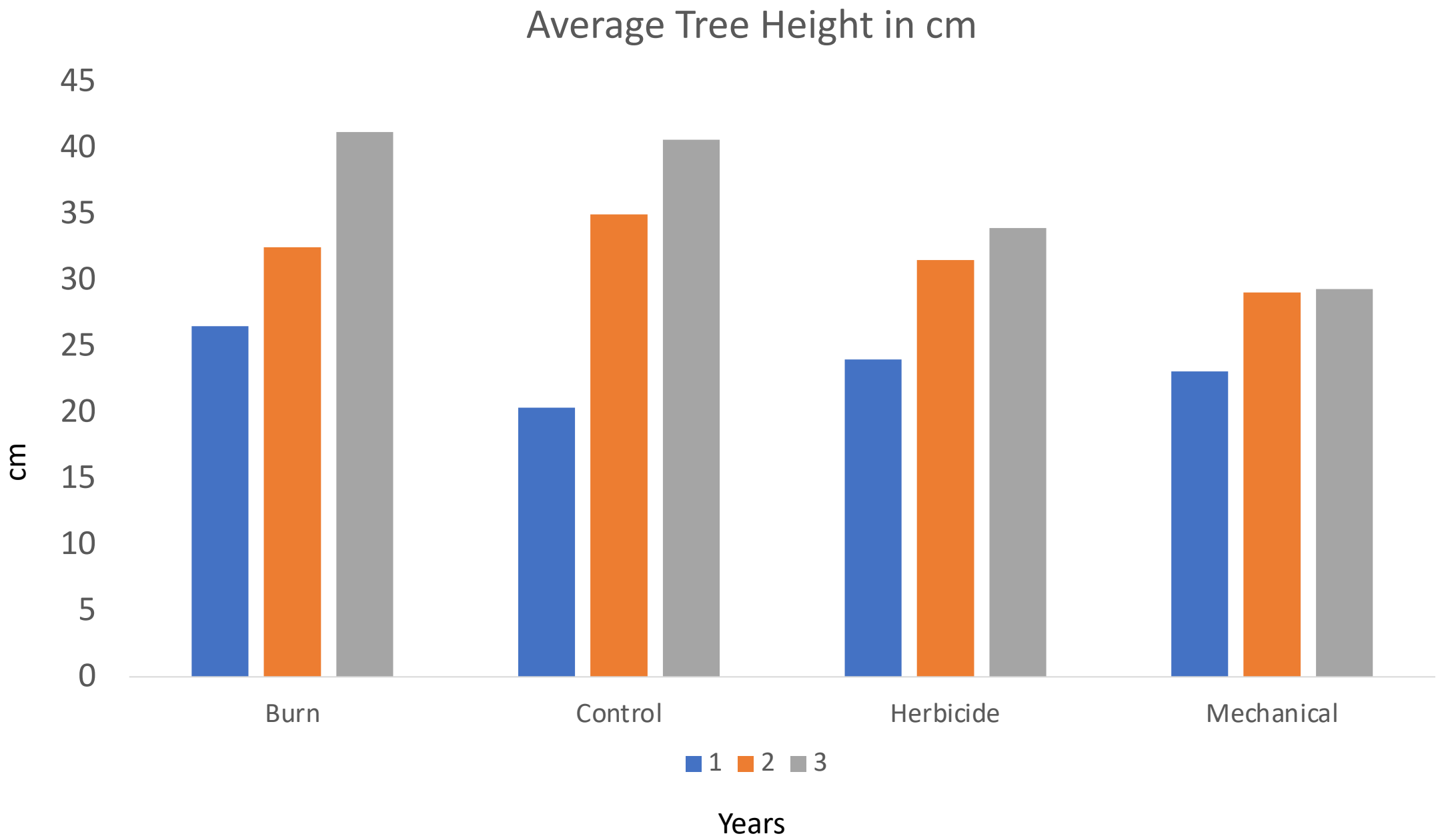
Indian Creek Burn

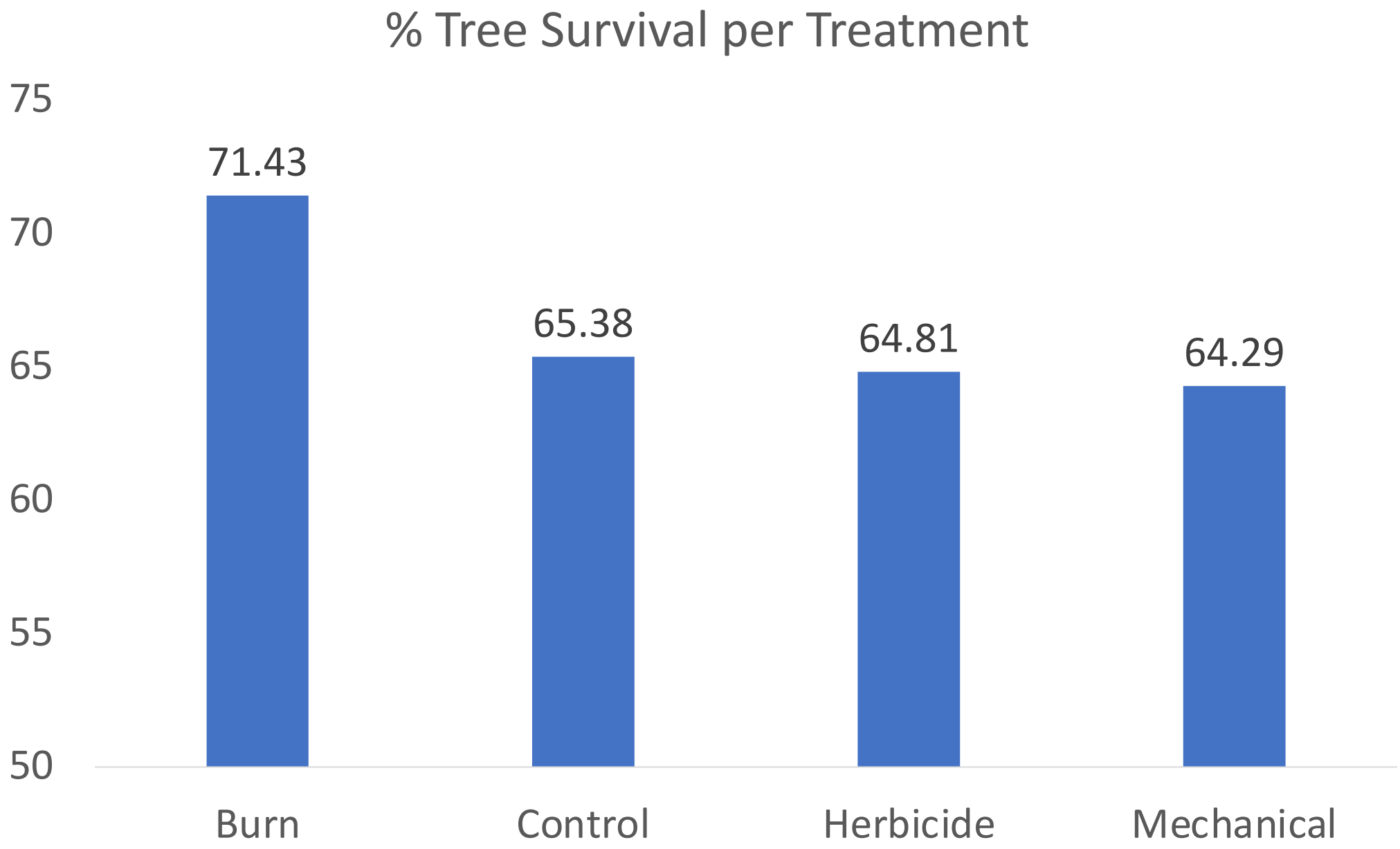
Bears

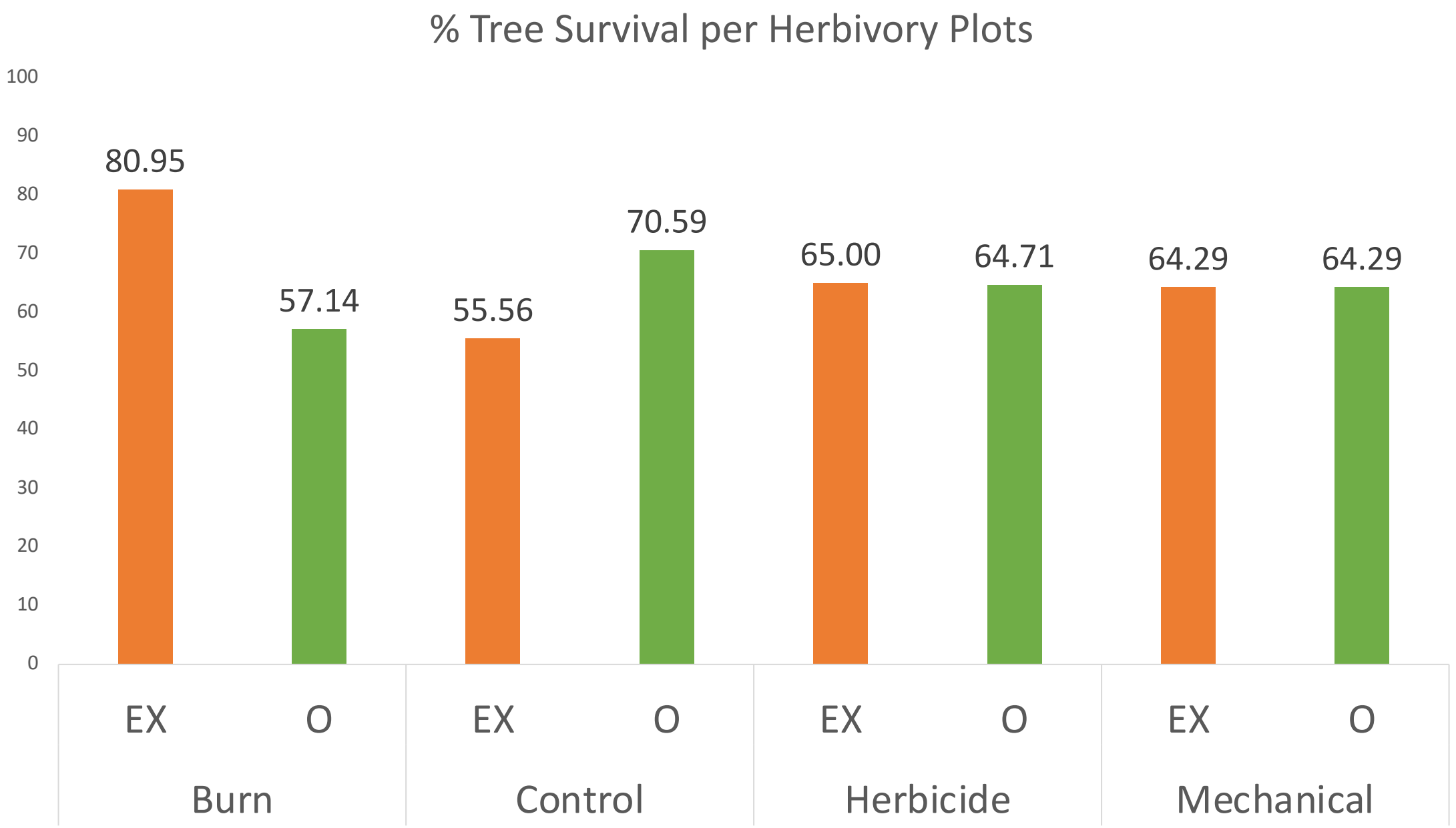
Probability of Ungulate Use



Tree Heights & Survival


Average Tree Height in cm
45
40
35
30
25
20
15
10
5
0
cm
Burn
Control
Herbicide
Mechanical
1
2
3
Years


% Tree Survival per Treatment
75
70
65
60
55
50
71.43
65.38
64.81
64.29
Burn
Control
Herbicide
Mechanical


% Tree Survival per Herbivory Plots
100
90
80
70
60
50
40
30
20
10
0
80.95
57.14
55.56
70.59
65.00
64.71
64.29
64.29
EX
O
EX
O
EX
O
EX
O
Burn
Control
Herbicide
Mechanical

Research

- Highest digestible energy in forbs and deciduous shrubs
  - Cook et al. 2016
- Ungulate rely on disturbance and early seral shrubs and herbaceous
  - Hobbs 1996, Augustine & McNaughton 1998, Ross et al. 2006, Coot et al. 2013
- Early seral communities have highest diversity
  - Halpern & Spies 1995
- Decline in ungulate forage due to fire suppression, decline of federal harvest and intensive management
  - Spies et al. 2017, Swanson et al. 2011, Cook et al. 2016
- 90% of Mule Deer and White Tail Deer diet consist of deciduous shrubs and forbs in Colville NF
  - Berry et al. 2016
- Coastal Range, diverse and abundant forage reduce pressure on any one species including crop trees
  - Stokely et al. 2018
- With out herbicide treatment serial stages can last decades
  - Halpern & Franklin 1990

Study Summary Points

- Industrial sites: after 7 yrs shrub suppression and prevalence of invasive forbs
- Diversity highest in Control treatment
- Native forbs cover generally high across treatments
- Shrub cover increasing at Burn and Mechanical, decreasing at Herbicide
- Shrub height greatest in Mechanical and Burn
- Ungulate use highest at non Herbicide treatments
- Tree survival and height highest in Burn treatment

Thank You

<u>Fencing Building:</u>
Marc Gauthier
Devin Sontag
Isaac Harmson

<u>Site Access:</u>
Norris Booth
Tim Larkoski
Matt Berger
Barry Coles
Rich Whitney
Corey Peone

<u>General:</u>
Bob Gilrein
Sam Rushing
Ray Entz
Lori Rothrock
DR Michel

Questions