



# Beyond Aerial Applications

## Alternative Herbicide Application Methods

# Start with the End in Mind

- What is your desired future state?

Conifer plantation

Riparian restoration

Wildlife Recreation Area

What are your constraints?

Time

Budget

Neighbor, Environmental or Other



# What is your current site situation?



Vegetation (Native?  
Invasive? Woody?  
Herbaceous? Seedbank?)



Topography (<50% ; 50-80%;  
>80% benchy or vertical?)



Access (Are there year-round  
roads? Is access seasonal or  
walk-in only?)



Soils (Clay? Sand? Rocky?  
Gravel? Heavy slash?  
Broadcast burned?)



Hydrology (Braided streams?  
High water Table? Perennial?  
Fish? Domestic water  
downstream?)



Climate Zone (Water  
limited/droughty? Rain/fog  
belt? Snow zone? Elevation?)



Wildlife issues (T&E species?  
Heavy browse? Extreme Mt  
beaver?)



Neighbors? Activist Area?



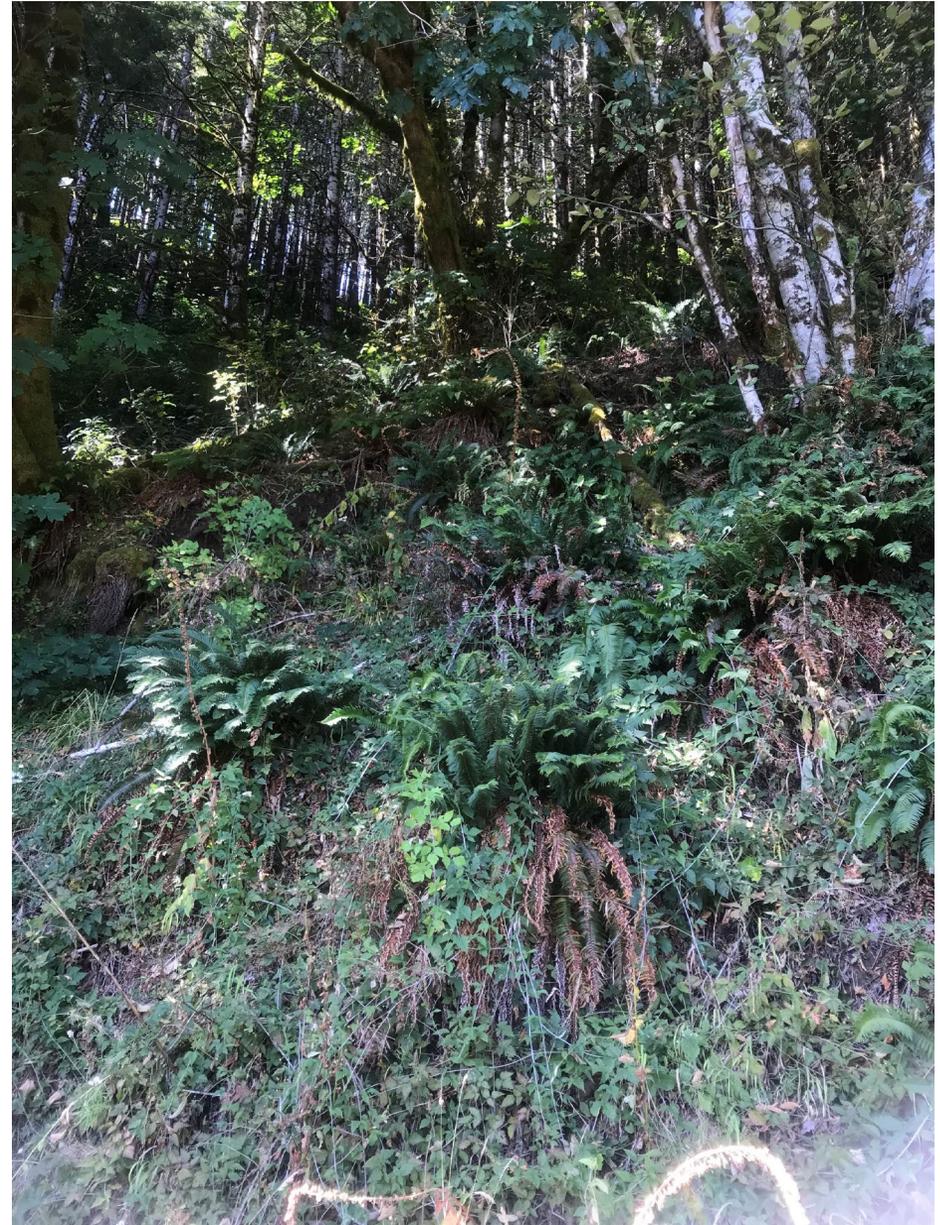
## Prioritize the vegetation you need to manage

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- Is there a woody component that you need to remove to prepare the site? If there is a dense stand, you may not need to site prep.
- **Site Preparation Option #1: no site preparation treatment**

In sites with an unwanted woody component evaluate your options and choose the method that best achieves your target.

Site Preparation Option #2: Pre-harvest vegetation treatment



In sites with good access and potential for woody and herbaceous vegetation competition consider a broadcast tank mix.

Site Preparation Option #3:  
Backpack spray of woody and herbaceous with pre-germinant batch tank mix.



# Does a pre-germinant make sense?

Site Preparation Option #4:  
broadcast of pre-germinant/  
herbaceous treatment only.



No spray stand 2  
years after planting  
(4 ft tall) in area  
with dense conifer  
preharvest canopy

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Release Option 1: No herbaceous  
treatment.



# Herbaceous Release Spray

Release Option #2: Spot or  
broadcast herbaceous spray.





# Hardwood Release

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Release Option #3: Hardwood Hack, Spray or Slashing



# Invasive Species

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Release Option #4: Invasive species spray



# Know your Toolbox

For Pre-germination : Sulfometuron Methyl; Metsulfuron Methyl; Indaziflam; Aminopyralid; Atrazine; Hexazinone

For site prep and dormant release:  
Glyphosate; Imazapyr; Triclopyr; 2,4-D,  
Fluroxypyr

For release during active tree growth:  
Clopyralid

# Personal Protective Equipment



MINIMUM : LONG SLEEVE SHIRT AND LONG PANTS OR COVERALLS WITH SHOES AND SOCKS



MOST: CHEMICAL RESISTANT GLOVES THAT ARE WATERPROOF



SOME: PROTECTIVE EYEWEAR



A FEW: - CHEMICAL RESISTANT APRON FOR MIXING AND LOADING; GOGGLES OR FACESHIELD



ALWAYS – CHECK YOUR PPE PRIOR TO USE AND REMOVE AND CLEAN OR REPLACE AFTER USE.

# Technology and the Future View : Drones; Autonomous Robots; Using APPS



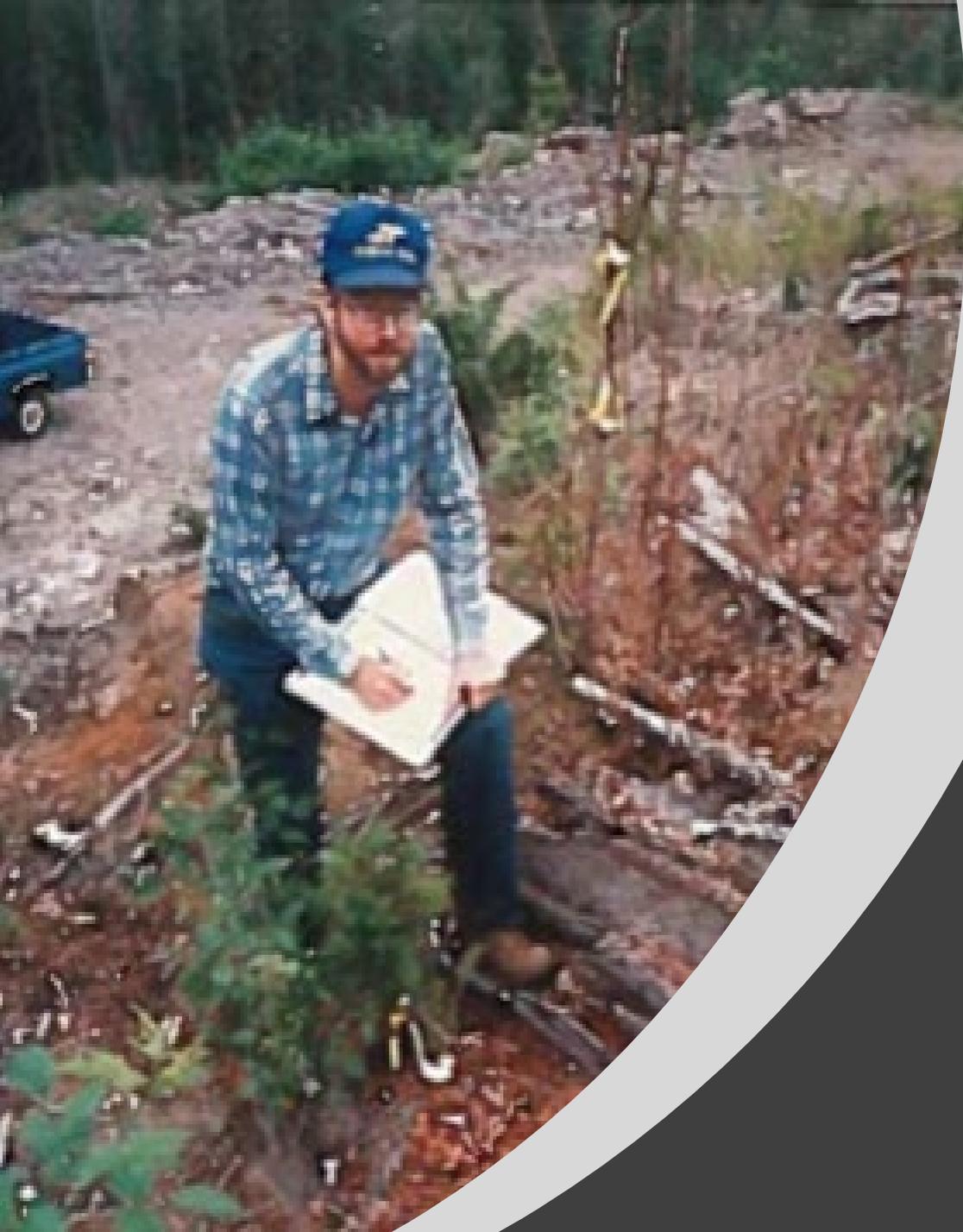
Precision spraying - Autonomous robot for agriculture  
<https://ecorobotix.com/en/>



Mechanical Weeding – autonomous robot for agriculture  
<https://farmwise.io>



Laser and Electric weed control  
<https://www.escarda.eu/technology/>



## Summary :

- \* Identify your objectives and constraints
- \* Prioritize your treatment needs: woody /herbaceous /invasive
- \* Evaluate timing and prescription choices and select one or more option
- \* Know your chemicals and required PPE
- \* Check for new tools and technology
- \* Check results and learn from your experiences