



# Tradeoffs Between Intensive Forest Management, Early Seral Vegetation and Cervid Foraging: Herbicides and Herbivores

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# Plantations to fulfill global demand of wood





Early seral competition



Big bad big leaf maple



Herbicides

Free-to-grow



# Implications?







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# Primary Questions

- How does herbicide application influence forage availability and early seral plant diversity?
- Does herbivory exacerbate the effects of herbicides?
- How does altered forage availability influence seedling browse damage and growth?
- Does herbicide application influence plantation utilization, and foraging behavior by deer and elk?

# INTENSIVE FOREST MANAGEMENT STUDY BLOCK LOCATIONS

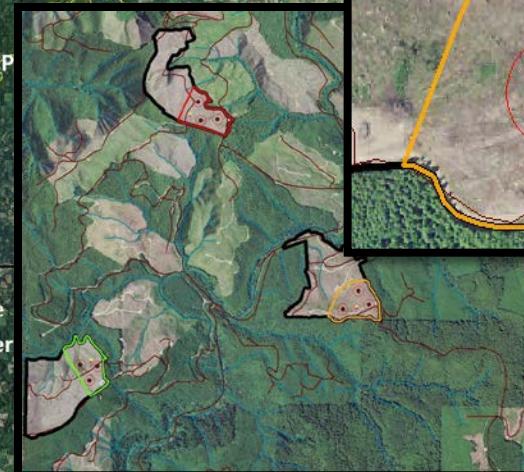
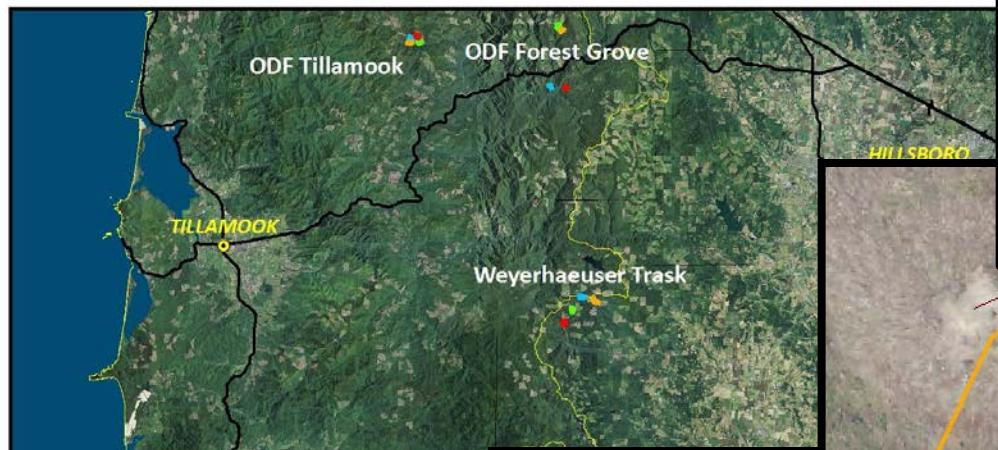
Scale = 1:500,000

0 5 10 20

30 Miles



- City or town
- Highway
- Coast Range crest
- Pacific Ocean
- Treatment
  - Control
  - Light Intermediate
  - Heavy Intermediate
  - Intensive

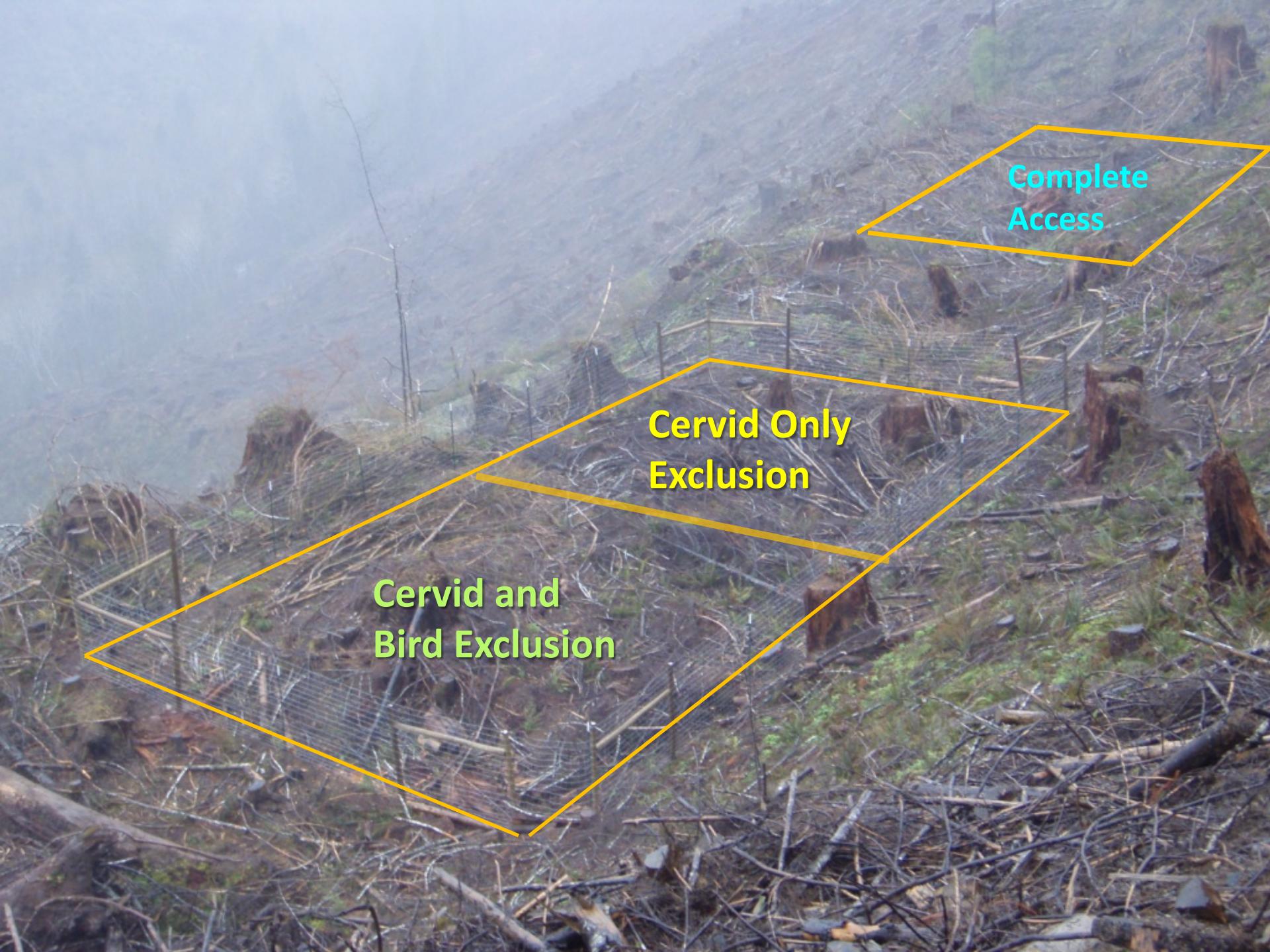


2011-2012:  
Exclosures constructed;  
Data collected;  
Herbicides treatments  
continue

2011: Seedlings planted, herbicide application commenced

2009: Units harvested,  
blocks set up.



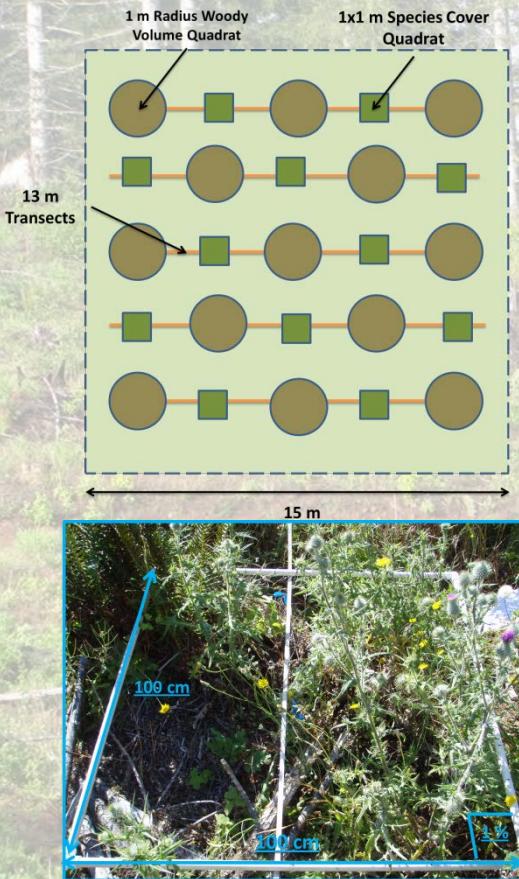


**Complete  
Access**

**Cervid Only  
Exclusion**

**Cervid and  
Bird Exclusion**

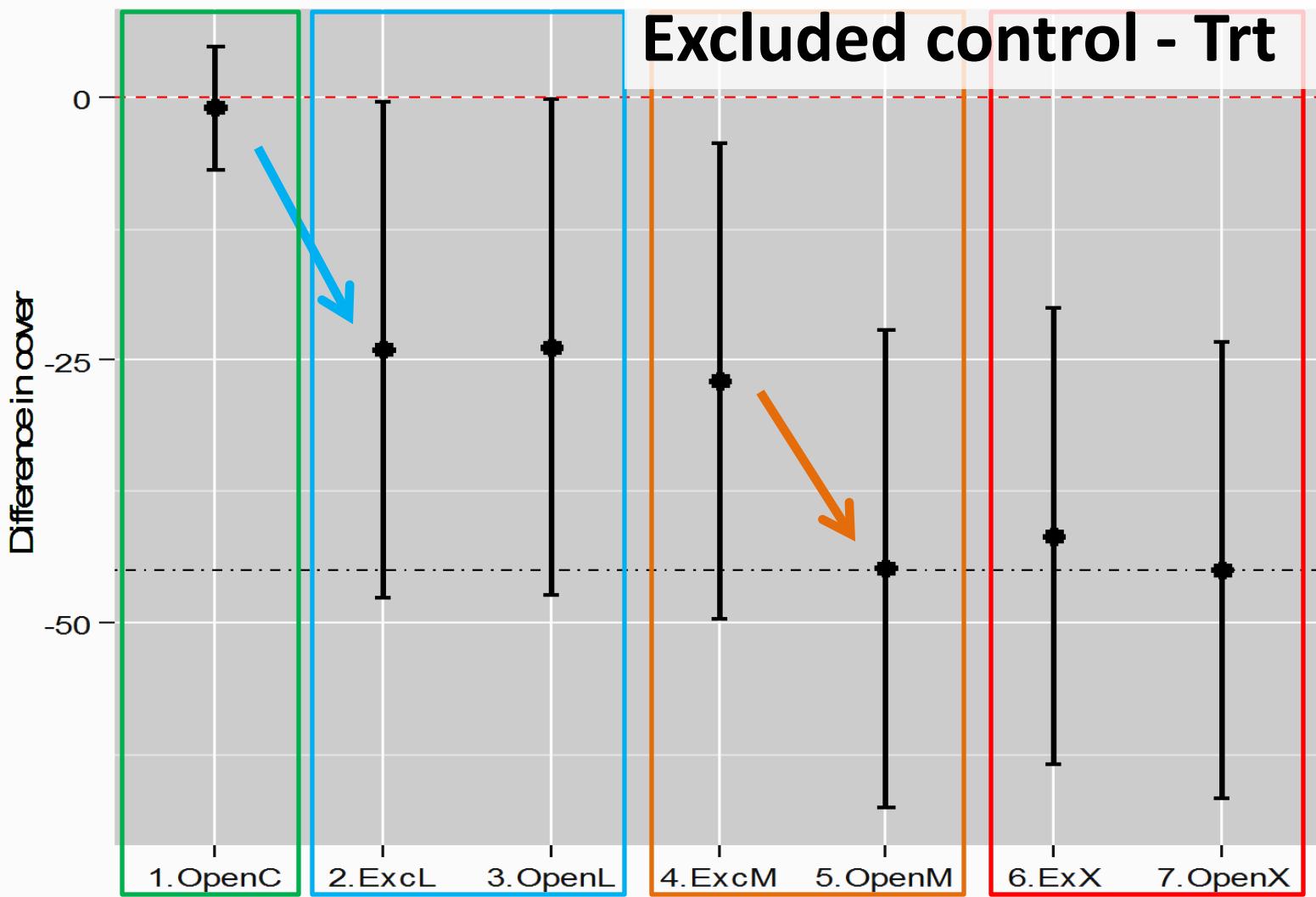
# Methods



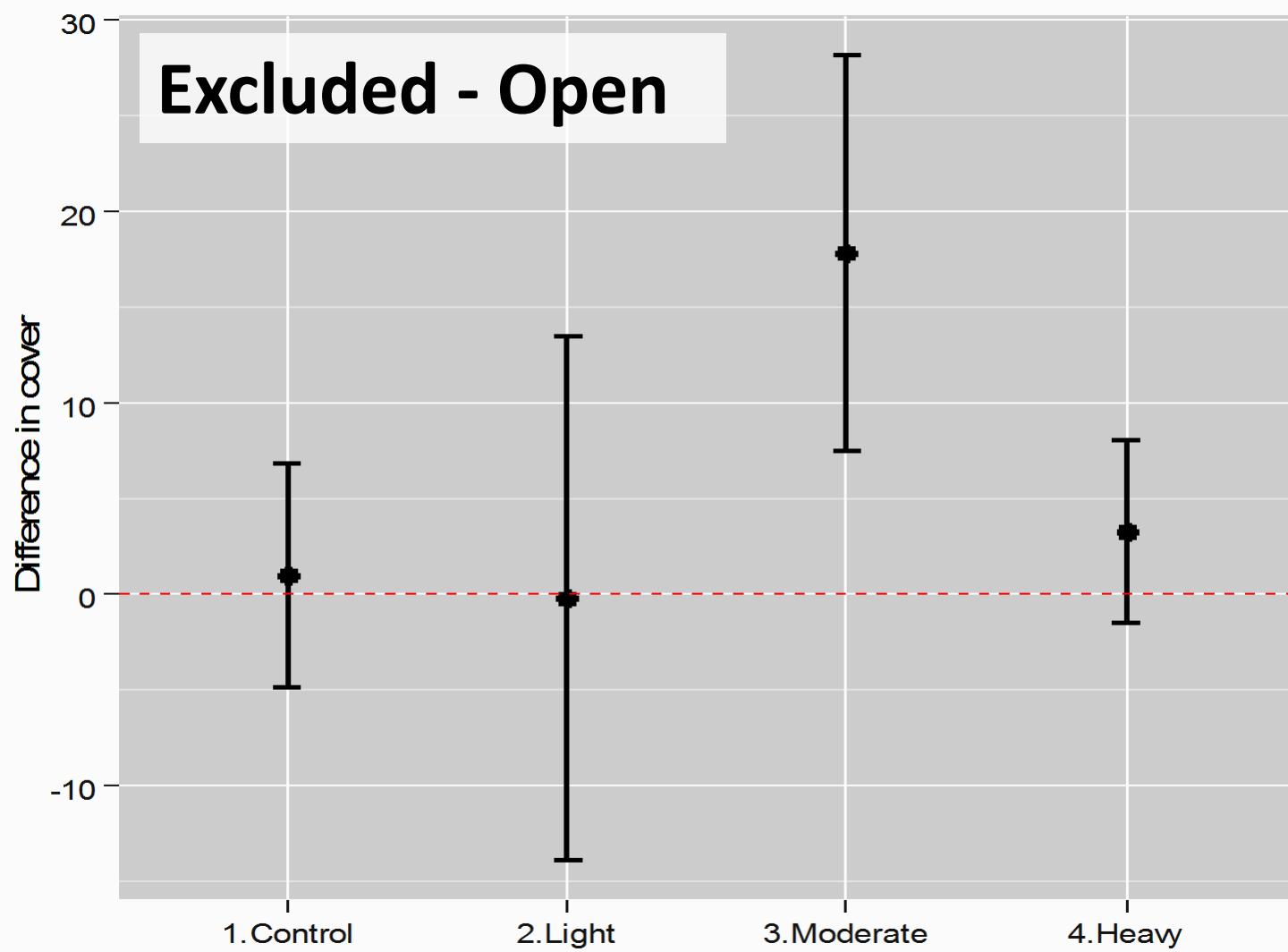
The background image shows a hillside covered in green grass and low-lying plants. In the upper portion of the image, there is a clearing where many trees have been cut down, leaving behind tall, vertical tree stumps. The sky above the hillside is overcast and hazy.

**PRELIMINARY RESULTS!**

# Comparing Cover



# Herbivory and Cover



**Control**  
**No-Spray**



**Light**  
**Herbicide**



**Moderate**  
**Herbicide**



**Heavy**  
**Herbicide**



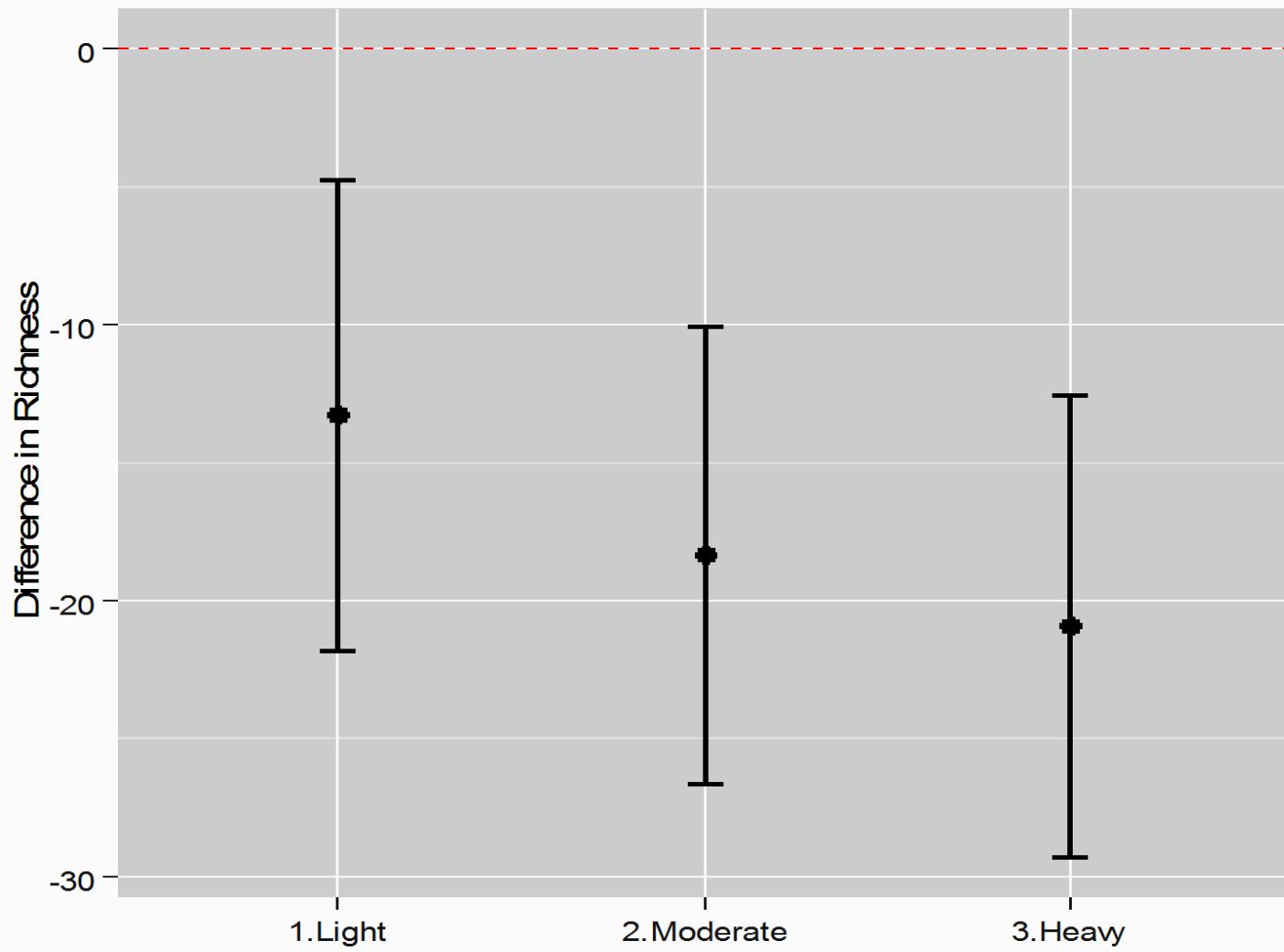
**Herbivory  
Excluded**

**Open  
Herbivory**

# Plant Cover



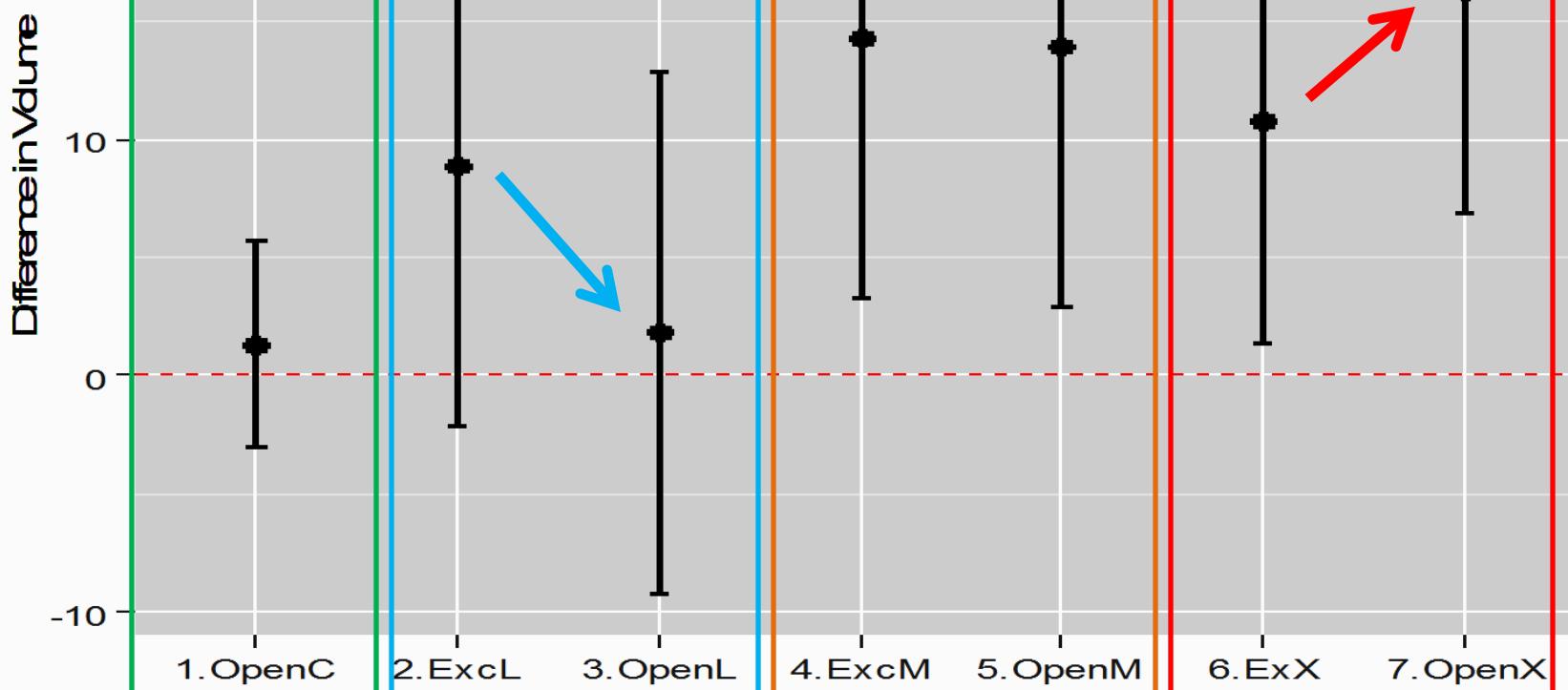
# Comparing Richness





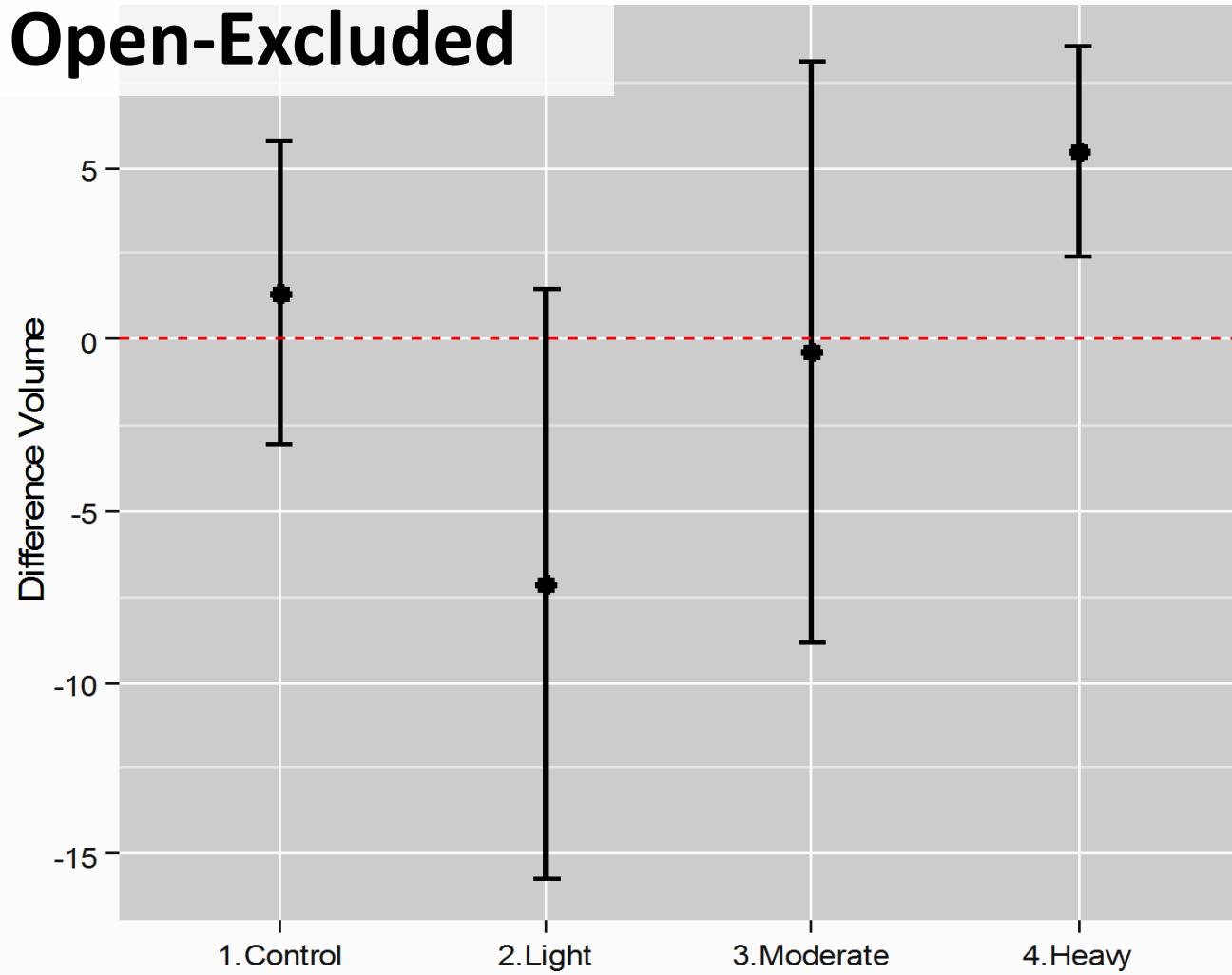
# Comparing Seedling Volume

**Excluded control - Trt**



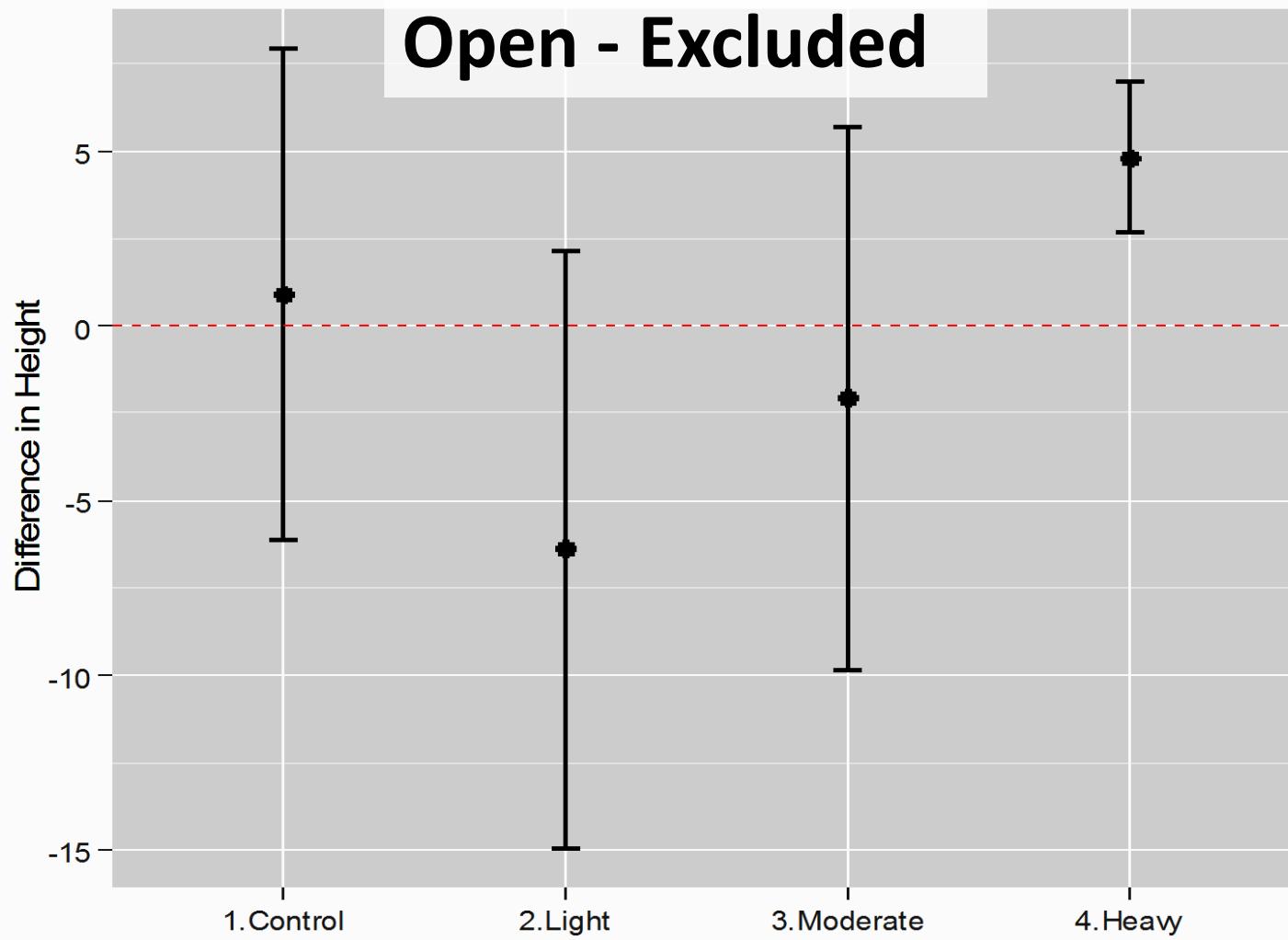
# Herbivory and Seedling Vol

**Open-Excluded**



# Height

**Open - Excluded**



**Control**  
**No-Spray**



**Light**  
**Herbicide**



**Moderate**  
**Herbicide**



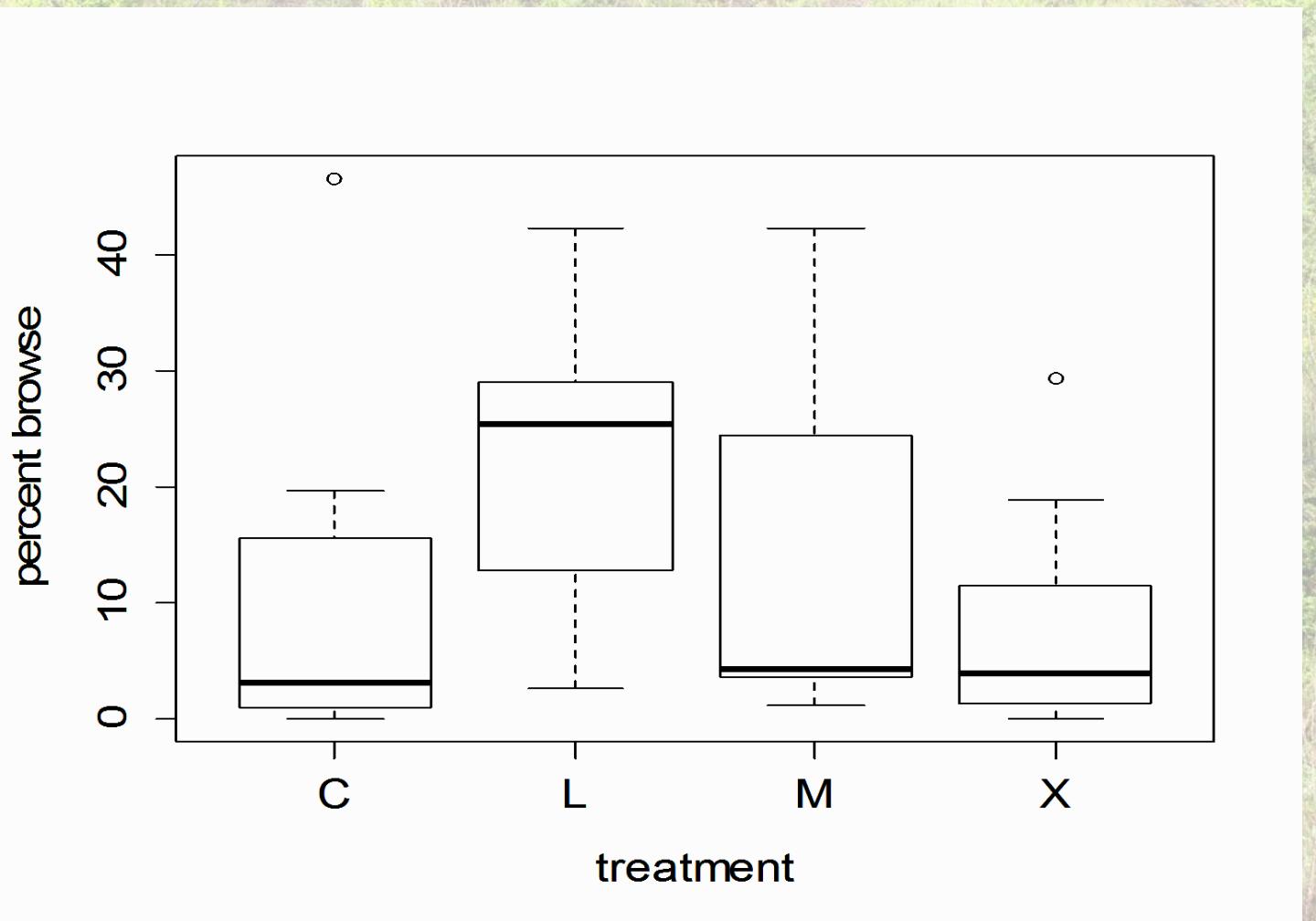
**Heavy**  
**Herbicide**



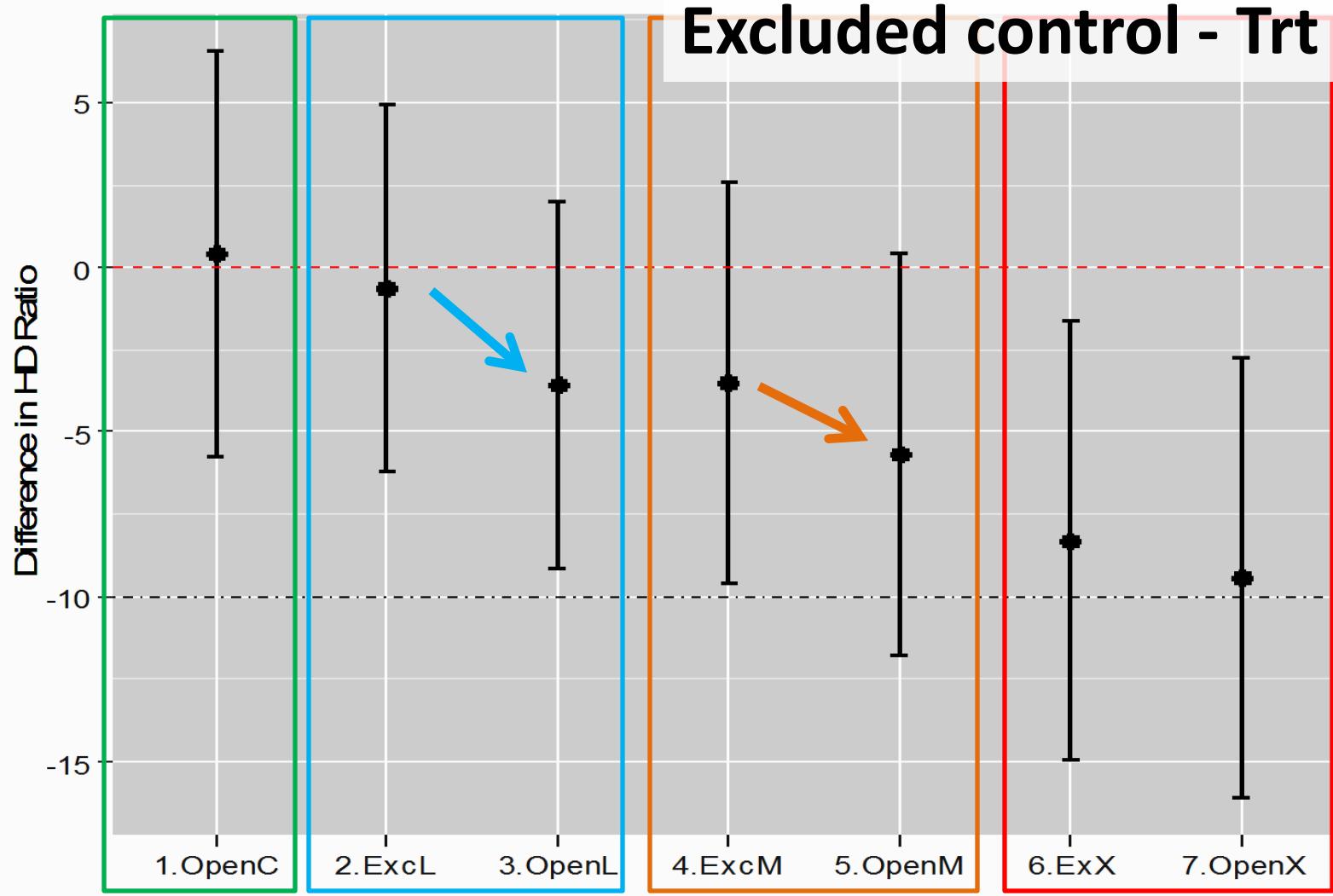
**Open**  
**Herbivory**



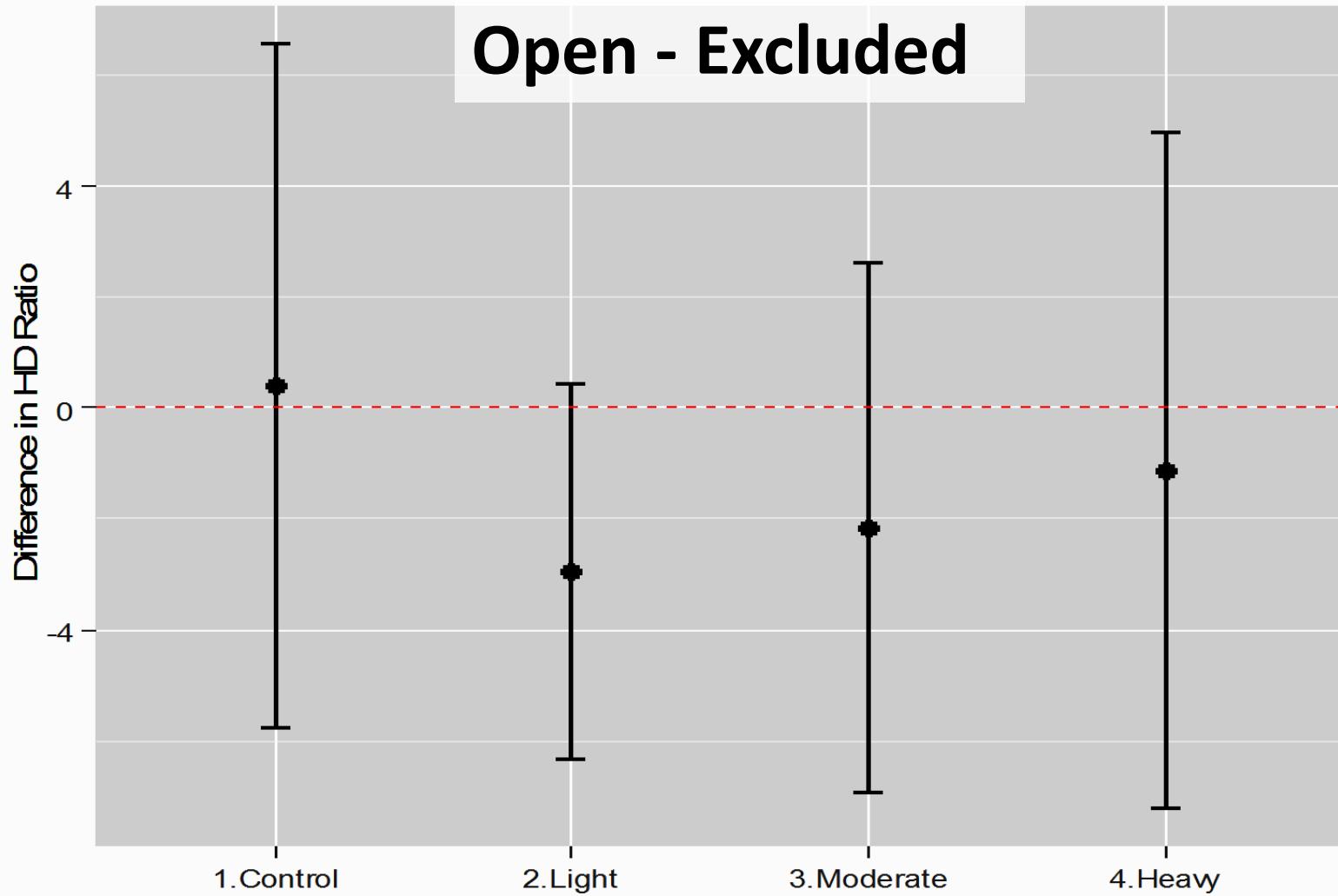
# Browse Damage



# Height to Diameter Ratio



# Browsing as Pruning?





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04-10-2012 23:54:52



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04-10-2012 23:55:00



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04-10-2012 23:55:02



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# Take-Home/to Work Message

- Herbivory exacerbates herbicide effect on plant cover.
- Herbicides negatively affect plant richness, herbivory does not.
- Herbicides increase seedling volume! WOW!
  - Deer presence can help or hurt depending on treatment
- Browsing as pruning, can decrease HD Ratio

# Future Analyses/Work

- Only preliminary results
- More time, data needed
- Diversity: Functional, Structural, Compositional
- Shrub and Seedling Biomass
- Browse Damage
- Camera trap work

# Acknowledgements

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ODFW

