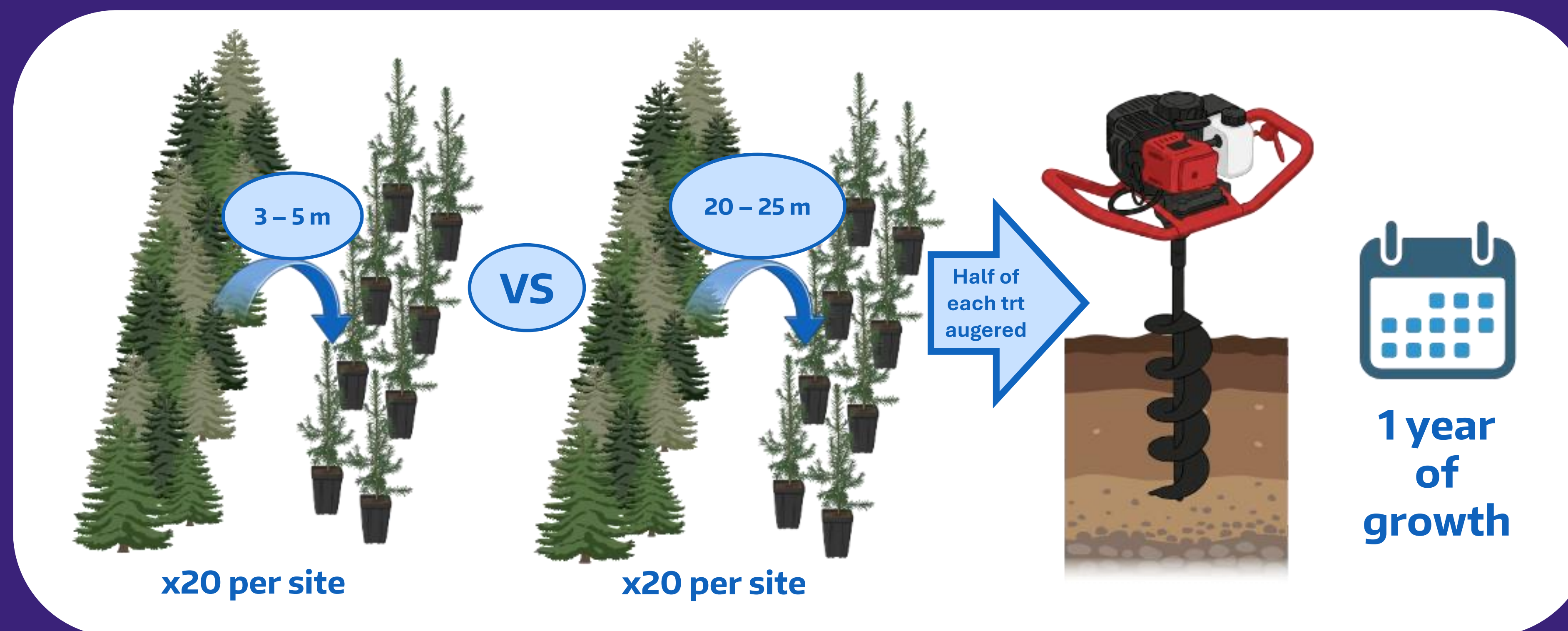


# Augering and Forest Edge effects on the Growth of *Pseudotsuga menziesii*

Cole Crosbie & Dr EC Cline

## Background

- We **hypothesized** that **edge effects** and **auger planting** would **enhance** the **survival** and **growth** of young seedlings by **amplifying the individual benefits of both treatments**.
- **Riparian forests** are vital for **river health** and **native salmonids**.
- **The forest edge** has more **moisture, protection** from sunlight and wind, and **warmer temperatures**.
- **Augering** creates an **ideal environment for planting** by loosening soil and **improving access to water**.
- **Three sites** within the Nisqually watershed were selected across a **moisture gradient** to represent **drought conditions**.
- These **restoration sites** are **difficult to restore** and have had **many failed plantings**.



## Douglas Fir seedlings survive at a greater rate when planted near a mature forest edge

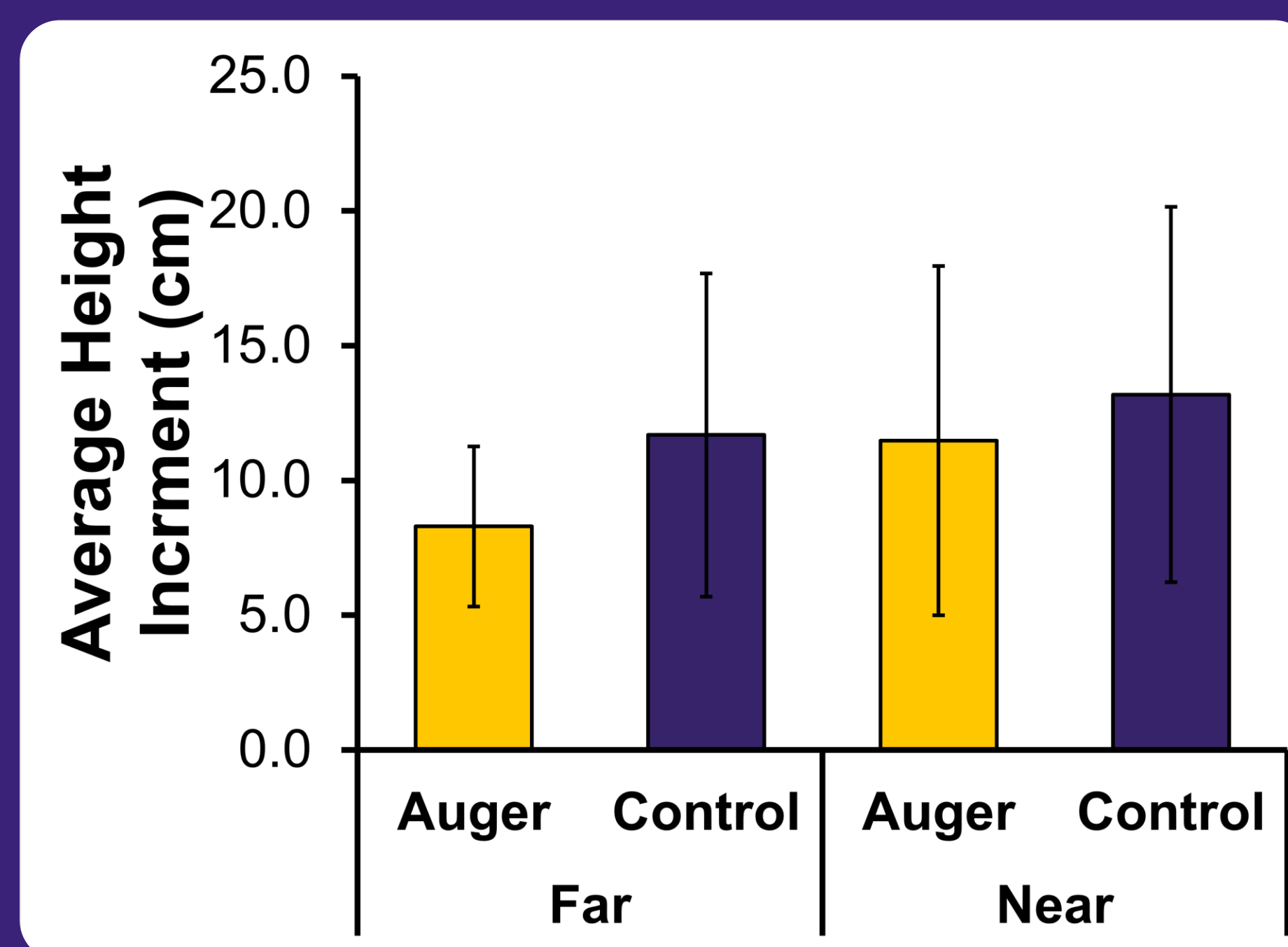


Figure 1. Effect of distance and augering (gold) v. control (purple) on Douglas fir seedling (N=60) height increment while excluding site. Values are the average of year-one height across the three sites minus the initial height,  $\pm$  the standard deviation for height.

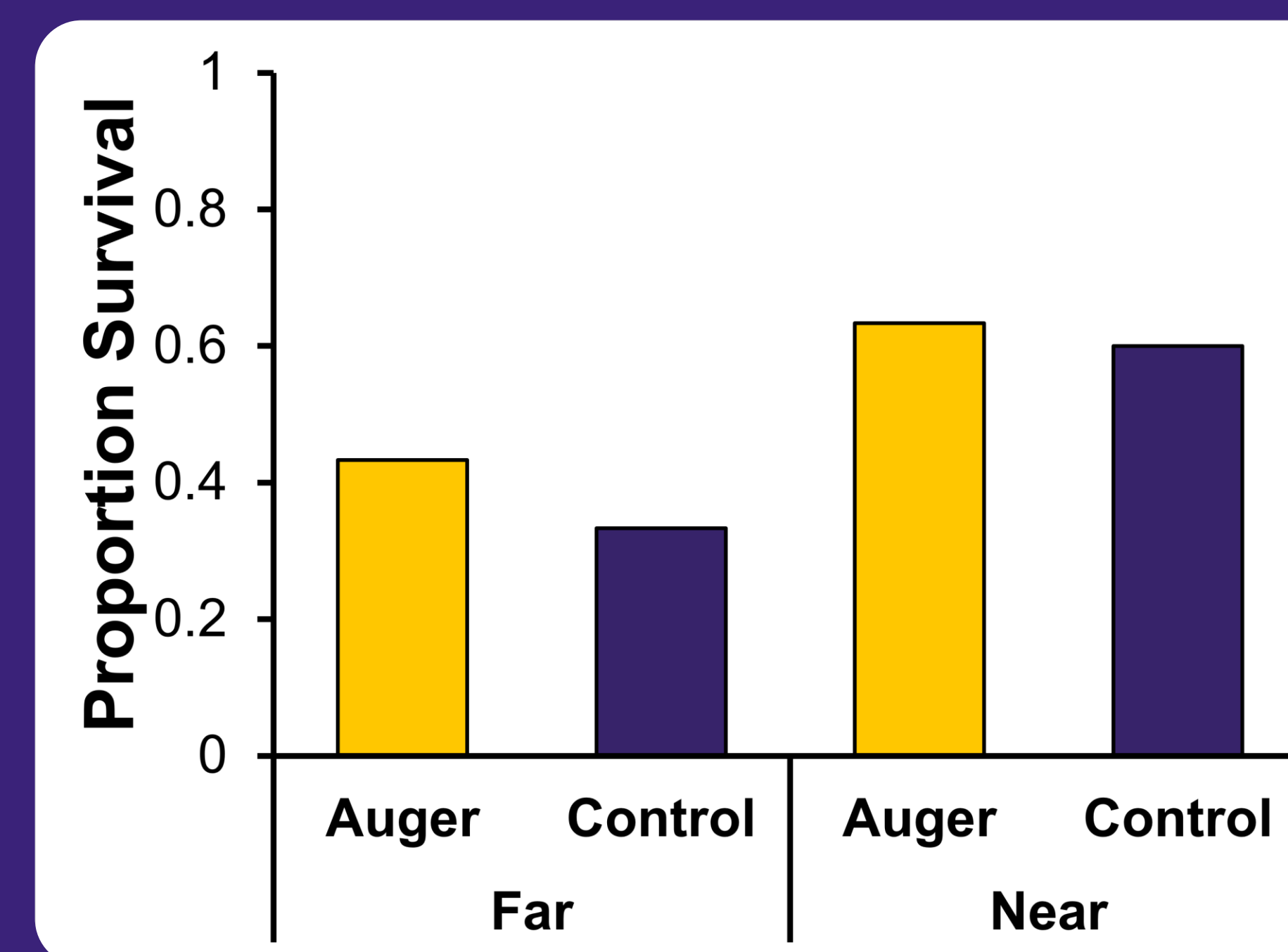


Figure 2. Effect of distance and augering (gold) v. control (purple) on proportion of survival of Douglas fir seedlings (N=120) across all three sites. Values are the total alive divided by the total planted for each treatment category after one year of growth.

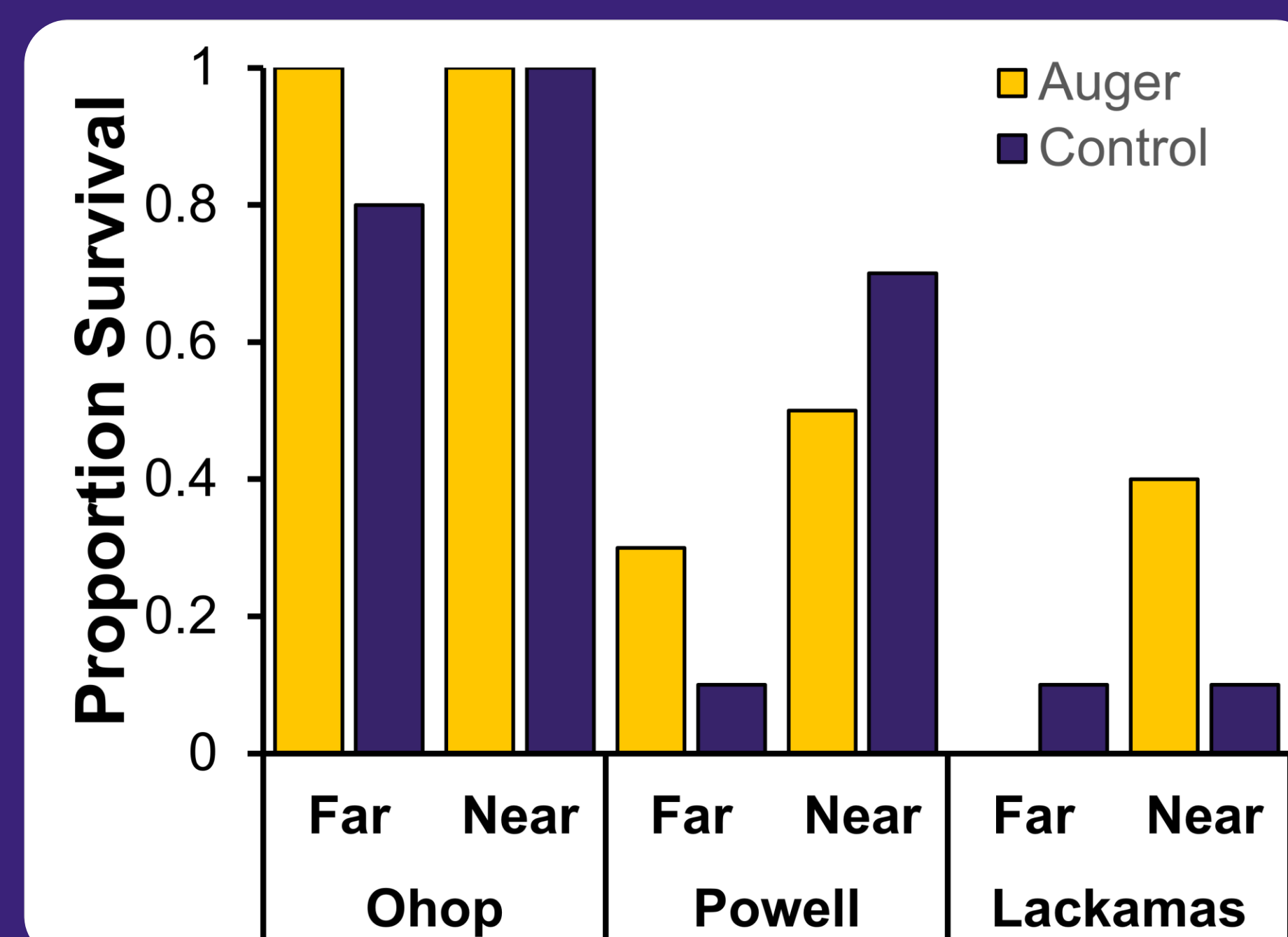


Figure 3. Effect of distance and augering (gold) v. control (purple) on proportion of survival of Douglas fir seedlings (N=120) while including site. Values are the total alive over the total planted for each treatment category after the first year.

## Results

1. **Height was not affected by planting distance** (GLM,  $F = 2.143$ ,  $p = 0.149$ ) or by **augering** (GLM,  $F = 2.558$ ,  $p = 0.115$ ).
2. **Survival was significantly greater when planted near the edge** (GLM,  $\chi^2 = 10.399$ ,  $df = 1$ ,  $p = 0.001$ ), but **augering did not increase survival** (GLM,  $\chi^2 = 1.102$ ,  $df = 1$ ,  $p = 0.294$ ).
3. **Site significantly affected the survival of seedlings** (GLM,  $\chi^2 = 31.475$ ,  $df = 2$ ,  $p < 0.01$ ).

## Discussion

- **Seedling establishment and survival** may be more **sensitive to environmental stress** than **growth**, within the first year of planting.
- **Augering does not universally improve planting quality** and must be used on a **site-to-site basis**.
- **The forest edge improves seedling survival**, which may be due to **physical protection** or access to **mycorrhizal networks**.
- **Site effects** are strong and **cannot be outweighed** through **planting location** or **augering alone**.

## Conclusion

Through the **selective use of augering** and the **support of existing mature edges**, restorationists can create **more efficient planting designs** and continue to restore our **riparian environments**.

Site Map



Photos



Full Paper



References

