

Conifer growth and nutrition response to fertilization and thinning in Northeast Washington

Stimson-IFC Add-on Research Activities

by

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Intermountain Forestry Cooperative Annual Meeting

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Research Locations & Objectives

- Rocky Gorge
 - Evaluate growth response to 200#N and 90#S
 - Stand Type: Mid-rotation DF plantation
 - Habitat Type: TSHE/ASCA
 - Soil Parent Material: Volcanic ash / Granitic glacial till
- Hidden Meadows
 - Evaluate growth response to mastication and 200#N and 90#S fertilization
 - Stand Type: Mid-rotation WL plantation
 - Habitat Type: ABLA/CLUN
 - Soil Parent Material: Volcanic ash / Granitic glacial till

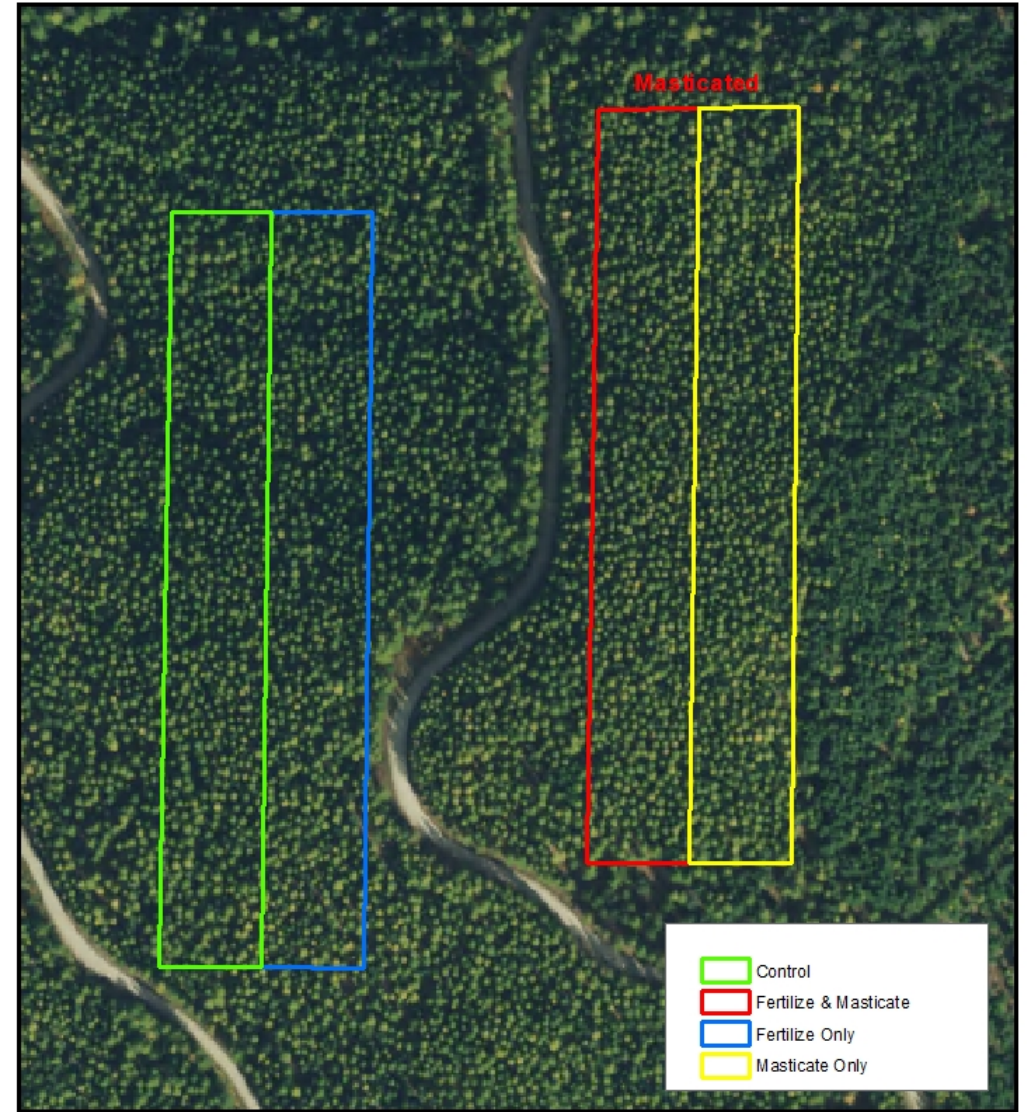
Rocky Gorge Fertilizer Study



0 230 460 920 1,380 1,840 2,300 Feet

Map Scale 1:4500

Hidden Meadows Fertilizer Study



0 100 200 400 600 800 1,000 Feet

Map Scale 1:2,000

Rocky Gorge Fertilizer Study

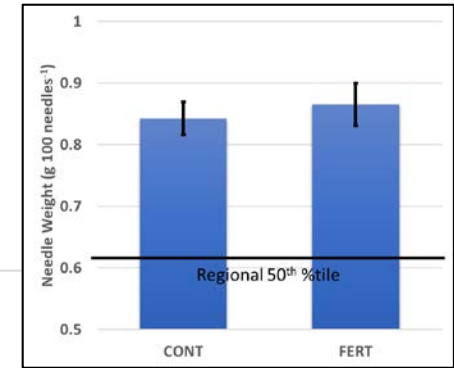
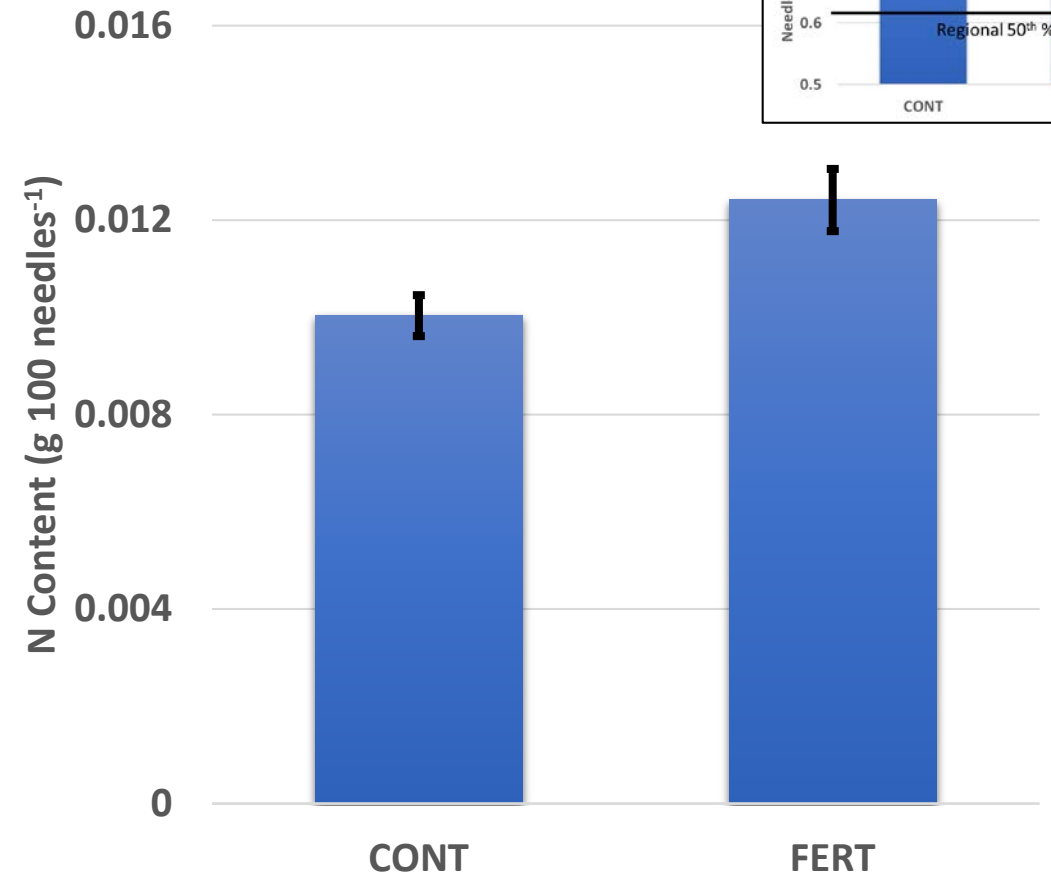
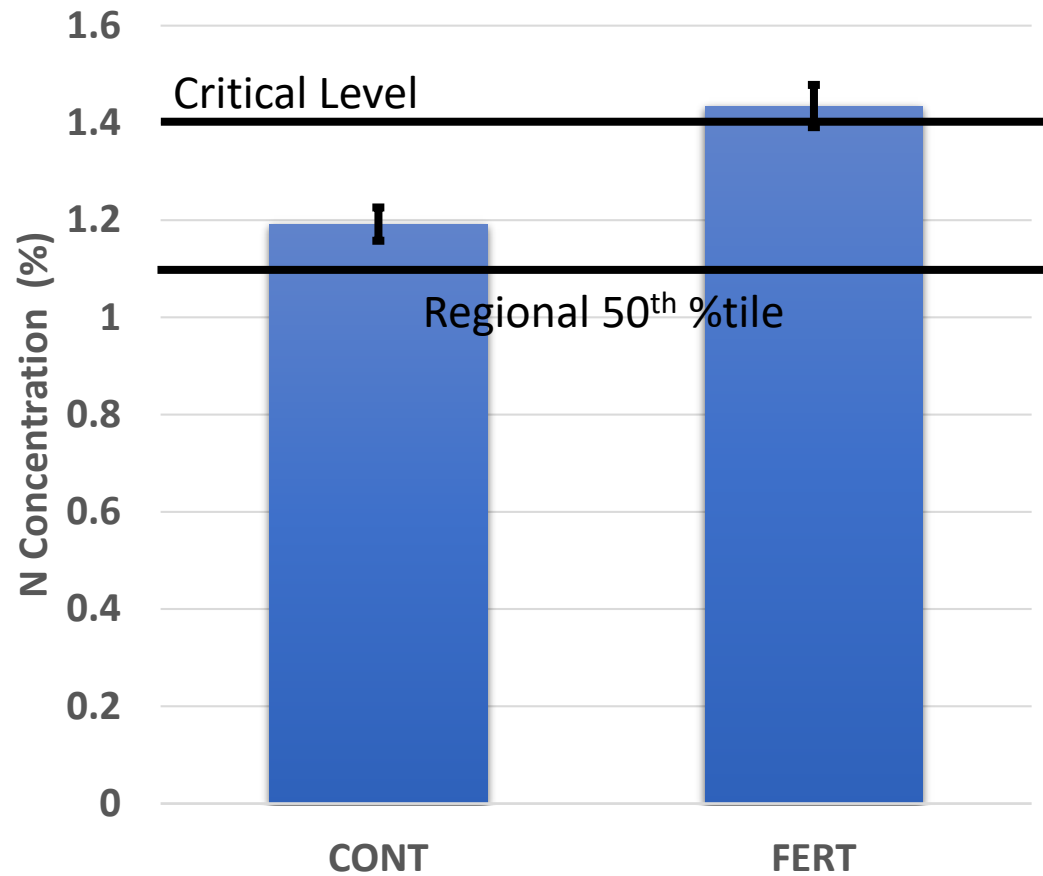


Rocky Gorge Site History

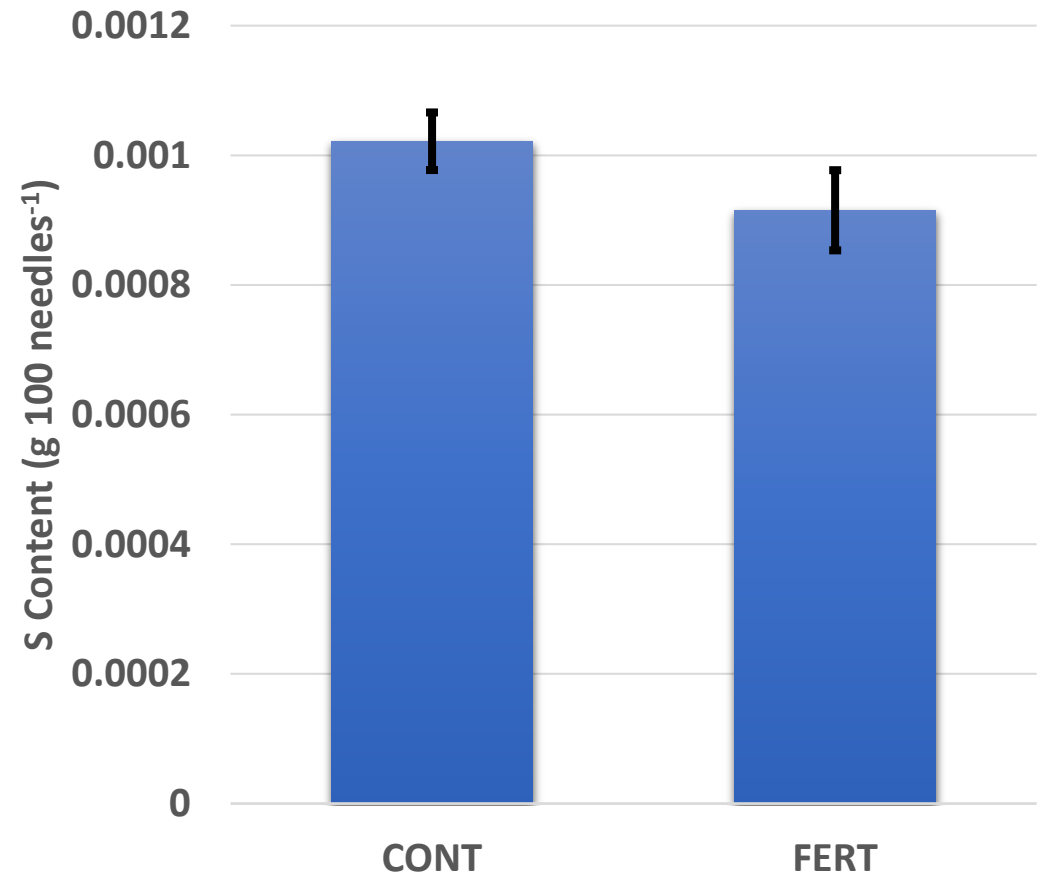
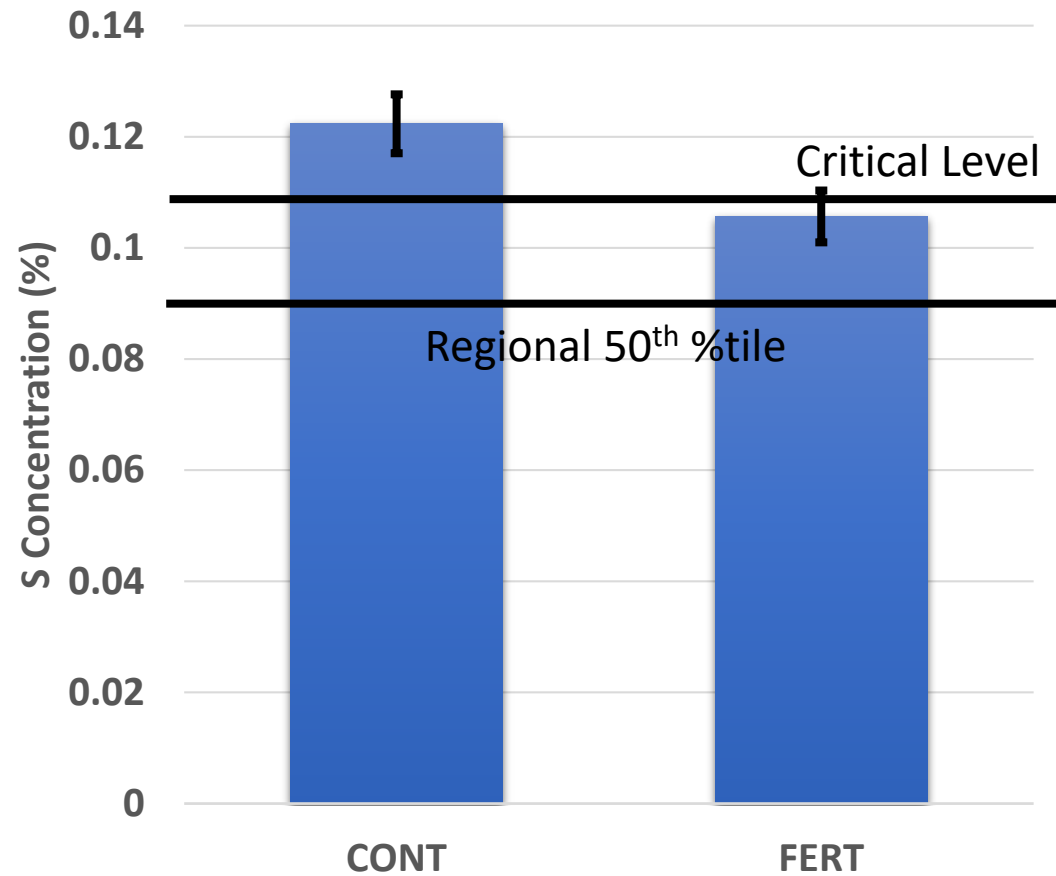
- Site was a hardwood conversion in the 1982
- Very productive site, TSHE/ASCA habitat type, deep ash cap soils, 2800 foot elevation
- It was planted in 1984 to 70% DF, 20% WP and 10% WL (few WP were Bingham)
- Site was about 30 years old when fertilized 43% DF, 30% GF, 8% WP and 7% PP
- Scribner volume in the range of about 5 to 10 mbf/acre
- About 40 acres were treated in 2014 with 200 lb. Nitrogen / 90 lb. Sulfur (elemental)



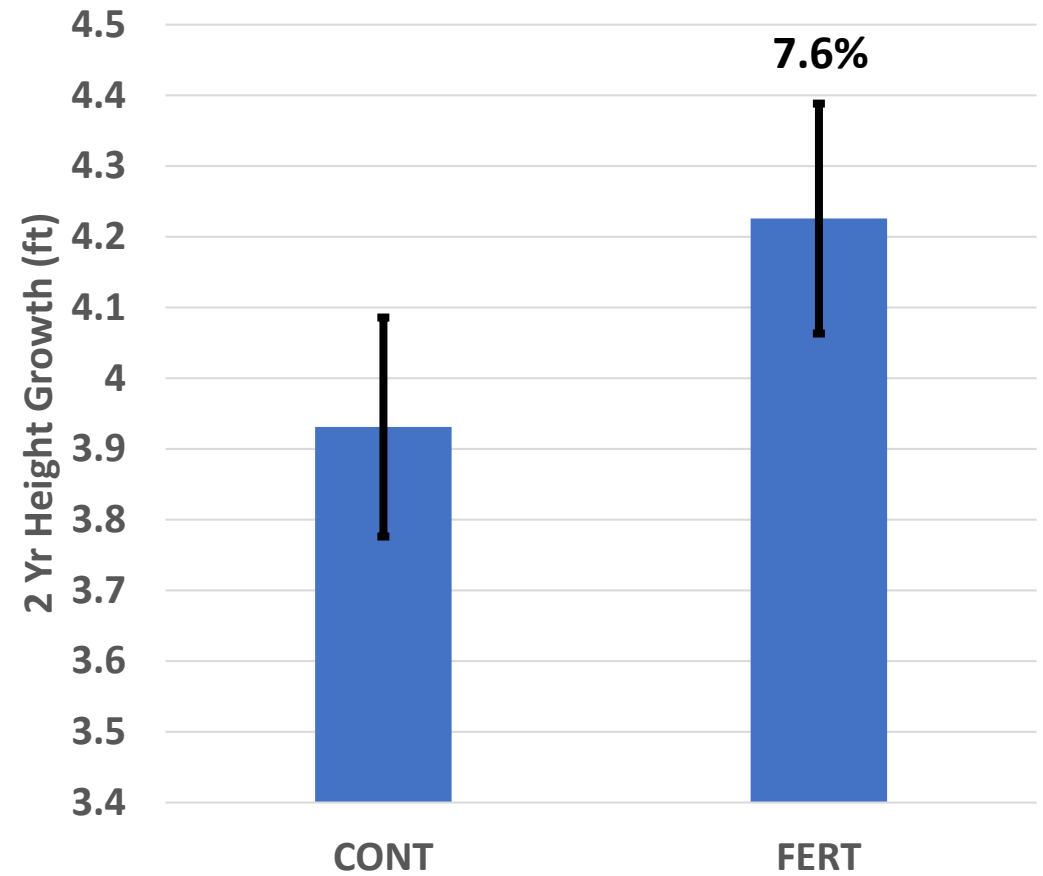
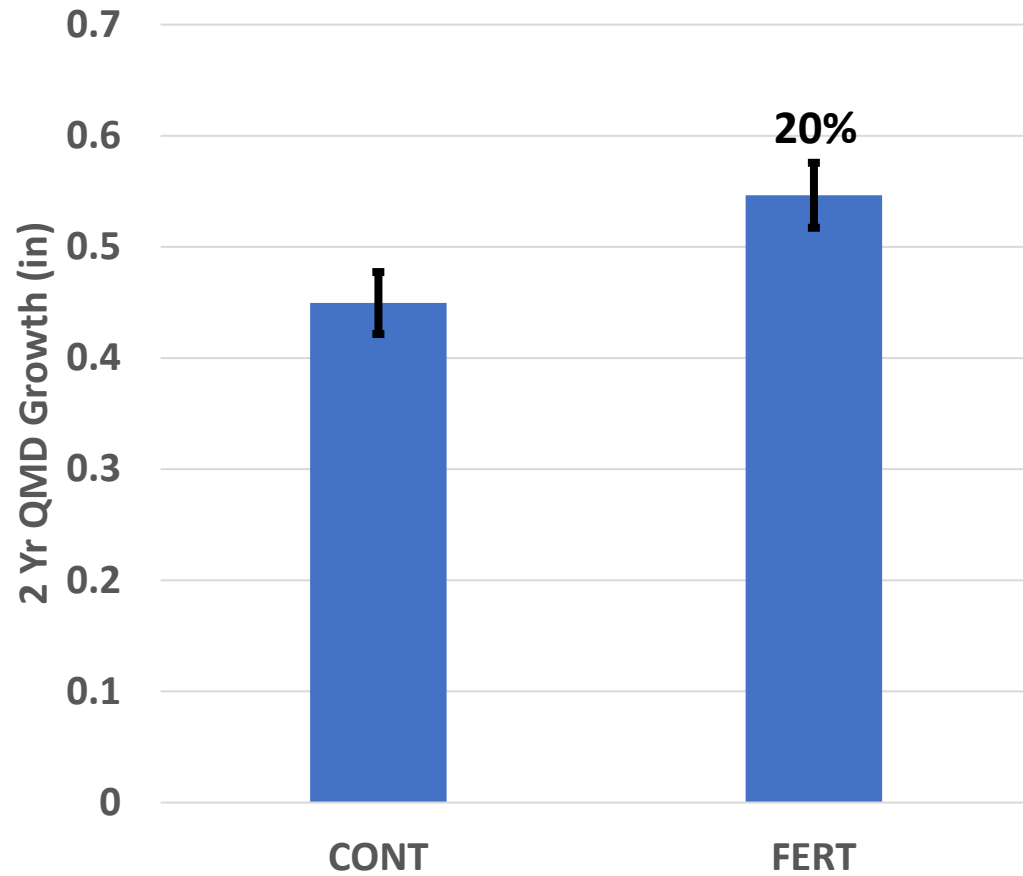
DF Foliar Nutrient Response – Nitrogen Rocky Gorge



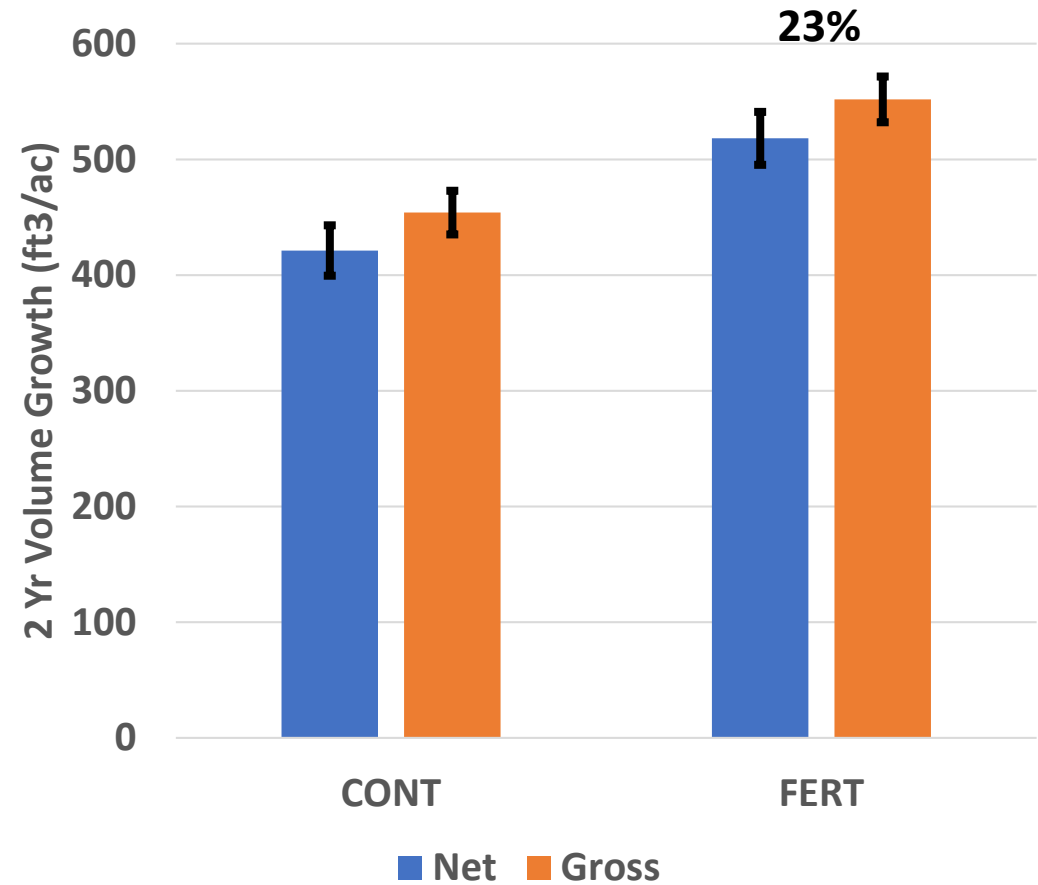
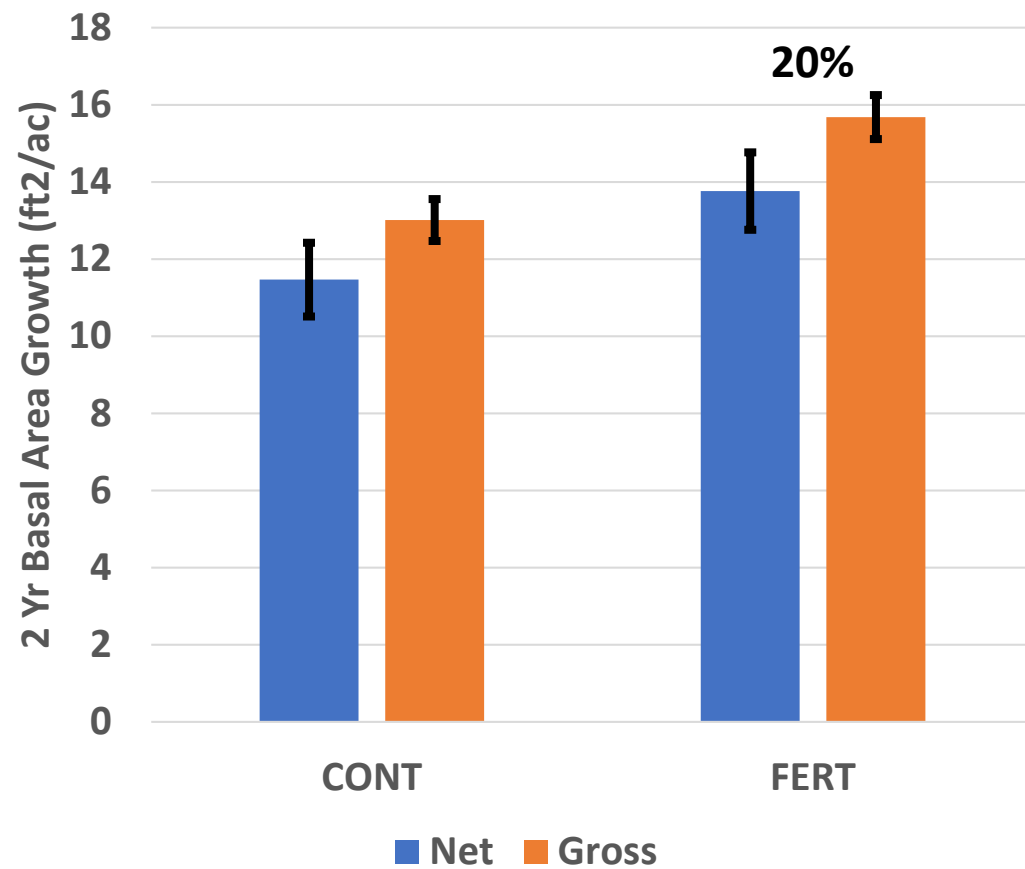
DF Foliar Nutrient Response – Sulfur Rocky Gorge



DF Growth Response – QMD & Height Rocky Gorge

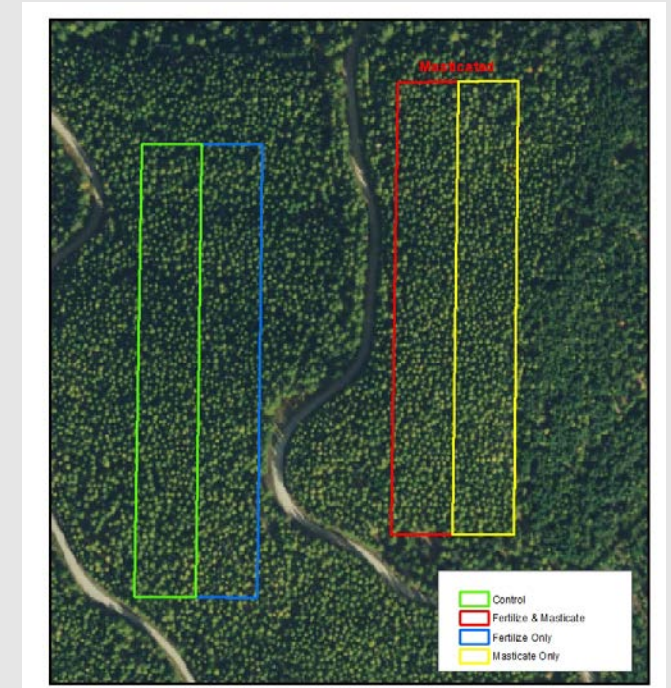


DF Growth Response – Basal Area & Volume Rocky Gorge



Hidden Meadows Site History

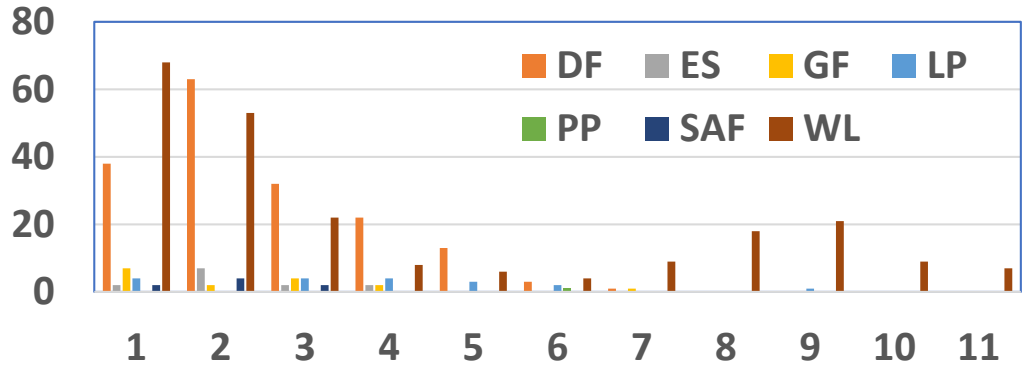
- Site was a seed tree harvested and broadcast burned in 1980
- It is a moderately productive site, ABLA/CLUN habitat type, 4600 foot elevation
- The western larch overstory was removed in 1985
- It was pre-commercially thinned in 1992 to a 14 foot spacing, primarily WL
- Site was about 35 years old when fertilized/masticated
- Scribner volume in the range of about 5 to 10 mbf/acre
- Fertilized plots were treated in 2016 with 200 lb. Nitrogen / 90 lb. Sulfur (sulfate)



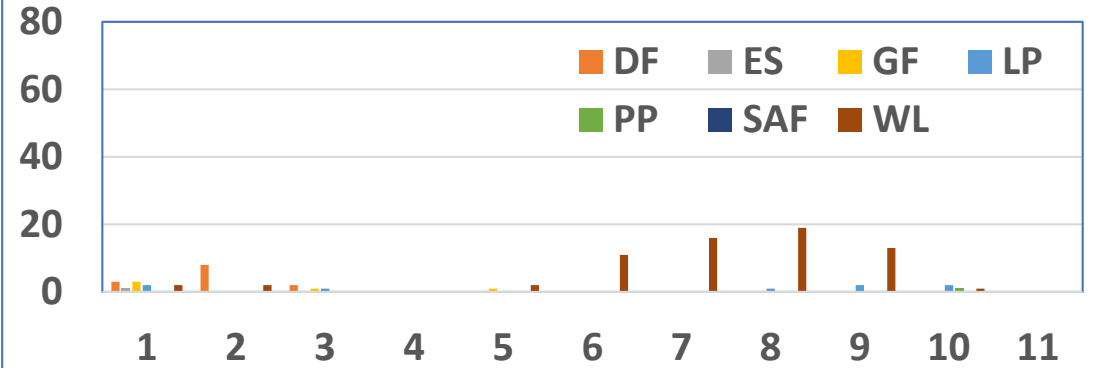
Hidden Meadows Mastication



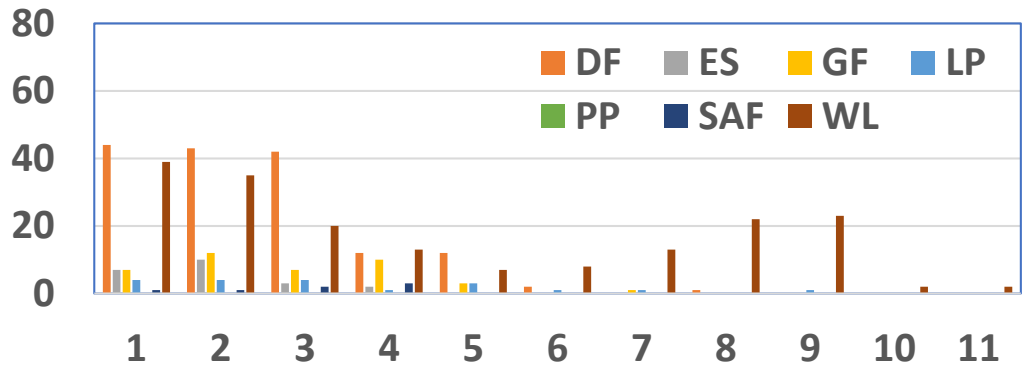
Species Distribution Control Strip



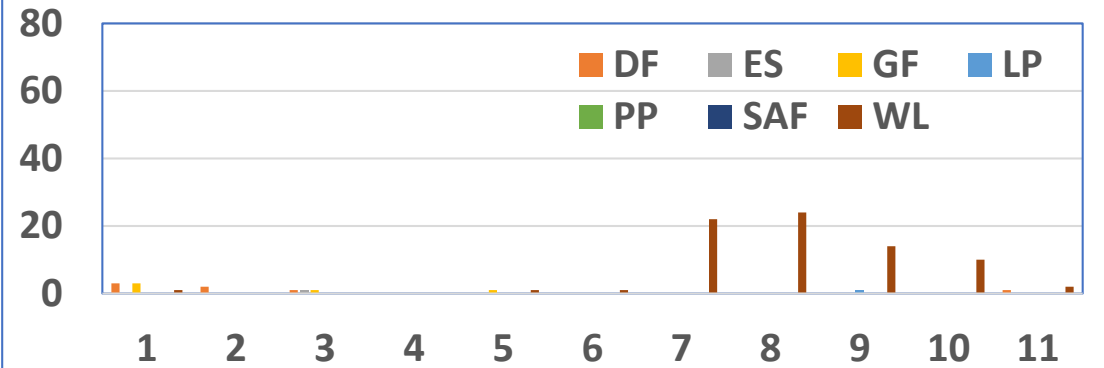
Species Distribution Thin Only



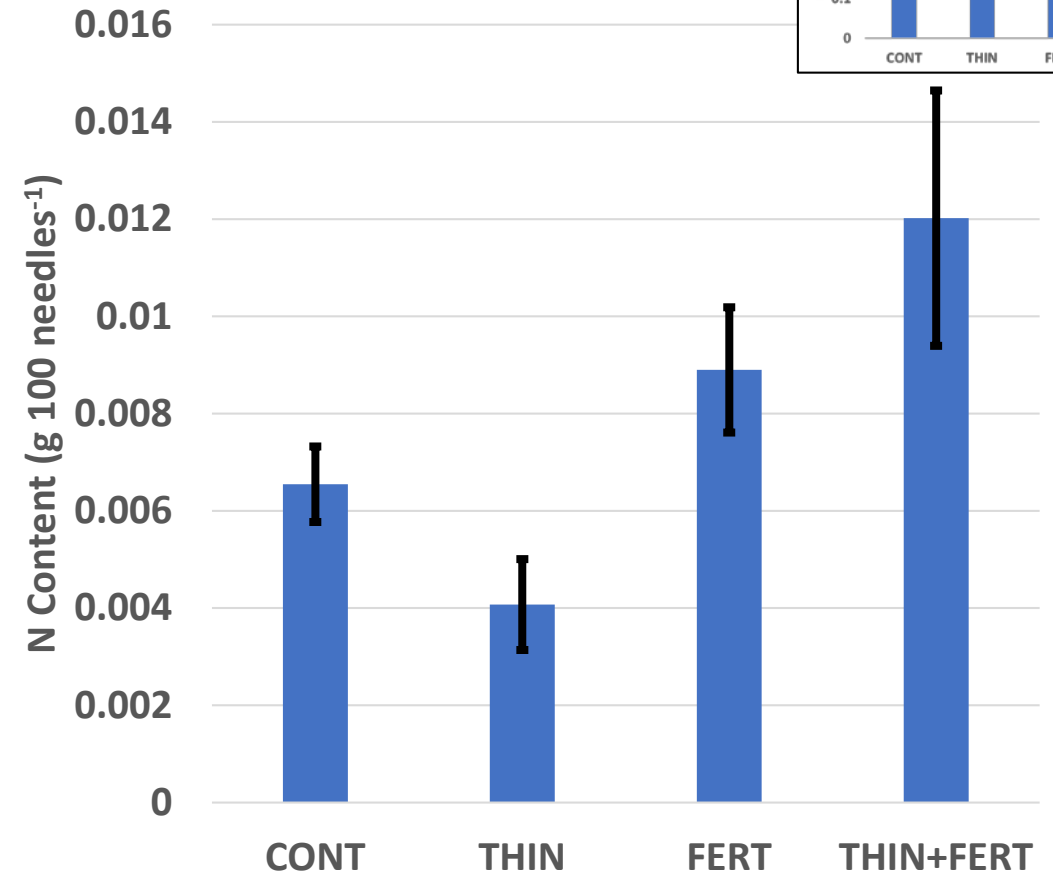
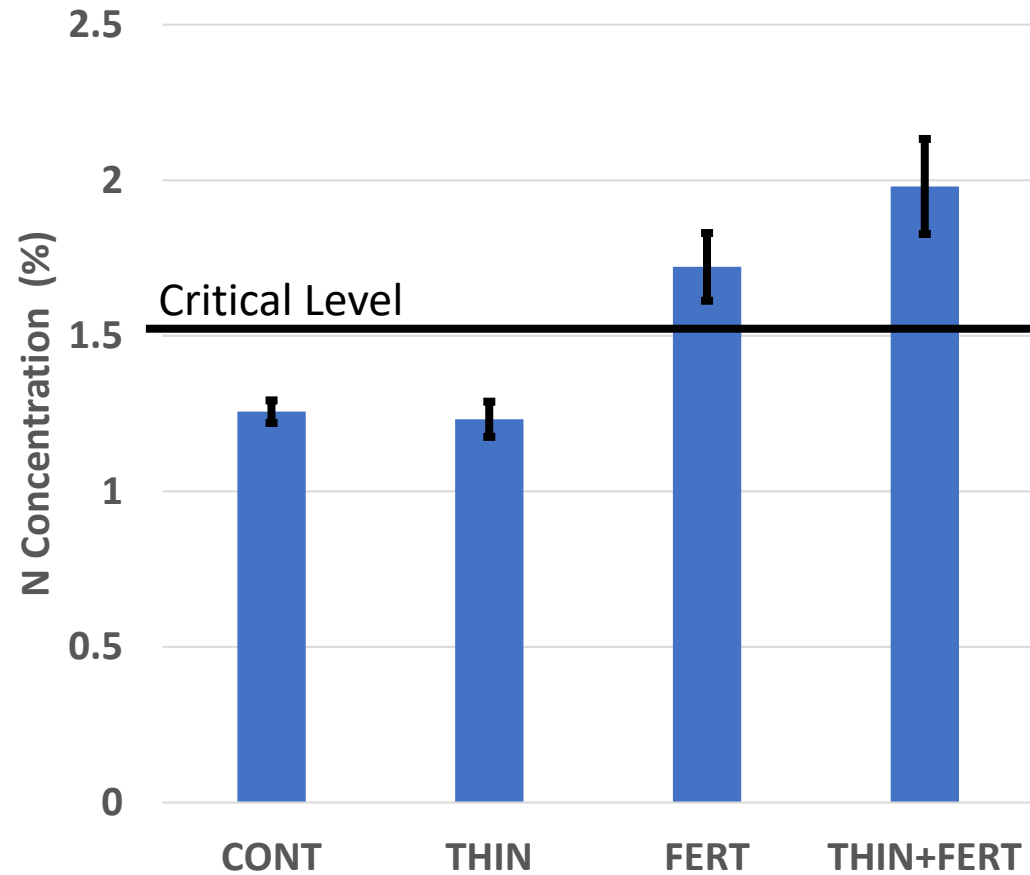
Species Distribution Fertilizer Only



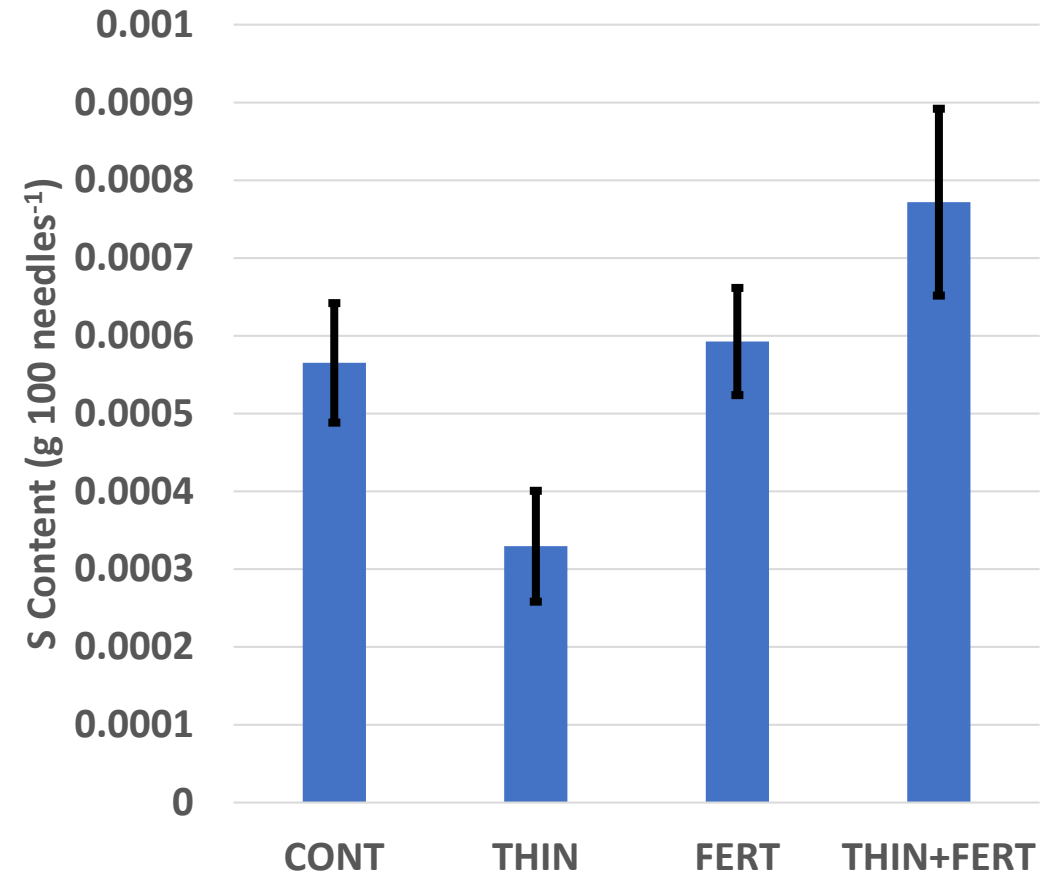
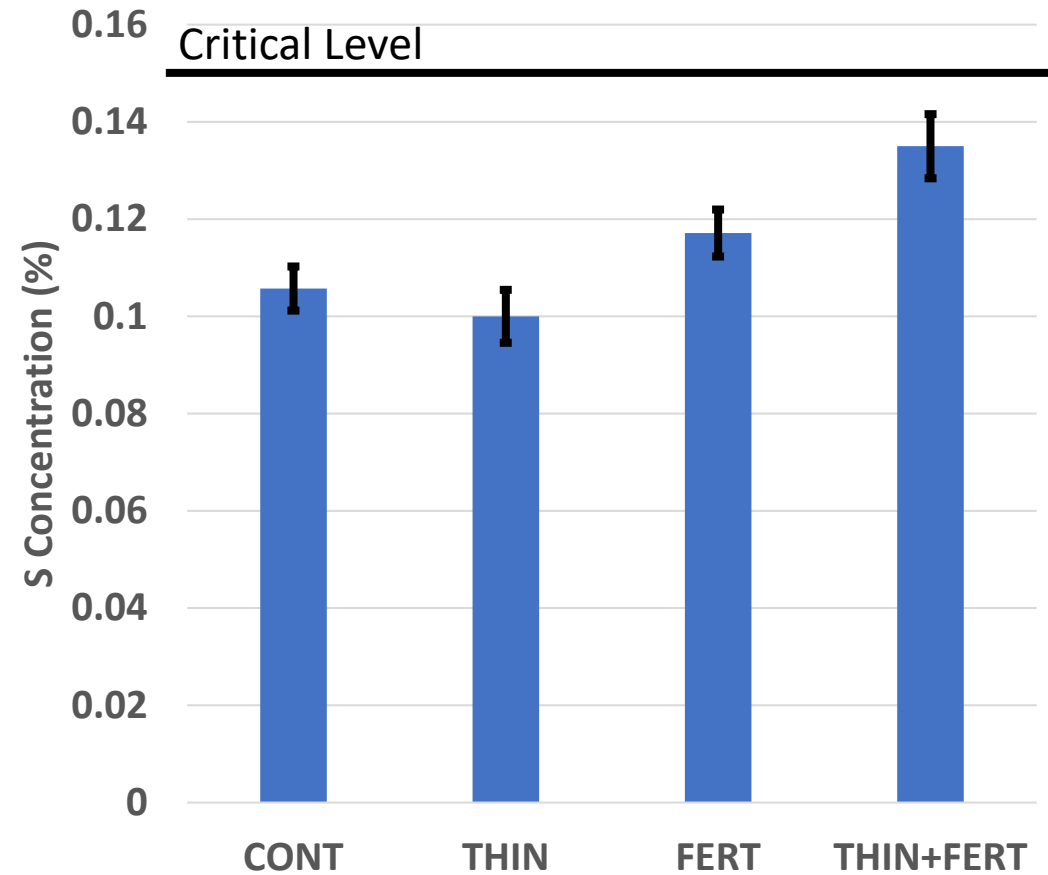
Species Distribution Thin + Fert



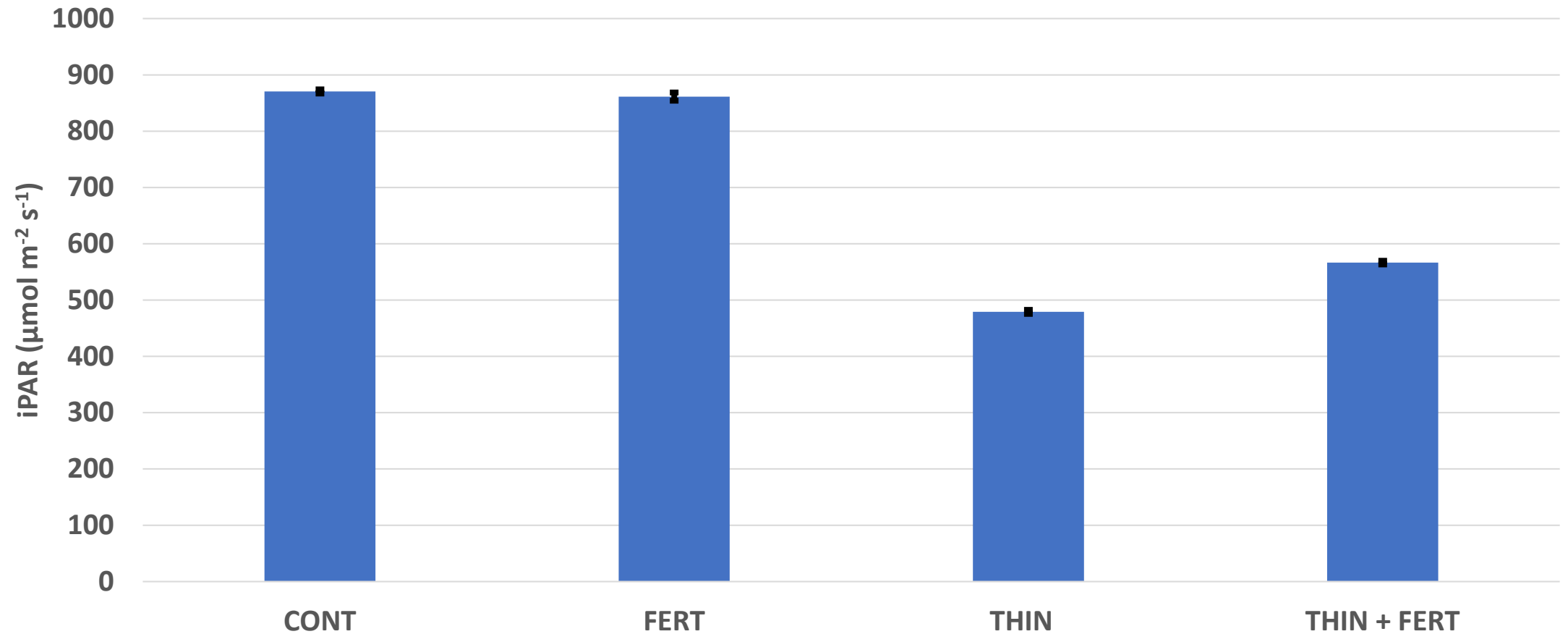
WL Foliar Nutrient Response – Nitrogen Hidden Meadows



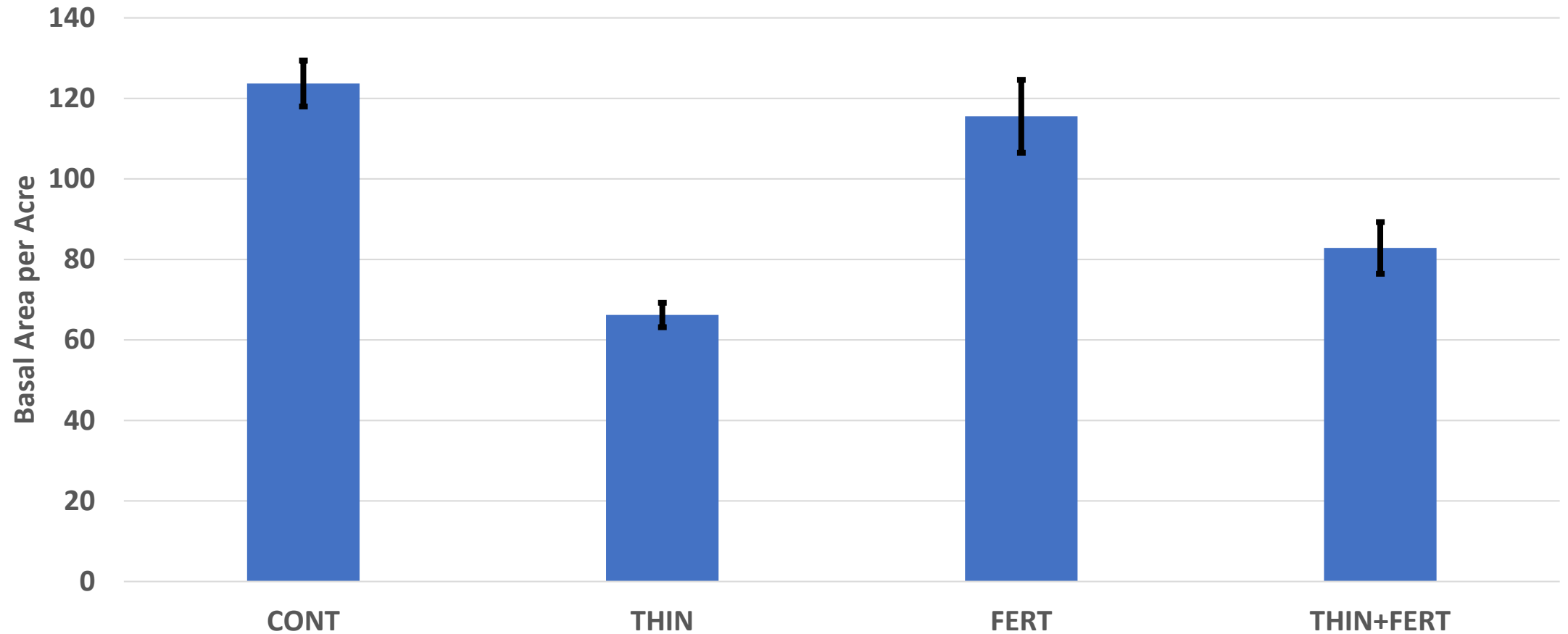
WL Foliar Nutrient Response – Sulfur Hidden Meadows



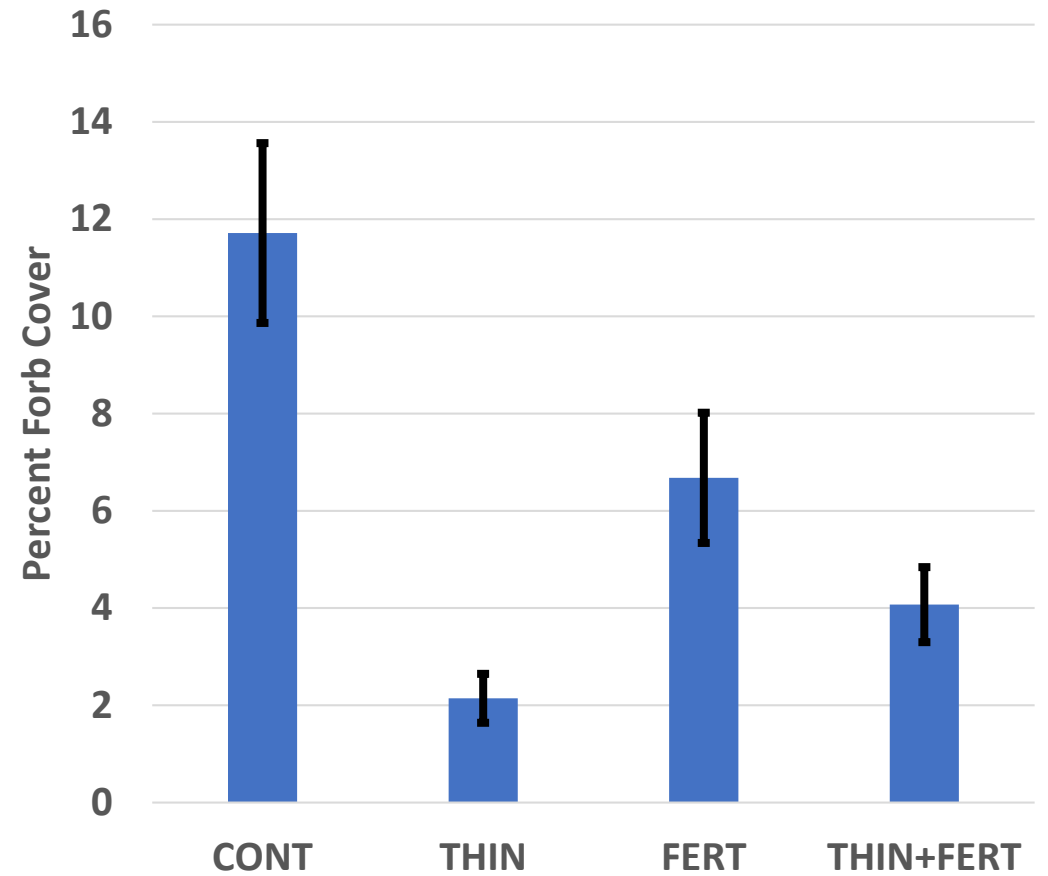
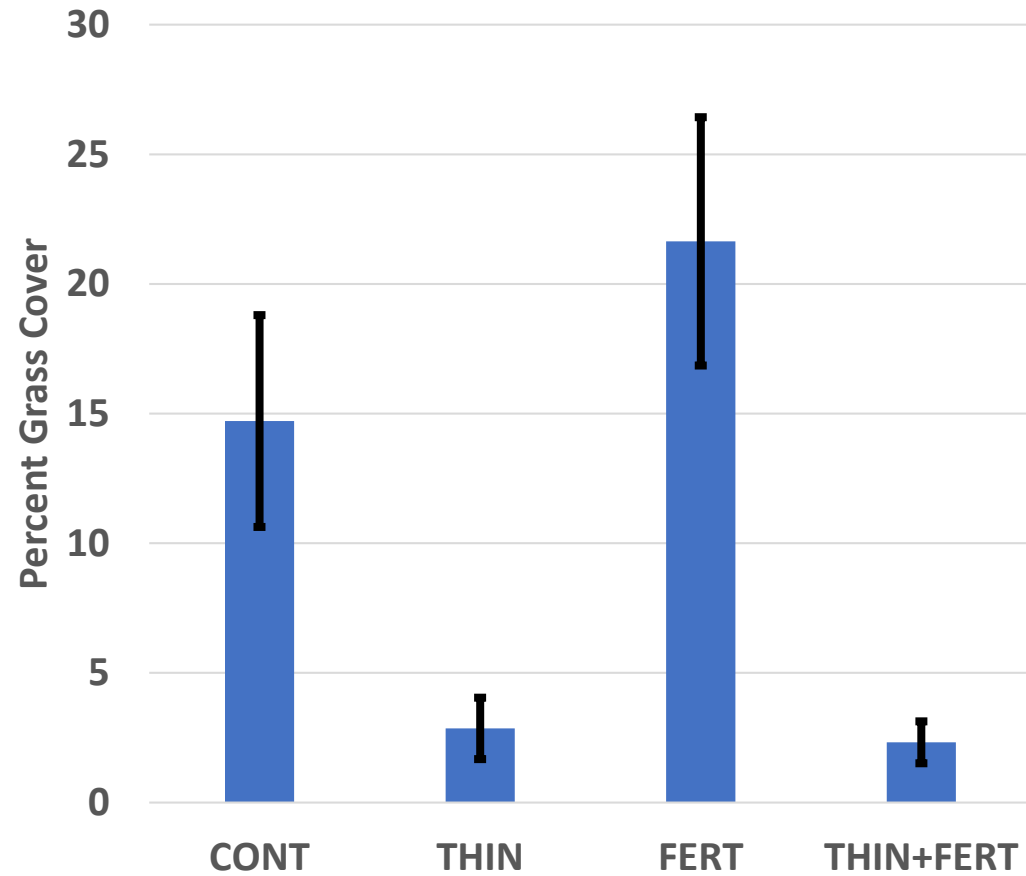
WL Light Interception by Treatment Hidden Meadows



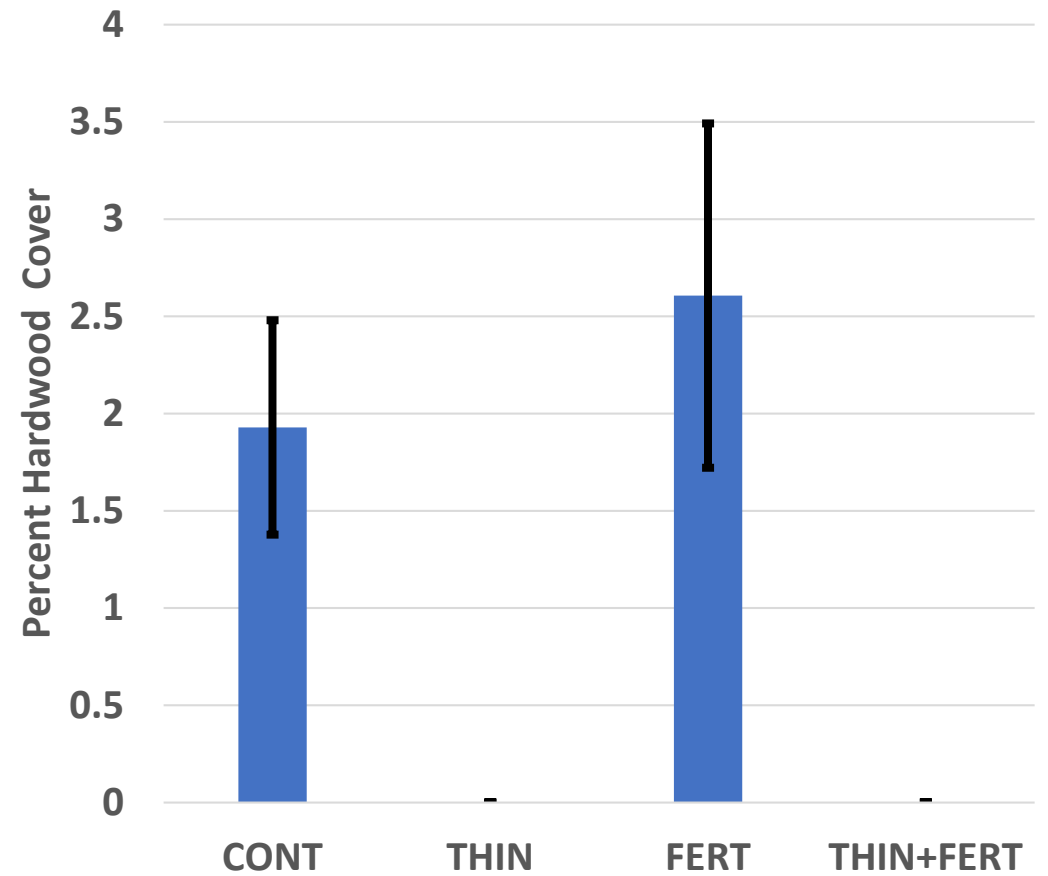
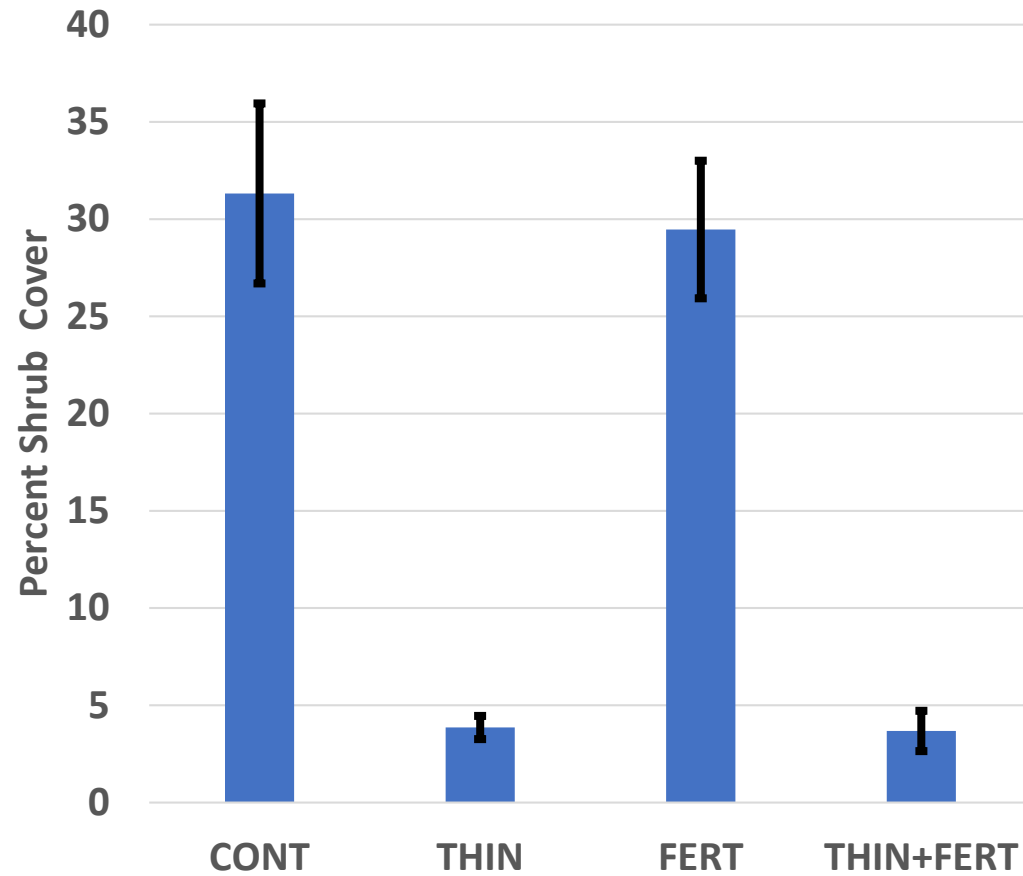
WL Stand Basal Area by Treatment Hidden Meadows



WL Veg Survey – Grass & Forb Cover Hidden Meadows



WL Veg Survey – Shrub & Hardwood Cover Hidden Meadows



Summary

- 200 #N and 90#S per acre increased Douglas-fir basal area and volume growth by 20 and 23%, respectively at Rocky Gorge
- 90#S per acre was not sufficient to alleviate either N dilution effects (Douglas-fir), or site limitations for Western Larch, suggesting that 90#S is not adequate to meet nutritional demands in either stand type
- Type of sulfur applied (elemental versus sulfate) may have influenced results
- Elevated levels of nutrient uptake in the overstory of the masticated portion of the Hidden Meadows test may be the result of removing understory vegetation