# Nutrient Budget Analysis of Six Forest Health/Nutrition Experiment Sites.

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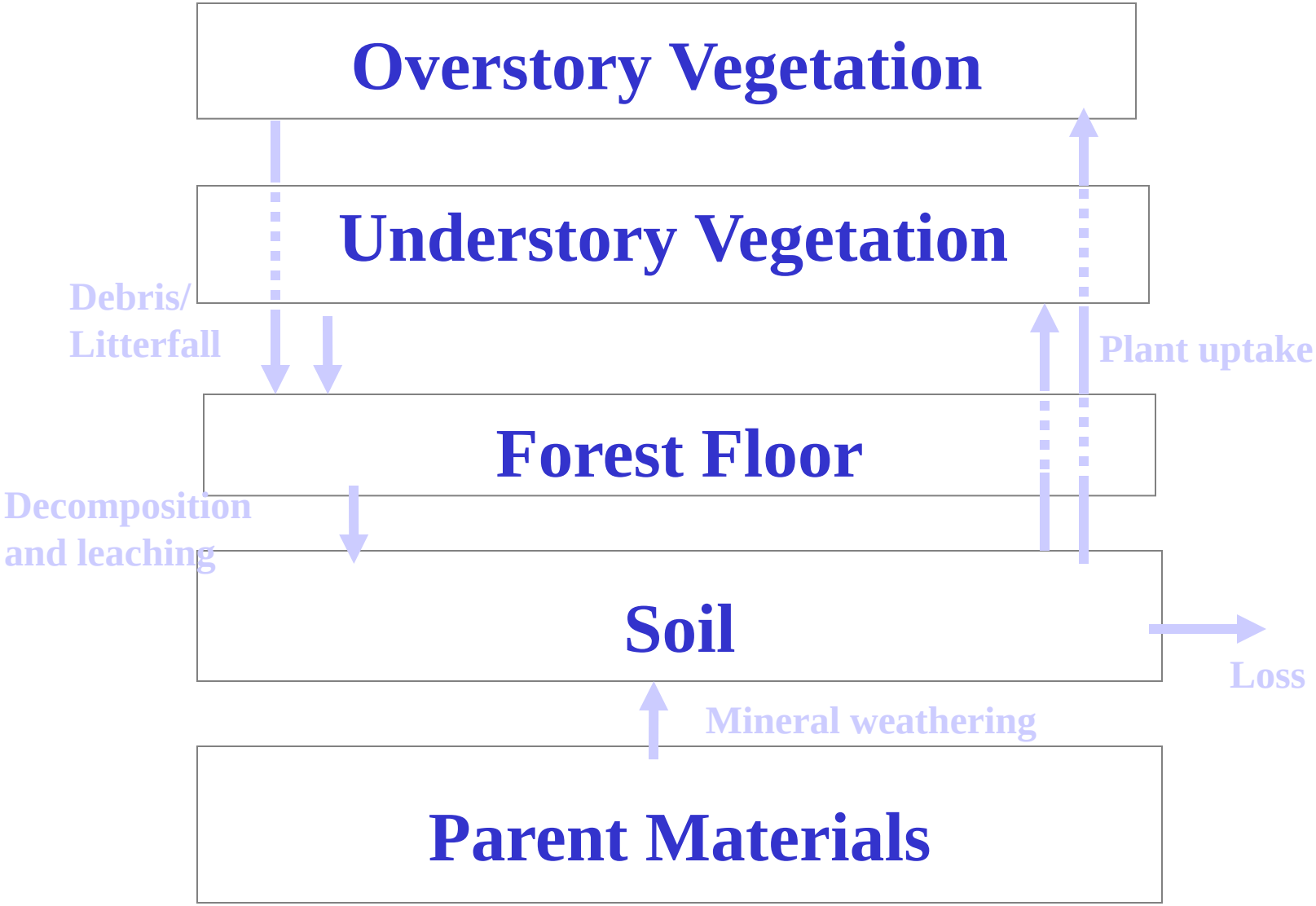
# The Basic Model Components



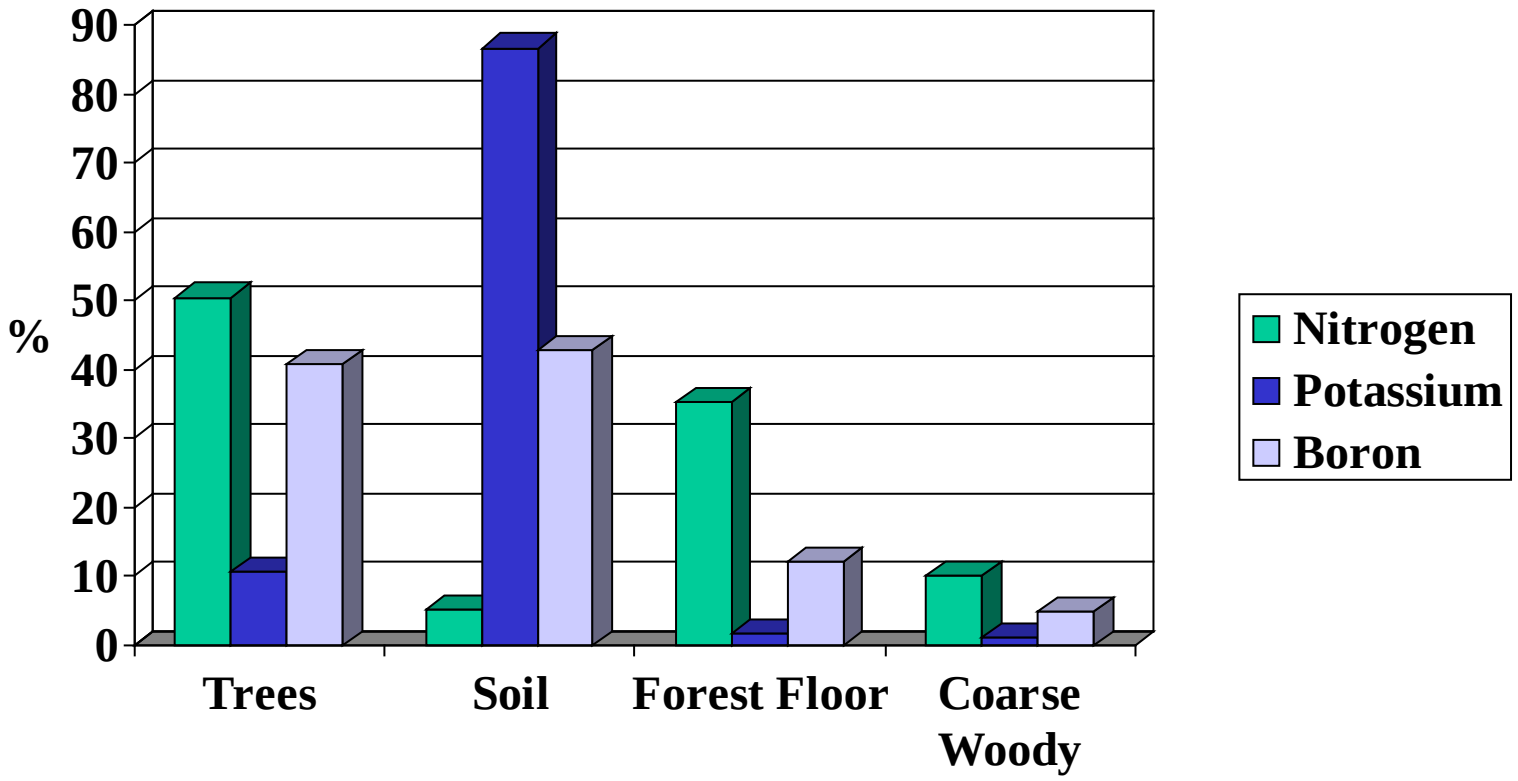
# Development of Nutrient Budget: Boxes

- Overstory biomass predicted using published equations and on-site destructive tree crown samples
- Forest floor and woody debris biomass estimated using field and lab measurements
- Soil and rock volume and mass calculated from field estimates, and nutrient estimates derived from laboratory chemical analyses

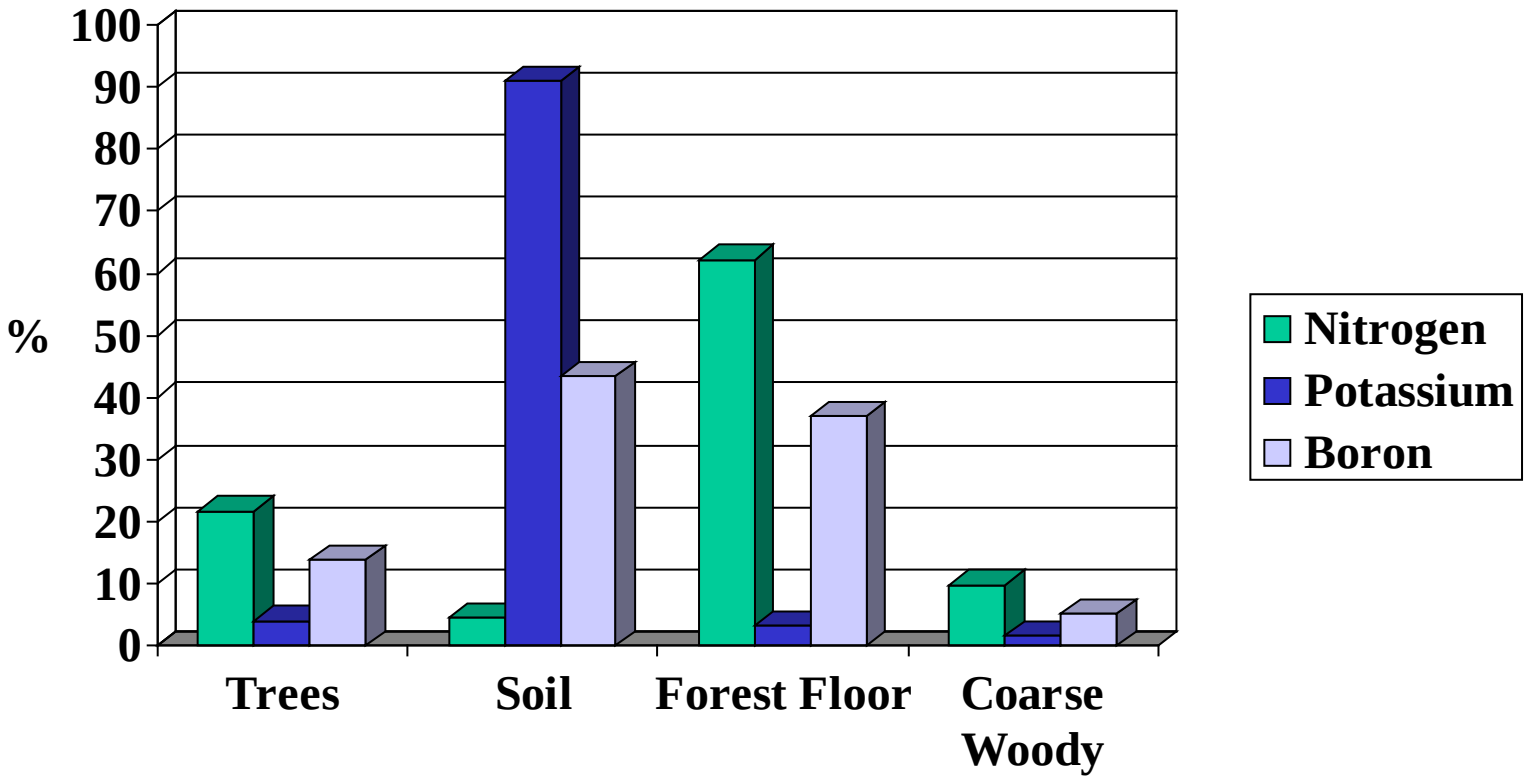
# IFTNC Forest Health Sites Sampled

| Installation | Rock Type | Habitat Type | Basal Area | DBH |
|---|---|---|---|---|
| 336 Spirit Lake | glacial | cedar | 141 | 8.5 |
| 338 Snowden | basalt | grand fir | 153 | 11.6 |
| 341 Grasshopper | granite(qd) | cedar | 247 | 5.8 |
| 354 Huckleberry | meta-sed. | grand fir | 61 | 6.9 |
| 355 Stanton Cr. | granite(?) | cedar | 158 | 6.2 |
| 362 Haverland | granite | grand fir | 124 | 8.4 |

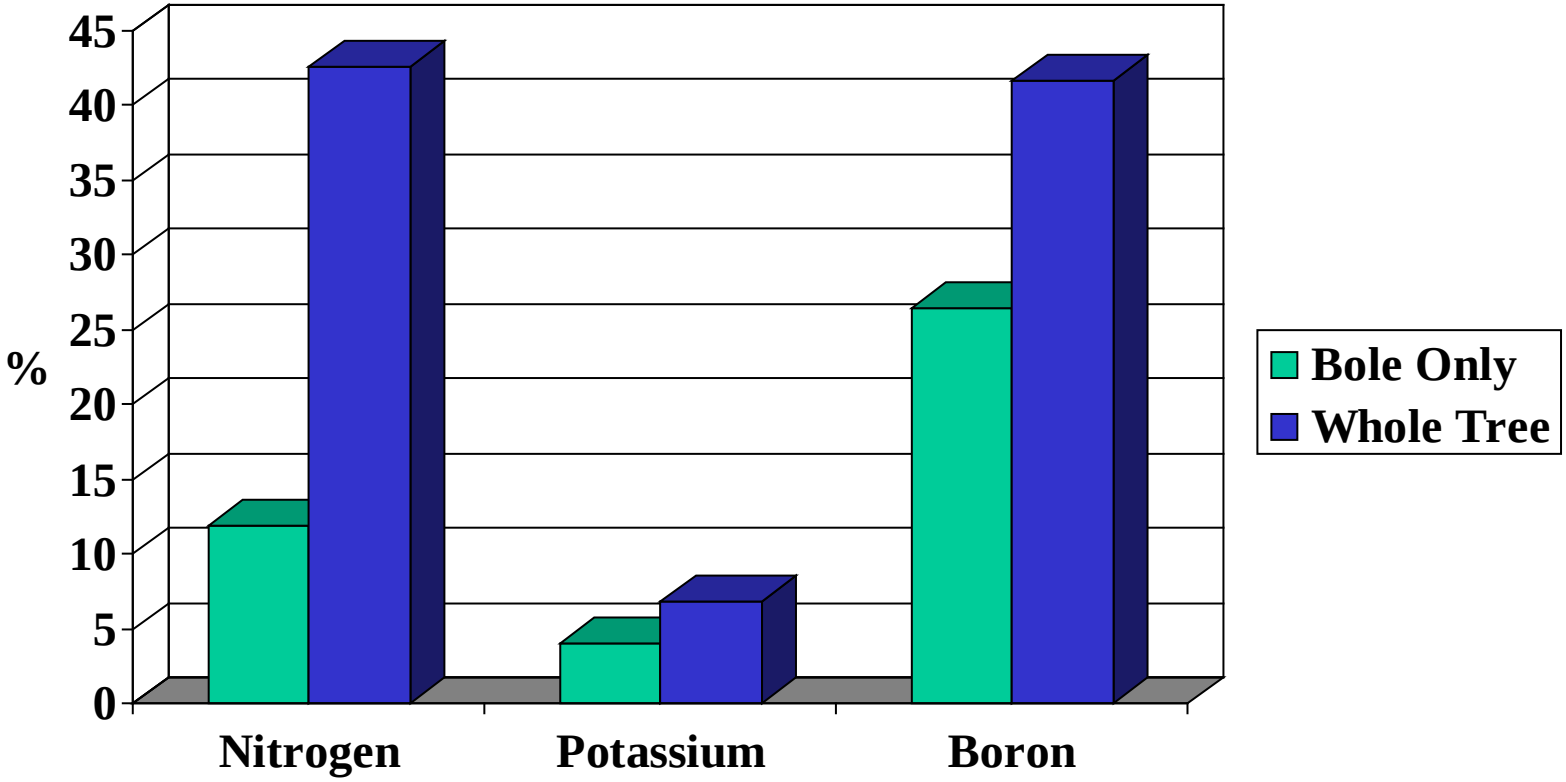
# Relative Nutrient Distributions in Forest Ecosystem Components for 5 IFTNC Sites



# Relative Nutrient Distributions in Forest Ecosystem Components for the Huckleberry Cr. Site



# Estimated Percent Nutrient Removals for Whole Tree versus Bole Only Harvest for the Snowden Site



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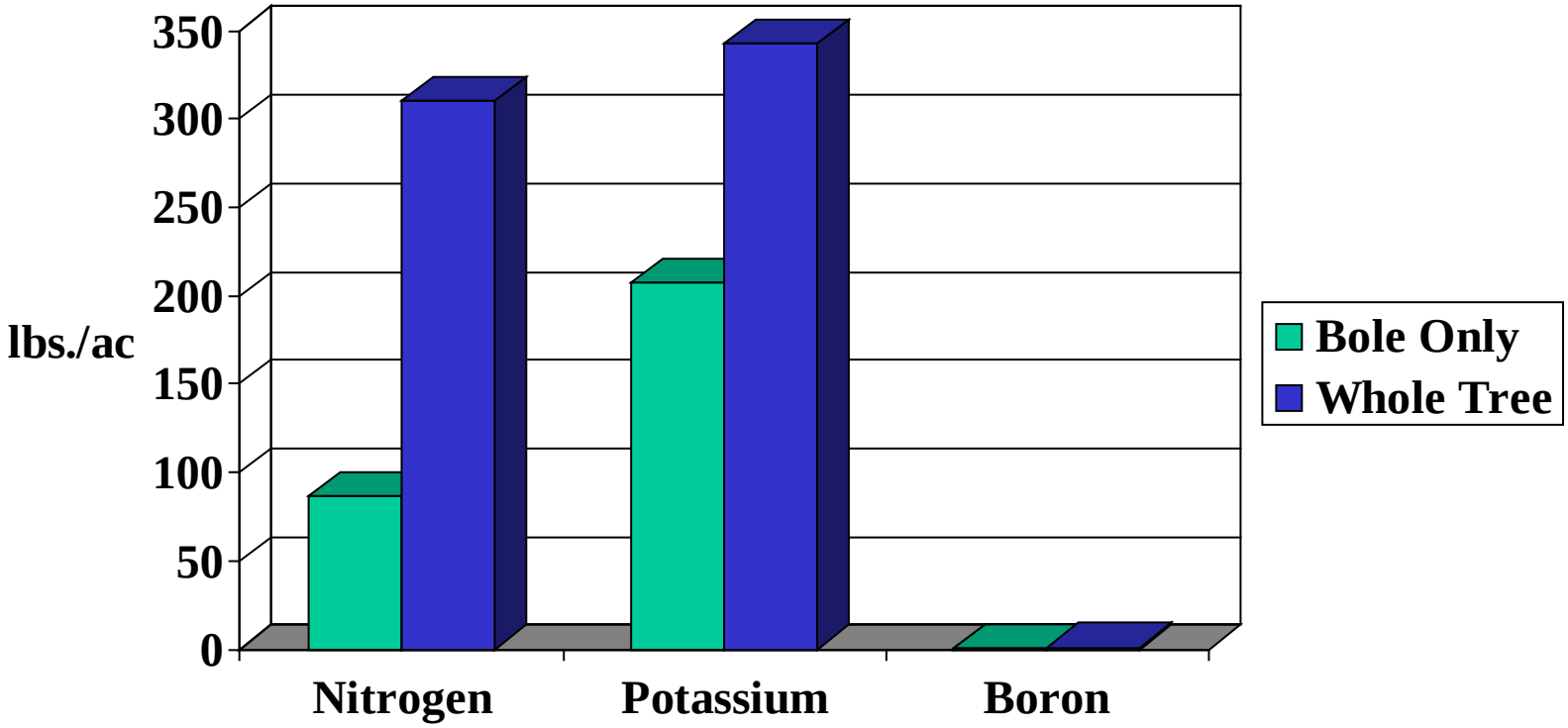
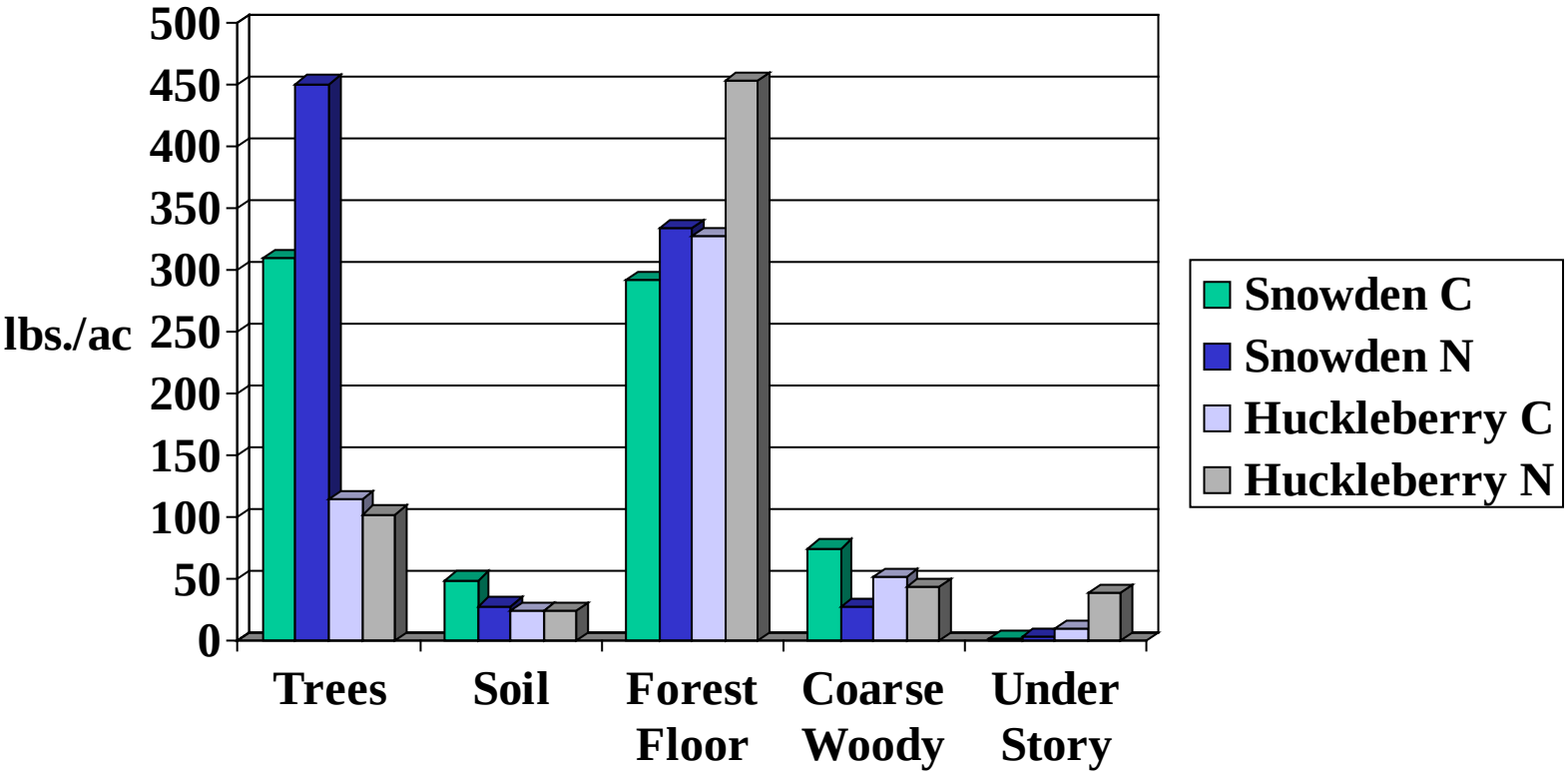


# Fertilization Effects on Nitrogen Distribution in Forest Ecosystem Components for 2 IFTNC Sites



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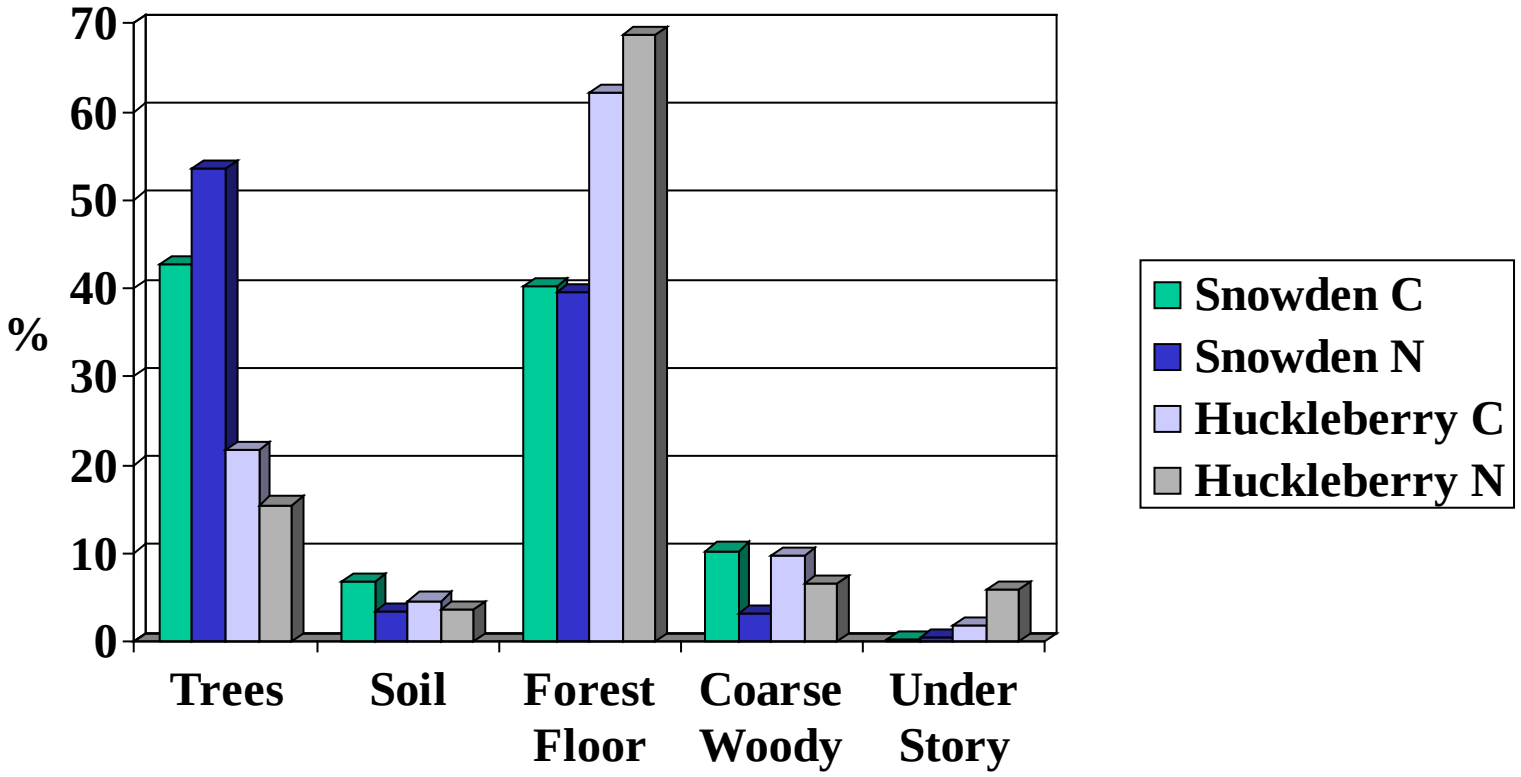
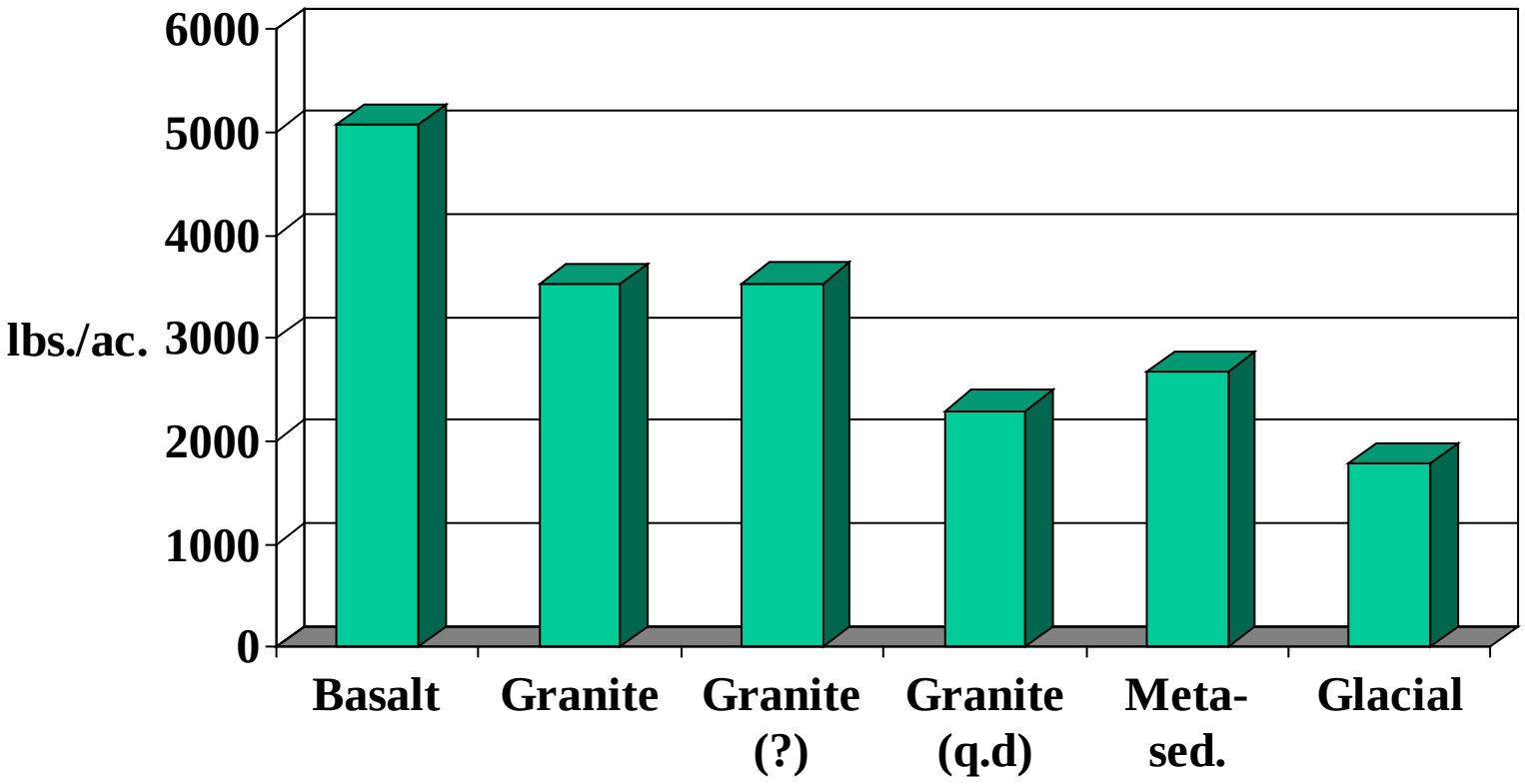


# Estimated Total Potassium in the Forest (excluding rocks) by Rock Type



# Summary

- For closed canopy stands, most of the nitrogen is in the trees and forest floor, while most of potassium is in the soil.
- For an open stand, much higher proportions of the nutrients are in the soil and forest floor with much less in the trees.
- Whole tree harvest would remove much higher nutrient amounts than bole only harvest at the Snowden site.

# Summary Cont.

- Much of the nitrogen added by fertilization went into the tree component for a site that showed large growth increases following treatment, while most of the added nitrogen went into the forest floor or understory for a site that showed negative fertilization response to nitrogen.
- Total forest potassium was strongly influenced by rock type. Basalt had 2 or 3 times more potassium than meta-sedimentary or glacial sites.
- A model such as this should be very useful in answering future nutrient management questions.