Post Harvest Fertilization as Mitigation for Nutrient Removals

St. Joe District
Panhandle N.F.

Intermountain Forest Tree
Nutrition Cooperative

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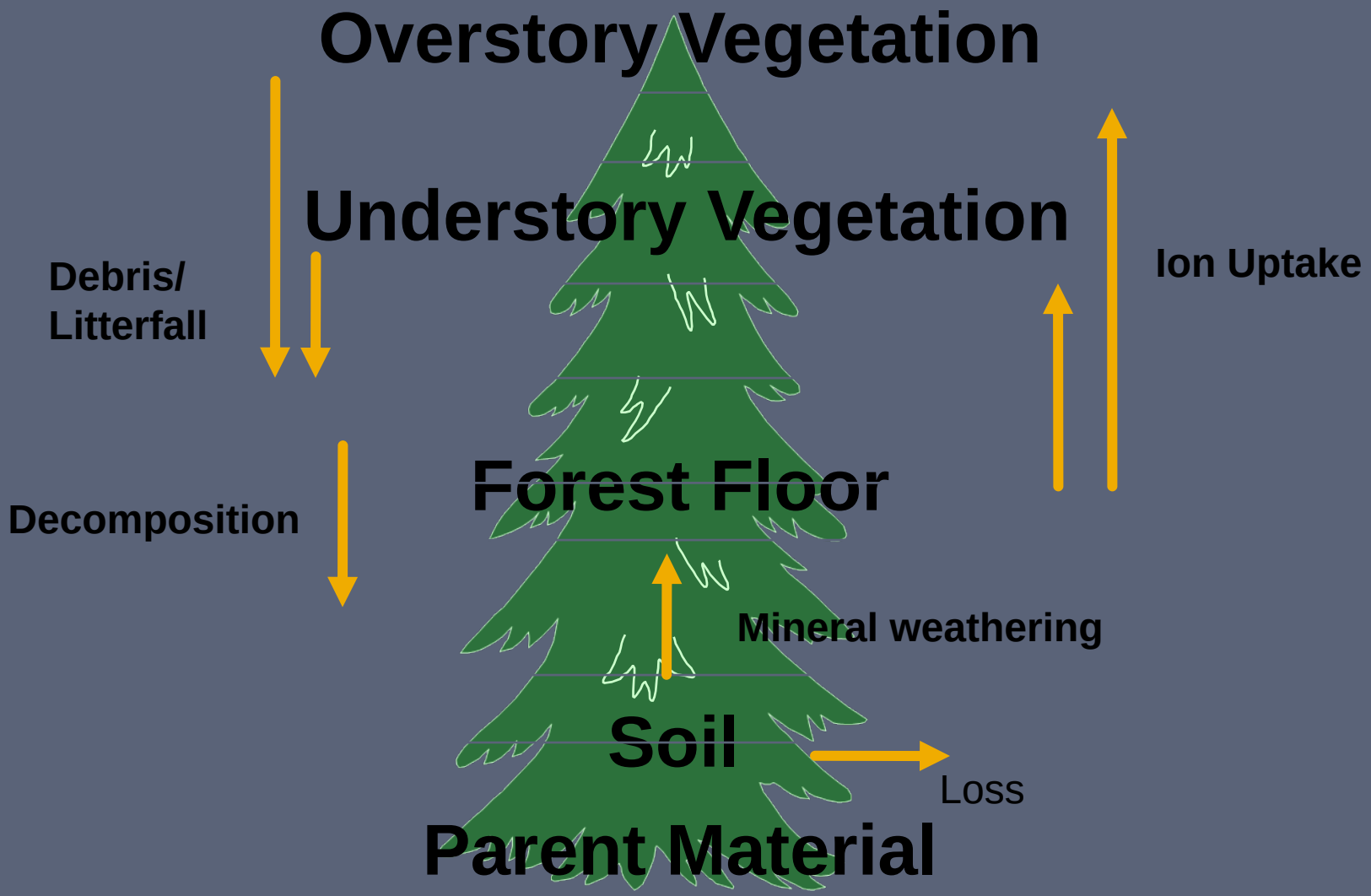
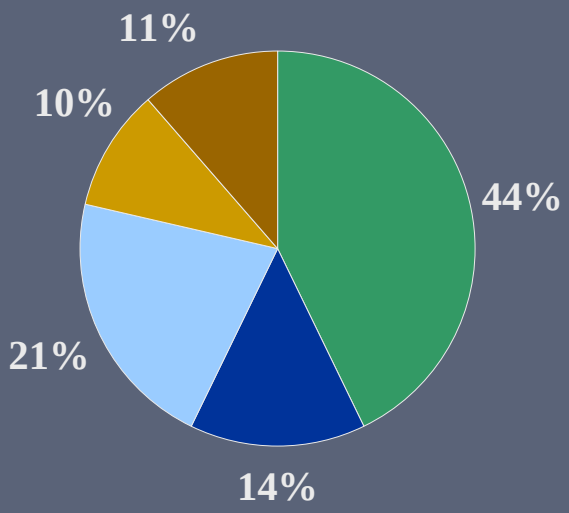
BASIC PREMISE:

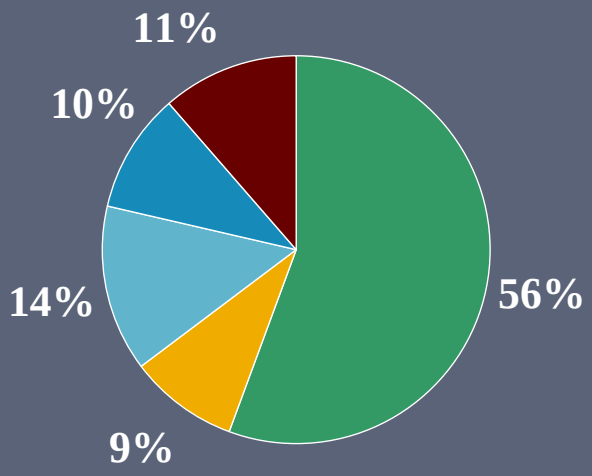
Trees play an important role in forest ecosystem nutrient cycling and in maintaining the total nutrient pool.



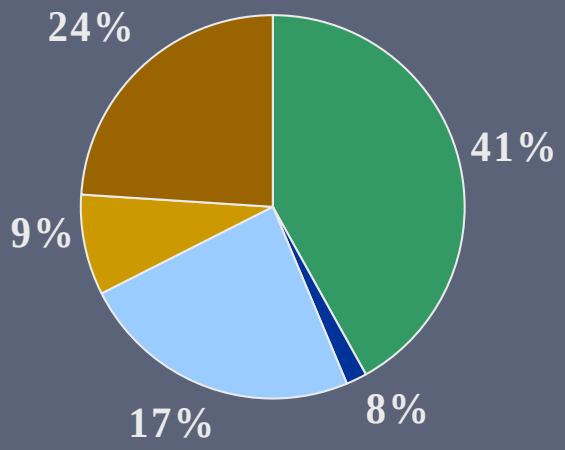
Nitrogen Distribution by Tree Component for DF, GF and PP



Douglas-fir



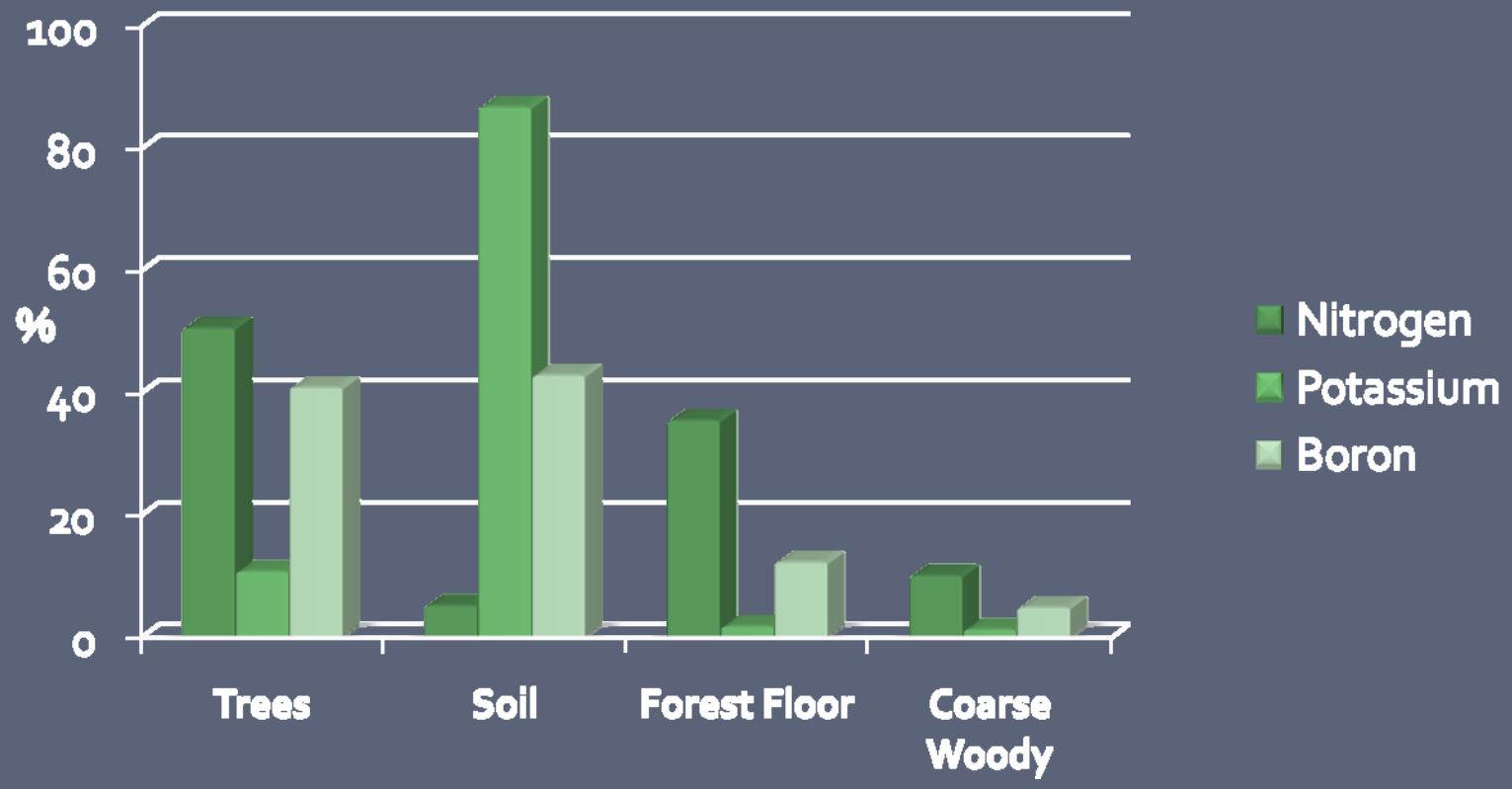
Grand fir



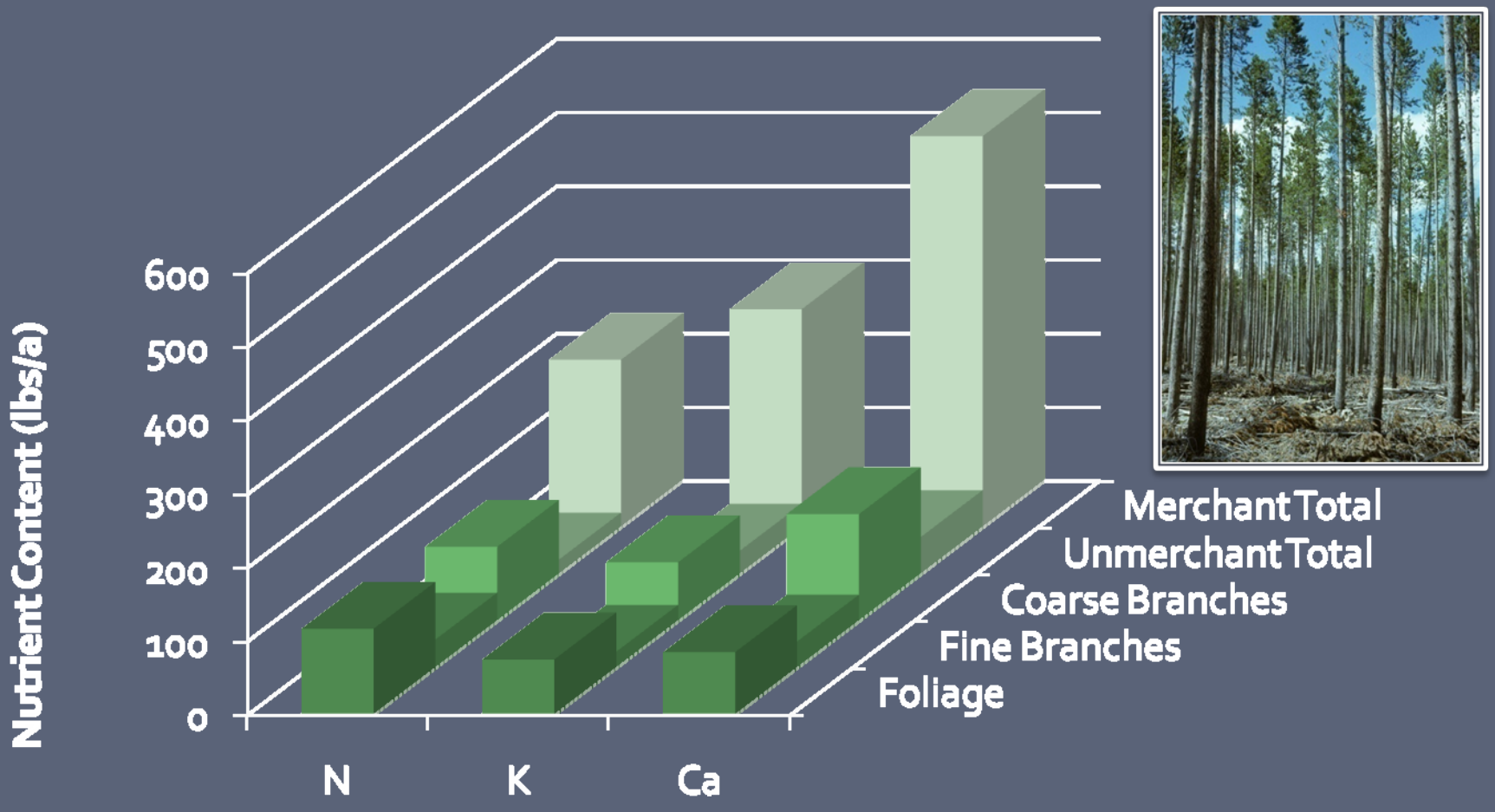
Ponderosa

Foliage
Twigs (<1/4 inch)
Branches (>1/4 inch)
Bark (on stem)
Stemwood

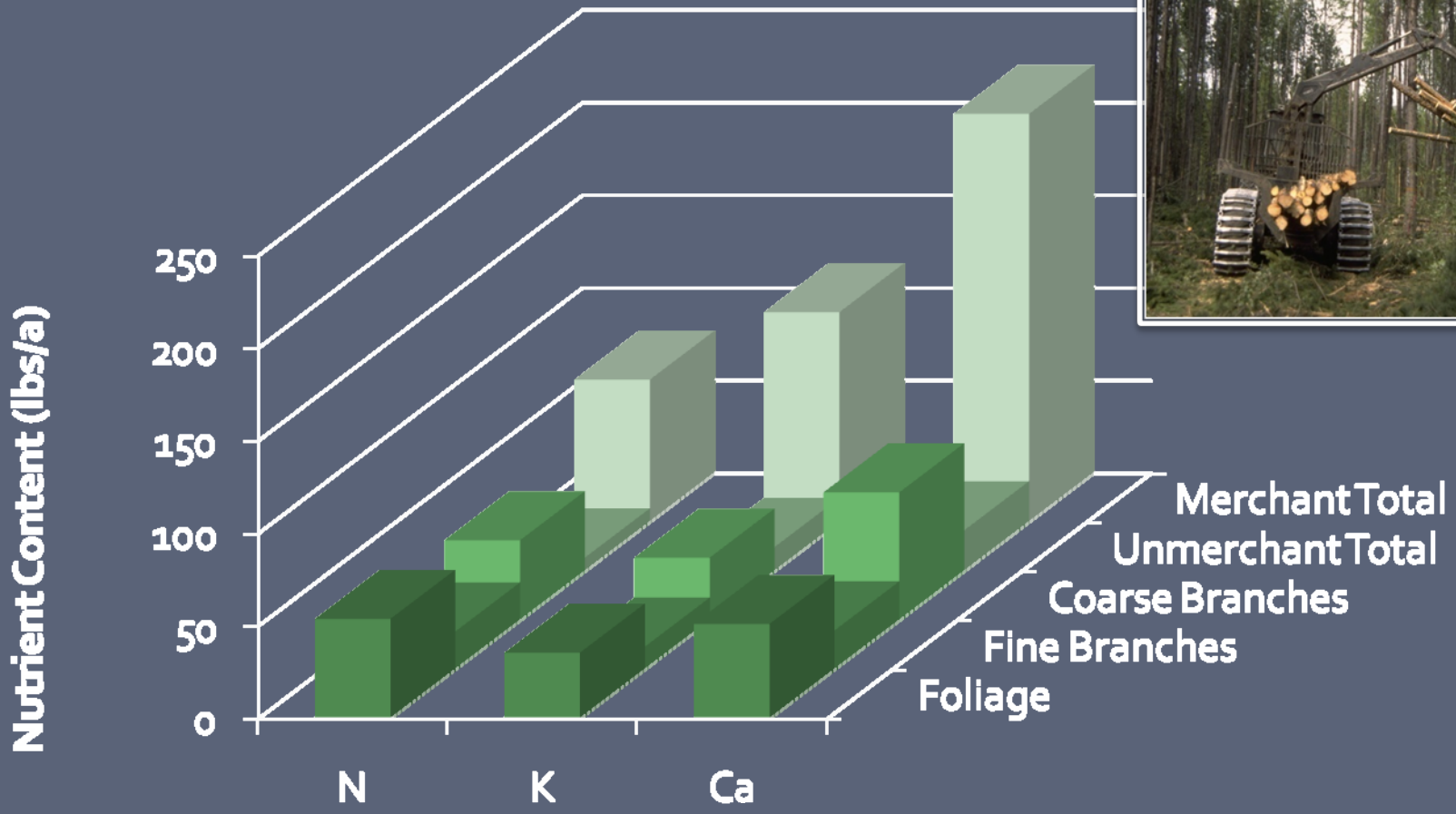
Relative Nutrient Distributions in Forest Ecosystem Components on IFTNC Sites



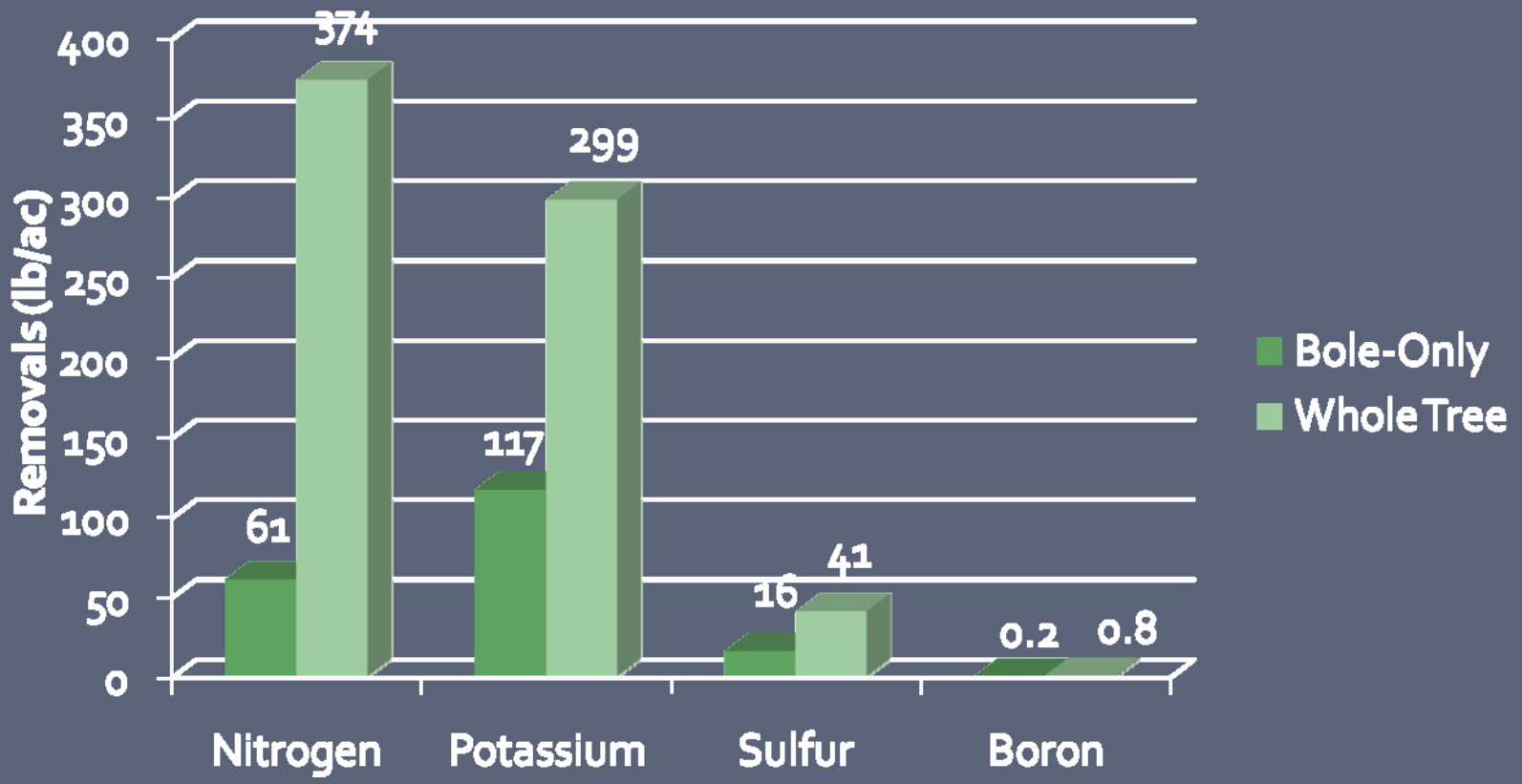
IFTNC Estimated Nutrients in Original Stand



IFTNC Estimated Nutrients in Materials Removed



Estimated Nutrient Removals for Whole Tree versus Bole Only Harvest



Post Harvest Fertilization Study

St. Joe District - Panhandle National Forest

The metasedimentary soil parent materials on the St. Joe District are inherently deficient in certain nutrients and therefore to maintain vigor and productivity sufficient nutrient capital needs to be maintained on forested sites

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Post harvest fertilization will be used as a mitigation measure for not harvesting with bole-only methods and over-wintering of tops before conducting subsequent site preparation activities

Post Harvest Fertilization Study

St. Joe District - Panhandle National Forest

OBJECTIVES:

Develop a method to determine appropriate post-harvest fertilization rates to replace nutrients lost during whole tree harvesting

Compare nutrient content of soils and vegetation on control plots with those fertilized at various rates and times over a five year period

Establish base-line data for permanent plots that can be monitored over time for differences in forest productivity and nutritional content

Post Harvest Fertilization Study

St. Joe District - Panhandle National Forest

MONITORING SITES:

SITE/SALE	HARVEST DATE	TREATMENTS*	TIMING
MOSSY CLIFF	2008 ?	OPERATIONAL 170 K, 3 B, 10 Cu	IMMEDIATE
TANGLEFOOT	~ 1997	OPERATIONAL 170 K, 3 B, 10 Cu	DELAYED IMMEDIATE
RYE ON HAM	2006	170 K, 3 B, 10 Cu	IMMEDIATE
		Full Replacement w/ N	IMMEDIATE
*** All sites have established controls**		Full Replacement w/o N	IMMEDIATE
		170 K, 3 B, 10 Cu	DELAYED 4 YEARS

Post Harvest Fertilization Study

St. Joe District - Panhandle National Forest

RYE ON HAM – Est. 2007

N,K,B,Cu Full Replacement	Fixed Rate K,B,Cu
Control	K,B,Cu Full Replacement
Fixed Rate K,B,Cu Delayed	

3 Blocks x 5 treatments =15 plots

Plot size = ½ acre plus 10' buffer

Middle Wallace Formation

Post Harvest Fertilization Study
St. Joe District - Panhandle National Forest
FVS Output: Rye on Ham Initial Nutrient Contents

OVERSTORY NUTRIENT COMPONENTS (lbs/acre)

STAND ID: Rye on Ham MGMT ID: Harvest

ROCK TYPE: Metasediment

Amount in standing crop before any cut

Year	Nutr	Unmerch Bark	Merch Bark	Unmerch Wood	Merch Wood
2004	Bio	1199.3	5793.8	39815.7	176982.6
	N	2.372	10.522	11.912	51.971
	K	2.210	10.379	47.579	209.756
	P	0.838	4.844	19.79	87.929
	Ca	7.620	32.211	59.67	263.413
	Mg	0.935	4.856	19.74	87.742
	S	0.242	1.115	3.986	17.698
	Mn	0.107	0.499	1.085	4.788
	Fe	0.141	0.686	4.814	21.310
	Zn	0.038	0.181	1.019	4.506
	B	0.010	0.046	0.159	0.697
	Cu	0.008	0.037	0.744	3.297

Post Harvest Fertilization Study
St. Joe District - Panhandle National Forest
FVS Output: Rye on Ham Nutrient Content after Harvest

Amount (lbs/ac) Remaining and Removed in Cut

Year	Nutr	Total	Remaining	Removed
2006	N	196.5	66.6	129.9
	K	337.3	58.2	279.1
	P	134.2	20.6	113.6
	Ca	452.1	76.8	375.3
	Mg	133.5	20.3	113.2
	S	33.4	7.2	26.2
	Mn	9.4	2.1	7.3
	Fe	28.7	3.4	25.3
	Zn	6.9	1.1	5.8
	B	1.2	0.2	1.0
	Cu	4.9	0.8	4.1

Post Harvest Fertilization Study

St. Joe District - Panhandle National Forest

Measurements and Methods:

Measurements

Foliar Nutrient Status

- Overstory, initial and 5-Year
- Understory, 2 and 5-Year

Plant Available Nutrients

- Resin Capsules , annually

Soil Chemistry Profile

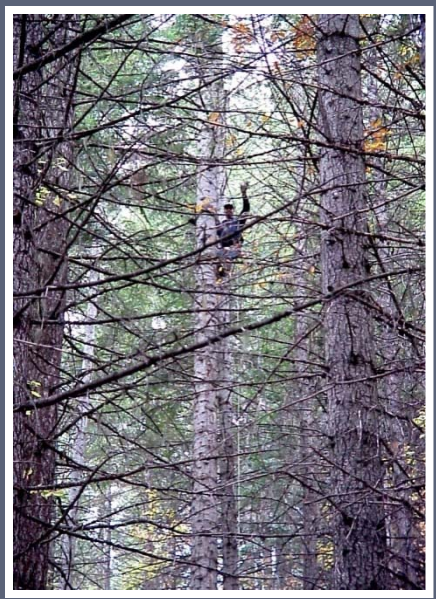
- OM, C, Nutrient Soil Pool
- Forest Floor and CWD

Soil Biology Profile

- Biolog, PFLA
- Decomposition, Microbial Activity

Productivity

- Growth – Residual and Seedlings



Post Harvest Fertilization Study

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Thank You - Questions

St. Joe River Drainage Looking Towards Shefoot