

# Stocking Levels and Their Influence on Riparian Inputs

Presentation to IFTNC

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# Presentation Outline

- **Brief Overview of our Study Objectives**
- **Maximum Stocking Levels Indicated by IDL's Continuous Forest Inventory (CFI)**
- **Response of LWD and SHD to Residual Stocking Levels by Forest Type**



# Current Riparian Practices

Carefully remove the mature timber from the Stream Protection Zone to prevent destruction of shade and vegetation filters. Leave 75 percent of the current shade over Class I streams. Standing trees including conifers, hardwoods, and snags will be left within 50 feet of the ordinary high water mark on each side of all Class I streams in the following minimum numbers per 1,000 feet of stream:

Minimum Standing Trees per 1,000 Feet Required (each side)				
Tree Diameter (DBH)	Class I	Class I	Class I	Class II*
	Stream Width			
	Over 20'	10'-20'	Under 10'	
3 - 7.9"	200	200	200	140
8 - 11.9"	42	42	42	—
12 - 19.9"	21	21	—	—
20" +	4	—	—	—

\* Provide soil stabilization and water filtering along Class II streams that flow into Class I streams for 30 feet each side of the SPZ. No standing trees are required for Class II streams with the 5-foot SPZ.



# Key Premises and Hypotheses

- **Key Premises:**
  - Ecological differences exist
  - Biological maxima exist
  - They vary over space/time
- **Key Hypotheses:**
  - They influence maximum possible LWD/SHD inputs
  - They influence the rate of response to ↓ stocking



# Overall Study Objectives

Identify Forest Types/Stands

Simulate Harvest and Growth

Simulate LWD and SHD

We seek to provide insight that leads to meaningful and implementable revisions to stand density targets

Simulate LWD/SHD for multiple forest types and residual stocking levels to use relationships to inform rule-making

Review Results

Identify Targets

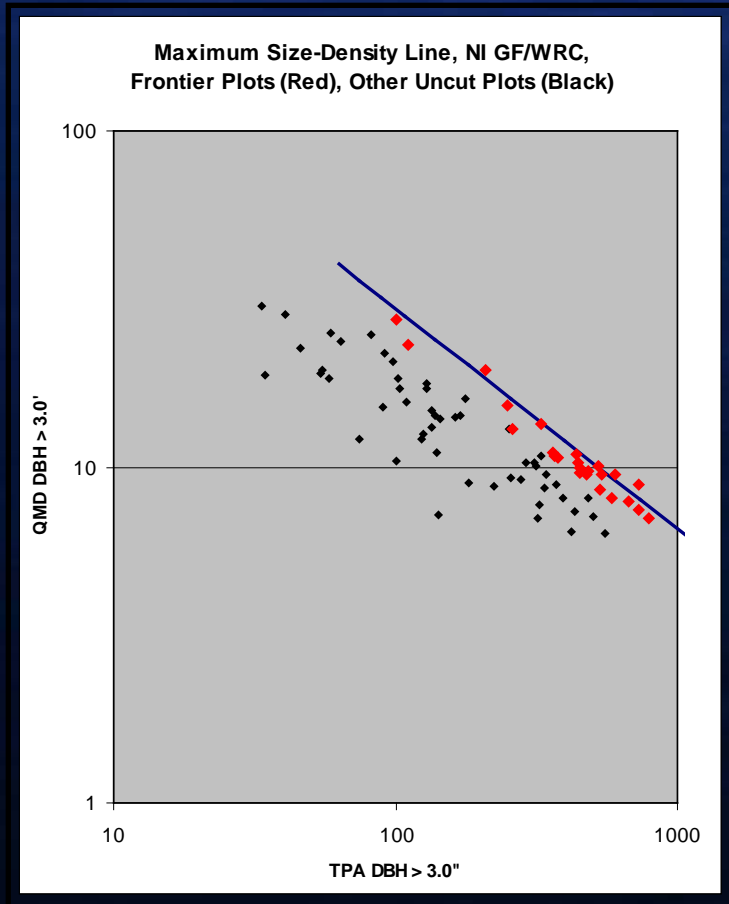


# Identifying Forest Types and Defining Stand Conditions

IDAHO DEPARTMENT OF LANDS CFI PLOT FIELD DATA SHEET														
AREA NUMBER	PLOT NUMBER	SUB PLOT NUMBER	MONTH	YEAR	TOWNSHIP	RANGE	SECTION	FORTY	TIMBER TYPE	CRUISERS:				
										DATE:				
MEASURED TREES														
TREE NUMBER	SPECIES	DBH	LOG HEIGHT	TOTAL HEIGHT	PRODUCT	AGE	MORTALITY	SAWLOG CULL PERCENT	VIGOR CLASS	CROWN CLASS	TREE STATUS	% LIVE CROWN	NOTES	
01														
02														
03														
04														
05														
06														
07														
08														
09														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
SEEDLING PLOT (ALL STEMS UNDER 4.5 FEET TALL) 1 / 400 ACRE - 5.9 FOOT RADIUS														
DF	PP	WP	LPP	GF	AF	ES	WH	WR	WL	JUN	PIN	WB	YEW	HW
DIRECTIONS TO PLOT:														
CORNER INFORMATION:														

- Based on analysis of IDL's CFI data set
  - Randomly located plots
  - Across IDL lands
  - Reliable and consistent
- Used the CFI data to:
  - Identify max size-density
  - Inform simulation models

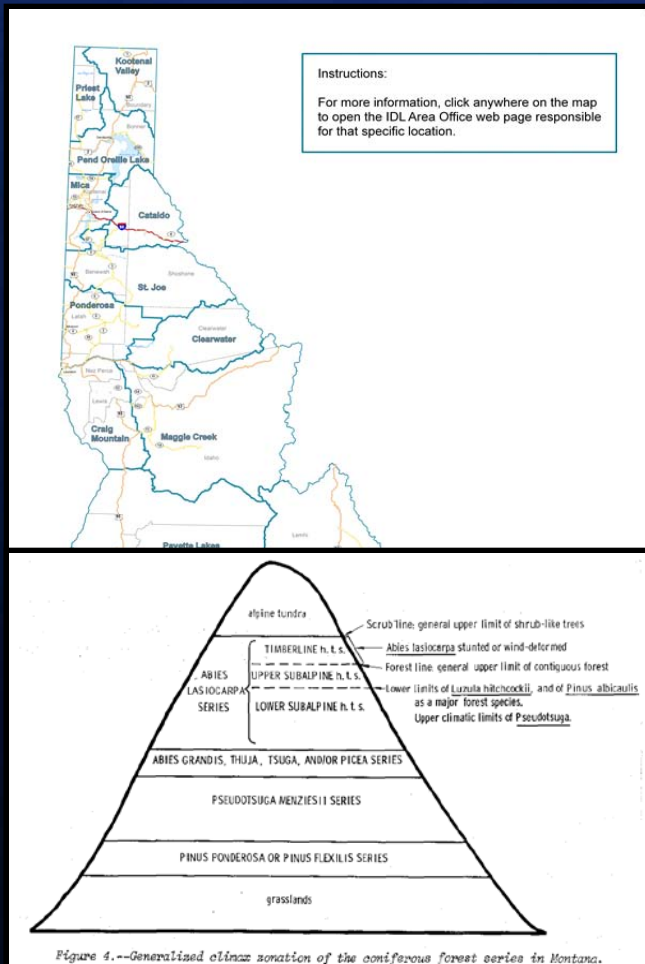
# Identifying Maximum Size-Density Relationships



- Select Candidate Plots
  - From “Uncut” stands
- Identify Max SDI Line
  - Fit a log-log regression of  $TPA = a + b * QMD$
  - Used trees g.t. 3.0” DBH
  - Iteratively fit/screen s.t. ~20+ “frontier” plots left
  - Fit a final regression and added  $s_{y,x}$  to intercept



# Investigating Differences and Trends in Maximum Size-Density

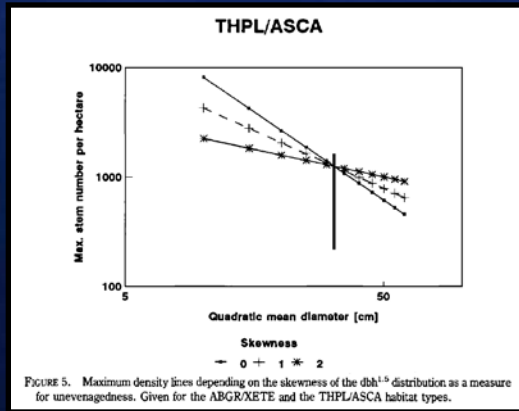


- Testing Regional Groups
  - Supervisory Areas Groups
  - Different combinations to discriminate NI v. CI
- Testing Habitat Types
  - Pfister et al. 1977 Series
  - Considered meaningful Habitat Type Groups in Monserud (1984)

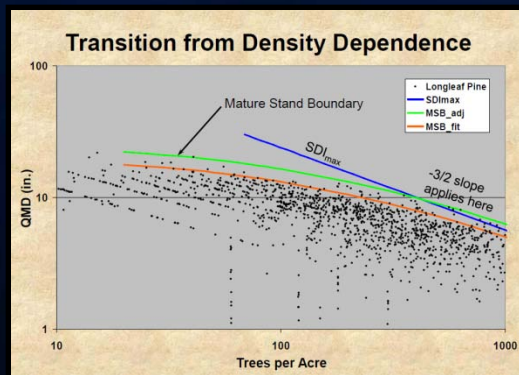




# Investigating Differences and Trends in Maximum Size-Density



Sterba and Monserud 1993

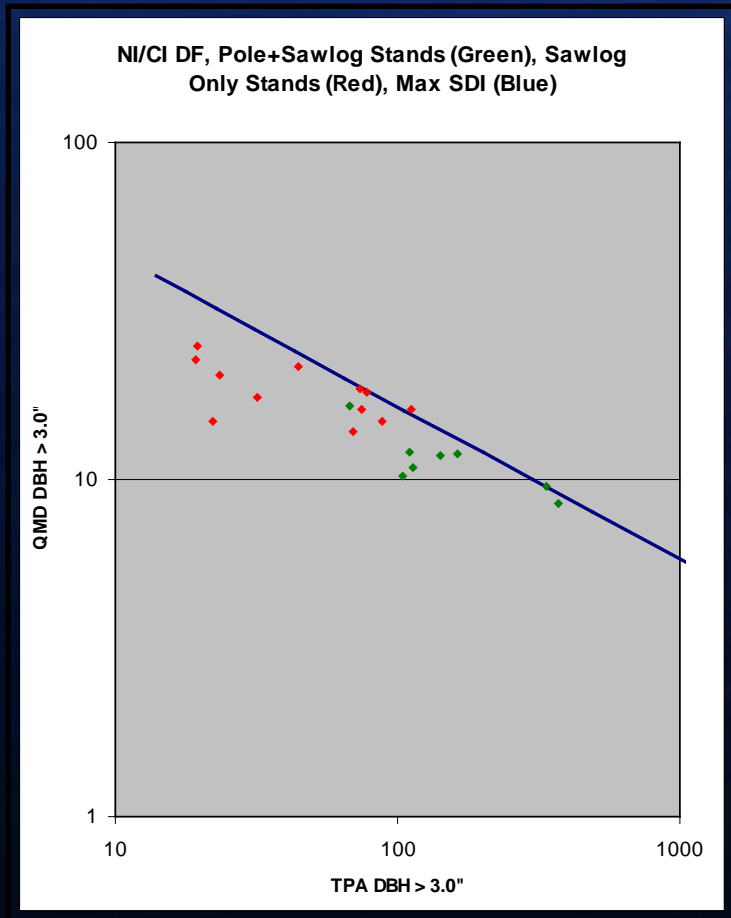


Shaw and Long 2009

- Testing Structure
  - Considered skewness per findings of Sterba and Monserud (1993)
  - We found meaningful differences, but none were significant
  - Therefore, dropped as a discriminator, but caution remains



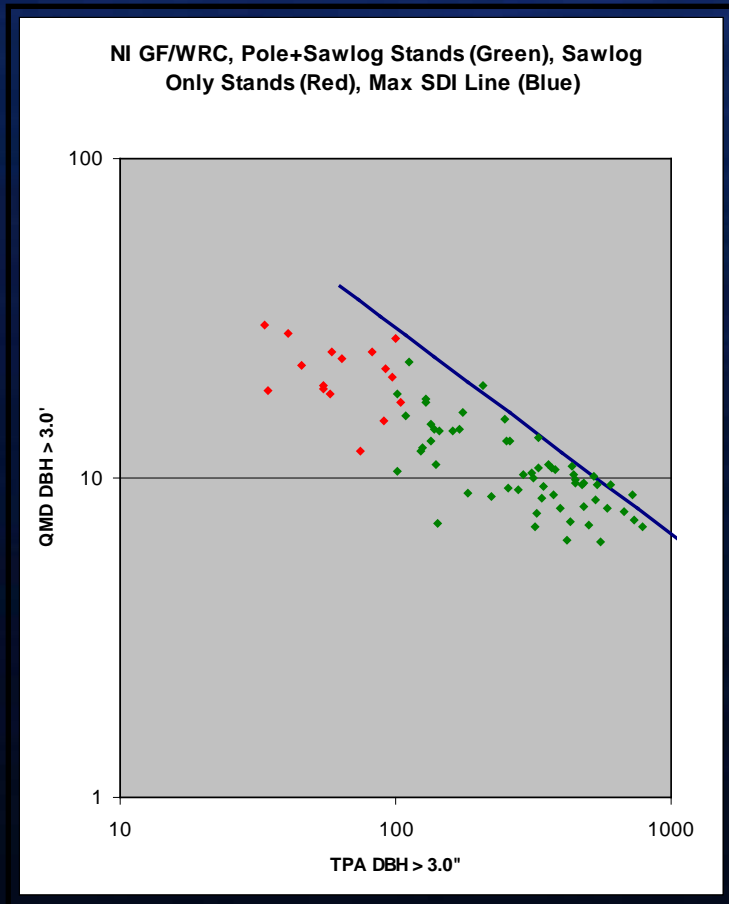
# Forest Type: NI-CI DF



- **Forest Type Definition**
  - Priest Lake/Kootenai to Craig Mtn/Maggie Cr.
  - Habitat Types 200-399
- **Max Stocking Levels**
  - Frontier BA: 130 (25)
  - Self-thinned SDI: 300
  - Self-thinned BA: 165
  - Theoretical SDI: 355
  - Theoretical BA: 190



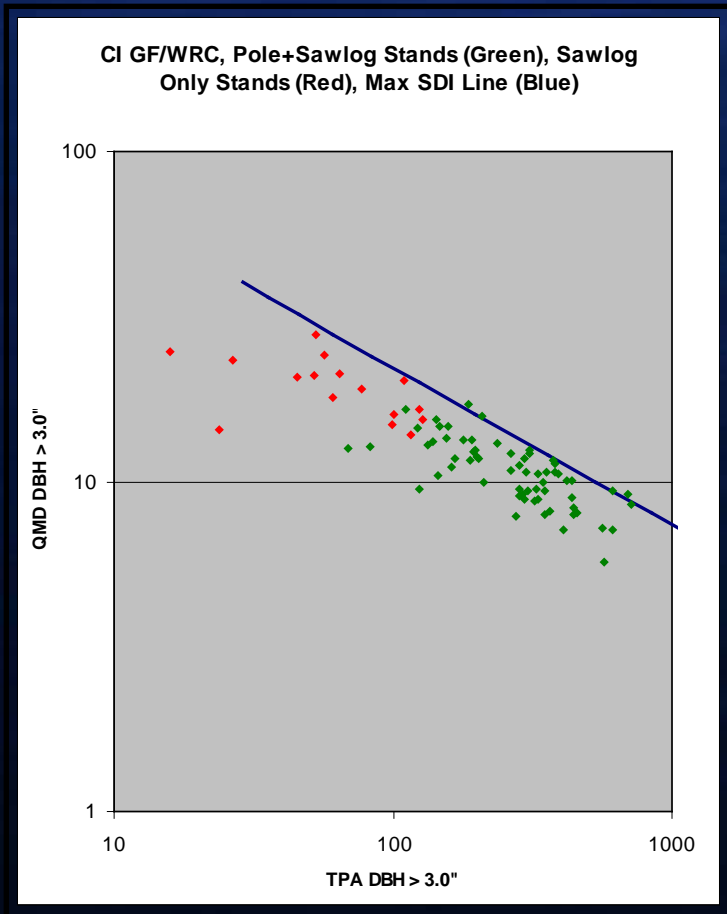
# Forest Type: NI GF-WRC



- **Forest Type Definition**
  - Priest Lake/Kootenai Valley to St. Joe
  - Habitat Types 500-569
- **Max Stocking Levels**
  - Frontier BA: 275 (60)
  - Self-thin SDI: 530
  - Self-thin BA: 290
  - Theoretical SDI: 630
  - Theoretical BA: 340



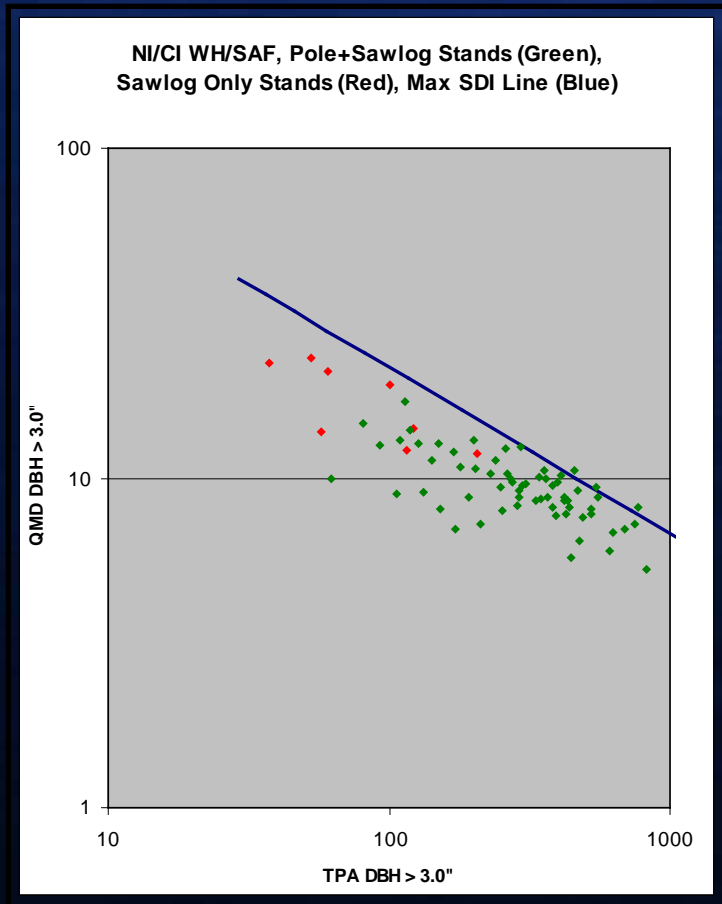
# Forest Type: CI GF-WRC



- **Forest Type Definition**
  - Ponderosa/Clearwater to Craig Mtn/Maggie Cr
  - Habitat Types 500-569
- **Max Stocking Levels**
  - Frontier BA: 250 (30)
  - Self-thin SDI: 530
  - Self-thin BA: 290
  - Theoretical SDI: 625
  - Theoretical BA: 340



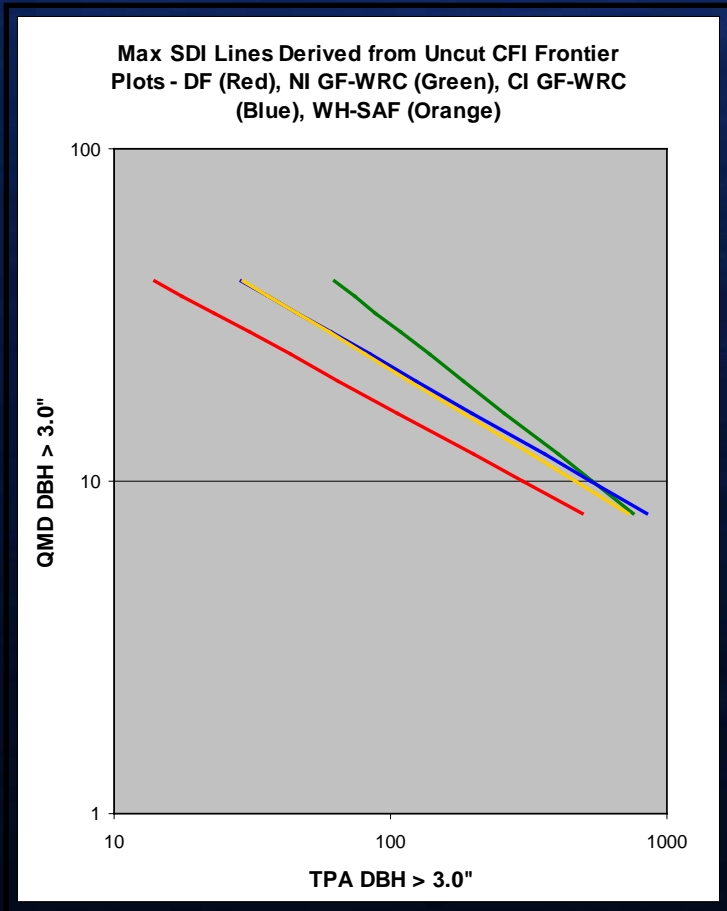
# Forest Type: NI-CI WH-SAF



- **Forest Type Definition**
  - Priest Lake/Kootenai to Craig Mtn/Maggie Cr.
  - Habitat Types 570-799
- **Max Stocking Levels**
  - Frontier BA: 220 (30)
  - Self-thin SDI: 465
  - Self-thin BA: 255
  - Theoretical SDI: 550
  - Theoretical BA: 300



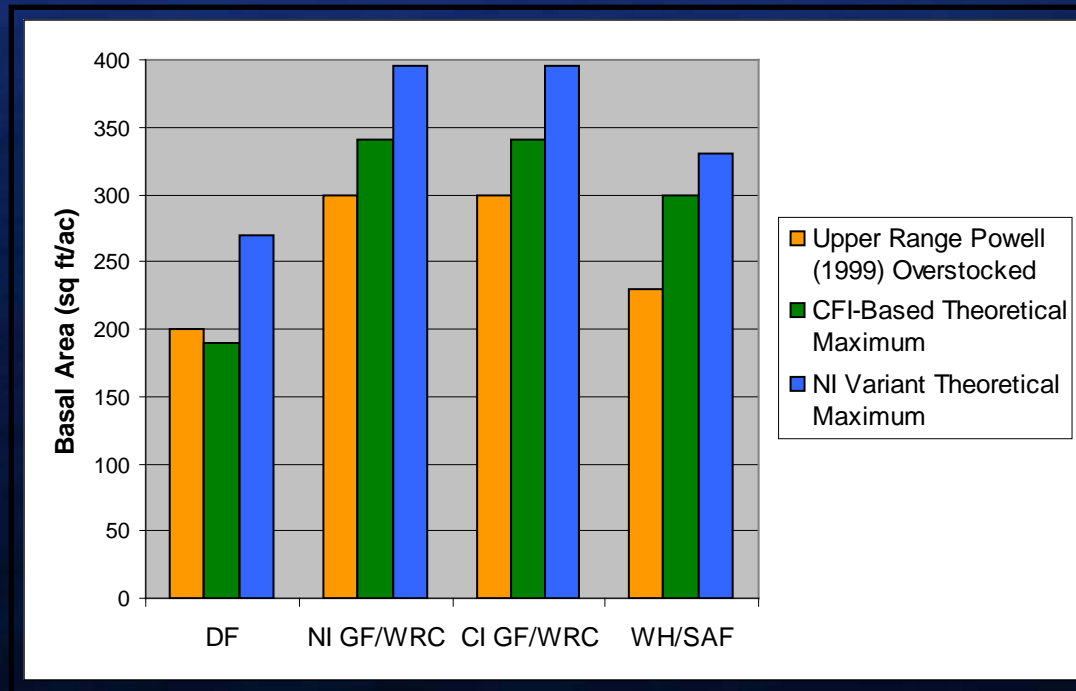
# Forest Type Comparisons



- **Meaningful trends exist among SAs and HTGs**
  - NI-CI DF is the lowest
  - NI GF-WRC is highest
  - Others are intermediate
- **Slopes tell a story, too**
  - NI GF-WRC is  $\sim -3/2$
  - Others are  $\sim -2$

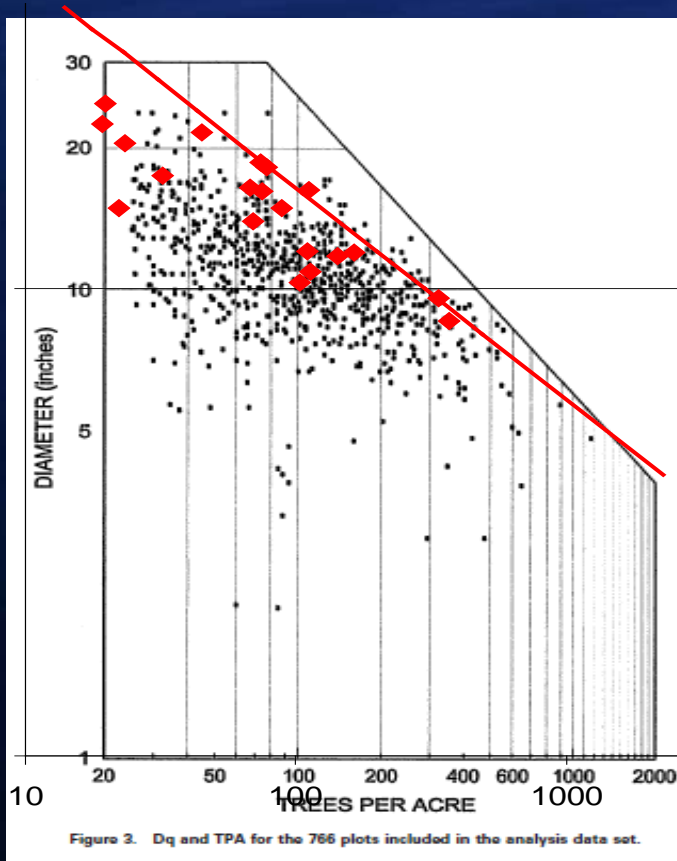


# Forest Type Comparisons



- Trends among HTGs ~ other studies
- Plausible differences among regions

# Several Concerns to Acknowledge



- Should we be concerned?
  - Very low DF maximum
  - Slopes not equal to  $-3/2$
  - SDI<sub>max</sub> via other methods
  - Maxima lower than FVS
  - Managed stands excluded
  - Most plots are in uplands
  - Tailing-off at upper QMDs

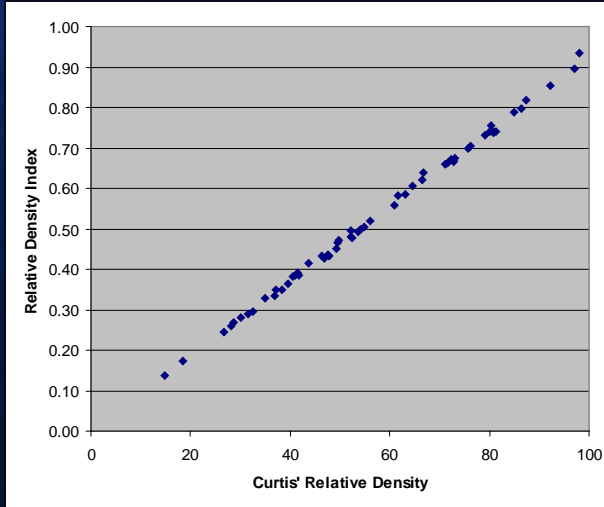
DF Max SDI v. Long and Shaw (2005) PP



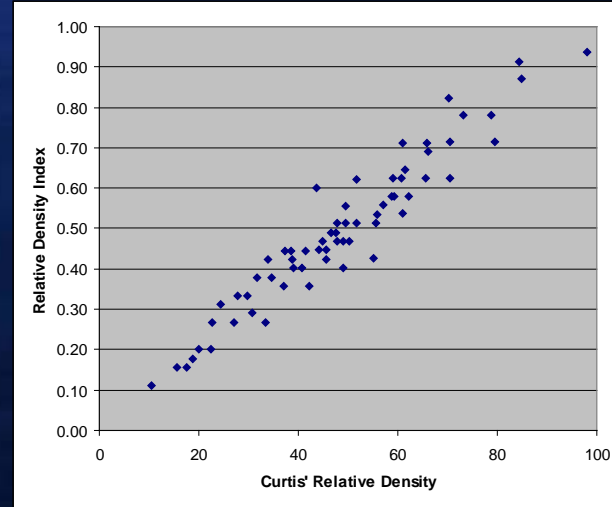


# Putting Relative Density onto a Common Scale - Curtis' RD

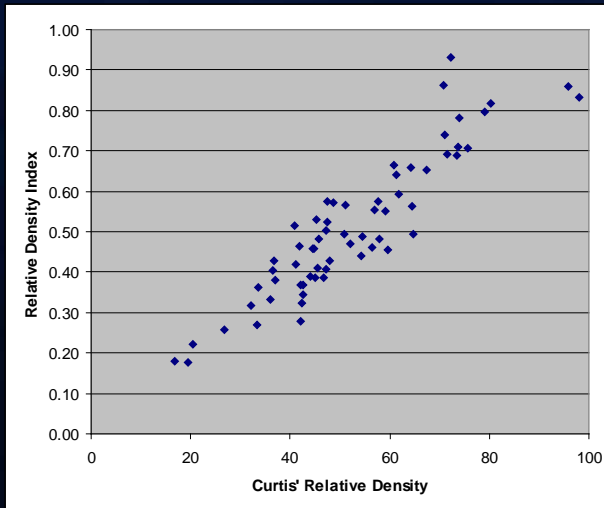
NI GF-WRC



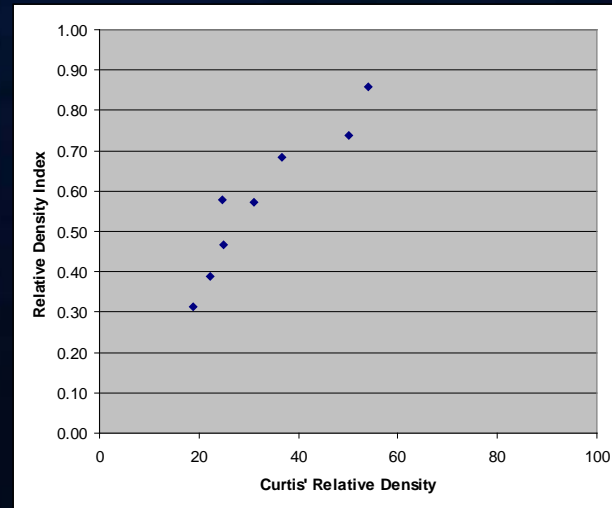
NI-CI WH-SAF



CI GF-WRC

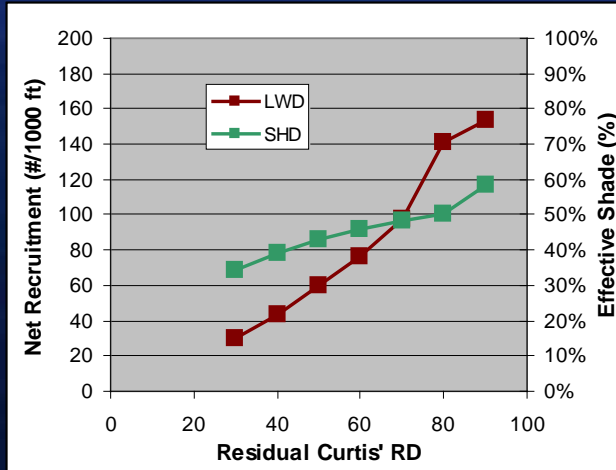


NI-CI DF

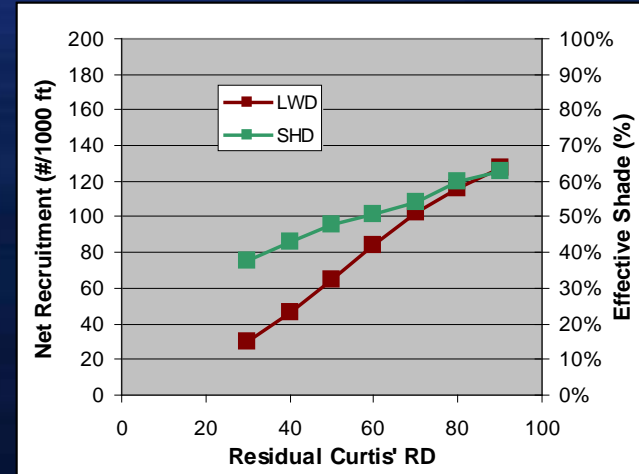


# Response of LWD and SHD by Residual Curtis' RD

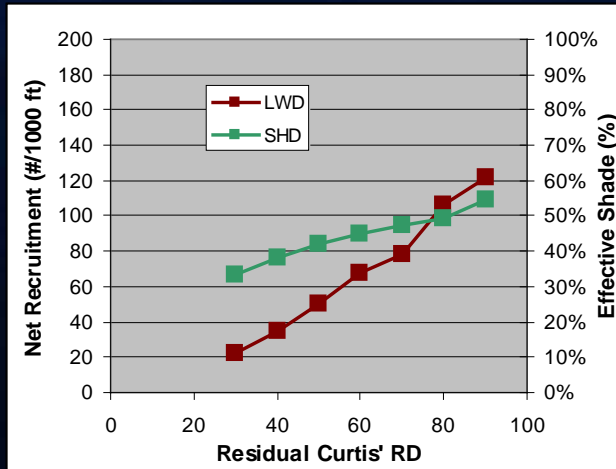
NI GF-WRC



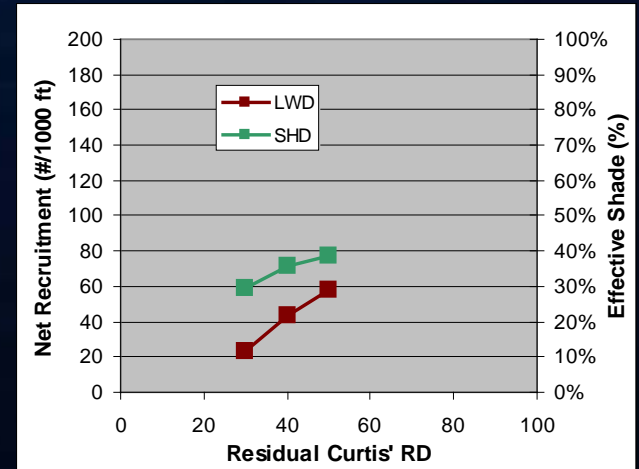
NI-CI WH-SAF



CI GF-WRC



NI-CI DF



# Reviewing our Premises/Hypotheses

- **Key Premises:**



- Ecological differences exist



- Biological maxima exist



- They vary over space/time

- **Key Hypotheses:**



- They influence maximum possible LWD/SHD inputs



- They influence the rate of response to ↓ stocking



# Discussion and Questions...

