The Economic and Market Impacts of Swiss Needle Cast in Western Oregon

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What is the economic impact of Swiss Needle Cast?

USUAL LOGIC

GROWTH REDUCTION → **LOWER HARVESTABLE VOLUMES** (HARVEST REDUCTION = GROWTH LOSS) → **REDUCED HARVEST X PRICE = VALUE OF LOSS**

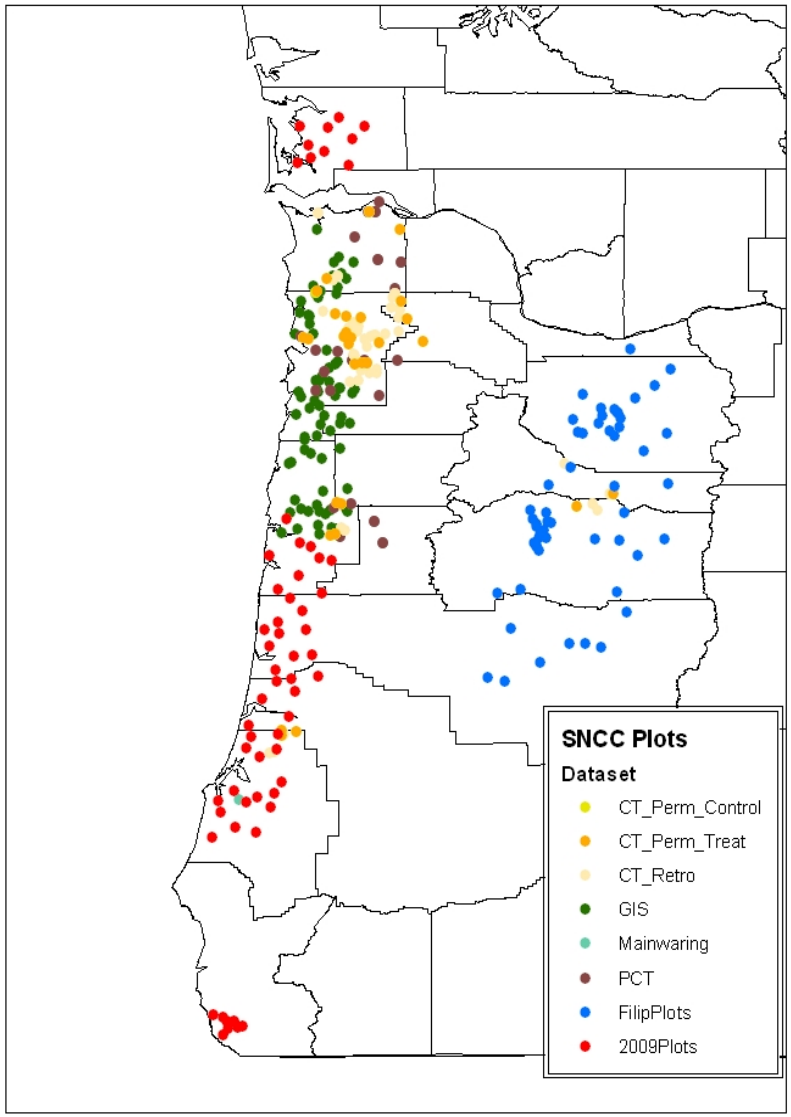
COMPLICATIONS

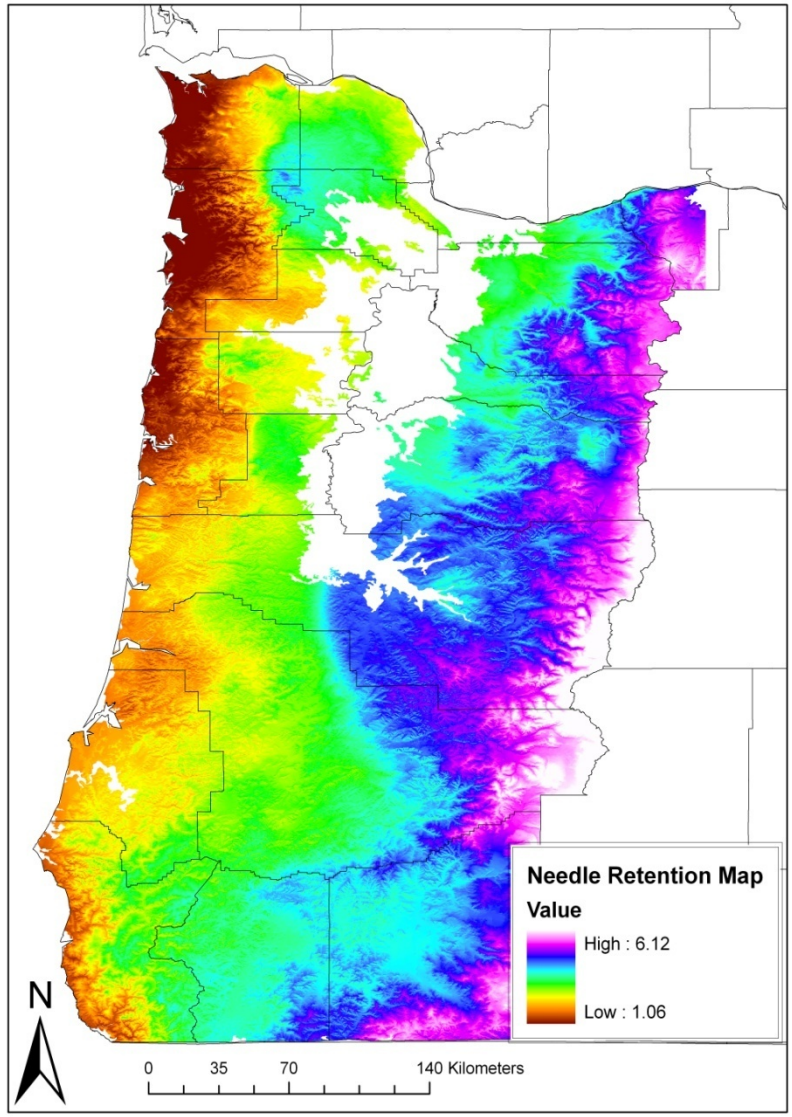
- **GROWTH REDUCTION APPLIED TO ALL SPECIES**
- **HARVESTS DEPEND ON MARKETS**
- **SUBSTITUTION AMONG SPECIES AND REGIONS**
- **PRICE AND CAPACITY VARY WITH HARVEST IMPACT**

ANALYTICAL APPROACH

- Model SNC needle retention across western Oregon based on augmented SNCC plots (as function of January temperature and July Climate Moisture Index)
- Apply model to detailed climate map of western Oregon to project needle retention by pixel (map)—climate held "fixed" in projections
- Project stand development on FIA plots using ORGANON with SNC growth reductions for Douglas-fir from Garber et al. (2007) model
- Simulate western Oregon timber harvest and log market with and without SNC growth adjustments

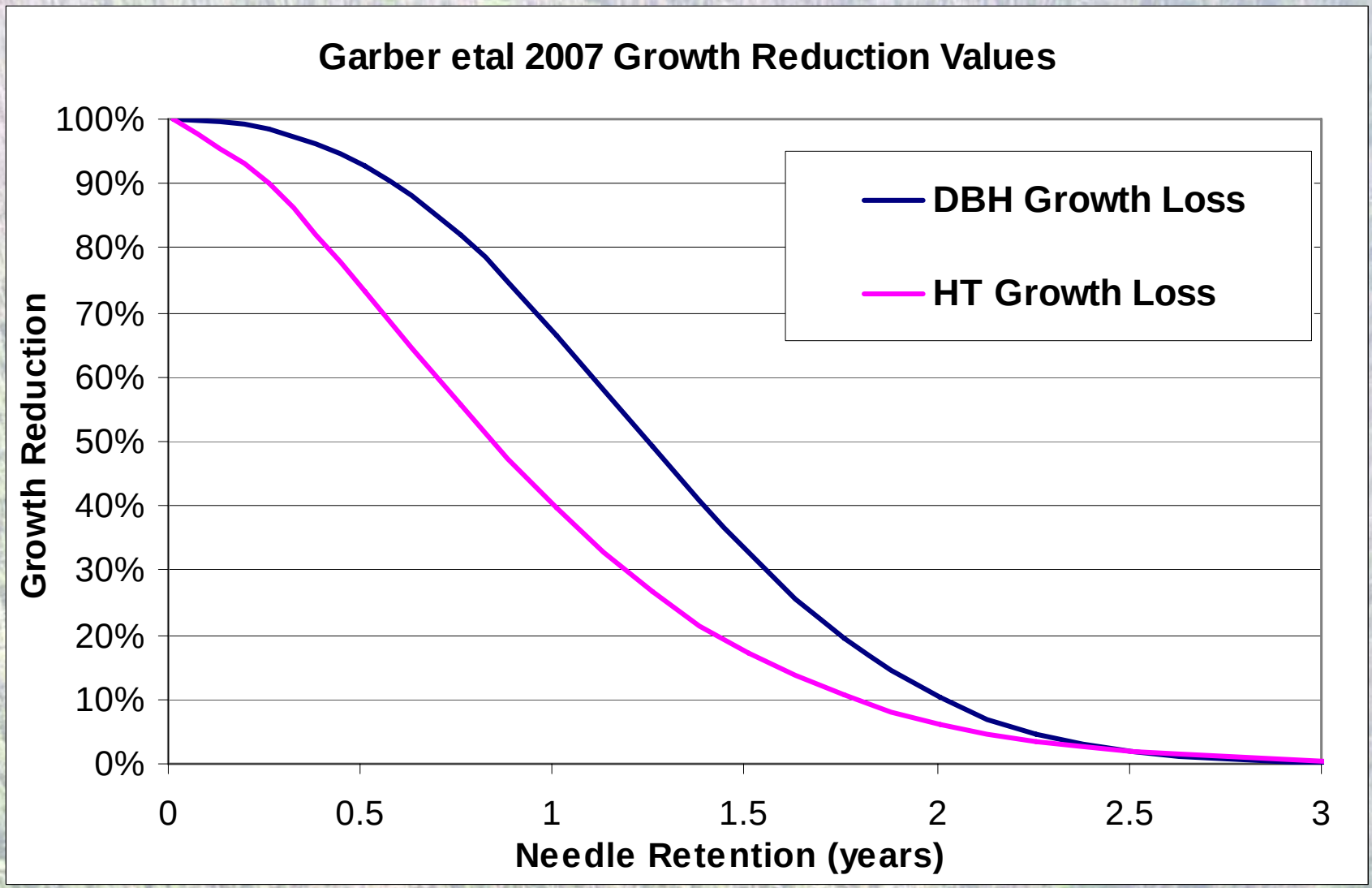
Needle Retention Model





NO CLIMATE CHANGE

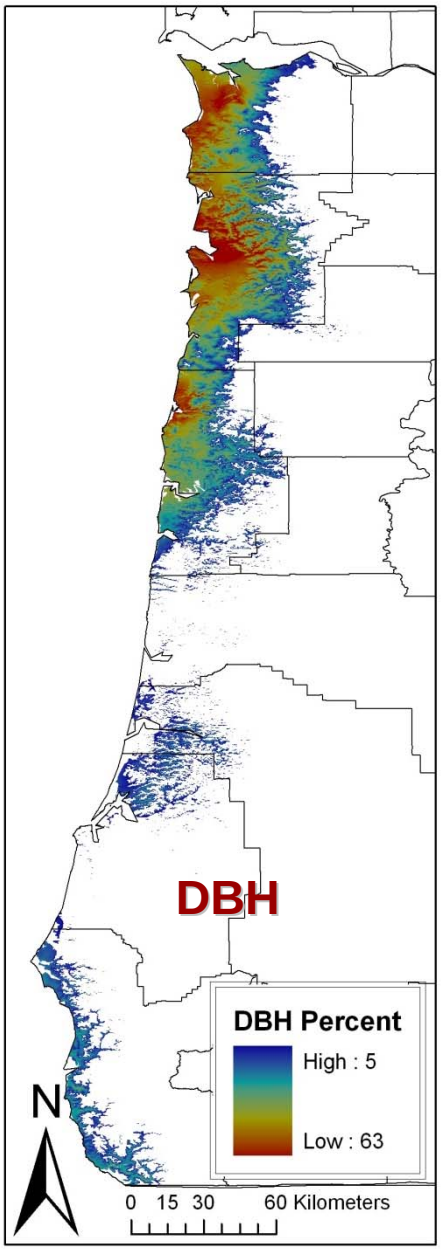
Diameter and Height Growth Reductions

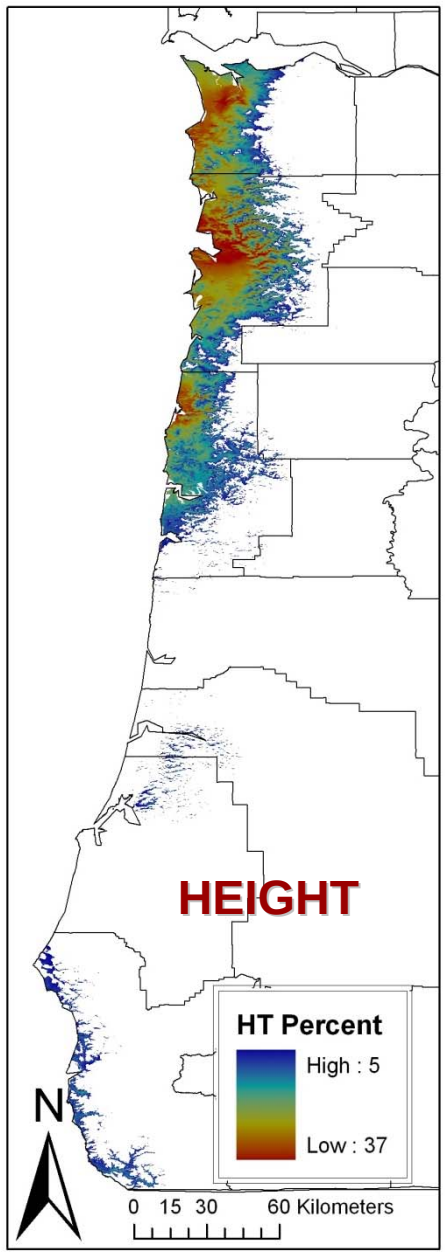


Garber, S, D Maguire, D Mainwaring, and D Hann. 2007. Swiss Needle Cast ORGANON Module Update. Pp. 63-66 in D. Shaw (ed). Annual Report 2007, Swiss Needle Cast Cooperative, College of Forestry, Oregon State University, Corvallis, OR.

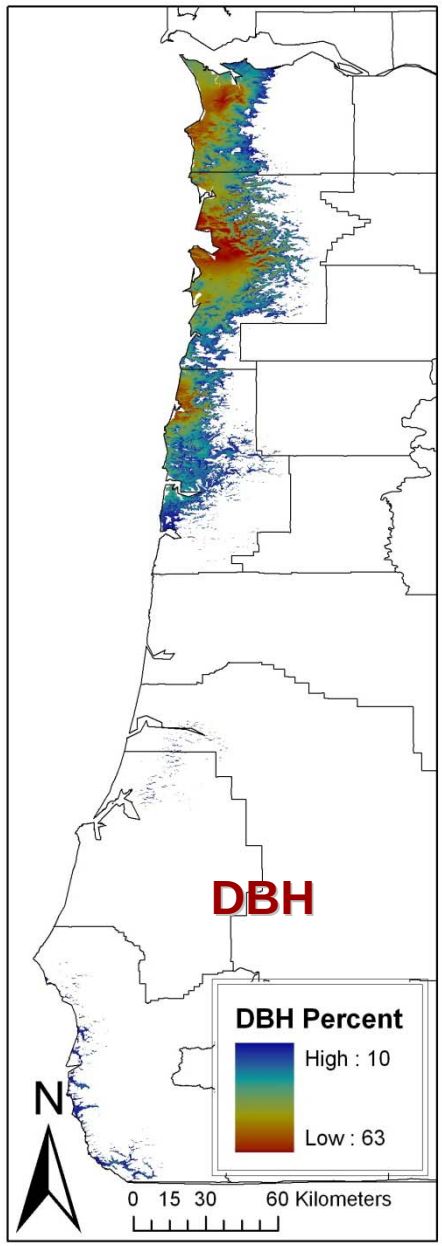
Concentration of Diameter and Height Growth Reductions

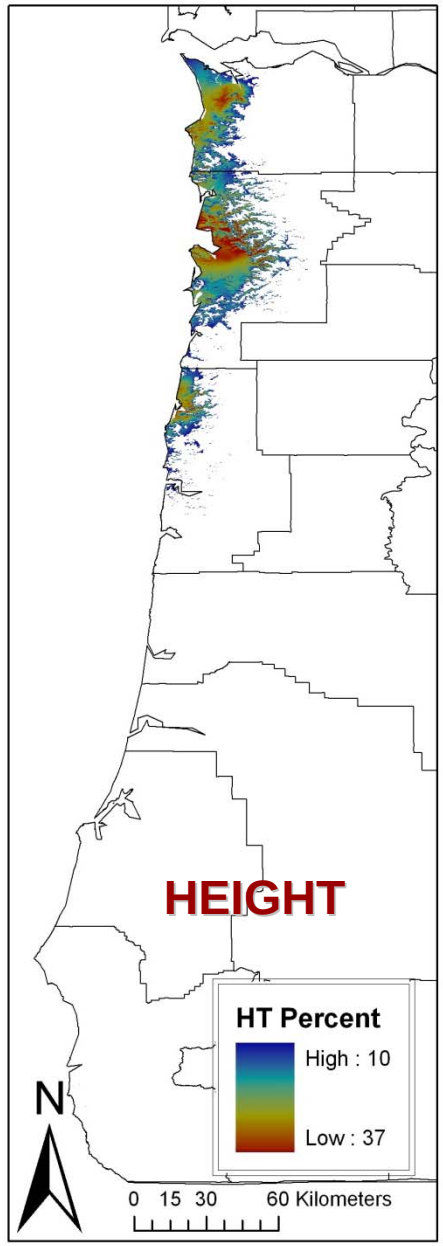
AT LEAST 5% REDUCTION



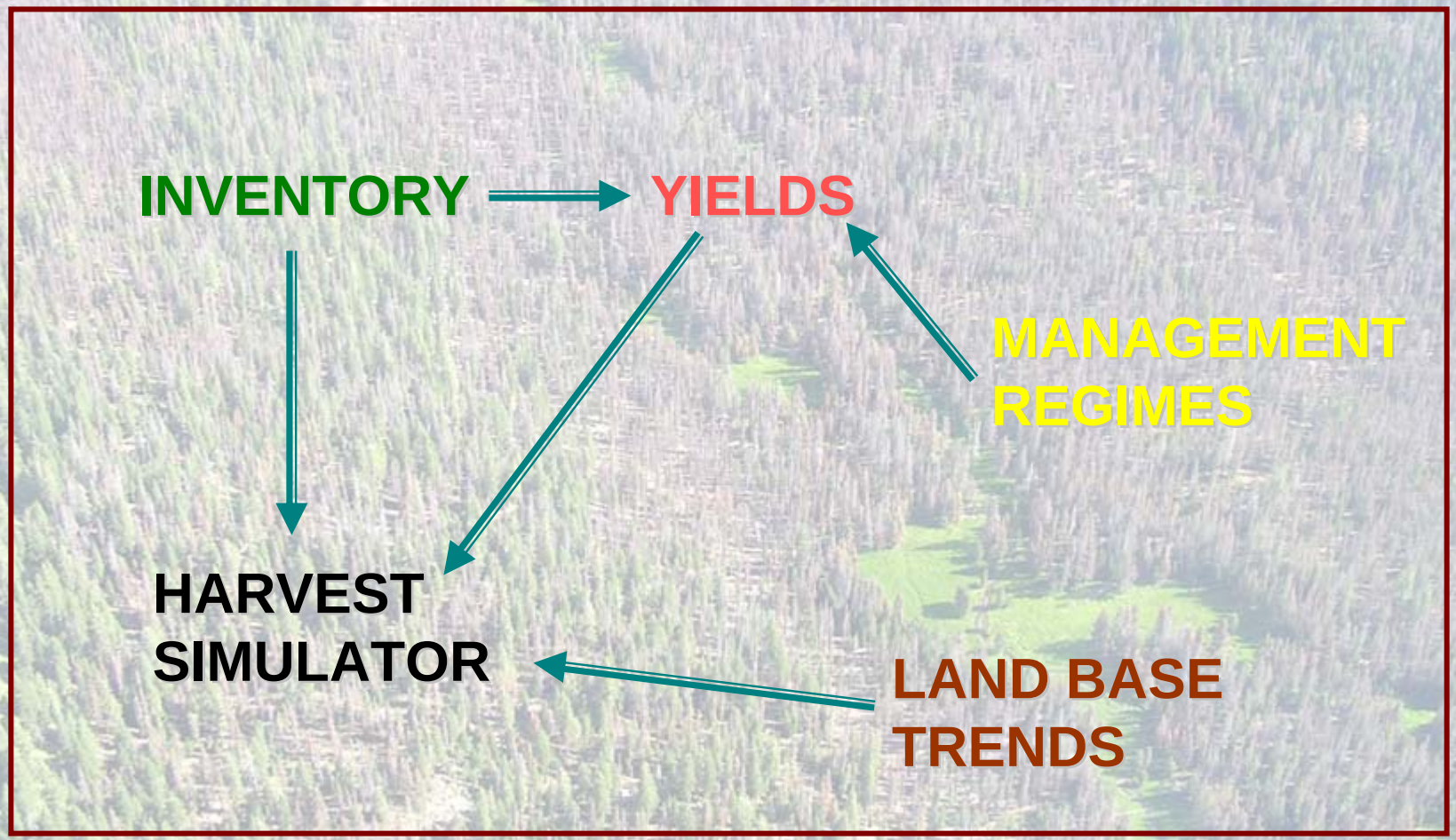


AT LEAST 10% REDUCTION

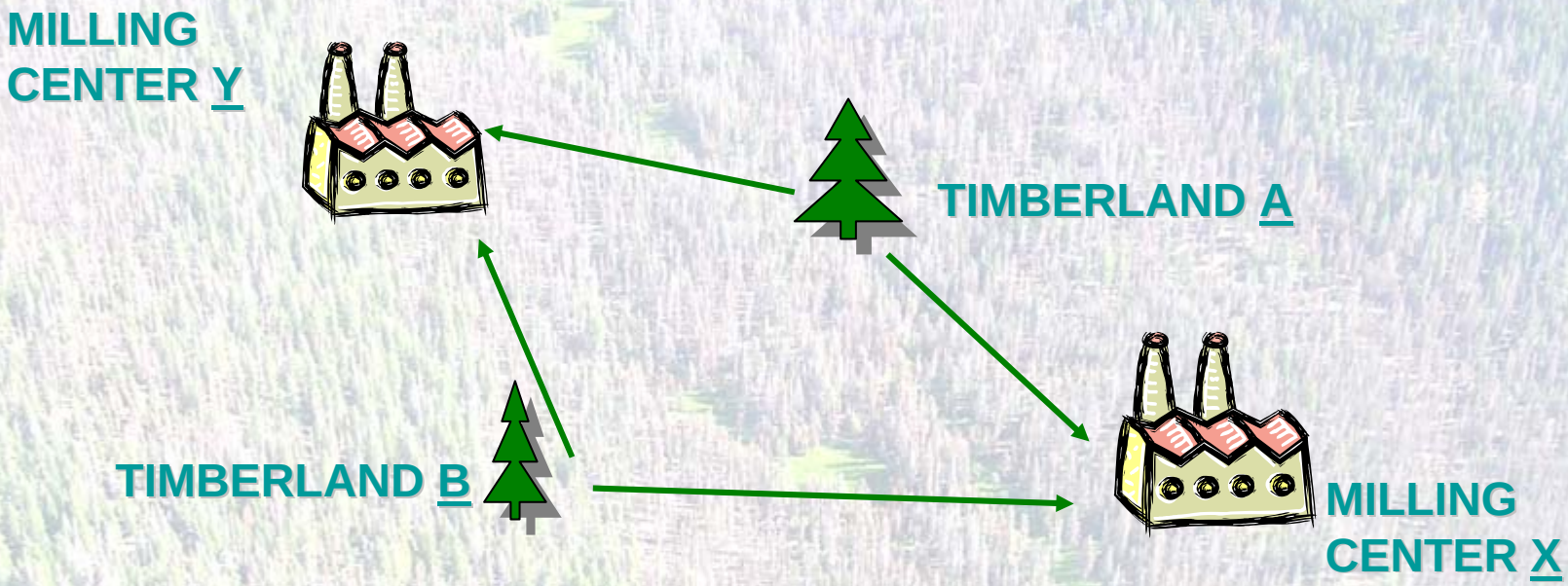




Elements of Harvest Projection Process

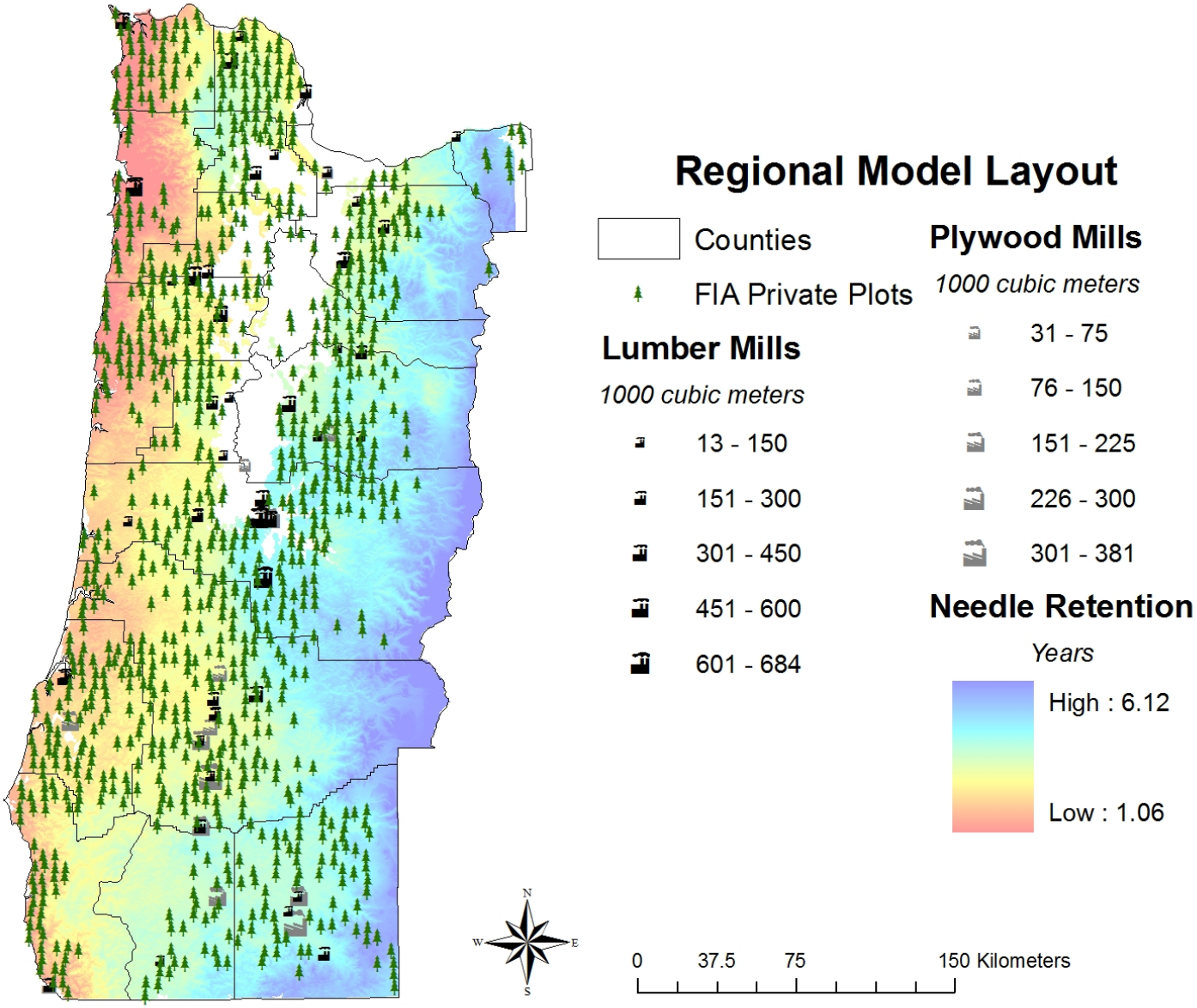


Model of Regional Log Market



- MARKET BALANCE MUST BE FOUND ACROSS ALL MILLING CENTERS AND LOG SOURCES
- LOG BUYERS TRADE-OFF SOURCES TO MINIMIZE COSTS
- LOG SELLERS TRADE-OFF DESTINATIONS TO MAXIMIZE NET RETURNS

LOCATING SNC IMPACTS



Estimating SNC Impacts

- Use models to make two sets of projections under different assumptions about SNC
  - A: No SNC growth impacts
  - B: Growth adjustments reflecting SNC impacts
- Types of Impacts
  - Physical
    - Change in harvest, growth, inventory
    - Change in product output
  - Market values
    - Change in prices
    - Changes in land values

Private Softwood Harvest and Inventory Market Projection by SNC Severity Zones

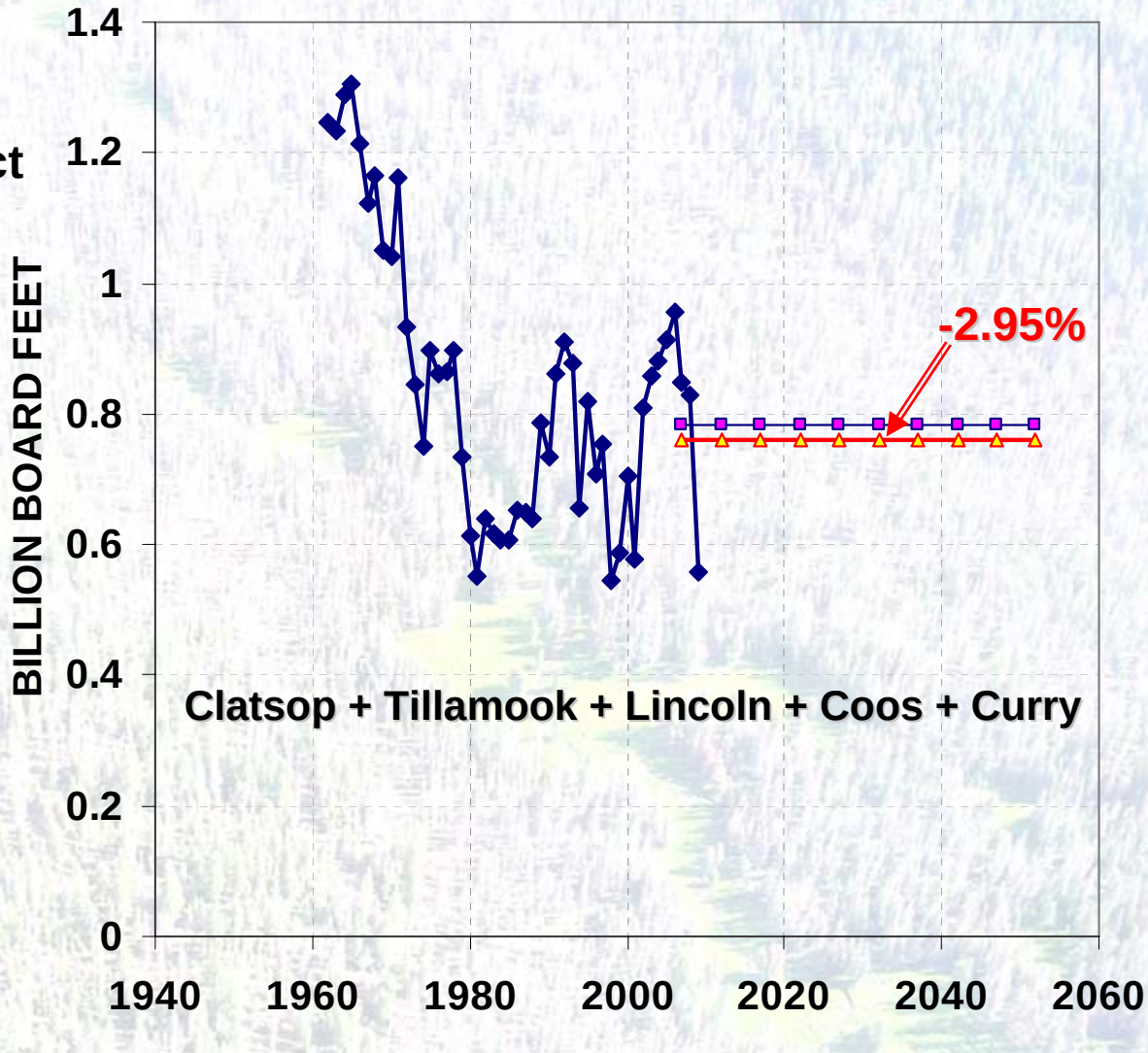
PROJECTED NEEDLE RETENTION	AVERAGE PERCENT CHANGE FROM BASE		MILLION BF	
	HARVEST	INVENTORY	BASE 5-YR HARVEST	BASE INVENTORY
> 3 years	-0.18%	0.97%	6,377	15,406
2 to 3 years	-1.34%	-0.64%	6,624	15,547
< 2 years	-4.06%	-2.19%		

AVERAGES 2007 TO 2052

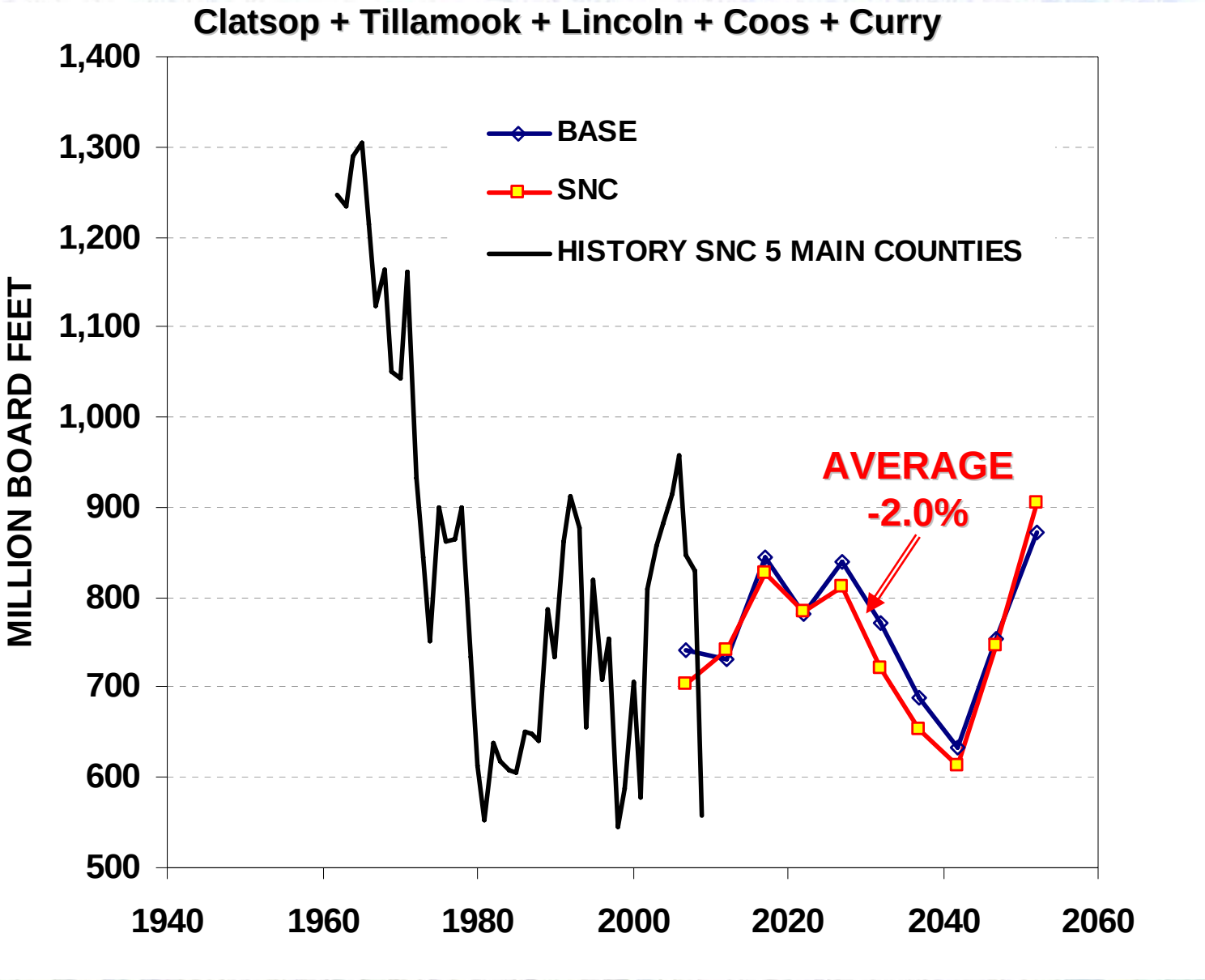
Private Softwood Harvest Levels
Even-flow – by County

Counties with coastal impact
% change from BASE

Clatsop	-2.0 %
Tillamook	-4.4 %
Lincoln	-4.7 %
Lane	-0.2 %
Douglas	-0.5 %
Coos	-1.5 %
Curry	-2.4 %



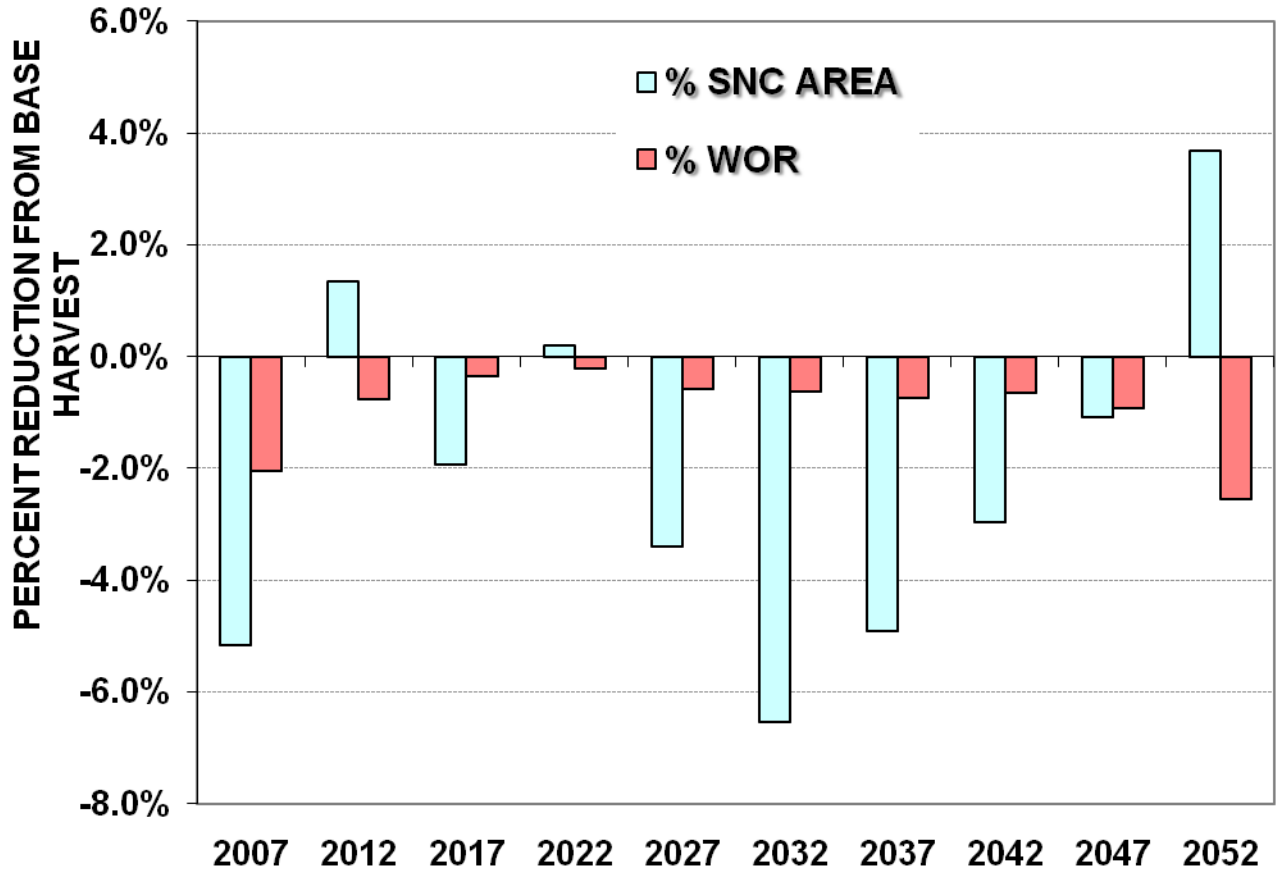
Private Softwood Harvest Levels
Market Projection – County Level



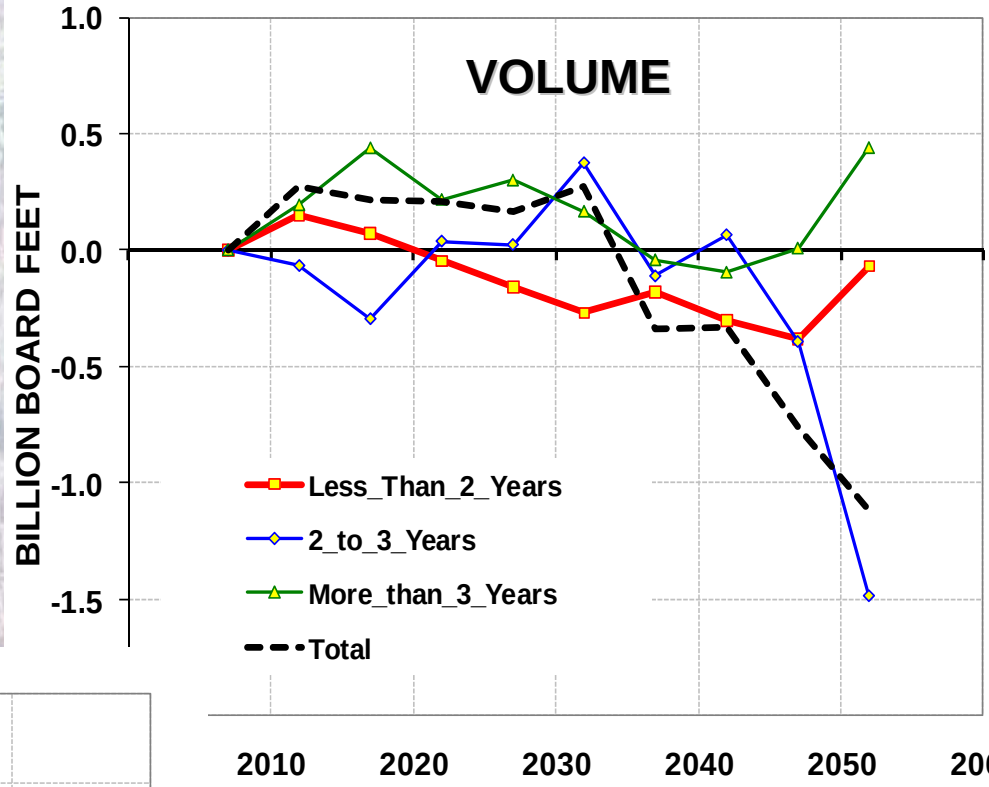
Private Softwood Harvest Levels
Market Projection - Region

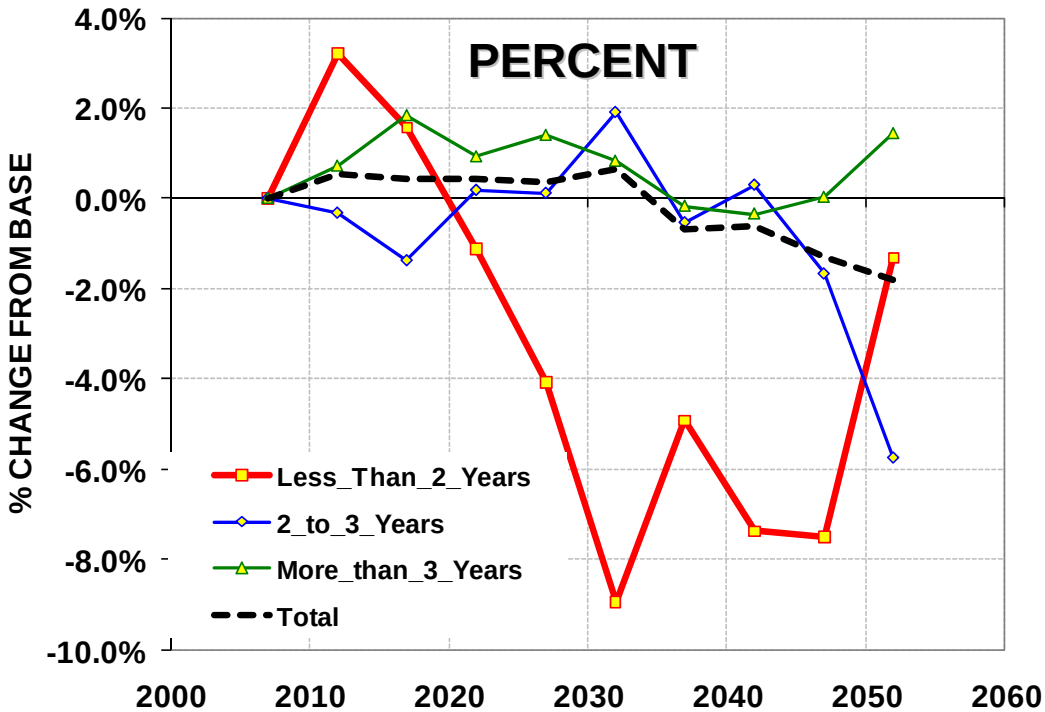
AVERAGE HARVEST 2007-2052	
% CHANGE FROM BASE	
5 SNC Counties	-2.0%
REST OF WOR	-0.6%
ALL WOR	-1.0%

SNC Change Relative to BASE Case
Clatsop + Tillamook + Lincoln + Coos + Curry and All WOR

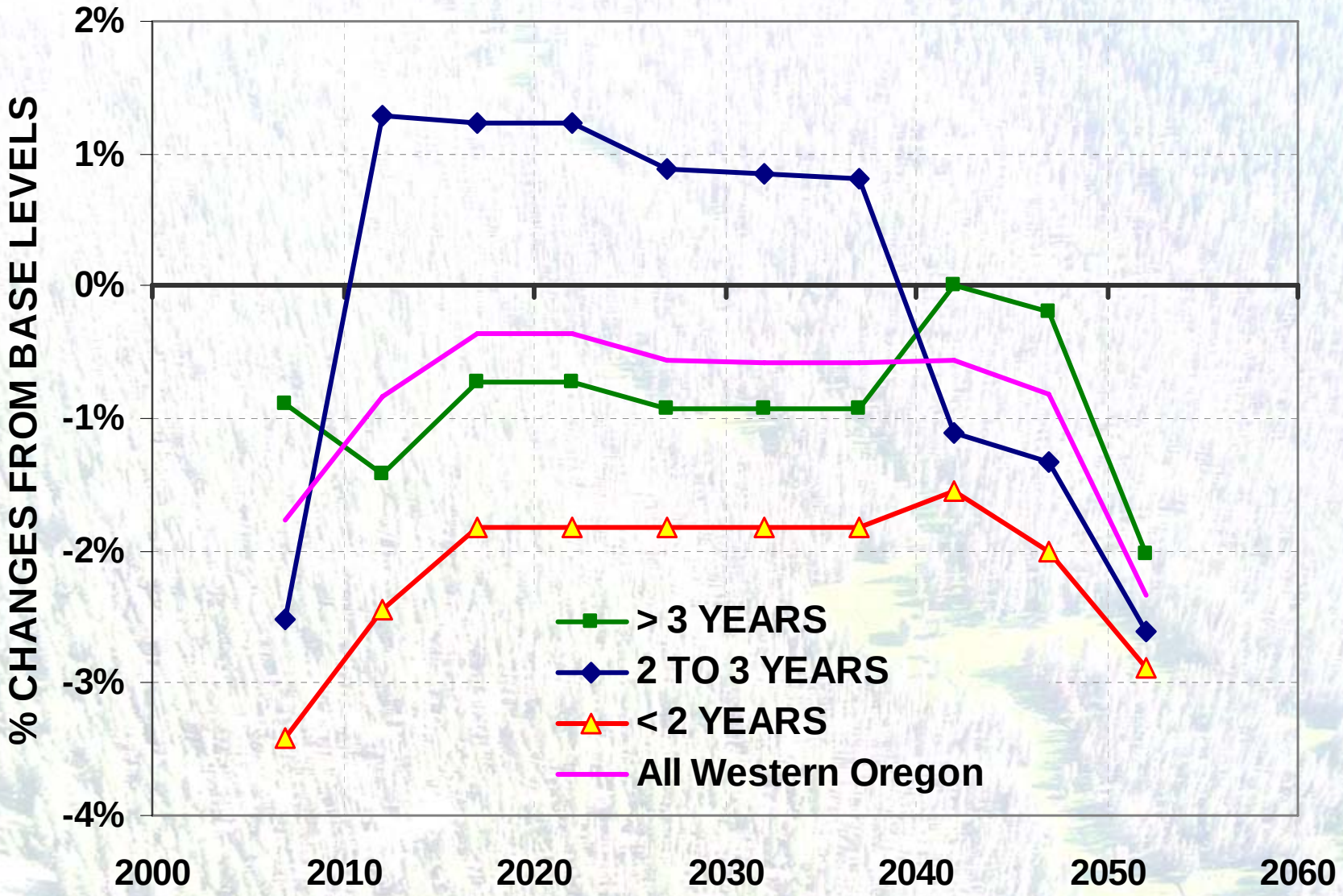


Changes Relative to Base
Softwood Inventory
by Needle Retention Zone





SOFTWOOD LUMBER PROCESSING CAPACITY CHANGE BY NEEDLE RETENTION ZONE



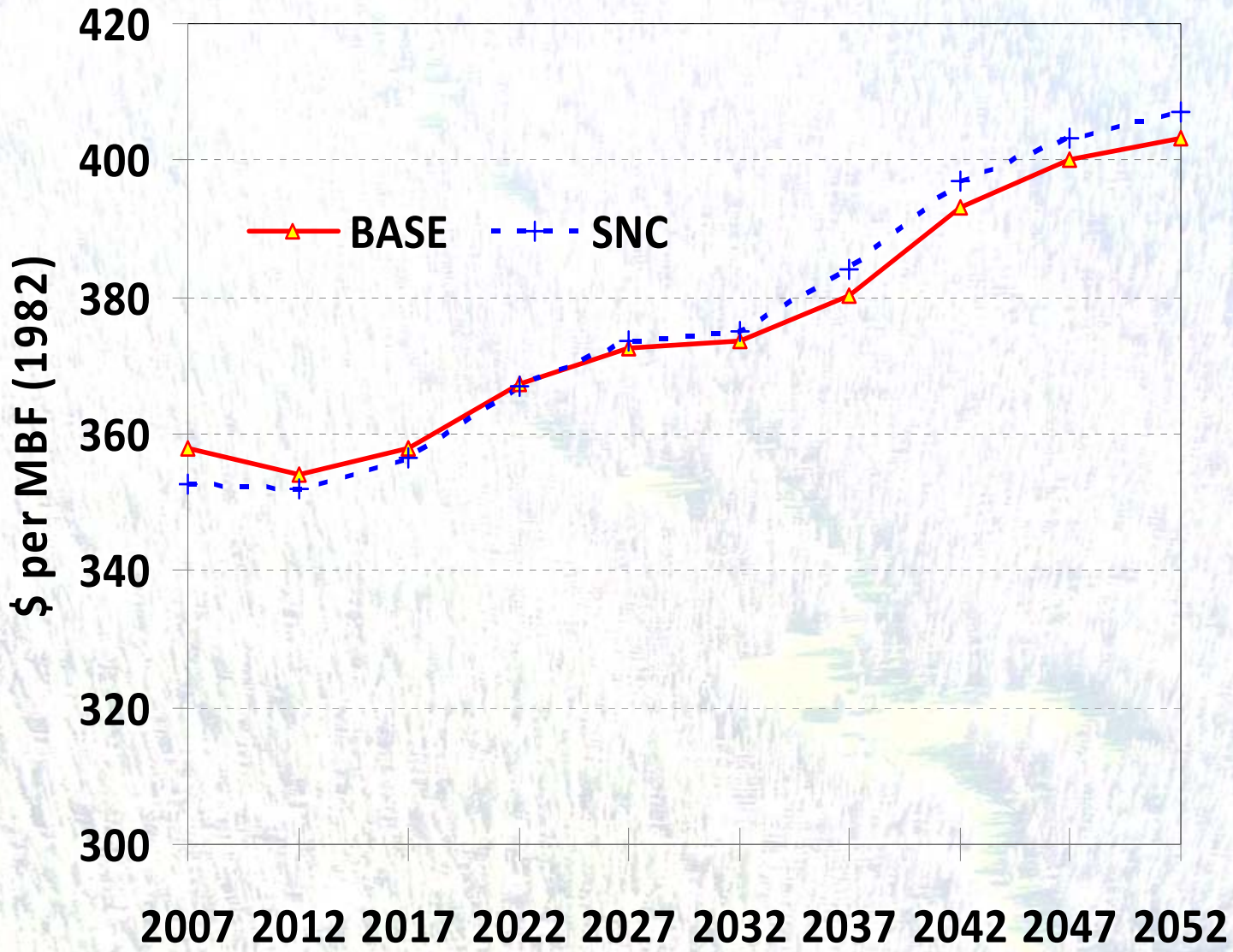
Harvest and Consumption of Private Timber by Needle Retention Zone Changes Relative to Base

HARVEST	< 2 Years	2 - 3 Years	> 3 Years
MBF	-8,779	-14,894	-2,313
RELATIVE TO BASE	-4.1%	-1.3%	-0.2%
CONSUMPTION			
MBF	-9,030	-48	-16,907
RELATIVE TO BASE	-2.3%	0.0%	-1.1%

LOGS MOVING INTO "MODERATE" IMPACT ZONE

AVERAGES 2007 - 2052

Softwood Log Price



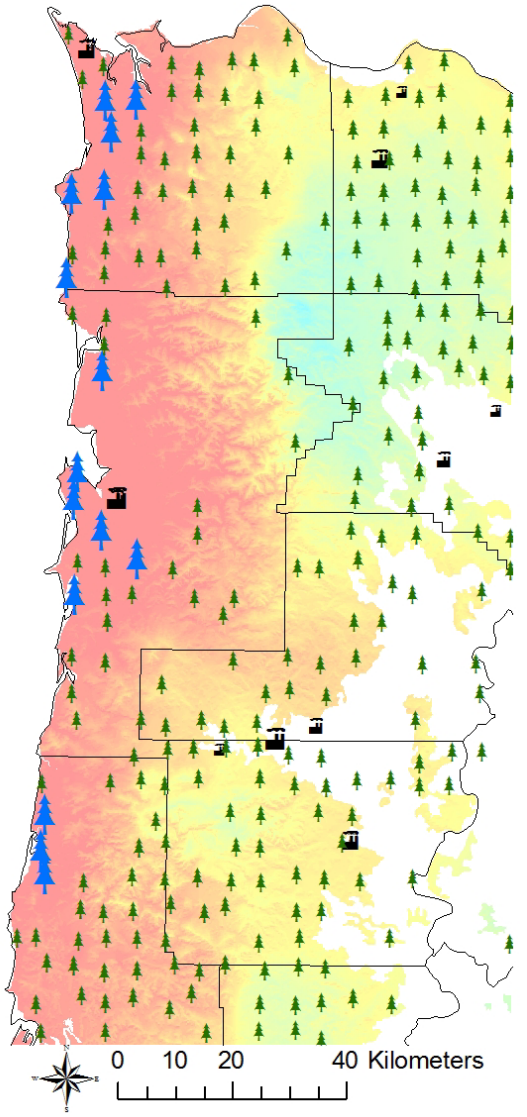
Softwood Land and Timber Prices

Projected Needle Retention	SOIL EXPECTATION VALUE SITE QUALITY HIGH	MED	LOW	LTV ≤ 35 years
Less_Than_2_Years	-13.4%	-48.1%	-38.6%	-6.9%
2_to_3_Years	-4.6%	-8.4%	-13.3%	-2.0%
More_than_3_Years	7.9%	6.3%	-21.4%	0.1%

SEV is the value of an acre of bare ground

LTV is average land and timber value for stands 35 and younger

Species Composition



Trees Per Acre of the 15 Private Timberland FIA Plots with the Lowest Needle Retention

Needle Retention *Years*	Bigleaf maple *Acer macrophyllum*	Douglas-fir *Psuedotsuga menziesii*	Red alder *Alnus rubra*	Western redcedar *Thuja plicata*	Sitka spruce *Picea sitchensis*	Western hemlock *Tsuga heterophylla*	Total
1.47		24			5	187	216
1.50		291					291
1.52		24			5	88	116
1.54			103	9	133	42	287
1.58					33	171	204
1.62			819		16	36	870
1.46		227			1	89	317
1.52			491			118	609
1.56		73				180	253
1.44		33			13	130	176
1.48			231		6	27	264
1.54			9		50	367	425
1.57					9		9
1.60	2	4	4		2	16	28
1.61			19	212	49	132	412
1.53	0	45	112	15	22	105	299

Species Composition in SNC Zone

Species	Total Volume	National Forest	Other Federal	Other Public	Private
Other Hardwood	72	7	1	52	12
Other Softwood	300	127	2	105	66
Red alder	2,842	962	96	949	835
Sitka spruce	2,569	1,125	-	85	1,358
Western hemlock	4,095	1,079	245	676	2,095
Douglas-fir	12,141	5,907	833	3,612	1,790

Inventory Volume by Species and Owner

Lincoln and Tillamook Counties (Million BF)

Inventory Volume by Species and Needle Retention

Private Timberland in Western Oregon (Million BF)

Species	Total Volume	< 2 years	2 to 3 years	> 3 years
Other Hardwood	4,870	46	2,182	2,642
Other Softwood	5,029	32	1,585	3,413
Red alder	4,598	541	2,820	1,237
Sitka spruce	2,176	1,535	640	
Western hemlock	6,862	1,626	2,981	2,254
Douglas-fir	43,687	433	17,260	25,994

(from FIA IDB v2)

- **Why not a bigger impact?**
  - Species are growing on the worst NR sites
  - Capacity adjustment
  - Log flows to and from affected area
- **Impacts decline with distance from “stand”**
  - Large relative SEV and LTV reductions
  - Smaller reductions at regional level
  - Smallest relative harvest changes at the ½-state level