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Fact Sheet #4

High Forest Mortality and Low Timber Removal Rates in the Western States Promise Hazardous Fuel Accumulations and Big Fires

This analysis compares published timber inventory data for each of the Pacific Coast states (Alaska, California, Oregon, and Washington) with the Northern Rocky Mountain (NRM) sub-region (Idaho and Montana), and the six-state Inter-mountain (INT) sub-region (Arizona, Colorado, New Mexico, Nevada, Utah, and Wyoming). Available data for British Columbia are included; however, comparisons with U.S.A. inventory-based indicators are limited by lack of published annual timber growth and mortality estimates for B.C.

- The NRM sub-region (Idaho and Montana) and the six-state INT sub-region have substantial timber resources, each sub-region comparable to either Oregon, Washington, or California (Table 1, line a).
- The eight-state Interior West region (NRM and INT sub-regions combined) and Alaska timberlands have less volume per acre than timberlands in California, Oregon, or Washington (Table 1, line q).
- The large amount of sound dead timber is a distinguishing feature of timberlands in the eight-state Interior West region (Table 1, footnotes to line a). (Note: Published inventory data for 2007 show zero sound dead timber in the Pacific Coast states, except Alaska, which is a reporting error rather than a fact.)
  - Dead timber accumulations in the Interior West region more than doubled from 1997 to 2007, and are substantially higher than for any other modern inventory period (i.e., since 1952).
  - Dead timber accumulations result from high mortality and low removals (Table 1, lines c, d).
- The NRM sub-region (Idaho and Montana) had by far the highest amount of mortality (Table 1, line c). Mortality is a component of the large annual wood increment in the NRM sub-region (Table 1, line e).
- The Pacific Coast states (except Alaska) each add more than a billion cubic feet of volume to timber inventories every year; so do the NRM and INT sub-regions (Table 1, line e). One billion cubic feet of wood is enough to cover a football field with a stack of wood four miles high.
- The annual wood increment (Table 1, line e) adds fuel for the inevitable wildfire.
- Wood is accumulating faster in California and the NRM sub- region than elsewhere (Table 1, line f).
- The six states in the INT sub-region and Alaska are also experiencing high mortality (Table 1, lines h, i), but as indicated by very low removals (Table 1, line d), the forest industry infrastructure necessary to improve the accumulating fuel situation may not exist in some places (Table 1, line k "infrastructure ratio").
- The NRM sub-region and California have become infrastructure-challenged compared to Oregon and Washington (Table 1, line k); removals have decreased due to the dominant presence of National Forest System lands (Table 1, line p) and the public policy barriers that make timber removal difficult.
- The traditional forest sustainability measure is the growth / drain ratio; all western states could increase timber removals substantially and still meet this criterion (Table 1, line j).

Table 1. Timber inventory indicators for four Pacific Coast states, two Interior West sub-regions comprised of eight states, and British Columbia, 2007*

	OR	WA	CA	NRM [1/]	INT [2/]	AK	BC
	billion cubic feet						
a) Timber Inventory, Growing Stock	87.9	71.1	67.2	75.7 [1/]	66.3 [2/]	34.3	194
b) Net Growth (annual)	1.7	1.6	1.5	1.1	0.6	0.2	? [8/]
c) Mortality (annual)	0.5	0.4	0.4	0.8	0.5	0.3	? [8/]
d) Removals (annual)	1.0	0.9	0.5	0.4	0.1	0.1	2.7
e) Wood Increment (annual) [3/]	1.2	1.2	1.4	1.4	1.1	0.4	? [8/]
	percentage						
f) Wood Accumulation Rate (%) [4/]	1.3%	1.7%	2.1%	1.9%	1.6%	1.3%	? [8/]
g) Net Growth as % of Inventory	1.9%	2.3%	2.3%	1.4%	0.9%	0.7%	? [8/]
h) Mortality as % of Inventory	0.6%	0.6%	0.5%	1.0%	0.8%	0.7%	? [8/]
i) Mortality as % of Gross Growth [5/]	23%	21%	19%	41%	47%	51%	? [8/]
	ratio						
j) Growth / Drain Ratio [6/]	1.6	1.8	3.3	2.5	10.2	3.8	? [8/]
k) Infrastructure Ratio [7/]	0.45	0.45	0.26	0.21	0.09	0.20	? [8/]
	million acres						
l) Forest Land Area	30.2	22.3	32.8	46.4	144.9	126.9	135.9
m) Timberland Area	24.6	18.9	19.1	36.0	29.7	11.9	59.3
n) National Forest Timberland Area	11.6	6.4	9.3	24.0	20.3	3.8	n.m. [9/]
	percent of total						
o) Timberland % of Total Land Area	40.2%	44.4%	19.2%	24.6%	7.4%	3.3%	25.3%
p) National Forest % of Timberland	47.2%	33.9%	48.7%	66.7%	68.4%	31.9%	n.m. [9/]
	cubic feet per acre of timberland						
q) Inventory per acre	3,573	3,762	3,518	2,103	2,232	2,882	3,272

[1/] NRM Northern Rocky Mountain sub-region (ID, MT); excludes 10 billion ft³ of sound dead wood.

[2/] INT Intermountain sub-region (AZ, CO, NM, NV, UT, WY); excludes 7.2 billion ft³ of sound dead wood.

[3/] Wood Increment is the annual addition of wood (Net Growth + Mortality – Removals).

[4/] Wood Accumulation Rate is Wood Increment as a % of Timber Inventory.

[5/] Gross Growth = Net Growth + Mortality

[6/] Growth / Drain Ratio = Net Growth / Removals

[7/] Infrastructure Ratio = Removals / Gross Growth

[8/] B.C. does not report annual growth & mortality data. Forest carbon emissions analysis indicates that annual mortality may exceed annual growth since 2003; however, this analysis "greatly overstates" emissions from timber harvest because forest products carbon pools are excluded as per international greenhouse gas accounting standards.

[9/] n.m. = not meaningful

*"Forest Products Industry Infrastructure Overview"handout for Western Regional Meeting, Forest Resources Association, Coeur d'Alene, Idaho, October 25, 2008; revised May 6, 2011, for Western Forest Economists meeting.

U.S.A. data source: Smith, W.B., Miles, P.D., Perry, C.H. & Pugh, S.A. (2009). *Forest Resources of the United States, 2007.* Gen. Tech. Report WO-78, U.S. Dept. of Agriculture, Forest Service, Washington, DC.

B.C. data source: B.C. Ministry of Forests, Mines and Lands (2010). *The State of British Columbia's Forests*, 3rd ed. Forest Practices and Investment Branch, Victoria, B.C.