Forested Lands and Wood Products Biodegradable Carbon Emissions & Sinks ($MMTCO_2$)

Category [Data Source]	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
Sinks															
Forested Lands Removals															
Forest woody biomass growth [1]	-13.141	-13.118	-13.096	-13.074	-13.052	-13.052	-13.052	-13.052	-13.052	-13.052	-13.052	-13.042	-13.032	-13.022	-13.012
Rangeland woody biomass growth [1]	-1.104	-1.102	-1.100	-1.099	-1.097	-1.097	-1.097	-1.097	-1.097	-1.097	-1.097	-1.096	-1.095	-1.094	-1.093
Total Sinks	-14.245	-14.221	-14.197	-14.172	-14.148	-14.148	-14.148	-14.148	-14.148	-14.148	-14.148	-14.137	-14.127	-14.116	-14.105
Emissions															
Forested Lands Emissions															
Forest and rangeland fires [1]	2.032	2.028	2.025	2.022	2.018	2.018	2.018	2.018	2.018	2.018	2.018	2.017	2.015	2.014	2.012
Other disturbances[1]	1.208	1.206	1.204	1.202	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.199	1.198	1.197	1.196
Development of forest or range lands (Landuse change) [1]	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
Timber harvest slash [1]	0.156	0.156	0.156	0.156	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155
Wood Products Emissions															
Fuel wood [1]	1.532	1.529	1.526	1.524	1.521	1.521	1.521	1.521	1.521	1.521	1.521	1.520	1.519	1.518	1.517
Wood waste dumps [2]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Discarded wood and paper in landfills [3]	2.350	2.438	2.577	2.815	2.988	3.170	3.268	3.261	3.392	3.357	3.469	3.655	3.779	3.746	3.740
Composting of wood waste materials [2]	0.255	0.305	0.354	0.403	0.451	0.500	0.549	0.597	0.646	0.694	0.743	0.743	0.745	0.800	0.803
Total Emissions	7.555	7.683	7.863	8.142	8.355	8.586	8.733	8.774	8.953	8.967	9.127	9.310	9.432	9.450	9.444
Net CO_2 Flux															
Net CO_2 Flux	-6.690	-6.537	-6.333	-6.030	-5.793	-5.563	-5.415	-5.374	-5.195	-5.181	-5.021	-4.827	-4.695	-4.666	-4.662

Data sources:

[1] – Winrock report: CEC (2004). Baseline Greenhouse Gas Emissions for Forest, Range, and Agricultural Lands in California. CEC PIER final report CEC-500-04-069F. Annual average forest and range land CO_2 removal and emission rates for period 1994 - 2000 in Table 1-21, CEC (2004) scaled to state-wide in CEC (2006): Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004. Publication CEC-600-2006-013-SF. Emissions and removals are back-cast to 1990 from 1994 using 0.1707 percent per year forest land area trend from 1953 to 1994, from p. 14 in Shih (1998): The Land Base of California's Forests. Fire and Resource Assessment Program, California Dept. of Forestry and Fire Protection. Emissions and removals forecasted from 2000 using 4 percent forest land area decline predicted for 1997 to 2050 in the Pacific Coast Region, from p. 53 in: Area Changes for Forest Cover Types in the United States, 1952 to 1997, with projections to 2050. (2004) USDA Forest Service, Pacific Northwest Research Station, publication PNW-GTR-613.

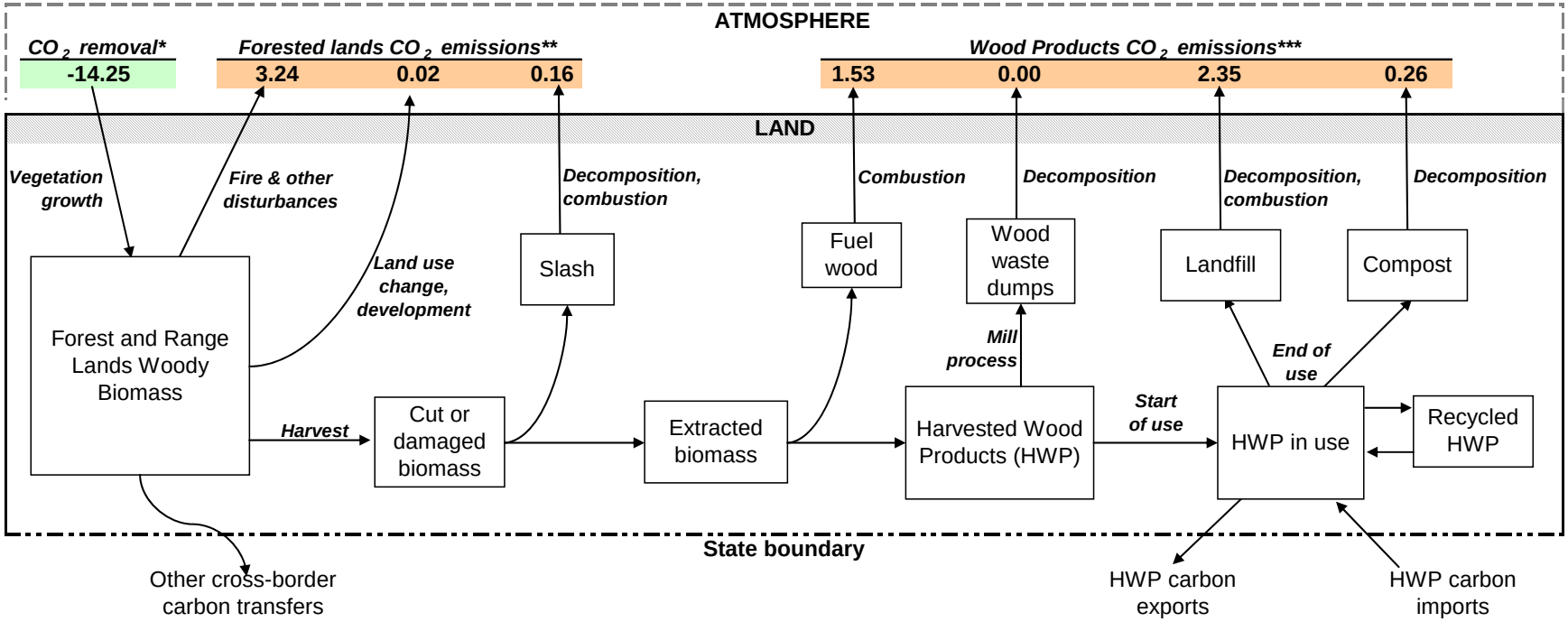
[2] - CIWMB/USEPA: California Integrated Waste Management Board SWIS waste-in-place and landfill survey data, USEPA Harvested Wood Products use data provided by Kenneth Skog (Forest Products Laboratory, USDA Forest Service, Madison, WI), scaled to state based on population.

[3] - ARB Model: From IPCC Mathematically Exact First-Order Decay Model, with CIWMB SWIS waste-in-place and landfill survey data.

Diagram of the Atmospheric Flow Approach to forested lands and wood products carbon accounting for the California GHG inventory.

1990 Net CO2 Flux = Sinks + Emissions = -14.25 + 7.55 = -6.69

Values for 1990 in million tonnes of CO_2 (Biodegradable carbon only, no fossil fuel CO_2)



*** CO2 removals** from the atmosphere include vegetation biomass growth in forests and wooded range lands.

**** Forested lands CO_2 emissions** to the atmosphere include biomass oxidation resulting from forest and range lands fires and other disturbances such as insect pest damage, forest and range land use change (development), decomposition/combustion of slash after tree harvest.

***** Wood Products CO_2 emissions** to the atmosphere include: fuel wood combustion, decomposition of wood mill waste and discarded wood products in landfills and composting facilities.

Adapted from:

1) Figure 12.A.2. System boundary of the Atmospheric Flow Approach. In: Chapter 12, Harvested Wood Products. Volume 4, Agriculture, Forestry, and Other Land Use (AFOLU). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. IPCC National Greenhouse Gas Inventories Programme.

2) Figure 1-6. Flow diagram illustrating the various destinations of pre-harvest carbon after commercial harvest. In: Baseline Greenhouse Gas Emissions for Forest, Range, and Agricultural Lands in California. (2004) California Energy Commission PIER final report 500-04-069