Estimate of Carbon Emissions from 2014-2018 Wildfires in Washington State

Year	Total wildfire emissions (metric tons CO2e)	Total acres burned in Washington State
2014	3,949,448	434,087
2015	17,975,112	1,130,625
2016	889,487	304,529
2017	11,479,798	402,262
2018	4,949,552	399,641

Methods

DNR assigned pre-fire fuel beds to both forest and non-forest lands for all areas burned in 2015 through 2018 using modeled inventory data (GNN). Fuel beds were assigned based on vegetation type and age class using the 2012 or 2017 GNN dataset, depending on fire year. DNR ran fuel beds through the Consume model, a tool that estimates fuel consumption and fire emissions for each fuelbed type under three fire severity scenarios - low, mixed, and high severity. Scenarios differ in their assumptions of fuel moisture and crown consumption; fuel moisture is reduced and crown consumption is increased as fire severity increases. The Consume analysis resulted in CO2 and CH4 emissions factors for each fuelbed in each of the three severity classes, with units of metric tons of CO2-equivalent (CO2e) per acre. DNR used Landsat imagery to calculate fire severity for burned areas using published methods and fire severity thresholds for all fires in DNR's fire perimeter database. Annual estimates (2014-2018) of metric tons CO2e released from wildfires were calculated by multiplying the Consume CO2e/acre emission factors by acres burned for each vegetation type and severity combination. Note: Emissions estimates are derived from the most up-to-date methodologies and data sets – each of which has inevitable minor error/variation associated with it. As such, these results should be considered imprecise but reasonable estimates of carbon emissions.

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