

Key Scientific Findings on Forests, Fire, Carbon and Climate (April 26, 2019)

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Carbon in forests is carbon that is not in the atmosphere.

- Young forests do not take up more carbon from the atmosphere annually than older forests (Luyssaert et al. 2008). The first 10 to 20 years after harvest or stand-replacing disturbance, young forests are a net emission to the atmosphere (Amiro et al. 2010, Law et al. 2001).
- Forest harvest results in net carbon emissions versus leaving forests unharvested. Significant amounts of carbon are lost at each stage of timber harvest, manufacturing, and the end of useful product life (Hudiburg et al. 2011, Law et al. 2018). Whereas, forests actively withdraw carbon from the atmosphere and store and conserve it more effectively and for longer periods of time than do products derived from harvested trees (Hudiburg et al. 2009, 2013, Law & Harmon 2011, Harmon et al. 1990). Forest carbon can be increased by reducing harvest, i.e. increasing harvest cycle, forest carbon reserves (Law et al. 2018).

Fires:

- **Wildfire is an essential ecological process.** The dominant fire regime is mixed severity (Law & Waring 2015). Such burned landscapes have shown prolific recovery and diversity of species (Tingley et al. 2016, Fontaine et al. 2009).
- Most Oregon fires release a small fraction (~5%-10%) of the biomass carbon (Law & Waring 2015). Fire emissions are <10% of OGWC reported non-forest emissions (Law et al. 2018).
- **Broad-scale thinning of forests conflicts with carbon sequestration goals** and would result in higher emissions (Law et al. 2013, Hudiburg et al. 2011). The amount of carbon removed is often much larger than that saved, and more area is harvested than would actually burn (Mitchell et al. 2009, Rhodes et al. 2009, Law & Harmon 2011).
- **Post-fire logging** frequently damages ecosystems, particularly on steep slopes. Impacts include soil erosion and degraded river hydrology (Karr et al. 2004).

Summary:

- **First priority is to protect the public in the wildland-urban interface** (Radeloff et al. 2005). Studies suggest focusing on residential loss in the home ignition zone rather than treating the larger WUI, because home materials, design and maintenance in relation to surroundings were main factors in residential losses (Calkin et al. 2014).
- **To meet climate mitigation goals and conserve forest carbon and the co-benefits to forest ecosystems**, there is the potential to keep carbon in existing forests and store more carbon in forests by reducing harvest and afforestation of areas that used to be forests long ago. Forests play an important role in offsetting fossil fuel emissions.

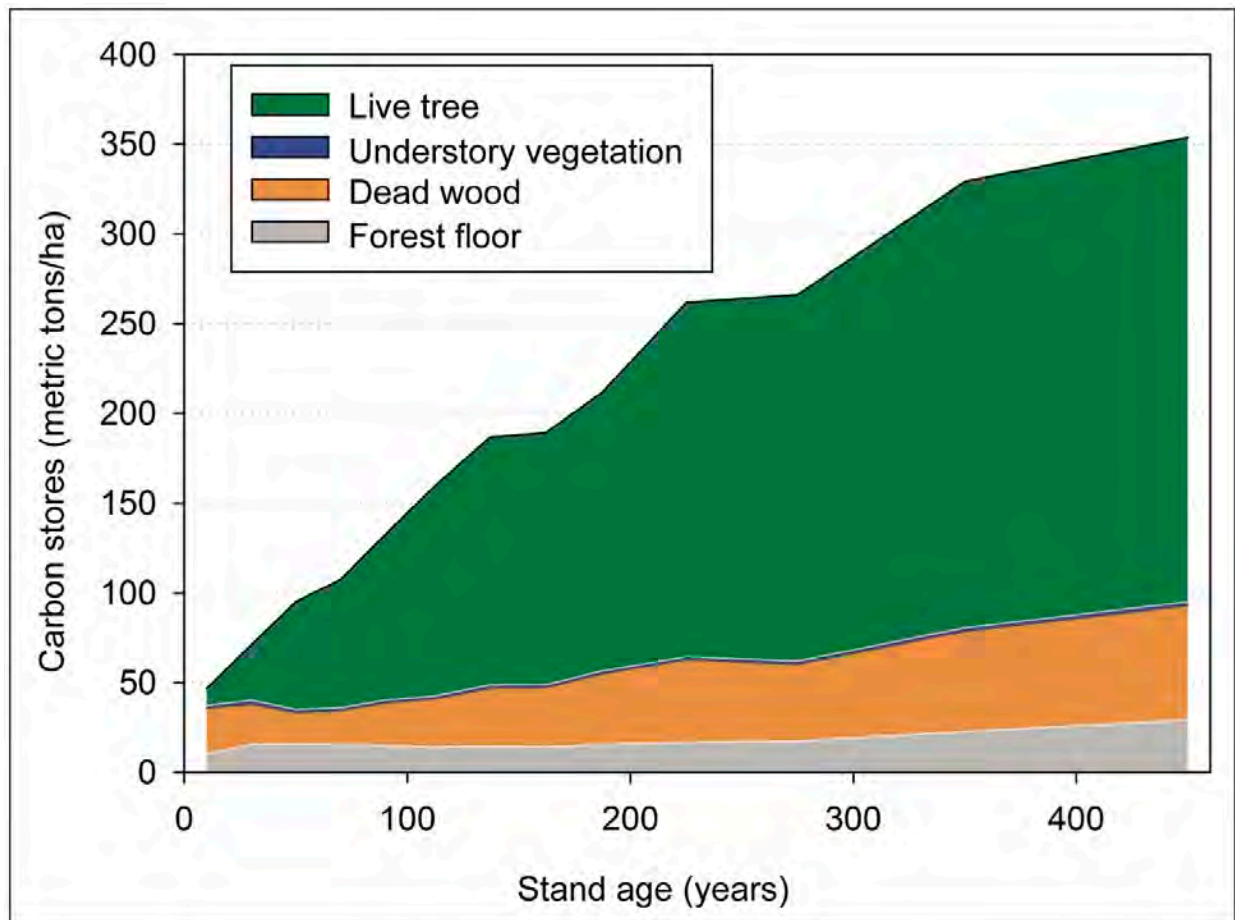
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TOTAL U.S. WILDFIRE ACRES 1926-2017

Source: National Interagency Fire Center; nifc.gov



Warm, dry climate period



Cool, wet climate period



Global climate change

MILLION
ACRES
BURNED

50

40

30

20

10

1930

1935

1940

1945

1950

1955

1960

1965

1970

1975

1980

1985

1990

1995

2000

2005

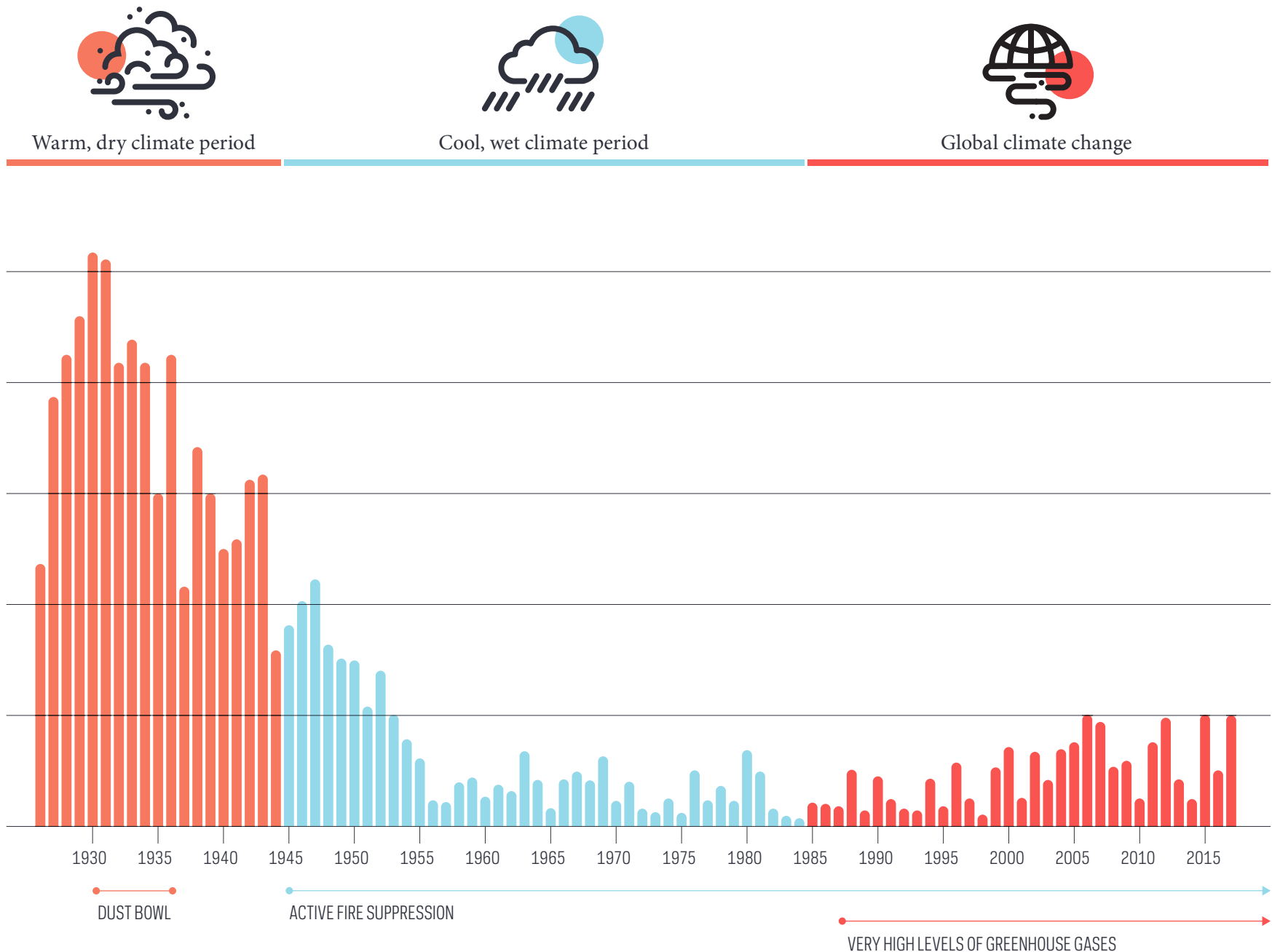
2010

2015

DUST BOWL

ACTIVE FIRE SUPPRESSION

VERY HIGH LEVELS OF GREENHOUSE GASES



FIRE SUPPRESSION GOT A HELPING HAND

WESTERN U.S.

Arizona
California
Colorado
Idaho

Montana
Oregon
New Mexico
Nevada

Utah
Washington
Wyoming



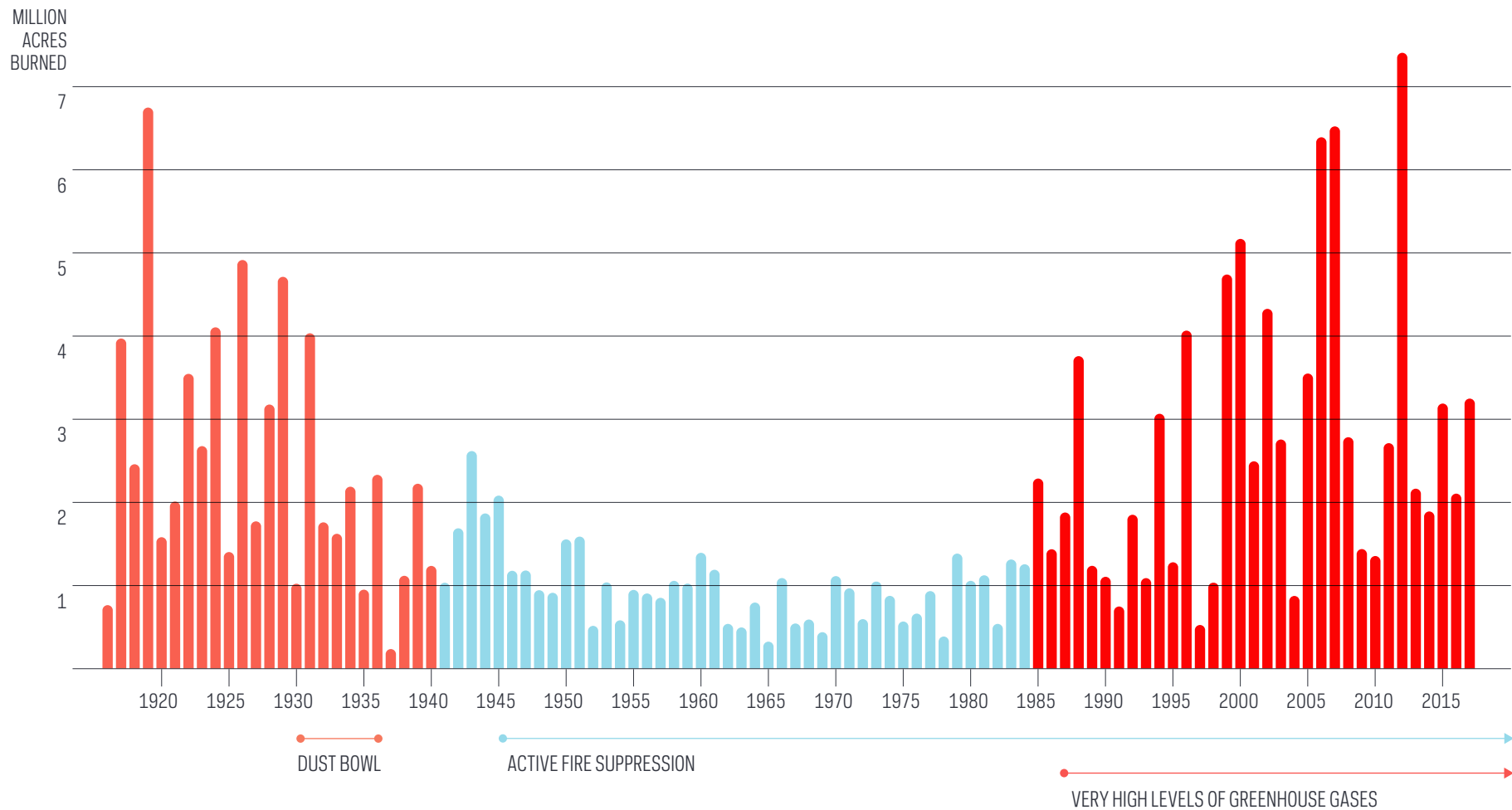
Warm, dry climate period



Cool, wet climate period

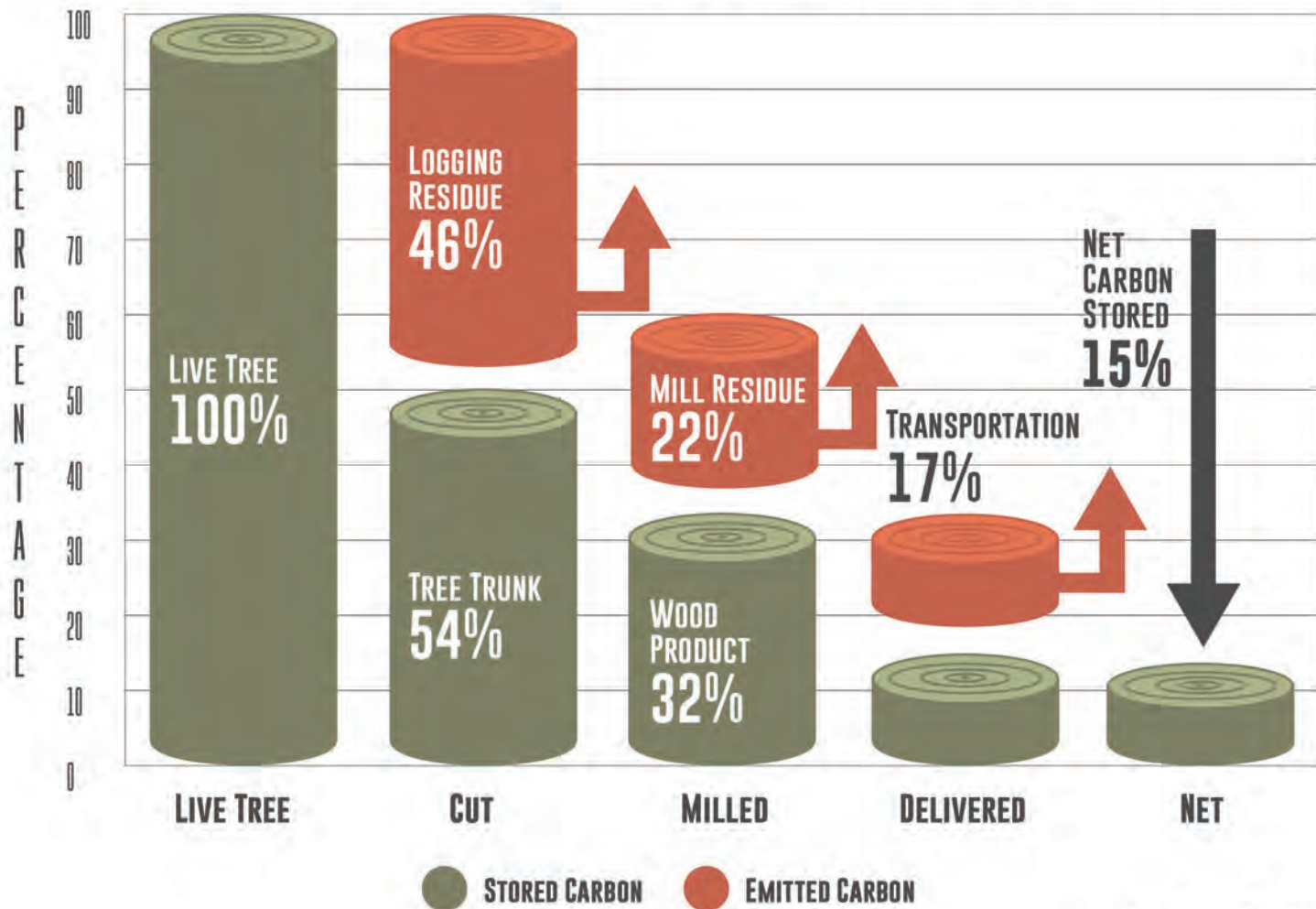


Global climate change



Source: National Interagency Fire Center; nifc.gov, ncdc.noaa.gov/teleconnections/pdo/; Dr. Paul Hessburg, May 2019 testimony to Oregon's Wildfire Response Council

FATE OF CARBON FROM HARVESTED WOOD

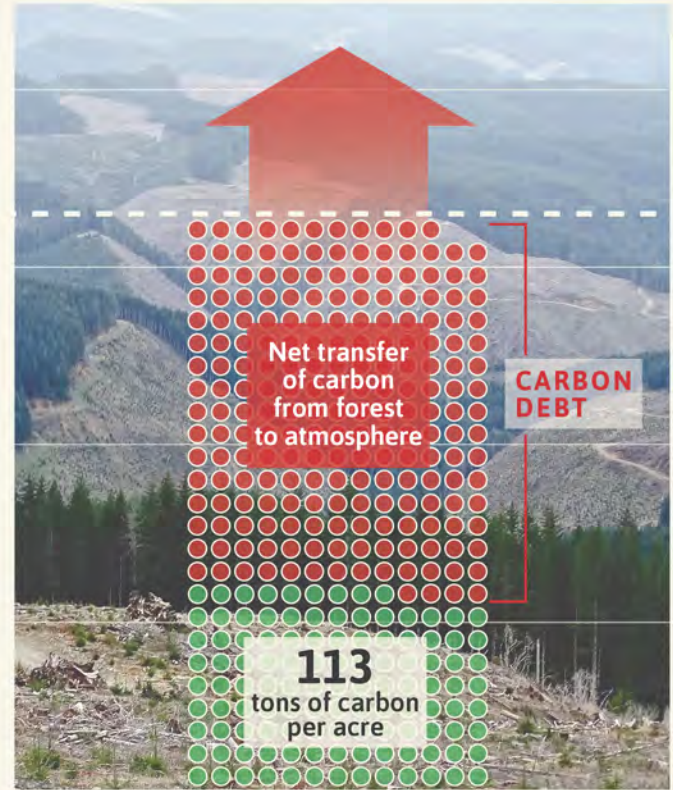


THE CARBON DEBT CREATED BY INDUSTRIAL FORESTRY



NATIVE OLD-GROWTH FOREST

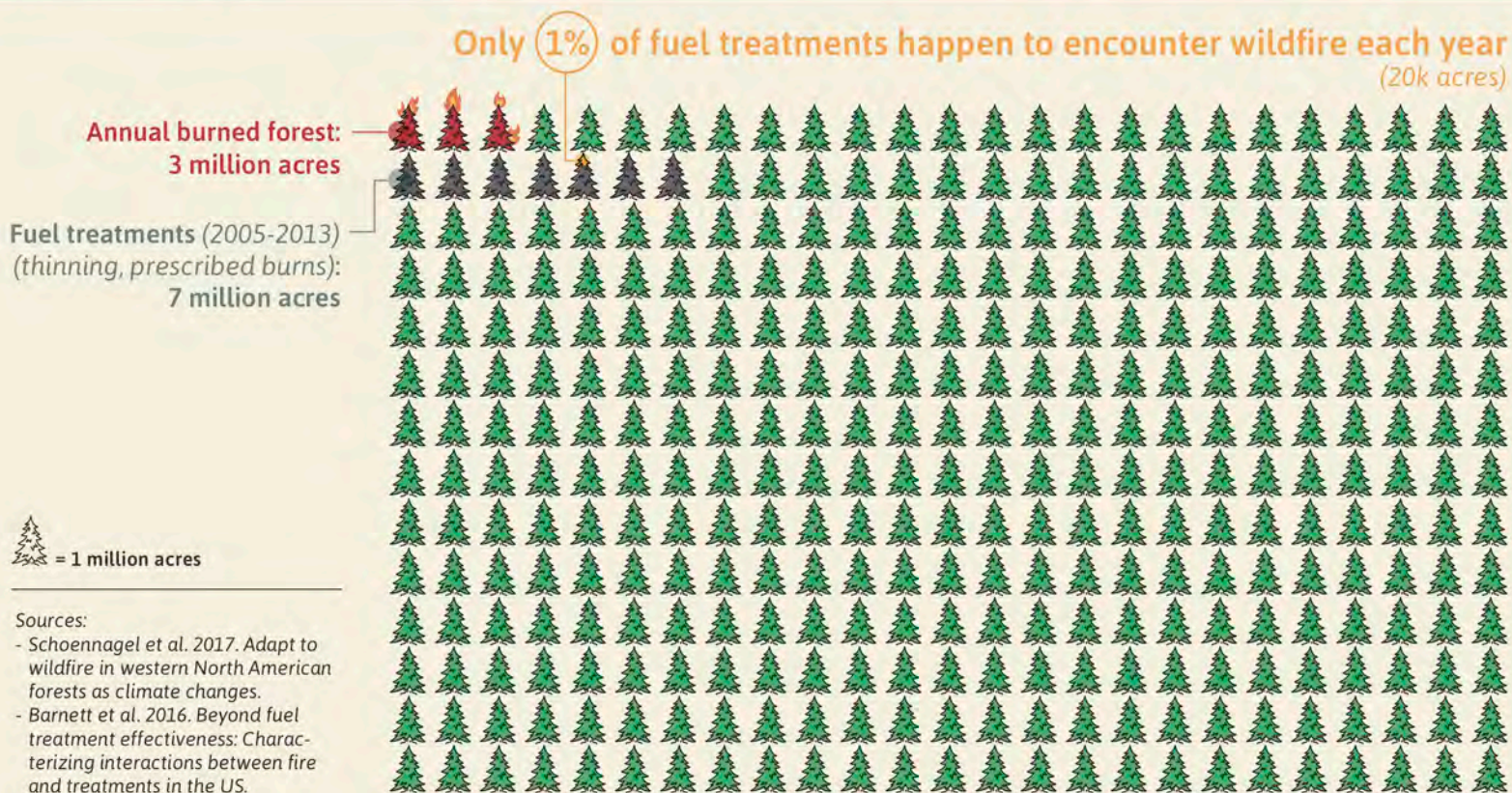
Average carbon stored in old-growth forests of western Oregon



INDUSTRIAL TIMBERLAND

Average carbon stored in timber plantations and clearcuts in Oregon Coast Range

THINNING THE FOREST TO INFLUENCE FIRE BEHAVIOR IS A SHOT IN THE DARK



Forests in the West: 350 million acres