Supplementary Material

Text S1. List of publications used in our synthesis.

Alexis, M. A., Rasse, D. P., Rumpel, C., Bardoux, G., Péchot, N., Schmalzer, P., et al. (2007). Fire impact on C and N losses and charcoal production in a scrub oak ecosystem. *Biogeochemistry* 82, 201–216. doi:10.1007/s10533-006-9063-1.

Brewer, N. W., Smith, A. M. S., Hatten, J. A., Higuera, P. E., Hudak, A. T., Ottmar, R. D., et al. (2013). Fuel moisture influences on fire-altered carbon in masticated fuels: An experimental study. *J. Geophys. Res. Biogeosciences* 118, 30–40. doi:10.1029/2012JG002079.

Donato, D. C., Campbell, J. L., Fontaine, J. B., and Law, B. E. (2009). Quantifying char in postfire woody detritus inventories. *Fire Ecol.* 5, 104–115. doi:10.4996/fireecology.0502104.

Eckmeier, E., Rösch, M., Ehrmann, O., Schmidt, M. W. I., Schier, W., and Gerlach, R. (2007). Conversion of biomass to charcoal and the carbon mass balance from a slash-and-burn experiment in a temperate deciduous forest. *Holocene* 17, 539–542. doi:10.1177/0959683607077041.

Finkral, A. J., Evans, A. M., Sorensen, C. D., and Affleck, D. L. R. (2012). Estimating consumption and remaining carbon in burned slash piles. *Can. J. For. Res.* 42, 1744–1749. doi:10.1139/x2012-112.

Huang, W., Hu, Y., Chang, Y., Liu, M., Li, Y., Ren, B., et al. (2018). Effects of fire severity and topography on soil black carbon accumulation in boreal forest of Northeast China. *Forests* 8. doi:10.3390/f9070408.

Licata, C., and Sanford, R. (2012). Charcoal and total carbon in soils from foothills shrublands to subalpine forests in the colorado front raneg. *Forests* 3, 944–958. doi:10.3390/f3040944.

MacKenzie, M. D., McIntire, E. J. B., Quideau, S. A., and Graham, R. C. (2008). Charcoal Distribution Affects Carbon and Nitrogen Contents in Forest Soils of California. *Soil Sci. Soc. Am. J.* 72, 1774. doi:10.2136/sssaj2007.0363.

Miesel, J., Reiner, A., Ewell, C., Maestrini, B., and Dickinson, M. (2018). Quantifying Changes in Total and Pyrogenic Carbon Stocks Across Fire Severity Gradients Using Active Wildfire Incidents. *Front. Earth Sci.* 6, 1–21. doi:10.3389/feart.2018.00041.

Pingree, M. R. A., Homann, P. S., Morrissette, B., and Darbyshire, R. (2012). Long and Short-Term Effects of Fire on Soil Charcoal of a Conifer Forest in Southwest Oregon. *Forests* 3, 353–369. doi:10.3390/f3020353.

Santín, C., Doerr, S. H., Preston, C. M., and González-Rodríguez, G. (2015). Pyrogenic organic matter production from wildfires: a missing sink in the global carbon cycle. *Glob. Chang. Biol.* 21, 1621–1633. doi:10.1111/gcb.12800.

Tinker, D. B., and Knight, D. H. (2000). Coarse Woody Debris following Fire and Logging in Wyoming Lodgepole Pine Forests. *Ecosystems* 3, 472–483. doi:10.1007/s100210000041.

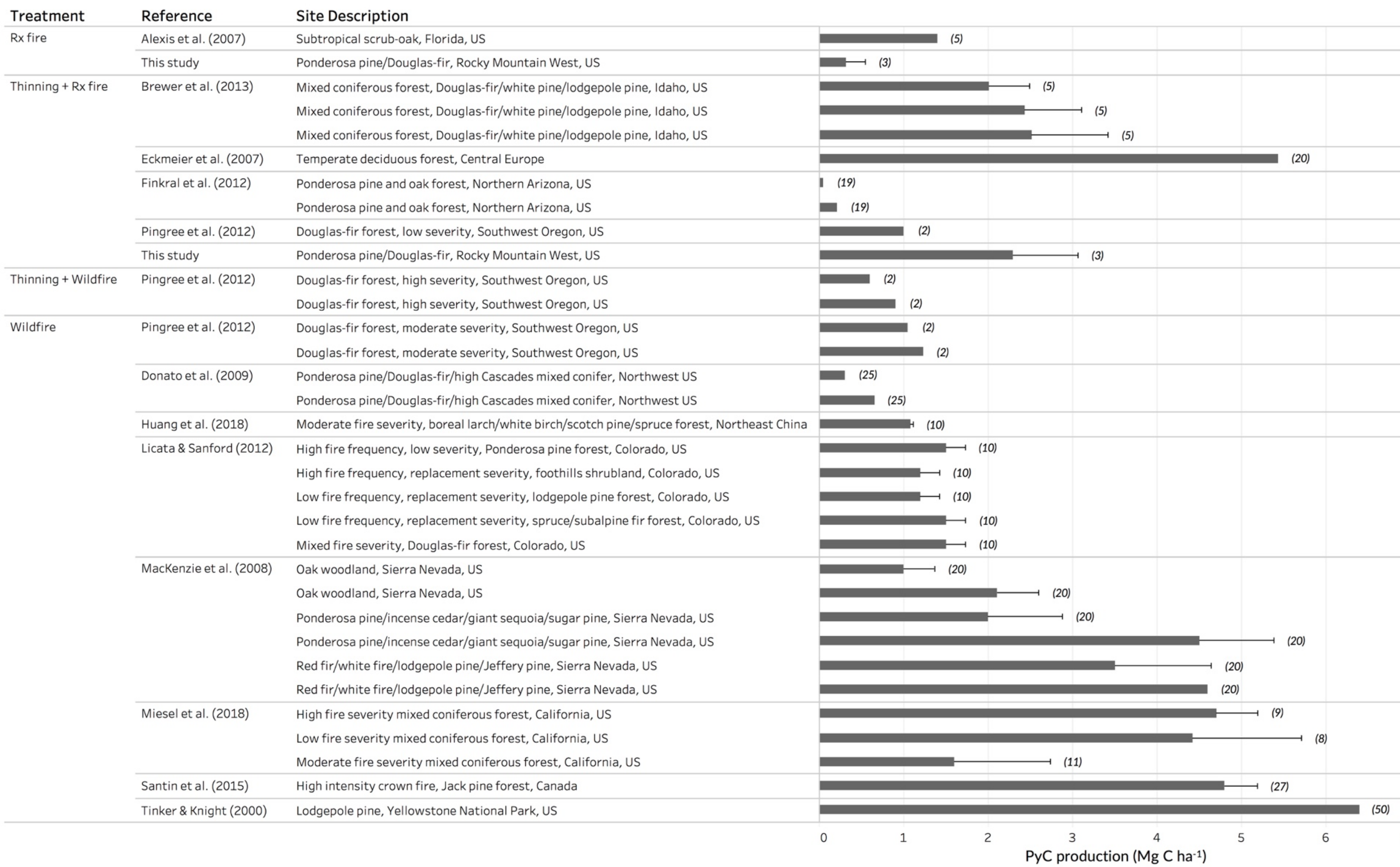

Figure S1. PyC production during wildfire or prescribed fire events with or without thinning treatments in forest ecosystems. Data were recorded from 12 publications that reported PyC production rate across 22 fire event sites under the scenario of 'prescribed fire (Rx fire)', 'thinning + Rx fire', 'thinning + wildfire', or 'wildfire'. Note that certain fire event site may include several independent records of PyC production rate. For each record collected at certain fire event site, data are depicted as mean in Mg C ha^{-1}, where PyC mass was converted to C mass based on the C content of PyC reported in individual studies. Whenever the original publication specifies data variation, an error bar showing 1× standard deviation is presented here. The number of replications upon which the individual PyC production rate was based on that reported in publication and is presented is in parentheses.

Table S1. Comments on selected descriptive variables and methods involved in PyC quantification in published studies included in our synthesis.

Alexis et al. (2007)	Total ecosystem PyC production involved a range of components (e.g. stem, litter); PyC production was examined across five fire temperature classes and multiple fuel sizes; PyC quantification by visual identification and then elemental analysis.
Brewer et al. (2013)	PyC production was examined across a series of fuel moistures under machinal forest thinning treatment; PyC was quantified by visual identification and elemental analysis and thermochemical methods.
Donato et al. (2009)	PyC production (mostly from downed wood) was estimated across two burn histories (single stand-replacing fire, two successive stand-replacing fires) and separated by multiple fuel sizes; PyC was determined by visual identification and calculation.
Eckmeier et al. (2007)	Slash-and-burn treatment; PyC production was separated by size fractions; PyC was determined by visual identification and calculation.
Finkral et al. (2012)	Slash-and-burn treatment; PyC generation rate was influenced by sampling method (sector sampling, line intersect sampling); PyC was determined by visual identification and calculation.
Huang et al. (2018)	PyC generation across a series of fire severities, slopes, and aspects; PyC in all soil layers were quantified using a chemo-thermal oxidation method following Caria et al. (2011).
Licata & Sanford (2012)	PyC generation across a series of elevations, slopes, aspects, and fire regimes; PyC was quantified using a modified version of the KMD method (Kurth et al. 2006) where hotplates and flasks were substituted with block heater/glass tubes for block digestion.
MacKenzie et al. (2008)	PyC generation across a series of elevations and latitudes. Mineral soil PyC was quantified using the KMD method (Kurth et al. 2006)
Miesel et al. (2018)	Total ecosystem PyC production involved a range of components (e.g. tree barks, downed wood); examined C and PyC gain/loss across a series of fire severities and fuel sizes; mineral soil samples were processed using the KMD method (Kurth et al. 2006); forest floor samples were processed following Maestrini & Miesel (2017) that involved a pre-digestion step to ensure full digestion of non-resistant C and sufficient post-digestion solid mass to be further processed for elemental analysis.
Pingree et al. (2012)	PyC generation across a series of fire severities and thinning regimes; PyC in the forest floor was determined by visual quantification and mineral soil by the KMD method (Kurth et al. 2006).
Santín et al. (2015)	Ecosystem PyC production involved a range of components (e.g. overstory, downed wood); PyC was examined by visual identification and elemental analysis.
Tinket & Knight (2000)	PyC production involved a series of decaying classes of woody fuels; PyC was estimated by visual identification and calculation.

References

Caria, G., Arrouays, D., Dubromel, E., Jolivet, C., Ratié, C., Bernoux, M., et al. (2011). Black carbon estimation in French calcareous soils using chemo-thermal oxidation method. *Soil Use Manag.*, no-no. doi:10.1111/j.1475-2743.2011.00349.x.

Kurth, V. J., MacKenzie, M. D., and DeLuca, T. H. (2006). Estimating charcoal content in forest mineral soils. *Geoderma* 137, 135–139. doi:10.1016/j.geoderma.2006.08.003.

Maestrini, B., and Miesel, J. R. (2017). Modification of the weak nitric acid digestion method for the quantification of black carbon in organic matrices. *Org. Geochem.* 103, 136–139. doi:10.1016/j.orggeochem.2016.10.010.