PRIMARY BOREAL FORESTS

PRIMARY BOREAL FORESTS PROVIDE CRITICAL STORES OF CARBON, BIODIVERSITY AND FRESHWATER

The statements made in the primary boreal forest infographic were drawn from the following publications.

Carbon

Balshi, M. S., Mcguire, A. D., Duffy, P., Flannigan, M., Kicklighter, D. W., & Melillo, J. (2009). Vulnerability of carbon storage in North American boreal forests to wildfires during the 21st century. Global Change Biology, 15(6), 1491-1510.

Bradshaw, C. J., & Warkentin, I. G. (2015). Global estimates of boreal forest carbon stocks and flux. Global and Planetary Change, 128, 24-30.

De Groot, W. J., Bothwell, P. M., Taylor, S. W., Wotton, B. M., Stocks, B. J., & Alexander, M. E. (2004). Jack pine regeneration and crown fires. Canadian Journal of Forest Research, 34(8), 1634-1641.

Harmon, M. E. (2019). Have product substitution carbon benefits been overestimated? A sensitivity analysis of key assumptions. Environmental Research Letters, 14(6), 065008.

Janowiak, M., Connelly, W. J., Dante-Wood, K., Domke, G. M., Giardina, C., Kayler, Z., ... Buford, M. (2017). Considering Forest and Grassland Carbon in Land Management. General Technical Report WO-95. United States Department of Agriculture, Forest Service, Washington, D.C. (68 pp).

McRae, D. J., Duchesne, L. C., Freedman, B., Lynham, T. J., & Woodley, S. (2001). Comparisons between wildfire and forest harvesting and their implications in forest management. Environmental Reviews, 9, 223-226.

National Council for Air and Stream Improvement (NCASI) (2006). Similarities and differences between harvesting- and wildfire-induced disturbances in fire-mediated Canadian landscapes. Technical Bulletin, 924. Research Triangle Park, N.C., Montreal, Canada (53 pp.)

Pohjanmies, T., Triviño, M., Le Tortorec, E., Mazziotta, A., Snäll, T., & Mönkkönen, M. (2017). Impacts of forestry on boreal forests: An ecosystem services perspective. Ambio, 46, 743-755.

Pan, Y., Birdsey, R. A., Fang, J., Houghton, R., Kauppi, P. E., Kurz, W. A., ... & Ciais, P. (2011). A large and persistent carbon sink in the world's forests. Science, 333(6045), 988-993.

Schuur, E. A. G., Bockheim, J., Canadell, J. G., Euskirchen, E., Field, C. B., Goryachkin, S. V., ... Zimov, S. A. (2008). Vulnerability of Permafrost Carbon to Climate Change: Implications for the Global Carbon Cycle. BioScience, 58(8), 701-714.

Stocks, B. J., Fosberg, M. A., Lynham, T. J., Mearns, L., Wotton, B. M., Yang, Q., ... & McKenney, D. W. (1998). Climate change and forest fire potential in Russian and Canadian boreal forests. Climatic change, 38(1), 1-13.

Tchebakova, N. M., Parfenova, E., & Soja, A. J. (2009). The effects of climate, permafrost and fire on vegetation change in Siberia in a changing climate. Environmental Research Letters, 4(4), 045013.

Walter Anthony, K., Schneider von Deimling, T., Nitze, I., Frolking, S., Emond, A., Daanen, R., ... Grosse, G. (2018). 21st-century modeled permafrost carbon emissions accelerated by abrupt thaw beneath lakes. Nature Communications, 9(1), 3262.

Carbon Numbers

Bradshaw, C. J., & Warkentin, I. G. (2015). Global estimates of boreal forest carbon stocks and flux. Global and Planetary Change, 128, 24-30.

Morales-Hidalgo, D., Oswalt, S. N., & Somanathan, E. (2015). Status and trends in global primary forest, protected areas, and areas designated for conservation of biodiversity from the Global Forest Resources Assessment 2015. Forest Ecology and Management, 352, 68-77.

Big, Old Trees

Bütler, R., Angelstam, P., Ekelund, P., & Schlaepfer, R. (2004). Dead wood threshold values for the three-toed woodpecker presence in boreal and sub-Alpine forest. Biological Conservation, 119(3), 305-318.

Cyr, D., Gauthier, S., Bergeron, Y., & Carcaillet, C. (2009). Forest management is driving the eastern North American boreal forest outside its natural range of variability. Frontiers in Ecology and the Environment, 7(10), 519-524.

Esseen, P. A., Renhorn, K. E., & Pettersson, R. B. (1996). Epiphytic lichen biomass in managed and old-growth boreal forests: effect of branch quality. Ecological Applications, 6(1), 228-238.

Larsen, J. A. (1980). The Boreal Ecosystem. Academic Press, New York (516 pp.).

Siitonen, J. (2001). Forest management, coarse woody debris and saproxylic organisms: Fennoscandian boreal forests as an example. Ecological Bulletins, 49, 11-41.

Siitonen, J., Martikainen, P., Punttila, P., & Rauh, J. (2000). Coarse woody debris and stand characteristics in mature managed and old-growth boreal mesic forests in southern Finland. Forest ecology and management, 128(3), 211-225.

Vaillancourt, M. A., Drapeau, P., Gauthier, S., & Robert, M. (2008). Availability of standing trees for large cavity-nesting birds in the eastern boreal forest of Québec, Canada. Forest Ecology and Management, 255(7), 2272-2285.

Venier, L. A., Thompson, I. D., Fleming, R., Malcolm, J., Aubin, I., Trofymow, J. A., ... & Holmes, S. B. (2014). Effects of natural resource development on the terrestrial biodiversity of Canadian boreal forests. Environmental Reviews, 22(4), 457-490.

Biodiversity

Anielski M., & Wilson, S. (2009). Counting Canada's Natural Capital: Assessing the Real Value of Canada's Boreal Ecosystems. Canadian Boreal Initiative, Ottawa, Canada (76 pp.).

Blancher, P., & Wells, J. (2005). The Boreal Forest Region: North America's Bird Nursery. Canadian Boreal Initiative, Ottawa, Canada (p. 30-39).

Boreal Songbird Initiative (2015). North America's Bird Nursery. https://www.borealbirds.org/boreal-birds

Gamfeldt, L., Snäll, T., Bagchi, R., Jonsson, M., Gustafsson, L., Kjellander, P., ... & Mikusiński, G. (2013). Higher levels of multiple ecosystem services are found in forests with more tree species. Nature communications, 4, 1340.

Holmberg, M., Aalto, T., Akujärvi, A., Arslan, A. N., Bergström, I., Böttcher, K., ... & Peltoniemi, M. (2019). Ecosystem services related to carbon cycling-modelling present and future impacts in boreal forests. Frontiers in Plant Science, 10, 343.

Johnston, C. A. (1991). Sediment and nutrient retention by freshwater wetlands: effects on surface water quality. Critical Reviews in Environmental Science and Technology, 21(5-6), 491-565.

Schindler, D.W. (2001). The cumulative effects of climate warming and other human stresses on Canadian freshwaters in the new millennium. Canadian Journal of Fisheries and Aquatic Sciences, 58, 18-29.

Uprety, Y., Asselin, H., Dhakal, A., & Julien, N. (2012). Traditional use of medicinal plants in the boreal forest of Canada: review and perspectives. Journal of Ethnobiology and Ethnomedicine, 8(1), 7.

Wells, J. V., & Roberts, D. (2020). Seeing the freshwater among the trees: the little-recognized aquatic resources of Canada's boreal forest region. Encyclopedia of the World's Biomes, Elsivier (p. 403-413).