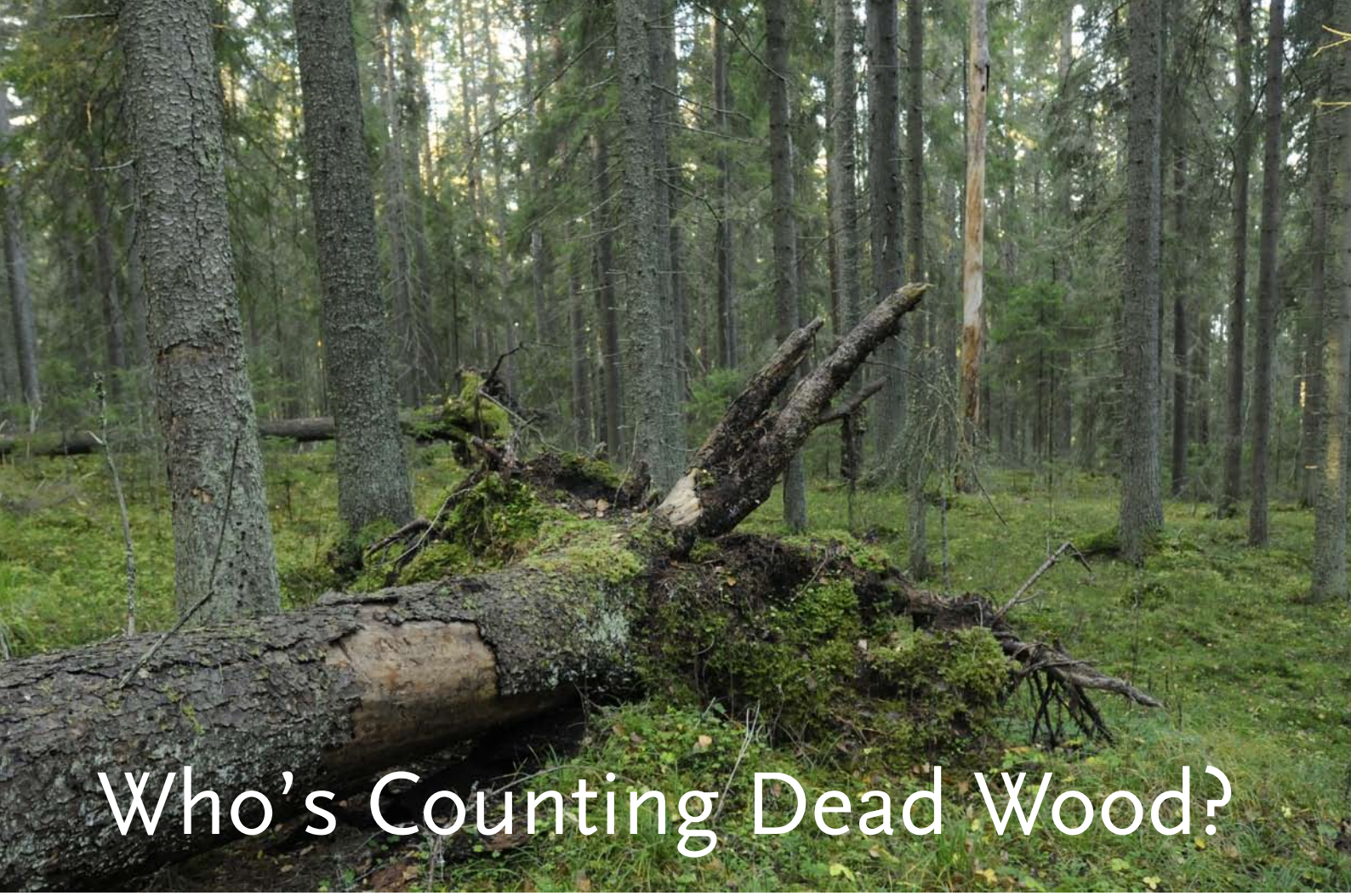

Who's Counting Dead Wood?

Christopher W. Woodall | U.S. Department of Agriculture, Forest Service
Hans Verkerk | European Forest Institute
Jacques Rondeux | Gembloux Agricultural University
Göran Ståhl | Swedish University of Agricultural Sciences

Dead wood in forests is a critical component of biodiversity, carbon and nutrient cycles, stand structure, and fuel loadings. Until recently, very few countries have conducted systematic inventories of dead wood resources across their forest lands. This may be changing as an increasing number of countries implement dead wood inventories. A recent survey looks at the status and attributes of forest dead wood inventories in over 60 countries. About 13 percent of countries inventory dead wood globally and most of these countries have initiated large-scale inventories of forest dead wood only recently (< 10 years). Given the growing importance of forest dead wood resources to many countries, globally harmonizing dead wood inventories helps everyone reach a common language in an era of climate change.

Dead wood can be defined as all non-living tree biomass (excluding organic soils and litter), including woody debris that is standing or lying along with stumps. Dead wood is increasingly being included in national forest inventories around the world for three broad pursuits. Firstly, dead wood is an important food source and serves as habitat for many plant, animal and fungal species and serves therefore as a good indicator for biodiversity. Secondly, to limit the impacts of human activities on climate change, 186 countries have ratified the Kyoto protocol. Carbon sequestration in dead wood is becoming an increasingly important estimate derived from national forest inventories because of its potential to sequester and emit carbon. Even so, estimates of dead wood have been omitted from some large-scale carbon assessments due to the lack of sufficient inventory data. Thirdly, concerns over the increase of forest fire occurrences have brought attention to the critical role that dead wood plays in large-scale fire hazards. Given the importance of national inventories of dead wood, the goal of the recent study was to survey over 60 countries around the world regarding their dead wood inventories and broadly summarize their dead wood inventory programs and suggest opportunities for harmonization.

Current Status of Forest Dead Wood National Inventories

Out of the hundreds of countries around the world, only a handful (≈ 30) currently inventory dead wood. However, these countries include over a third of the world's

Most countries that inventory dead wood include both standing and down dead trees. Comparison of the amount of deadwood between countries can be difficult because different diameter thresholds are applied; 42% of the countries have a diameter threshold of 10 cm or more for both standing and down dead trees.

forestland. Despite encompassing a wide array of forest ecosystems, conditions, and ownerships, there are surprising similarities among many of the countries that inventory dead wood. First, most countries recently initiated dead wood inventories since 2000. Second, the sample intensity (number of forested hectares in any country divided by the number of dead wood inventory plots) was typically greater than one plot per 10,000 forested ha. Almost all countries remeasure plots at an interval of less than or equal to 10 years. Third, almost all countries that had a dead wood inventory compiled information on both standing dead and down dead trees. Of countries that had a dead wood inventory, 60% inventoried stumps, 73% inventoried residue piles, and 47% inventoried small woody pieces. Fourth, most countries measured the species and decay class of dead wood with 68% of countries having a four or five decay class rating system for dead wood. Fifth, almost all countries used fixed-area plots for inventorying standing dead trees, but sample methods for downed dead wood were more varied. 63% of countries used fixed-area plots for CWD and 19% used line-intersect sampling. Finally, one of the few attributes that widely varied among countries that inventory dead wood was that of dead wood component definitions. At what point does a standing dead tree become a down dead tree? How small does a piece of downed, dead wood need to be in order to be considered part of the litter layer? It was found that measurement threshold variations distinguished definitions among countries. There was considerable variety in minimum diameters countries use to define both standing dead and dead wood populations. Minimum heights/lengths for standing and dead downed trees were overwhelmingly either 1 or 1.3 m. Overall, the thresholds for dead wood components appear in most cases to be based on the relationship between sampling efficiency and the relative contribution of the dead wood component to overall stand biomass/carbon. Because the sampling of standing dead trees is probably the most efficient, along with being a major contributor to stand biomass, the population definition was the most inclusive (i.e., smallest minimum diameter). In contrast, either small woody pieces (i.e., fine woody debris) were often not measured or its population was narrowly defined.

Opportunities to Harmonize Globally Harmonize Dead Wood Inventories

Dead wood national forest inventories have numerous similarities. First, standing dead and downed trees are often measured in unison. Rarely does a country inventory standing dead trees, but not downed trees. Second, the size, species, and decay class of dead trees are often measured. Most countries recognize the need to measure these parameters in order to more accurately estimate dead tree attributes such as volume, biomass, or carbon. Third, most countries have only recently started inventorying dead wood. Fourth, fixed-radius sampling techniques were the most common technique for inventories of both standing and downed dead trees. Despite the broad similarities among countries that inventory dead wood, even slight differences can cause problems with combining and comparing estimates in a regional/global context such as those required by global greenhouse gas offset accounting programs.

The most prominent difference that can inhibit dead wood estimate comparison among countries is the use of separate minimum diameters for either standing or downed dead trees. Possible solutions to this problem and others include: 1) increasing the estimation flexibility to accommodate comparison of different components with varying measurement thresholds, 2) developing common dimensional thresholds of dead wood components, 3) widely publishing inventory procedures/protocols, 4) releasing inventory data/reports to international peer review, and 5) increasing communication (e.g., workshops) among countries inventorying dead wood. Given the substantial progress with dead wood inventories during recent years, there is little doubt that with more effort and communication, these inventories can be more closely harmonized in the future.

Further information
Christopher Woodall, cwoodall@fs.fed.us

The complete results are currently in review with Environmental Management .

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