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Forest Measurements

Yuhi Weng
Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, wengy@sfasu.edu

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Book Review

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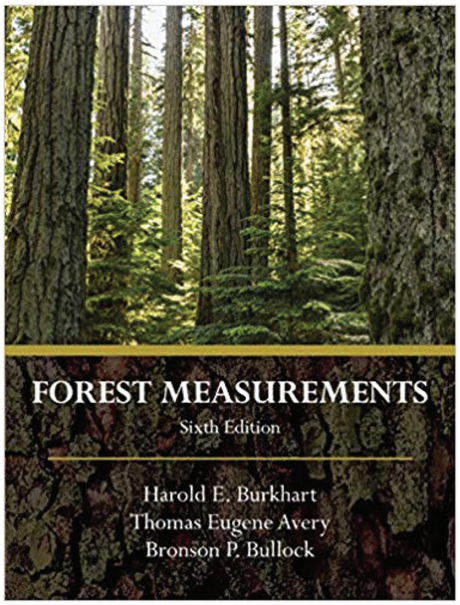
Yuhui Weng (wengy@sfasu.edu), Stephen F. Austin State University, Nacogdoches, TX.

Forest Measurements, sixth edition. H.E. Burkhart, T.E. Avery, and B.P. Bullock. 2019. Waveland Press, Long Grove, IL. 434 p. $77.95 (softcover). ISBN: 1-4786-3618-1.



Forest measurements, one of the cornerstones in the foundation of forestry, is the art and science of providing the quantitative information about trees and forest stands necessary for forest management, planning, and research. The updated edition (sixth edition) of this longstanding classic textbook, *Forest Measurements*, provides new and complete coverage of conventional and current measurement practices and technological applications that link the role of forest measurements with management of forest resources.

Similar to previous editions, the emphasis of this new edition is on principles and methods of measuring products cut from tree boles, measuring standing trees, and inventorying volumes of forest stands. For these methods, the book provides step-by-step outlines with great details and their limitations in application. Conceptions of site quality, stocking and stand density, and growth and yield modeling are presented in a straightforward fashion to ensure that even introductory students may understand the book's concise explanations, obtaining the foundation for further learning in silviculture, timber management, and ecology. Information that is strongly relevant to forest mensuration, such as basic statistics and land measurement, is also included. The book assumes no advanced knowledge of statistical methods other than algebra and plane trigonometry. Hidden within these details is a wealth of information for forestry students seeking to improve mensuration accuracy and efficiency. Abundant photographs and illustrations paired with many numerical examples highlight and clarify important concepts.

The new edition has been reorganized from the fifth edition to better integrate current issues and modern technologies into forest measurements. Concerns about global warming and recognition that forests remove carbon dioxide from the atmosphere and sequester it have led to a flourishing of research on biomass and carbon measurement. Recognizing this, the new edition includes a new chapter that provides an overview on assessing forest biomass and carbon using traditional forest measurements, sampling, and modeling. Another rapid advance is the application of modern electronic and computing technologies to forest mensuration not only for traditional forestry but also for the nontimber inventory. Among the most notable are use of geographic information systems, unmanned aerial vehicles, satellite imagery, and airborne LiDAR and DEMs that are being used to measure and monitor trees and forests. While application of these tools does not alter the principles of tree and forest measurement fundamentally, it has reduced considerably the time needed for field measurements and can

be used to quickly obtain many tree characteristics including spatial positions. The new edition includes expanded discussions of aspects central to the application of these tools in assessing forest resources. Since these tools may be widely used in future, students in forestry need an understanding in this area.

One unexpected change in this new edition is that the last chapter of the previous editions, Assessing Rangeland, Wildlife, Water, and Recreational Resources, was removed. Although the measurement principles and techniques discussed in the text apply to any inventory, regardless if it is conducted for timber, range, wildlife, watershed, recreation, or other management objectives, this chapter would have benefited students in knowing specified measurement methods for different objectives. This seems especially important, given the changes in objectives of forest management in the past 30 years. Also, this text does not address some practically applied and widely used tools in forest measurements such as using laser rangefinders and ultrasound distance-measuring devices for slope or limiting distance measurement. The use of electronic data recorders is discussed, but the author falls short of addressing current advances (i.e., using modern smartphones for both data recording and GPS) in this area as well.

Overall, this book is an exceptional resource given its broad scope from measuring individual tree to stand, growth and yield modeling, as well as the application of modern electronic and computing tools to improve tree mensuration accuracy and efficiency. Many of the topics (chapters) may require their own textbooks, but the authors did an excellent job in balancing depth and synopsis. For foresters or students who need more details, materials for in-depth case studies of successful implementation of the concepts outlined in the text are referenced in the additional sources at the ends of chapters throughout the text. I would recommend this book as an educational resource for instructors teaching lower-level forestry students. I use this book as a textbook for Forest Measurements and also as a reference book for other upper-level courses such as sampling designs and timber management, and it is a great textbook to build on. This book may also serve as a handbook for practicing foresters, since it helps professional foresters to keep themselves abreast of new developments, as well as providing the fundamental basics used to ensure precise forest measurements.