

# Trees to Tap

How Forest Practices  
Affect Oregon's  
Municipal Water



**Oregon State**  
University

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## How Forest Practices Affect Oregon's Municipal Water

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Extension Service



**Oregon Forest  
Resources Institute**



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## Foreword

**F**orests are important to Oregonians. Water is important to Oregonians. Thus, the relationship between forest management and drinking source water is doubly important to Oregonians. Forestland covers about 47% of Oregon, and it's the most expansive land use in the state. Oregon's forest sector contributes more than 61,500 direct jobs with nearly \$3.5 billion in wages in 2019. Oregon leads the nation in the production of softwood lumber and plywood, and has for decades. Forests produce much more than important economic benefits such as timber, forest products and jobs. Forests also provide wildlife habitat, recreation, carbon storage and clean water. In fact, most of Oregon's drinking water is sourced from our forests. But logging, forest road building, using herbicides and other activities related to growing and harvesting timber can impact the quality and quantity of water sourced from forested watersheds. Surveys of Oregonians have consistently shown that protecting drinking water sources during forest management is one of their key concerns relating to forestry.

In 1991, the Oregon Legislature created the Oregon Forest Resources Institute (OFRI) to support Oregon's forest sector by advancing public understanding of forests, forest management and forest products, and encouraging sustainable forestry through landowner education. OFRI achieves its mission through education programs for the general public, K-12 teachers and students, and forest landowners.

In 2017, the OFRI board of directors asked staff to develop a public education program on the relationship between forest management and drinking water. As staff reviewed available scientific summaries to inform this effort, they discovered the latest comprehensive scientific review was an OFRI-commissioned report produced in 2001 by Paul Adams and Mark Taratoot of the Oregon State University College of Forestry titled *Municipal Water Supplies from Forest Watersheds in Oregon: Fact Book and Catalog*.

Much research had been conducted and published since 2001, so the OFRI Board approved the commissioning of an update. OFRI staff approached Anthony Davis, then interim dean of the Oregon State University College of Forestry, who called on Jon Souder, forest watersheds Extension specialist. Davis and Souder recruited the *Trees to Tap* science team.

More than two years of dedicated work by the science team, who were assisted by a steering committee representing a diverse set of stakeholders, led to the development of this report.

In addition to this comprehensive and technical science review report published by the Oregon State University Extension Service, OFRI published a much shorter special report called *Keeping Drinking Water Safe* that gives a general overview of how forest management affects drinking water and highlights key findings from *Trees to Tap*. Both reports can be downloaded from OFRI's website at [OregonForests.org/TreesToTap](https://OregonForests.org/TreesToTap).

We hope that you will find this *Trees to Tap* science review report useful. We'd like to offer a big thank you to Anthony Davis, Jon Souder and the *Trees to Tap* science team for a job well done.

For the forest,

**Mike Cloughesy**, *director of forestry*  
Oregon Forest Resources Institute

## Authors

**Jon A. Souder**, principal investigator. Assistant professor in Oregon State University's Forest Engineering, Resources and Management (FERM) department; forest watershed specialist in the Forestry and Natural Resources Extension program; and the concluding director of the Watersheds Research Cooperative (WRC). He is the former executive director of the Coos Watershed Association in Charleston, Oregon, managing their water quality assessment, restoration and monitoring programs. He has a doctorate and master's degree in Wildland Resources Science from the University of California, Berkeley and a bachelor's degree in biology (limnology) from Marlboro College, Vermont.

**Kevin Bladon**, co-principal investigator. Assistant professor of forest hydrology in OSU's FERM department. He is interested in the effects natural (wildfire, pests, pathogens) and human (conventional and salvage harvesting) disturbance has on water quantity, water quality and aquatic ecology. He previously worked with transdisciplinary teams researching the implications of forest disturbance on drinking water treatability. This research examined source water supply and protections strategies to enable both forest and community resiliency to respond to disturbances. He has a doctorate in forest hydrology from the University of Alberta.

**Emily Jane Davis**, co-principal investigator. Assistant professor in OSU's Forest Ecosystems and Society (FES) Department and specialist in the Forestry and Natural Resources Extension program. Her research and technical assistance focuses on natural resource social science, environmental governance, collaboration and partnerships, community development, wildfire response and science delivery. She has a doctorate and master's degrees in human geography from the University of British Columbia, and a bachelor's in history from McGill University in Montreal.

**Bogdan Strimbu**, co-principal investigator. Assistant professor of forest management in OSU's FERM. His research focuses on strategic forest planning, remote sensing and biometry. He has conducted research and published on the effects of forest management and petroleum drilling on moose and martin habitat, travel distances for debris flows, structurally complex forest stands and remote sensing for forest inventories. He has a doctorate and master's degree in forest management from the University of British Columbia, a master's in mathematics/statistics from Louisiana Technical University, and a bachelor's degree in forest operations from Transilvania University, Romania.

**Jeff Behan**, senior policy research analyst at OSU's Institute of Natural Resources. He has over 20 years of experience working with state and federal agencies, universities and native tribes to acquire, synthesize and deliver natural resource science knowledge. Jeff's professional interests include science-based natural resource and water policy, science synthesis and knowledge transfer, sustainability, public land management, river management, and outdoor recreation policy and management.

Chapter 8 on Fire Risk was written by **Michelle A. Day**, a biological scientist with the USDA Forest Service, Rocky Mountain Research Station; **Chris Ringo**, a senior faculty research assistant in the OSU Department of Crop and Soil Science; and **Alan A. Ager**, a research forester with the Forest Service, Rocky Mountain Research Station. Day and Ringo provided fire risk maps for each of the 156 community water supply watersheds for an accompanying atlas.

The forest cover change analysis presented in Chapter 1 was conducted by **Robert Kennedy**, an associate professor in OSU's College of Earth, Ocean, and Atmospheric Sciences; and **Peter Clary**, faculty research assistant in the OSU College of Earth, Ocean, and Atmospheric Sciences. They have also created forest cover change maps and data for each of the 156 community water supply watersheds for an accompanying atlas.

**Lisa Gaines**, is the director of OSU's Institute for Natural Resources and provided convening and facilitation for the *Trees To Tap* Steering Committee. She has bachelor's degrees in economics and international relations from the University of California, Davis, a master's in Agricultural and Resource Economics and a doctorate in environmental sciences from Oregon State University.

## Steering committee

We were fortunate to convene a broadly representative Steering Committee that worked well together. The role of the Steering Committee was to identify priorities for our science review, appraise the community water system survey questions, and review the draft chapters. We did not ask for their approval of the final report.

The Steering Committee consisted of:

**Marganne Allen** was the forest health and monitoring manager for the Oregon Department of Forestry prior to moving over to the Department of Agriculture towards the end of the project. She is an Oregon State University graduate, with a master's degree in forest management and a minor in soil science and a master's degree in forestry in forest hydrology.

**Seth Barnes** is the director of forest policy for the Oregon Forest and Industries Council, and previously was the operations manager for the Washington Forest Practices program. He has a bachelor's in forest management from Oregon State University and attended graduate school for public administration and natural resource policy at Washington State University.

**Dr. Ashley Coble** is a forest watershed scientist with the National Council on Air and Stream Improvement (NCASI). Coble has a bachelor's degree in biological sciences from Mount Holyoke College, a master's in terrestrial biogeochemistry from Northern Arizona University, and a doctorate in aquatic biogeochemistry from Michigan Technological University.

**Mike Collier** is the deputy director and source water specialist at the Oregon Association of Water Utilities, a nonprofit, independent association of 422 water and wastewater utilities that represent water utilities' interests and provides technical assistance. He has a master's in water resources engineering from Oregon State University.

**Cathy Kellon** was the Working Waters program director for the Geos Institute during most of this project, moving to be the Columbia Slough Watershed Council's executive director in January 2019. Cathy earned her master's degree in geography, with a minor in interdisciplinary water resources studies, from Oregon State University.

**Teresa Kubo** was the environmental review and sediment manager for the Oregon Operations Office, Region 10 of U.S. Environmental Protection Agency, where she worked for last 16 years. She has a master's in forest resources management from the University of Idaho, as well as a bachelor's in Spanish and international studies (emphasis on natural resources), also from UI. She was succeeded by Dan Brown when she left EPA in July 2019.

**Casey Lyon** is the technical services unit manager for Oregon Health Authority Drinking Water Services, currently managing the source water protection team within OHA drinking water services and coordinating drinking water implementation efforts with DEQ partner staff. He has a bachelor's degree in environmental studies from the University of Oregon and is a registered environmental health specialist.

**Mary Scurlock** is coordinator for the Oregon Stream Protection Coalition, representing 20 environmental and conservation organizations in Oregon and Washington. Prior to joining the coalition, Scurlock was policy director for 19 years at the Pacific Rivers Council. She has an A.B. degree from Duke University in public policy and history, and a J.D. degree, cum laude, from the Boston University School of Law.

**Josh Seeds** is a nonpoint source analyst in the Drinking Water Protection program at Oregon Department of Environmental Quality, where his work focuses on nonpoint source pollution risks, natural processes, land management and drinking water provision. He has a bachelor's in biochemistry, and a master's in environmental science from Washington State University.

**Brian Staab** has been the regional hydrologist for the USDA Forest Service Pacific Northwest Region for the last 11 years, and previously the regional hydrologist for the Pacific Southwest Region. Staab has a bachelor's degree in civil engineering from Penn State University, and a master's in hydrology and water resources science from Stanford University.

**Mike Cloughesy** served in an ex officio role as director of forestry and project manager for the Oregon Forest Resources Institute. Prior to joining OFRI in 2003, Mike was the director of outreach education at the Oregon State University College of Forestry and the assistant leader of the Forestry Extension Program and professor of forest resources. He has a bachelor's degree in forestry from Iowa State University and a master's in forest science from Oregon State University.