

Stereo Photo Series for Quantifying Natural Fuels in the Americas

Roger D. Ottmar, Robert E. Vihnanek and Clinton S. Wright

U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Seattle Forestry Sciences Laboratory, Fire and Environmental Research Applications Team, 400 North 34th Street, Suite 201, Seattle, WA 98105, USA.

The natural fuels photo series is a set of data and photographs that collectively display a range of natural conditions and fuel loadings in a wide variety of ecosystem types throughout the Americas from central Alaska to central Brazil. Fire managers are the primary target audience of the natural fuels photo series, although the data presented will also prove useful for scientists and managers in other natural resource fields.

The first six volumes of the natural fuels photo series are grouped and published by geographical region of the United States. Volume I included sites in mixed-conifer, western juniper, sagebrush, and grassland ecosystem types in the interior Pacific Northwest. Volume II included sites in black spruce and white spruce ecosystem types in Alaska. Volume III included sites in lodgepole pine, quaking aspen, and gambel oak ecosystem types in the Rocky Mountains. Volume IV included sites in pinyon-juniper, sagebrush, and chaparral ecosystem types in the Southwest. Volume V included sites in red and white pine, northern tallgrass prairie, and mixed-oak ecosystem types in the Midwest. Volume VI included sites in longleaf pine, pocosin, and marsh grass ecosystem types in the Southeast.

Additional published or in press volumes include sites in grassland, shrubland, woodland and forest types in Hawaii; jack pine in the Lake States; hardwoods with spruce succession in Alaska; and sand hill, sand pine scrub and hardwoods with white pine types in the Southeast. A volume to characterize western oaks and manzanita/ceanothus types is currently being compiled and field work is ongoing in pitch pine, balsam fir/red spruce, and mixed hardwoods types in the northeast U.S. While the primary focus has been on ecosystems found throughout the United States, a volume has also been produced for savannah (*cerrado*) ecosystem types in central Brazil and a volume is under development for pine forest and other types in Mexico.

Generally, sites include wide-angle and stereo-pair photographs supplemented with information on living and dead fuels and vegetation, and where appropriate, stand structure and composition within the area visible in the photographs. The sites in each volume provide a basis for appraising and describing woody material, vegetation, and stand conditions in different ecosystems across the United States.

Why Is The Photo Series Needed?

The natural fuels photo series are land management tools that can be used to assess landscapes through appraisal of living and dead woody material and vegetation (i.e., fuels) and stand characteristics. Once an assessment has been completed, stand treatment options, such as prescribed fire or harvesting, can be planned and implemented to better achieve desired effects while minimizing negative impacts on other resources.

The photo series has application in several branches of natural resource science and management. Inventory data found in each volume can be used as inputs for evaluating animal and insect habitat, nutrient cycling, and microclimate, for example. Fire managers will find the photo series useful for predicting fuel consumption, smoke production, fire behavior, and fire effects during wildfires and prescribed fires. In addition, the photo series can be used to appraise carbon sequestration, an important factor in predictions of future climate, and to link remotely sensed signatures to live and dead fuels on the ground.

Ground inventory procedures that directly measure site conditions (e.g., fuel loading and arrangement, vegetation structure and composition, etc.) exist for most ecosystem types and are useful when a high degree of accuracy is required. Ground inventory is time-consuming and expensive, however, and photo series can be used to make quick, easy, and inexpensive determinations of fuel quantities and stand conditions when less precise estimates are acceptable.

How Was The Photo Series Developed?

Sites photographed for the various series are selected to show ranges of important ecosystem characteristics (e.g., down and dead woody material loading, understory composition, overstory development, etc.).

Photographs And Information Arrangement

Stereo-pair photographs are included in each photo series volume. The three-dimensional image obtained by viewing the photographs with a stereoscope improves the ability of the land manager to appraise natural fuel, vegetation, and stand structure conditions. Larger, wide-angle photographs are included for additional comparisons.

The photographs and accompanying data summaries are presented as single sites organized into series. Each site is arranged to occupy two facing pages. In most cases the upper page contains the wide-angle (50mm) photograph, and general site and stand information. The lower page typically includes the stereo-pair photographs and summaries of overstory structure and composition, understory vegetation structure and composition, forest floor composition and loading, and dead and down woody material loading and density by size class.

Using The Photo Series

To use the photo series one makes a visual inventory of the site by observing fuel and stand conditions within their field of view and comparing them with the stereo-pair photographs. The user observes each characteristic of interest (e.g., 3.1-9.0-inch woody material loading) and selects a photo series site (or sites) that nearly matches or brackets the observed characteristics. The quantitative value of the characteristic being estimated can then be read from the data summary accompanying the selected photo series site, or a value can be interpolated using the data from more than one site. These steps are repeated for each size class or stand characteristic of interest and the total loading or stand condition can then be calculated by summing the estimates.

How Do I Get the Photo Series?

Volumes I-VI are available for purchase from the National Interagency Fire Center, Great Basin Cache Supply office, Publication Management System working team in Boise, Idaho (Fax: 208-387-5573 or <http://www.fire.blm.gov/gbk/pms.htm>). The Hawaii and Brazil volumes are available upon request from the Pacific Northwest Research Station, Seattle Forestry Sciences Laboratory.

Photo Series Citations

- Ottmar, Roger D.; Vihnanek, Robert E.; Wright, Clinton S. 1998. Stereo photo series for quantifying natural fuels. Volume I: mixed-conifer with mortality, western juniper, sagebrush, and grassland types in the interior Pacific Northwest. PMS-830. Boise, ID: National Wildfire Coordinating Group, National Interagency Fire Center. 73 p. Order Number – NFES #2580 \$33.07
- Ottmar, Roger D.; Vihnanek, Robert E. 1998. Stereo photo series for quantifying natural fuels. Volume II: black spruce and white spruce types in Alaska. PMS-831. Boise, ID: National Wildfire Coordinating Group, National Interagency Fire Center. 65 p. Order Number – NFES #2581 \$32.21
- Ottmar, Roger D.; Vihnanek, Robert E.; Wright, Clinton S. 2000. Stereo photo series for quantifying natural fuels. Volume III: lodgepole pine, quaking aspen, and gambel oak types in the Rocky Mountains. PMS-832. Boise, ID: National Wildfire Coordinating Group, National Interagency Fire Center. 85 p. Order Number – NFES #2629 \$36.82
- Ottmar, Roger D.; Vihnanek, Robert E.; Regelbrugge, Jon C. 2000. Stereo photo series for quantifying natural fuels. Volume IV: pinyon-juniper, sagebrush, and chaparral types in the Southwestern United States. PMS 833. Boise, ID: National Wildfire Coordinating Group, National Interagency Fire Center. 97 p. Order Number – NFES #1084 \$27.53
- Ottmar, Roger D.; Vihnanek, Robert E. 1999. Stereo photo series for quantifying natural fuels. Volume V: Midwest red and white pine, northern tallgrass prairie, and mixed oak types in the Central and Lake States. PMS 834. Boise, ID: National Wildfire Coordinating Group, National Interagency Fire Center. 99 p. Order Number – NFES #2579 \$36.52
- Ottmar, Roger D.; Vihnanek, Robert E. 2000. Stereo photo series for quantifying natural fuels. Volume VI: Longleaf pine, pocosin, and marshgrass types in the Southeast United States. PMS 835. Boise, ID: National Wildfire Coordinating Group, National Interagency Fire Center. 56 p. Order Number – NFES #2630 \$30.09
- Ottmar, Roger D.; Vihnanek, Robert E.; Miranda, Heloisa S.; Sato, Margarete N.; Andrade, Saulo M.A. 2001. Stereo photo series for quantifying Cerrado fuels in central Brazil – Volume I. Gen. Tech. Rep. PNW-GTR-519. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 87 p. Available from Seattle Forestry Sciences Laboratory. Send requests via e-mail to: rottmar@fs.fed.us
- Wright, Clinton S.; Ottmar, Roger D.; Vihnanek, Robert E.; Weise, David R. 2002. Stereo photo series for quantifying natural fuels. Grassland, shrubland, woodland, and forest types in Hawaii. Gen. Tech. Rep. PNW-GTR-545. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 91 p. Available from Seattle Forestry Sciences Laboratory. Send requests via e-mail to: cwright@fs.fed.us



Natural Resource Network

Connecting Research, Teaching and Outreach

2003 Workshop Proceedings Using Fire to Control Invasive Plants: What's New, What Works in The Northeast?

**January 24, 2003
Portsmouth, New Hampshire**

UNH Cooperative Extension
131 Main Street, Nesmith Hall, Durham, NH 03824





Julie Richburg

Using Fire to Control Invasive Plants: What's New, What Works in the Northeast? was held on January 24, 2003 at the Urban Forestry Center, Portsmouth, NH. Over one hundred natural resource professionals gathered to hear from researchers and fire managers whose observations might not have been summarized elsewhere. These papers were not peer-reviewed or edited. They were compiled by Karen P. Bennett, University of New Hampshire Cooperative

Extension, Dr. Alison C. Dibble, USDA Forest Service, Northeastern Research Station, and Dr. William A. Patterson III, University of Massachusetts. These proceedings are available at <http://www.ceinfo.unh.edu/forestry/documents/WPUFCI03.pdf>

Workshop Agenda

Can Northeastern Woody Invasive Plants Be Controlled With Cutting and Burning Treatments? Julie Richburg, University of Massachusetts

Stereo Photo Series for Quantifying Natural Fuels in the Americas Robert Vihnanek, USDA Forest Service, Pacific Northwest Research Station (see poster)

Lessons Learned from Eleven Years of Prescribed Fire at the Albany Pine Bush Preserve Tom Dooley, Albany Pine Bush Preserve

Regional Climate and Fire Danger Modeling Specific to the Pine Barrens Dr. John Hom, USDA Forest Service, Northeast Research Station

Panel: Using Fire to Control Invasive Plants- What's New, What Works in the Northeast?

David Crary, Cape Cod National Sea Shore

Dr. Michael Ciaranca, Camp Edwards

Tom Dooley, Albany Pine Bush Preserve

Jessie Murray, The Nature Conservancy

Dr. Ernie Steinauer, Mass Audubon

Gerald Vickers, US Fish and Wildlife Service

Dr. Betsy Von Holle, Harvard Forest

Policy Changes and Funding Opportunities Affecting Fire Managers and Researchers Allen Carter, USDI Fish and Wildlife Service, Northeast Region

Use of Prescribed Fire for Management of Old Fields in the Northeast Laura Mitchell, US Fish and Wildlife Service, Prime Hook National Wildlife Refuge

Fuel Bed Characteristics of Invaded Forest Stands Dr. Alison C. Dibble, USDA Forest Service, Northeastern Research Station

Modifying the Behave Fuel Model for Northeast Conditions: Research Needs for Managing Invasives Dr. Mark J. Ducey, University of New Hampshire

Overview and Synthesis Dr. William A. Patterson III, University of Massachusetts



This meeting was sponsored in part by the Joint Fire Science Program, NIFC, Boise, ID, which provided support for a 3-year fire/invasive plants study. Other sponsors include USDA Forest Service, Northeastern Research Station; University of NH Cooperative Extension; University of Massachusetts.