

Malcolm North
Sierra Nevada Research Center
Department of Plant Sciences
One Shields Ave.
University of California
Davis, CA 95616
(530) 754-7398
email: mpnorth@ucdavis.edu

Current Position: Research Plant Ecologist, Pacific Southwest Research Station,
U.S. Forest Service and Associate in Forest Ecology, Department of
Plant Sciences, U.C. Davis.

Education

- Ph.D. 1993 *University of Washington, College of Forest Resources, Seattle, WA. Forest Ecosystems Analysis Division. Dissertation title: "Stand structure and truffle abundance associated with the northern spotted owl (Strix occidentalis caurina)". Major Adviser: Dr. Jerry Franklin.*
- MFS 1988 *Yale University, School of Forestry and Environmental Studies, New Haven, CT. Forest Ecology Division. Master's Thesis: "Old-growth research areas of the Department of Natural Resources". Major Adviser: Dr. John Gordon.*
- AB 1979 *Vassar College, Poughkeepsie, NY. English major.*

Publications

- Hanson, C. and M. North. In press. Postfire survival and flushing in three Sierra Nevada conifers with high initial crown scorch. *International Journal of Wildland Fire*.
- Bigelow, S.W., M.P. North, and W.R. Horwath. 2009. Resource-Dependent Growth Models for Sierran Mixed-Conifer Saplings. *The Open Forest Science Journal* 2: 31-40.
- Hurteau, M., M. North, and T. Foines. 2009. Modeling the influence of precipitation and nitrogen deposition on forest understory fuel connectivity in Sierra Nevada mixed-conifer forest. *Ecological Modelling* 220: 2460-2468.
- North, M., M. Hurteau, and J. Innes. 2009. Fire suppression and fuels treatment effects on mixed-conifer carbon stocks and emissions. *Ecological Applications* 19: 1385-1396.
- North, M., P. Stine, K. O'Hara, W. Zielinski, and S. Stephens. 2009. An ecosystem management strategy for Sierran mixed-conifer forests. USDA Forest Service, PSW General Technical Report. PSW-GTR-220.
- Soung-Ryoul, R., A. Concilio, J. Chen, M. North, and S. Ma. 2009. Prescribed burning and mechanical thinning Effects on belowground conditions and soil respiration in a mixed-conifer forest, California. *Forest Ecology and Management* 257: 1324-1332.
- Hurteau, M. and M. North. 2009. Response of *Arnica dealbata* to climate change, nitrogen deposition, and fire. *Plant Ecology* 202: 191-194.
- Rambo, T. and M. North. 2009. Canopy microclimate response to pattern and density of thinning in a Sierra Nevada forest. *Forest Ecology and Management* 257: 435-442.
- Hurteau, M. and M. North. 2009. Fuel treatment effects on tree-based forest carbon storage and emissions under modeled wildfire scenarios. *Frontiers in Ecology and the Environment*. 7: 409-414.
- Concilio, M., J. Chen, S. Ma, and M. North. 2009. Precipitation drives interannual variation in summer soil respiration in a Mediterranean-climate, mixed-conifer forest. *Climatic Change* 92: 109-122.

- Hanson, C.T. and M.P. North. 2008. Postfire woodpecker foraging in salvage-logged and unlogged forests of the Sierra Nevada. *Condor* 110: 777-782.
- North, M. and W. Keeton. 2008. Emulating natural disturbance regimes: an emerging approach for sustainable forest management. Chapter 17 in R. Laforzezza, J. Chen, G. Sanesi, and T. Crow (eds.) *Landscape Ecology: Sustainable Management of Forest Landscapes*, Springer-Verlag Press. Pages 341-372. (invited)
- Meyer, M., M. North, and S. Roberts. 2008. Truffle abundance in recently prescribed burned and unburned forests in Yosemite National Park: Implications for mycophagous mammals. *Fire Ecology* 4: 24-33.
- Rambo, T. and M. North. 2008. Spatial and temporal variability of canopy microclimate in a Sierra Nevada riparian forest. *Northwest Science* 82: 259-268.
- Plamboeck, A., M. North, and T. Dawson. 2008. Conifer seedling survival under closed-canopy and manzanita patches in the Sierra Nevada. *Madrono* 55: 193-203.
- Maloney, P. T. Smith, C. Jensen, J. Innes, D. Rizzo, and M. North. 2008. Initial tree mortality, and insect and pathogen response to fire and thinning restoration treatments in an old growth, mixed-conifer forest of the Sierra Nevada, California. *Canadian Journal of Forest Research* 38: 3011-3020.
- Zald, H., A. Gray, M. North, and R. Kern. 2008. Initial regeneration responses to fire and thinning treatments in a Sierra Nevada mixed-conifer forest, USA. *Forest Ecology and Management* 256: 168-179.
- Hurteau, M. and M. North. 2008. Mixed-conifer understory response to climate, nitrogen, and fire. *Global Change Biology* 14:1543-1552
- Meyer, M., D. Kelt, and M. North. 2007. Effects of burning and thinning on lodgepole chipmunks (*Neotamias speciosus*) in the Sierra Nevada, California. *Northwestern Naturalist* 88: 61-72.
- Meyer, M., M. North, A. Gray, and H. Zald. 2007. Influence of soil thickness on stand characteristics in a Sierra Nevada mixed-conifer forest. *Plant and Soil* 294: 113-123.
- Hurteau, M., H. Zald. and M. North. 2007. Species-specific response to climate reconstruction in upper-elevation mixed-conifer forests of the western Sierra Nevada, California, USA. *Canadian Journal of Forest Research* 37: 1681-1691.
- North, M., J. Innes, and H. Zald. 2007. Comparison of thinning and prescribed fire restoration treatments to Sierran mixed-conifer historic conditions. *Canadian Journal of Forest Research* 37: 331-342.
- Plamboeck, A.H., T.E. Dawson, L.M. Egerton-Warburton, M. North, T.D. Bruns and J.I. Querejeta. 2007. Water transfer via ectomycorrhizal fungal hyphae to conifer seedlings. *Mycorrhiza* 17: 439-447.
- Meyer, M.D., M.P. North and D.A. Kelt. 2007. Nest tress of northern flying squirrels in Yosemite National Park, California. *The Southwestern Naturalist* 52: 157-161.
- Wayman, R. and M. North. 2007. Initial response of a mixed-conifer understory plant community to burning and thinning restoration treatments. *Forest Ecology and Management* 239: 32-44.
- Meyer, M., D. Kelt, and M. North. 2007. Microhabit associations of northern flying squirrels in burned and thinned stands of the Sierra Nevada. *American Midland Naturalist* 157: 202-211.

- Innes, J., M. North and N. Williamson. 2006. Effect of thinning and prescribed fire restoration treatments on woody debris and snag dynamics in a Sierran old-growth mixed-conifer forest. *Canadian Journal of Forest Research* 36: 3183-3193.
- North, M. and A. Rosenthal. 2006. Restoring forest health: Fire and thinning effects on mixed-conifer forests. *USDA PSW Science Perspective* 7.
- Oakley, B., M. North and J. Franklin. 2006. Facilitative and competitive effects of a N-fixing shrub on white fir saplings. *Forest Ecology and Management* 233: 100-107.
- Concilio, A., S. Rhu, S. Ma, M. North, and J. Chen. 2006. Soil respiration response to experimental disturbances over three years. *Forest Ecology and Management* 228: 82-90.
- Hansen, C. and M. North. 2006. Post-fire epicormic branching in Sierra Nevada *Abies concolor* (white fir). *International Journal of Wildland Fire* 15: 31-35.
- Concilio, A., S. Ma, Q. Li, J. LeMoine, J. Chen, M. North, D. Moorhead, and R. Jensen. 2005. Soil respiration response to prescribed burning and thinning in mixed conifer and hardwood forests. *Canadian Journal of Forest Research* 35: 1581-1591
- Meyer, M. D., and M. North. 2005. Truffle abundance in riparian and upland forests of California's southern Sierra Nevada. *Canadian Journal of Botany* 83: 1015-1020.
- Meyer, M. D., M. P. North and D. A. Kelt. 2005. Short-term effects of fire and forest thinning on truffle abundance and consumption by *Neotamias speciosus* in the southern Sierra Nevada of California. *Canadian Journal of Forest Research* 35: 1061-1070.
- Meyer, M., D. Kelt, and M. North. 2005. Nest trees of northern flying squirrels in the Sierra Nevada. *Journal of Mammalogy* 86: 275-280.
- North, M., B. Oakley, R. Fiegenger, A. Gray and M. Barbour. 2005. Influence of light and soil moisture on Sierran mixed-conifer understory communities. *Plant Ecology* 177(1): 13-24.
- Meyer, M. D., M. North and D. A. Kelt. 2005. Fungi in the diets of northern flying squirrels and lodgepole chipmunks in the Sierra Nevada. *Canadian Journal of Zoology* 83: 1581-1589.
- North, M and J. Chen. 2005. Introduction to the Teakettle Special Issue. *Forest Science* 51(3): 185-186.
- North, M., M. Hurteau, R. Fiegenger, and M. Barbour. 2005. Influence of fire and El Niño on tree recruitment varies by species in Sierran mixed conifer. *Forest Science* 51(3): 187-197.
- Gray, A., H. Zald, R. Kern, and M. North. 2005. Stand conditions associated with tree regeneration in Sierran mixed-conifer forests. *Forest Science* 51(3): 198-210.
- Ma, S., J. Chen, J. Butnor, M. North, E. Euskirchen, and B. Oakley. 2005. Biophysical controls on soil respiration in the dominant patch types of an old-growth, mixed-conifer forest. *Forest Science* 51(3): 221-232.
- Izzo, A. D., M. D. Meyer, J. M. Trappe, M. North, and T. Bruns. 2005. Hypogeous ectomycorrhizal fungal species on roots and in small mammal diet in a mixed-conifer forest. *Forest Science* 51(3): 243-254.
- Smith, T., D. Rizzo and M. North. 2005. Patterns of Mortality in an Old-Growth Mixed-Conifer Forest of the Southern Sierra Nevada, California. *Forest Science* 51(3): 266-275.
- Oakley, B., M. North, J. Franklin, B. Hedlund, and J. Staley. 2004. Diversity and distribution of *Frankia* strains symbiotic with *Ceanothus* in California. *Applied and Environmental Microbiology* 70: 6444-6452.

- North, M., J. Chen, B. Oakley, B. Song, M. Rudnicki, A. Gray and J. Innes. 2004. Forest stand structure and pattern of old-growth western hemlock/Douglas-fir and mixed-conifer forest. *Forest Science* 50 (3):299-311. (Invited)
- J. Chen, B. Song, M. Rudnicki, M. Moeur, K. Bible, M. North, D.C. Shaw, J.F. Franklin and D.M. Braun. 2004. Spatial relationship of biomass and species distribution in an old-growth *Pseudotsuga-Tsuga* forest. *Forest Science* 50(3):364-375. (Invited)
- Ma, S., J. Chen, M. North, H. Erickson, M. Bresee, and J. Le Moine. 2004. Short-term effects of experimental treatments on soil respiration in an old-growth, mixed-conifer forest. *Environmental Management* 33(1): 148-159.
- Oakley B, North M, Franklin J. 2003 The effects of fire on soil nitrogen associated with patches of the actinorhizal shrub *Ceanothus cordulatus*. *Plant and Soil* 254:35-46.
- North, M. 2002. The Teakettle Experiment. pp 47-54 in Jared Verner (tech. editor). *Proceedings of a Symposium on the Kings River Sustainable Forest Ecosystems Project: Progress and Current Status*. USDA Forest Service, Pacific Southwest Research Station Gen. Tech. Rep. PSW-GTR-183.
- North, M., B. Oakley, J. Chen, H. Erickson, A. Gray, A. Izzo, D. Johnson, S. Ma, J. Marra, M. Meyer, K. Purcell, T. Rambo, B. Roath, D. Rizzo, T. Schowalter. 2002. Vegetation and ecological characteristics of mixed-conifer and red-fir forests at the Teakettle Experimental Forest. USFS General Technical Report, PSW-GTR-186.
- North, M. 2002. Seasonality and abundance of truffles from oak woodlands to red fir forests. p 91-98 in Jared Verner (tech. editor). *Proceedings of a Symposium on the Kings River Sustainable Forest Ecosystems Project: Progress and Current Status*. USDA Forest Service, Pacific Southwest Research Station Gen. Tech. Rep. PSW-GTR-183.
- North, M. 2002. Environmental factors associated with Spotted Owl reproduction. pp 117-120 in Jared Verner (tech. editor). *Proceedings of a Symposium on the Kings River Sustainable Forest Ecosystems Project: Progress and Current Status*. USDA Forest Service, Pacific Southwest Research Station Gen. Tech. Rep. PSW-GTR-183.
- North, M. 2001. Ecological zone of influence: Terrestrial considerations. Pages 48-56 in *Defining Ecological Zones of Influence to Giant Sequoia Ecology from Proposed Management Activities on the Sequoia National Forest*. USDA Forest Service Sequoia National Forest Report.
- North, M., G. Steger, R. Denton, G. Eberlein, T. Munton, and K. Johnson. 2000. Association of weather and nest-site structure with reproductive success in California spotted owls. *Journal of Wildlife Management* 64: 797-807.
- Lyons, B., N. Nadkarni and M. North. 2000. Spatial distribution and succession of *Tsuga heterophylla* (western hemlock) in old-growth Douglas-fir forest. *Canadian Journal of Botany* 78:957-968.
- Lyons, B., M. North and N. Nadkarni. 1999. The distribution of epiphytes on western hemlock trees in an old-growth temperate forest. *What's Up?* 5(3): 4-5.
- North, M., J. Franklin, A. Carey, E. Forsman and T. Hamer. 1999. Forest structure of the northern spotted owl's foraging habitat. *Forest Science* 45:520-527.
- Van Pelt, B. and M. North. 1999. Testing a ground-based canopy model using the Wind River Canopy Crane. *Selbyana* 20: 357-362.
- North, M.P. and J. Greenburg. 1998. Stand conditions associated with truffle abundance in western hemlock/Douglas-fir forests. *Forest Ecology and Management* 112:55-66.
- Peterson, G., S. E. Pope, G. A. De Leo, M. A. Janssen, J. R. Malcolm, J. M. Parody, G. Hood,

- and M. North. 1997. Ecology, Ethics and Advocacy. Conservation Ecology 1(1). Invited participant in the inaugural issue of an internet publication and forum discussion. (<http://www.consecol.org/Journal/vol1/iss1/art17/>)
- North, M.P., J. Trappe, and J. Franklin. 1997. Standing crop and animal consumption of fungal sporocarps in Pacific Northwest forests. Ecology 78: 1543-1554.
- North, M.P. and J. Reynolds. 1996. Microhabitat analysis using radio telemetry locations and polytomous logistic regression. Journal of Wildlife Management 60(3): 639-653.
- North, M.P., J. Chen, G. Smith, and L. Krakowiak. 1996. Initial response of understory plant diversity and overstory tree diameter growth to a green tree retention harvest. Northwest Science 70(1): 24-35.
- Van Pelt, B. and M. P. North. 1996. Analyzing canopy structure in Pacific Northwest old-growth forests using a stand-level crown model. Northwest Science 70 (special issue): 15-30.
- North, M.P. 1995. Virgin forests and endangered species: The northern spotted owl and the Mt. Graham red squirrel. Encyclopedia of Environmental Biology. Invited chapter. Academic Press. San Diego, CA., pp. 447-461.
- North, M.P. and J.M. Trappe. 1994. Small mammal exclosures for studies of hypogeous fungi. Mycologia 86:583-585.
- North, M.P. and J.F. Franklin. 1992. Stand structure of multi-age spotted owl habitat. The Northwest Environmental Journal 8: 229-230.
- North, M.P. and J.F. Franklin. 1990. Post-disturbance legacies that enhance biological diversity in a Pacific Northwest old-growth forest. The Northwest Environmental Journal 6: 427-429.
- North, M.P. 1990. Old-growth research areas of the Department of Natural Resources. Washington State Dept. of Natural Resources Publication 256, 59pp.

Other Publications

- North, M.P. 1996. Book review of Uncommon Ground: Toward Reinventing Nature. William Cronon editor. Conservation Biology 10(3): 688-690.

Grants

- Lassen National Forest for \$125,000. Title: "Fuels treatment and fire history of Almanor District Riparian Forests.
- Sierra Nevada Forest Management Program for Tahoe for \$158,000. M. Hurteau, G. Koch and M. North. Modeling the influence of management actions on fire risk and spread under future climatic conditions.
- Sierra Nevada Forest Management Program for Tahoe for \$125,000. Title: "Restoration and Fuel Treatment of Lake Tahoe's Riparian Forests"
- Joint Fire Science Program for \$180,000. Title: "Fuel treatments and forest health: A film and interactive DVD"
- Joint Fire Science Program for \$192,000. Title: "Fuel Reduction Effects on a Key Sierra Food Web"
- Joint Fire Science Program for \$50,000. Title: "Demonstrating the Ecological Effects of Mechanical Thinning and Prescribed Fire on Mixed-Conifer Forests"

- Andrew Mellon Foundation for \$77,000. Title: “Mycorrhizal facilitation of tree regeneration in the Sierra Nevada”
- California State University Applied Agricultural Research Initiative for \$143,000. Title: “Shrub influences on tree regeneration in Sierra Nevada forests”
- PSW Forest Service Research Internal Competitive Grant for \$19,820. Title: “Fire’s effect on nitrogen in Sierra Nevada forests”.
- Forest Service Forest Health Technology Enterprise Team, NE Station, Competitive Grant for \$51,000. Title: “Impacts of fire and thinning on truffle abundance and northern flying squirrel populations”.
- PSW Forest Service Research Internal Competitive Grant for \$19,917. Title: “Stand structure and soil conditions associated with truffle abundance”.
- PSW Forest Service Research Internal Competitive Grant for \$17,600. Title: “Developing a measure of stand-level canopy structure”.

Teaching Experience and Past Graduate Students

- 2005-2008: Chair of Integrative Ecology, U.C. Davis.
- 2000-2008 “Experimental design and grant writing”, winter quarter, Dept. of Environmental Horticulture, University of California, Davis.
- 2007 Fudan University, Shanghai, China. Invited to teach experiment design and fire ecology to select graduate students and researchers at special National Academy Advanced Ecology seminar.
- 1991 Assistant Instructor. University of Washington. Course: “Structure and Function of Forest Ecosystems”. Graduate forest ecology class. Principle instructor: Dr. Jerry Franklin.
- 1988 Teaching Assistant. Yale University. Course: “Environmental History”. Organized and taught two weekly seminars for Dr. William Cronon.

Hurteau, M. 2007. The effects of climate change and nitrogen deposition on the Sierran mixed-conifer understory plant community. PhD dissertation. Department of Plant Sciences. University of California, Davis, CA.

Hanson, C. 2007. High severity fire and snag habitat in the Sierra Nevada. PhD dissertation. Department of Plant Sciences. University of California, Davis, CA.

Wayman, R. 2006. Initial response of a Sierran mixed-conifer understory community to burning and thinning restoration treatments. MS thesis. Department of Plant Sciences. University of California, Davis, CA.

Oakley, B. 2003. An investigation into the ecology and biogeography of the *Ceanothus-Frankia* symbiosis. PhD dissertation. College of Forest Resources, University of Washington, Seattle, WA.

Figener, R. 2002. Influence of sampling intensity on the fire history of an old-growth Sierra Nevada mixed conifer forest. MS thesis. Department of Environmental Horticulture, University of California, Davis, CA.

Lyons, E. 1998. Influence of canopy structure on epiphyte biomass and diversity in a Pacific Northwest Old-Growth forest. MS Thesis. The Evergreen State College, Olympia, WA.

Professional Experience

- 1993-1995 Post-Doctorate Research Associate, College of Forest Resources, University of Washington. Research, analysis and publication of articles on spotted owls and hypogeous fungi. Initiated and coordinated research on stand-level forest canopy structure at the Wind River Canopy Crane project in Carson Washington.
- 1989 Research Consultant, The Wilderness Society. Assisted in development of an old-growth forest inventory of the Olympic National Forest.
- 1987-1988 Natural Resources Aid, Washington State Department of Natural Resources, Forest Land Management Division. Using GIS and inventory databases, selected old-growth natural research areas in western Washington. Developed the DNR's first old-growth inventory. Collected stand structure information on the research areas and published a report.
- 1984-1985 Forest Crafts Technician, Washington State Department of Natural Resources, Northwest Area. Organized the Washington Conservation Corp program for the Northwest Regional Division. Hired, trained and supervised disadvantaged youth in tree planting, thinning, fire fighting, timber sales and inventory, and other forestry practices. Provided job training and employment search skills.
- 1981-1983 Log Home Designer, Republic, WA. Designed and built log homes for recreation property owners.
- 1979 Chokersetter and Chaser, Fletcher and Fletcher Logging Co., Forks, WA. Logging work on the cables of high-lead, skyline and skidder operations.