

CHRISTOPHER J. EARLE, PHD

Forest Ecologist



Chris Earle is a forest ecologist specializing in global conifer-dominated systems, particularly in relation to their responses to principal 21st-century disturbances such as fire suppression, climate change, and development. His professional experience includes analyses of major project effects on threatened and endangered species, designing and implementing environmental monitoring programs, designing projects to perform in an environmentally friendly manner, preparing and negotiating an array of federal and state environmental permits, managing watershed-level studies of forestry, grazing and agricultural impacts to stream channels and riparian ecosystems, and developing programmatic solutions to minimize such impacts. His current work focuses on writing about the systematics and biology of conifers, chiefly through his website, the Gymnosperm Database at www.conifers.org. He also writes, photographs and lectures about conifer forests in venues ranging from professional journals to magazines, blogs, and popular books.

Chris lives near Olympia, Washington with his wife Bonnie and a varied cast of pets and livestock. In his limited spare time he travels to visit conifer-dominated ecosystems in distant lands.

Publications

(does not include limited-distribution publications related to project work, which listed in a subsequent section)

Earle, C.J. Gymnosperm database. <http://www.conifers.org>. 1997–2022.

Earle, C.J. 2020. *Douglas Fir, The Story of the West's Most Remarkable Tree* [Book Review]. *Douglasia* 44(3):27-29.

Earle, Chris. 2019. After the fire. *British Conifer Society Journal* 27:18-21.

Prior Experience

- 1997-current, Curator of the Gymnosperm Database at www.conifers.org
- 1993-2021, Consulting ecologist with ICF and predecessor companies
- 1986-1993, University of Washington College of Forest Resources
- 1984-1986, University of Arizona Laboratory of Tree-Ring Research
- 1979-1984, Environmental activist with varied organizations

Education

- PhD, Forest Ecology, University of Washington, 1993
- MS, Geosciences, University of Arizona, Tucson, 1986
- BA, Biology and Geology, Whitman College, 1978

Areas of Expertise

- Conifer biology and systematics (global)
 - Conservation biology (Pacific Northwest emphasis)
 - Forest ecosystems of western North America
 - Fisheries-Forestry interactions
 - Acoustic, hydroacoustic, and visual impacts on fish and wildlife
 - Biological impacts of renewable energy development
 - Salmonid habitat
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- Earle, Christopher. 2014. Gymnosperm Ecology. *Oxford Bibliographies*, DOI: 10.1093/OBO/9780199830060-0092.
- Nelson, G., C. J. Earle, and R. Spellenberg. 2014. *Trees of Eastern North America*. Princeton University Press. ISBN: 9780691145914.
- Spellenberg, R., C. J. Earle, and G. Nelson. 2014. *Trees of Western North America*. Princeton University Press. ISBN: 9780691145808.
- Hanson, D. A., Britney, E. M., Earle, C. J., and Stewart, T. G. 2013. Adapting Habitat Equivalency Analysis (HEA) to assess environmental loss and compensatory restoration following severe forest fires. *Forest Ecology and Management* 294:166–177. doi:10.1016/j.foreco.2012.12.032.
- Oestman, R. and C. J. Earle. 2012. Effects of pile-driving noise on *Oncorhynchus mykiss* (steelhead trout). Pp. 263-265 in A. Hawkins (ed.), *The Effects of Noise on Aquatic Life*. Springer-Verlag.
- Adams, R.P., C.J. Earle, and D. Thornburg. 2011. Taxonomy of infraspecific taxa of *Abies lasiocarpa*: leaf essential oils and DNA. *Phytologia* 93(1):87-101.
- Earle, C. 2005, July 28. Farmers, government team up to save fish. *Daily Journal of Commerce*: 2 p.
- Earle, C. J. 2002. "How old is that tree?" *Douglasia* 26(2):6-10 (reprinted in 2002 in *Menziesia* and the *Bulletin of the Native Plant Society of Oregon*).
- Earle, C. J. 2000. Numerous short articles about conifer species, prepared for the Forestry Compendium. CAB International, ISBN 0 85199 483 0. <http://tree.cabweb.org/efctext.htm>.
- Earle, C. J. 1998. Factors affecting peak stream temperature in the southern Washington Cascade Range [Abstract]. Program & abstracts for the seventy-first annual meeting of the Northwest Scientific Association, Olympia, Washington.
- Earle, C. J. and S. W. Madsen. 1997. An assessment of variation in channel geomorphic units described under watershed analysis [Abstract]. Program & abstracts for the 70th annual meeting of the Northwest Scientific Association, Spokane, Washington.
- Earle, C. J., L. B. Brubaker and P. M. Anderson. 1996. Charcoal in northcentral Alaskan lake sediments: relationships to fire and late-Quaternary vegetation history. *Review of Palaeobotany and Palynology* 92: 83-95.
- Earle, C.J. 1995. A reconstruction of presettlement forest and fishery habitat in the valley of the South Fork Nooksack River, Washington, USA [Abstract]. *Bulletin of the Ecological Society of America* 76(2): 71.
- Earle, C.J., L.B. Brubaker, A.V. Lozhkin and P.M. Anderson. 1994. Summer temperature since 1600 for the Upper Kolyma region, northeastern Russia, reconstructed from tree rings. *Arctic and Alpine Research* 26:60-65.
- Earle, C. J. 1993. Forest dynamics in a forest-tundra ecotone, Medicine Bow Mountains, Wyoming. Ph.D. Dissertation, University of Washington, Seattle, Washington.

- Earle, C. J. 1993. Asynchronous droughts in California streamflow as reconstructed from tree rings. *Quaternary Research* 39:290-299.
- Earle, C. J. 1992. Evolution of a forest-tundra landscape in the Medicine Bow Mountains, Wyoming [Abstract]. Regional landscape change: impacts of climate and land use, the seventh annual U.S. Landscape Ecology Symposium, p. 57.
- Brubaker, L. B., S. Vega-Gonzalez, E. D. Ford, C. A. Ribic, C. J. Earle and G. Segura. 1992. Old-growth Douglas-fir in western Washington. Pages 333-364 in: Olson, R. K., D. Binkley and M. Böhm, eds., *The response of western forests to air pollution*. Springer-Verlag, New York.
- Earle, C. J. 1991. Spatial and temporal patterns of tree establishment near timberline, Medicine Bow Mountains, Wyoming [Abstract]. *Bulletin of the Ecological Society of America* 72: 105.
- Brubaker, L. B., E. D. Ford, C. J. Earle, S. Vega-Gonzalez and C. A. Ribic. 1989. Growth variations in old-growth Douglas-fir forests of the Puget Sound area. EPA Project No. CR-814271-01-0, Final Report.
- Earle, C. J. and H. C. Fritts. 1986. Reconstructing riverflow in the Sacramento basin since 1560. Laboratory of Tree-Ring Research, University of Arizona, Tucson. 122 p.
- Earle, C. J. 1985. Science in political debate: nuclear waste in Washington state [Abstract]. Programs with abstracts of the 66th annual meeting, Pacific Division, AAAS. p.27.
- Baird, B. and C. J. Earle. 1984. *High-level nuclear waste disposal at Hanford: a geologic critique*. Washington Public Interest Research Group, Seattle, Washington. 34 p. .

Lectures

- Earle, Chris, Michael Murray and Michael Kauffman. Magnificent Five-Needle Pines of Western North America. Webinar sponsored by Backcountry Press, <https://backcountrypress.com/product/five-needle-pines-of-western-north-america/>. December 9 and 16, 2021.
- Earle, Christopher. Interviewed by Matt Candeias on the podcast In Defense of Plants, <https://www.indefenseofplants.com/podcast/2021/10/10/ep-338-how-old-are-the-oldest-trees>. October 10, 2021.
- Earle, C.J. 2012, October 18. Biological Goals and Objectives for the Bay Delta Conservation Plan: Balancing Theoretical, Practical, and Institutional Factors. Presentation at the 7th Bay Delta Science Conference.
- Earle, Christopher. Conifer Longevity. Invited address at the Conifer Encyclopedia Symposium, Blijdstein Pinetum, Netherlands. June 10, 2010.
- Earle, Christopher. Ecology of Redwood. Invited address at meeting of the Stolte Grove Land Trust. Mill Valley, California. February 4, 2007.
- Earle, Christopher. Dendrochronology and Surveying. Invited address at annual meeting of the Land Surveyor's Association of Washington. 2002.

Project Work Examples (Chronological)

Science coordinator for environmental impact statement of Oregon Department of Forestry Habitat Conservation Plan (2020-2021)

Lead scientist for analysis of bird and bat mortality impacts associated with various proposed wind power projects in California (2018-2021)

Scientific author, often senior reviewer, for many documents assessing biological effects of proposed California High-Speed Rail System segments from Anaheim to San Francisco (2010-2021)

Wildlife and vegetation biologist for environmental impact statement of Deschutes River Habitat Conservation Plan (2017 – 2020)

Science coordinator for Elliott State Forest Habitat Conservation Plan (2017-2020)

Science coordinator for Oregon Department of Forestry Habitat Conservation Plan (2017-2019)

Project manager for Bay-Delta Conservation Plan (BDCP), California Department of Water Resources (2011 – 2014). Work on closely-related projects continued into 2019.

Lead scientist assessing biological and water quality impacts of various fish hatchery construction and operations projects in California, Oregon, and Idaho (2009-2018)

Contributing author, National Guidelines Textbook on Large Woody Debris in Streams and Rivers, Bureau of Reclamation (2012–2015).

Lead scientist and author evaluating biological impacts of various comprehensive conservation plans for wildlife refuge management in Washington (2010-2013)

Habitat Equivalency Valuation of Forest Fire Damages, Moonlight Fire, California (2010 – 2012)

Lead scientist for analysis of all biological impacts associated with a wave energy testing facility in Oregon (2009-2012)

Author, *Pile Driving Underwater Noise Evaluation Manual*, FHWA, Olympia, Washington 2011.

Lead scientist for analysis of all biological impacts associated with various solar photovoltaic generating facilities in California (2010-2011)

Water quality and marine fish & wildlife scientist for documents assessing port facilities upgrades in California (2007-2011)

Lead scientist for analysis of vegetation, fish and wildlife impacts associated with various proposed powerline upgrades in Washington and Oregon (2000-2011)

Scientist and author for various documents assessing biological impacts of proposed finfish and shellfish culture facilities in Washington and California (2006-2011)

Lead scientist and author evaluating biological impacts of various comprehensive planning actions by local governments in western Washington (2003-2011)

Wildlife biologist monitoring the Smith Island/Union Slough restoration project in Washington (2007-2010)

Scientific lead, often project manager, for many documents assessing rail system upgrades in Washington (2000-2009)

Task lead and author, biological assessment for demolition of Alaska Way Viaduct and replacement of Seattle Seawall (2006–2008)

Lead scientist for King County Wastewater Treatment Habitat Conservation Plan and related work on the Brightwater treatment plant project, Washington (1999 – 2008)

Project manager, biological assessment for the Levee Maintenance Program, U.S. Army Corps of Engineers, Seattle District (2002 – 2003)

Project manager, Skykomish River Training Structure environmental permitting (2002 – 2003)

Project manager, biological assessment for operations at Mud Mountain Dam, Washington (2001)

Project manager, many small biological assessments assessing highway project impacts on fish and wildlife habitat (1999-2001)

Riparian and water quality analyst for 14 watershed analyses conducted in Oregon, Washington and British Columbia (1993-1998)

Supervisor, author, project manager, and task lead for various research projects at the University of Washington. Chris supervised field crews and managed expedition logistics for fieldwork in China, Alaska, and the western U.S. He designed, acquired funding for, conducted, and reported research on problems including long-term climate change in eastern Siberia, long-term climate and vegetation change in Alaska, land use and climate variation in subalpine forests of eastern Tibet, and air pollution effects on tree growth in the Puget Sound Basin (1989-1993).

Author, *Reconstruction of Streamflow in the Sacramento River Basin, 1600-1980* (1985 – 1986)

Scientist and activist with Washington Public Interest Research Group reviewing proposal to store high-level nuclear waste at the Hanford Reservation in Washington (1983-1984)

Mudlogger on various geothermal exploration wells in California and Nevada (1981-1983)

Combine operator, cannery worker, rye puller, firewood cutter, millworker, custodian, warehouse worker, factory worker, data entry technician, tour guide, carpenter, driver, etc. in many parts of the U.S. (1975-1981)

Activist with National Audubon Society, Alaska Coalition, and other groups active in the Washington DC area (1979)