

William L. Gaines
Wildlife Ecologist, Executive Director

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ACADEMIC TRAINING: Ph.D., 2002, Wildlife Science, University of Washington, Seattle, Washington, 98195. GPA 3.9. Summa Cum Laude

RECENT POSITIONS:

Wildlife Ecologist, Executive Director, October 2011 to present, Washington Conservation Science Institute, 12725 Wilson St., Leavenworth, Washington

Forest Wildlife Ecologist, July 1999 to October 2011, U.S. Forest Service, 215 Melody Lane, Wenatchee, Washington.

Graduate/Adjunct Faculty, (July 2003 to Present), Central Washington University, Geography and Biology Departments.

CONSERVATION SCIENCE LEADERSHIP: For the past 30 years I have played leadership roles in applying science to address complex conservation issues with implications at regional and national scales. Examples include:

- *Restoration*. Team Leader to develop a Forest Restoration Strategy being used on the Okanogan-Wenatchee and Colville National Forests. Led a diverse team of scientists and managers. The process included peer review, internal review by practitioners, and external review by a large and diverse collaboration group. Other national forests are considering the adoption of similar restoration strategies.
- *Species Recovery*. Participated on the Interagency Northern Spotted Owl East-side Working Group. Long-term member of the North Cascades Grizzly Bear Recovery Team. Served as the Gray Wolf Species Lead for the USFS in Oregon and Washington.
- *Biodiversity Assessments*. Represented Northeast Washington on a Regional Team to develop a process for evaluating species viability in Forest Planning. Process was developed and published, then implemented in northeastern Washington and northeastern Oregon.
- *Habitat Connectivity*. Member of the Washington Wildlife Habitat Connectivity Working Group. I served on the Core Team and on both the Modeling and Focal Species subcommittees.
- *Climate Change*. On leadership committee for the Cascadia Partner Forest Climate Change Strategy. I co-organized a science-management collaboration workshop to help employees on the Okanogan-Wenatchee and Colville National Forest identify resources vulnerable to climate change and develop adaptations to address the vulnerabilities. This information was published in a technical report and integrated into the development of the Forest Restoration Strategy that includes a goal of increasing forest resiliency to climate change.

CONSERVATION SCIENCE DEVELOPMENT AND APPLICATION:

- *High Scientific Standards*. I have worked diligently to conduct scientifically credible assessments and monitoring to address forest management and species conservation issues. The standard that I strive for is for the results of the assessments and monitoring to be published in peer reviewed journals and technical reports. As a result, I have published in a wide-variety of conservation journals and on a wide-variety of subjects.
- *Graduate Studies*. Over the past 18 years I have served on numerous graduate committees ranging from single-species studies to research on communities of terrestrial species.

Students have always successfully completed their graduate degrees and several published their thesis's in scientific journals.

- *Associate Editor/Reviewer.* From 2002 until 2009 I served as the Associate Editor for Wildlife for the journal Northwest Science. During that time I oversaw peer reviews of over 50 articles on a wide-array of wildlife species and topics. This opportunity was extremely valuable in the development of my own writing style and exposed me to a very diverse range of research methods. I now have a much better understanding of what constitutes high quality science. I continue to review articles submitted to a variety of journals including, Forest Ecology and Management, Biological Conservation, Biodiversity and Conservation, etc.
- *Science Application.* I have participated in numerous efforts to synthesize complex science into formats that are applied to address pressing management issues. Examples include: Synthesis of the effects of recreation on wildlife to address cumulative effects; workshops for managers on the effects of restoration treatments of an array of resources to better design projects and evaluate effects; a climate change workshop to help managers understand climate change science, identify vulnerable resources, and adapt management to address vulnerable resources.

SCIENCE COLLABORATION AND PARTNERSHIPS: I am a proponent of conservation through collaboration and have a proven record in developing successful partnerships. I am convinced that conservation is successful only when the science is rigorous and human relationships are highly functional. Some example of collaborations and partnerships include:

- The development and implementation of the Okanogan-Wenatchee Forest Restoration Strategy. Included many disciplines, conservation organizations, industry representatives, universities, and state and federal agencies.
- The Mission Creek Fire and Fire Surrogate Study. This was an interdisciplinary study that included universities, federal scientists, and federal land managers.
- Leadership Council for the Cascadia Partner Forum, including serving on the interagency Canada Lynx Committee and the Climate Change Strategy Committee.
- Several projects and studies that I have served as a principal or co-principal have included funding from a diverse group of partners. Examples include: USFWS Recovery Funds, Rocky Mountain Elk Foundation, Skagit Environmental Endowment Commission, Seattle City Light, and the Joint Fire Sciences Program.
- Other partnerships have not been based on funding but on mutual efforts to achieve a common goal. Examples include: US Fish and Wildlife Service, Washington Department of Fish and Wildlife, The Wilderness Society, The Nature Conservancy, Conservation Northwest, Western Transportation Institute, Pacific Biodiversity Institute, University of Washington, and Central Washington University.

PEER REVIEWED PUBLICATIONS:

Gaines, W.L., P.F. Hessburg, G.H. Aplet, P. Henson, S.J. Prichard, D.J. Churchill, G.M. Jones, D.J. Isaak, and C. Vynne. 2022. Climate change and forest management on federal lands in the Pacific Northwest, USA: Managing for dynamic landscapes. *Forest Ecology and Management* <http://doi.org/10.1016/j.foreco.2021.119794>.

Stephens, S.L., L.N. Kobziar, B.M. Collins, R. Davis, P.Z. Fule, W. Gaines, J. Ganey, J.M. Guldin, P.F. Hessburg, K. Hiers, S. Hoagland, J.J. Keane, R.E. Masters, A.E. McKellar, W. Montague, M. North, and T.A. Spies. 2019. Is fire “for the birds”? How to rare species influence fire management across the US. *Frontiers in Ecology and Environment*; doi10.1002/fee.2076.

Vanbianchi, C., W.L. Gaines, M.A. Murphy, and K.E. Hodges. 2018. Navigating fragmented landscapes: Canada lynx brave poor quality habitats while traveling. *Ecology and Evolution* DOI: 10.1002/ece3.4605.

- Suring, L.H., W.L. Gaines, and J.S. Begley. 2019. Incorporating habitat use and movement patterns of focal species into wildlife mitigation strategies for highways on the Kenai Peninsula, Alaska, USA. Proceedings of the 2017 International Conference on Ecology and Transportation. Center for transportation and the Environment, North Carolina State University, Raleigh, NC.
- Cannon, J., R. Hickey, and W. Gaines. 2018. Using GIS and the Ecosystem Management Decision Support Tool for Forest Management on the Okanogan-National Forest, Washington State. Journal of Forestry doi: 10.1093/jofore/fvy034.
- Lyons, A.L., W.L. Gaines, W.F. Kasworm, and J.S. Begley. 2017. Grizzly bear climate change vulnerability assessment: Cascadia Partner Forum Decision Support Framework. Cascadia Partner Forum. <https://cascadiapartnerforum.org/grizzly-bear>.
- Lyons, A.L., W.L. Gaines, P.S. Singleton, W.F. Kasworm, M.F. Proctor, and J.S. Begley. 2017. Spatially explicit carrying capacity estimates to inform species-specific recovery objectives: grizzly bear recovery in the North Cascades. Biological Conservation. <https://doi.org/10.1016/j.biocon.2018.03.027>.
- Vanbianchi, C., W.L. Gaines, M.A. Murphy, J. Pither, and K.E. Hodges. 2017. Habitat selection by Canada lynx: making do in heavily fragmented landscapes. Biodiversity and Conservation. DOI 10.1007/s10.531-017-1409-6.
- Gaines, W. L., A. L. Lyons, J. S. Begley, and L. H. Suring. 2017. Habitat use patterns of Canada lynx on the Kenai Peninsula, Alaska, USA. In: L. H. Suring, W. L. Gaines, and J. S. Begley, editors. Habitat use and movement patterns of focal species on the Kenai Peninsula, Alaska. Northern Ecologic L.L.C. Technical Report 2017-1.
- Gaines, W. L., J. S. Begley, and L. H. Suring. 2017. Movement patterns and potential corridors for Canada lynx on the Kenai Peninsula, Alaska. In: L. H. Suring, W. L. Gaines, and J. S. Begley, editors. Habitat use and movement patterns of focal species on the Kenai Peninsula, Alaska. Northern Ecologic L.L.C. Technical Report 2017-1.
- Gaines, W. L., A. L. Lyons, J. S. Begley, and L. H. Suring. 2017. Habitat use patterns of female moose on the Kenai Peninsula, Alaska, USA. In: L. H. Suring, W. L. Gaines, and J. S. Begley, editors. Habitat use and movement patterns of focal species on the Kenai Peninsula, Alaska. Northern Ecologic L.L.C. Technical Report 2017-1.
- Gaines, W. L., J. S. Begley, and L. H. Suring. 2017. Movement patterns and potential corridors for female moose on the Kenai Peninsula, Alaska. In: L. H. Suring, W. L. Gaines, and J. S. Begley, editors. Habitat use and movement patterns of focal species on the Kenai Peninsula, Alaska. Northern Ecologic L.L.C. Technical Report 2017-1.
- Gaines, W.L., J.S. Begley, B.C. Wales, L.H. Suring, K. Mellen-McLean, and S. Mohoric. 2017. Terrestrial viability assessments for the national forests in northeastern Washington. USDA Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR-907.
- Lyons, A.L., W.L. Gaines, J.S. Begley, and W.F. Kasworm. 2017. Grizzly Bear Climate Change Vulnerability Assessment: Cascadia Partner Forum Decision Support Framework. Final report to the Cascadia Partner Forum. <https://cascadiapartnerforum.org>.
- Lyons, A.L., P.H. Singleton, W.L. Gaines, J.C. Lewis, B.T. Maletzke, and J.S. Begley. 2016. Canada lynx carrying capacity in Washington: final report. Washington Conservation Science Institute, Leavenworth, WA. 98826.
- Gaines, W.L., A.L. Lyons, and J.S. Begley. 2016. Climate adaptations in the Northwest Forest Plan area. Final report to The Wilderness Society. www.waconservationscience.org.

Lyons, A.L., W.L. Gaines, and J.S. Begley. 2016. Application of the bighorn sheep risk of contact model on the Blue Mountains National Forests. Final report to the USDA Forest Service, Pacific Northwest Region, Portland, Or. www.waconservationsscience.org.

Gaines, W.L., A.L. Lyons, and J.S. Begley. 2016. Upper Methow Resource Assessment. Final report to The Wilderness Society. www.waconservationsscience.org.

Krosby, M., I. Breckheimer, D.J. Pierce, P.H. Singleton, S.A. Hall, K.C. Halupka, W.L. Gaines, R.A. Long, B.H. McRae, B.L. Cosentino, and J.P. Schuett-Hames. 2015. Focal species and landscape “naturalness” corridor models offer complementary approaches for connectivity conservation planning. *Landscape Ecology*. Doi:10.1007/s10980-015-0235-z.

Hessburg, P.F., A.J. Larson, D.J. Churchill, R.D. Haugo, C. Miller, T.A. Spies, M.P. North, N.A. Povak, R.T. Belote, P.A. Singleton, W.L. Gaines, R.E. Keane, G.H. Aplet, S.L. Stephens, P. Morgan, P.A. Bissonette, B.E. Rieman, R.B. Salter, and G.H. Reeves. 2015. Restoring Fire- Prone Inland Pacific Landscapes: Seven Core Principles. *Landscape Ecology*. DOI 10.1007/s10980-015-0218-0.

Lehmkuhl, J., W. Gaines, D.W. Peterson, J. Bailey, A. Youngblood. Eds. 2015. Restoration of Dry Mixed-Conifer Forest and Spotted Owl Habitat Management in the Eastern Cascade Range. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-915.

Gaines, W.L., J.F. Lehmkuhl. 2015. Monitoring, Adaptive Management, and Information Gaps. Pages 103-125 in Lehmkuhl, J., W. Gaines, D.W. Peterson, J. Bailey, A. Youngblood, eds. *Silviculture and Monitoring Guidelines for Integrating Restoration of Dry Mixed-Conifer Forest and Spotted Owl Habitat Management in the Eastern Cascade Range*. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-915.

Gaines, W.L., J.B. Buchanan, J.F. Lehmkuhl, K. Halupka, P. Singleton. 2015. Northern spotted owl issues and objectives. Pages 33-62 in Lehmkuhl, J., W. Gaines, D.W. Peterson, J. Bailey, A. Youngblood, eds. *Silviculture and Monitoring Guidelines for Integrating Restoration of Dry Mixed-Conifer Forest and Spotted Owl Habitat Management in the Eastern Cascade Range*. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-915.

Hessburg, P.F., K.M. Reynolds, R.B. Salter, J.D. Dickinson, W.L. Gaines, R.J. Harrod. 2013. Landscape evaluation for restoration planning on the Okanogan-Wenatchee National Forest, USA. *Sustainability* 5: 805-840.

Long, R.A., J.S. Begley, P. MacKay, W.L. Gaines, and A.J. Shirk. 2013. The Cascades Carnivore Connectivity Project: A landscape genetic assessment of connectivity for carnivores in Washington’s North Cascades Ecosystem. Final report for the Seattle City Light Wildlife Research Program, Seattle, Washington. Western Transportation Institute, Montana State University, Bozeman. 57 pp.

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Hessburg, P.F., K.M. Reynolds, R.B. Salter, J.D. Dickinson, W.L. Gaines, R.J. Harrod. 2014. Chapter 6: Landscape evaluation and restoration planning. In: K.M. Reynolds et al. (eds.) *Making Transparent Environmental Management Decisions*. Springer-Verlag, Berlin Heidelberg.

Gaines, W.L., D.W. Peterson, C.A. Thomas, and R.J. Harrod. 2012. Adaptations to climate change: Colville and Okanogan-Wenatchee National Forest. USDA Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR-862.

- Suring, L.H., W.L. Gaines, B.C. Wales, K. Mellen-McLean, J.S. Begley, and S. Morhoric. 2011. Assessing the sustainability of terrestrial wildlife species through land management planning: a case study. *Journal of Wildlife Management* 75(4): 945-958.
- Gaines, W.L., A.L. Lyons, K. Weaver, and A. Sprague. 2011. Monitoring the short-term effects of prescribed fire on an endemic mollusk in the dry forests of the eastern Cascades, Washington, USA. *Forest Ecology and Management* 261: 1460-1465.
- Farris, K.L., S.J. Converse, S. Zack, W.D. Robinson, A.J. Amacher, T. Contreras, W.L. Gaines, E.S. Kilpatrick, J.D. Lanham, D. Miles, G. Rompre', K.E. Sieving, J.C. Pierson. 2010. Short-term effects of Fire and Fire Surrogate treatments on avian nest survival: a national-scale analysis. *Open Environmental Sciences* 4: 53-62.
- Gaines, W.L., R.J. Harrod, M. Dahlgreen, and C. Thomas. 2010. The Okanogan-Wenatchee National Forest Restoration Strategy: adaptive ecosystem management to restore landscape resiliency. USDA Forest Service, Pacific Northwest Region, Okanogan-Wenatchee National Forest, Wenatchee, WA.
- Gaines, W.L., R.J. Harrod, G. Bauer, J. Dickinson, A. Lyons, and K. Halupka. 2010. Integration of Northern Spotted Owl Habitat and Fuels Treatment Areas on the Okanogan-Wenatchee National Forest, Washington, USA. *Forest Ecology and Management* 260: 2045-2052.
- Gaines, W.L., J.F. Lehmkuhl, M. Haggard, A.L. Lyons, and J. Begley. 2010. Short-term effects of Fire and Fire Surrogate treatments on avian community composition, density, and nest survival in the eastern Cascades, Washington. *Forest Science* 56(1): 88-99.
- Singleton, P.H., J.F. Lehmkuhl, W.L. Gaines, and S.A. Graham. 2010. Barred owl space use and habitat selection in the eastern Cascades, Washington: implications for northern spotted owl conservation. *Journal of Wildlife Management* 74(2): 285-294.
- Gaines, W.L., A.L. Lyons, J.F. Lehmkuhl, M. Haggard, J. Begley, and M. Farrell. 2009. Avian community composition, nesting ecology and bark-gleaner foraging ecology. Chapter 8 in Agee, J.K., and J.F. Lemkuhl, compilers. *Description of the Mission Creek (Northeastern Cascade) Fire and Fire Surrogate Site, Okanogan and Wenatchee National Forests*. USDA Forest Service, PNW-RP-577.
- Munzing, D. and W.L. Gaines. 2008. Monitoring American Marten on the east-side of the North Cascades of Washington. *Northwest Naturalist* 89(2): 67-75
- Lyons, A.L., W.L. Gaines, and J.F. Lehmkuhl. 2008. Short-term effects of Fire and Fire Surrogate treatments on foraging tree selection by cavity-nesting birds in dry forests of central Washington. *Forest Ecology and Management* 255: 3203-3211.
- Lehmkuhl, J.F., M. Kennedy, E.D. Ford, P.H. Singleton, W.L. Gaines, and R.L. Lind. 2007. Seeing the forest for the fuel: integrating ecological values and fuels management. *Forest Ecology and Management* 246:73-80.
- Gaines, W.L., M. Haggard, J.F. Lehmkuhl, J.F. Lehmkuhl, and R.J. Harrod. 2007. Short-term response of land birds to ponderosa pine restoration. *Restoration Ecology* 15(4): 666-674.
- Gaines, W.L., A.L. Lyons, and A. Sprague. 2005. Predicting the occurrence of a rare mollusk in the dry-forests of North-central Washington. *Northwest Science* 79(2&3): 99-105.
- Gaines, W.L., A.L. Lyons, J.F. Lehmkuhl, and K.J. Raedeke. 2005. Landscape evaluation of female black bear habitat effectiveness and capability in the North Cascades, Washington.

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Townsley, J., B. Gaines, J. Hadfield, R. Harrod, C. Mehmel, E. Leyda. 2004. Forest Health Assessment: Okanogan and Wenatchee National Forests. USDA Forest Service, Okanogan and Wenatchee National Forests, Wenatchee, Washington. 105 pp.

Singleton, P., W.L. Gaines, and J.F. Lehmkuhl. 2004. Evaluating landscape permeability for grizzly bear (*Ursus arctos*) movements in Washington. *Ursus* 15(1): 90-103.

Gaines, W.L. 2004. Black bear, *Ursus americanus*, denning chronology and site selection in the northeastern Cascades of Washington. *The Canadian Field-Naturalist*. 117(4):626-633.

Gaines, W.L., P.H. Singleton, and R. Ross. 2003. Assessing the cumulative effects of linear recreation routes on wildlife habitats on the Okanogan and Wenatchee National Forests. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-586. 79 p.

Lyons, A.L., W.L. Gaines, and C. Servheen. 2003. Black bear resource selection in the Northeast Cascades, Washington. *Biological Conservation* 113:55-62.

Gaines, W.L., and A.L. Lyons. 2003. Crepuscular and nocturnal activity patterns of black bears in the North Cascades of Washington. *Northwest Science* 77(2):140-146.

Gaines, W.L., R.J. Harrod, and J.F. Lehmkuhl. 2003. Monitoring Biodiversity for Ecoregional Initiatives. Pages 377-402 in D.E. Busch and J.C. Trexler, Eds. *Ecological Monitoring of Ecoregional Initiatives: Interdisciplinary approaches for determining status and trends of ecosystem*. Island Press, Washington, DC.

Singleton, P., W. Gaines, and J. Lehmkuhl. 2003. Large carnivore habitat connectivity in Washington: A GIS weighted distance and least-cost corridor assessment of landscape permeability. USDA Forest Service, Pacific Northwest Research Station, PNW-RP-549.

Haggard, M.E., and W.L. Gaines. 2001. Effects of Stand-Replacement Fire and Salvage Logging on a Cavity-Nesting Bird Community in eastern Cascades, Washington. *Northwest Science* 75(4):387-396.

Singleton, P.H., W. Gaines, and J.F. Lehmkuhl. 2001. Using weighted distance and least-cost corridor analysis to evaluate regional-scale large carnivore habitat connectivity in Washington. Pages 583-594 in *Proceedings of the International Conference on the Environment and Transportation*.

Gaines, W.L. 2001. Disturbance Ecology, Land Allocations and Wildlife Management. *Proceedings of the Management of Fire-Maintained Ecosystems Workshop*. Whistler, British Columbia, Canada.

Gaines, W.L., R.H. Naney, W.O. Noble. 2001. Grizzly Bear Recovery in the North Cascades Ecosystem. *Western Black Bear Workshop* 7:57-62.

Gaines, W.L. 2001. Large Carnivore Surveys in the North Karakorum Mountains, Pakistan. *Natural Areas Journal* 21:168-171.

Gaines, W.L., P.S. Singleton, A.L. Gold. 2000. Conservation of Large Carnivores in the North Cascades Ecosystem. *Natural Areas Journal* 20:360-369.

Gaines, W.L., R.J. Harrod, and J.F. Lehmkuhl. 1999. Monitoring Biodiversity: quantification and interpretation. USDA Forest Service, Pacific Northwest Research Station, PNW GTR-443.

Harrod, R.J., W.L. Gaines, W.E. Hartl, and A.E. Camp. 1998. Estimating historical snag Density in the east Cascades of Washington. USDA Forest Service, Pacific Northwest Research Station, PNW GTR-428.

Gaines, W.L., R.A. Strand, and S.D. Piper. 1997. Effects of the Hatchery Complex fires on northern spotted owls in the Washington Cascades. Pages 123-129 in Proceedings: Fire Effects on Threatened and Endangered Species and habitats, Coeur d'Alene, Idaho.

Harrod, R.J., W.L. Gaines, R.J. Taylor, R. Everett, T. Lillybridge, and J. McDivier. 1996. Biodiversity in the Blue Mountains. Pages 81-106 in: R.G. Jaindal and T.M. Quigley, Eds. Search for a Solution: sustaining the land, people and economy of the Blue Mountains. American Forests, Washington, D.C.

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Gaines, W.L., G.K. Neale, and R.H. Naney. 1995. Response of coyotes and gray wolves to simulated howling in north-central Washington. Northwest Science 69(3): 217-222.

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Gaines, W.L., C.E. Cushing, and S.D. Smith. 1989. Trophic relations and functional Group composition of benthic insects in three cold desert streams. Southwest Naturalist 34(4): 478-482.

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Gaines, W.L., and R.E. Fitzner. 1987. Winter diet of the Harlequin duck at Sequim Bay, Puget Sound, Washington. Northwest Science 61(4): 213-215.

Gaines, W.L. 1987. Secondary production of benthic insects in three cold desert streams. Battelle Technical Bulletin. PNL-6286.

Graduate Committees

Piper, Susan Dixon. 1996. Terrestrial amphibian and passerine bird abundance in riparian habitats of eastern Washington Cascade forests. M.S. Thesis. Washington State University.

Gold, Andrea L. 1997. Black bear habitat use in the North Cascades of Washington. M.S. Thesis. University of Montana.

Haggard, Mary Ellen. 1999. Effects of stand replacement wildfire and salvage logging on cavity nesting bird communities. M.S. Thesis. Central Washington University.

Moore, William. 2003. Winter habitat use by mule deer in Chelan County. M.S. Thesis. Central Washington University.

Munzing, Danielle. 2005. Monitoring the American marten on the east-slope of the North Cascade mountains, Washington. M.S. Thesis. Central Washington University.

Evens, Kelly. 2007. Plant community response to grazing in four Washington meadow exclosures. M.S. Thesis. Central Washington University.

Begley, James. 2008. Predicting Swakane Canyon bighorn sheep habitat and potential overlap with domestic sheep grazing allotments. M.S. Thesis. Central Washington University.

Wagenecht, John. 2011. Effects of dry forest restoration treatments on Cassin's finch and MacGillivray's warbler. M.S. Thesis. Central Washington University.

Cannon, Jamie. 2012. Prioritizing forest restoration treatment areas using Decision Support and geospatial analyses on the Okanogan-Wenatchee National Forest. Central Washington University.
Wagenecht, John. 2011. Effects of forest restoration treatments on focal bird species. M.S. Thesis. Central Washington University.

Woodrow, Aja. 2013. Effects of Stand-Replacement Fire, Salvage Logging and Succession on Bird Communities of the Eastern Cascades, Washington. M.S. Thesis. Central Washington University.

Richardson, Kristen. 2013. Factors influencing the occurrence and abundance of American black bears in the North Cascades Ecosystem. M.S. Thesis. University of Washington.

Vanbianchi, Carmen. 2015. Habitat use and connectivity for Canada lynx in the North Cascade Mountains, Washington. M.S. Thesis. University of British Columbia, Okanagan.

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