

ATTACHMENT 1

Daniel B. Fagre, Ph.D.

RETIRED 2020 from:

U.S. Geological Survey, Northern Rocky Mountain Science Center
Glacier National Park, West Glacier, MT 59936

406-270-5484
danfagre@gmail.com

Education

- 1981-83 Postdoctoral Fellow, Wildlife Biology, University of California, Davis
- 1981 Ph.D., Animal Ecology, University of California, Davis.
- 1978 M.S., Animal Ecology, University of California, Davis.
- 1975 B.A., Environmental Science, Prescott College, Prescott, AZ

Selected Professional Experience

- 1996-2020 Research Ecologist, U.S. Geological Survey, Glacier National Park, MT
- 1993-1996 Research Ecologist, National Biological Service, Glacier National Park, MT
- 1991-1993 Ecologist, National Park Service, Glacier National Park, MT
- 1989-1991 Animal Ecologist, National Park Service, Indiana Dunes National Park, IN
- 1983-1988 Faculty, Dept. Wildlife and Fisheries Sciences, Texas A&M University
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- 2021 Keynote speaker, National Meeting of Society of University Neurosurgeons
- 2019 Keynote speaker, International Academy of Trial Lawyers
- 2016 Co-sponsor and Advisory Committee for Mountain Climate Science Conference, Leavenworth, WA
- 2013-2020 Co-Lead for USGS Benchmark Glacier Program
- 2007-2009 Lead Author, U.S. Climate Change Science Program, Synthesis and Assessment Product 4.2, "Thresholds of Ecological Change"
- 2008-2020 Director, Climate Change in Mountain Ecosystems Project, USGS
- 2006-2008 Science Advisory Panel, Montana Governor's Commission on Climate Change
- 2006-2020 Co-chair, North American chapter, GLORIA (Global Observation and Research in Alpine Areas), sponsored by University of Vienna, Austria
- 2005-2008 Associate Editor, International Journal of Biodiversity Science and Management, Sapiens Publishing, Duncow, United Kingdom
- 2004 Invited expert, UNESCO Climate Change Conference, Paris
- 2004-2020 Co-founder, CIRMOUNT (The Consortium for Integrated Climate Research in Western Mountains)
- 2003-2005 Invited Member, Mountain Research Initiative Program, Bern, Switzerland, with support from Swiss National Science Foundation, European Union and UNESCO MAB, "Global Change in Mountain Regions (GLOCHAMORE)".
- 2003-2020 Co-founder, Western Mountain Initiative
- 2000-2004 US team partner, United Nations Man and Biosphere Programme, Mountain Biosphere Reserves
- 2002 Co-hosted *Rocky Mountain Summit*, a conference celebrating the International Year of the Mountain, September 22-26, Whitefish, Montana
- 2002 Invited speaker, Mansfield Center International Conference on Pacific Affairs, "Climate Change in the Asia Pacific Region", co-hosted by China, Japan, and Korea



- 2002-2007 Chair, Acting Chair, Secretary-Treasurer, Advisory Board Member, Mountain Geography Specialty Group, American Association of Geographers
- 1999-2000 Member, Reviewer - Global Mountain Biodiversity Assessment, University of Basel, Switzerland.
- 1997-2001 Invited Member, International Geosphere-Biosphere Programme (Swedish Royal Academy of Sciences), Mountain Research Initiative, co-sponsored by BAHC, Biospheric Aspects of the Hydrological Cycle.

Faculty Affiliate (various years): University of Montana, Department Geosciences, Univ. Montana, Flathead Lake Biological Station, University of Missouri-Columbia, Montana State University, Oregon State University, Univ. of Arizona, SUNY Syracuse, University of Alberta

Awards

- Eugene M. Shoemaker Lifetime Achievement Award for Science Communication, U.S. Geological Survey, 2017
- USGS Special Achievement Award, September 2005.
- Director's National Award for Natural Resource Research for 2004, National Park Service, Department of the Interior
- Regional Director's Award for Natural Resource Research for 2004, Intermountain Region, National Park Service, Department of the Interior
- Distinguished Alumni Award, Prescott College, Arizona, 2000
- Department of Interior, Office of the Secretary, Superior Service Award, 1999
- Superior Accomplishment Award (for research productivity and program leadership), National Biological Service, 1995

Selected publications with focus on glaciers

Key, C. H., D. B. Fagre, and R. K. Menicke. 2002. Glacier retreat in Glacier National Park, Montana. Pages J365-J381 *In* R. S. Jr. Williams and J. G. Ferrigno, editors. Satellite Image Atlas of Glaciers of the World, Glaciers of North America - Glaciers of the Western United States. U.S. Geological Survey Professional Paper 1386-J. United States Government Printing Office, Washington D. C., USA.

Hall, M. P. and D. B. Fagre. 2003. Modeled climate-induced glacier change in Glacier National Park, 1850-2100. *Bioscience*. 53(2):131-140.

Pederson, G. T., D. B. Fagre, S. T. Gray, and L. J. Graumlich. 2004. Decadal-scale climate drivers for glacial dynamics in Glacier National Park, Montana, USA. *Geophysical Research Lett.*, 31, L12203, doi:10.1029/2004GL019770.

Reardon, B. A., J. T. Harper, and D. B. Fagre. 2008. Mass balance of a cirque glacier in the U.S. Rocky Mountains *In* Proceedings of the mass balance measurement and modeling workshop, Skeikampen, Norway, 26-28 March 2008. *Annals of Glaciology* 50:A074 1-5.

Watson, E., G.T. Pederson, B.H. Luckman, and D.B. Fagre. 2008. Glacier mass balance in the northern U.S. and Canadian Rockies: paleo-perspectives and 20th century change. Pages 141-153 *In* Ben Orlove, Ellen Wiegandt and Brian Luckman (Eds.), *Darkening Peaks: Glacier Retreat, Science, and Society*, University of California Press, Berkeley, CA. USA. 280pp.

Pederson G.T., L.J. Graumlich, D.B. Fagre, T. Kipfer, and C. Muhlfield. 2010. A century of climate and ecosystem change in Western Montana: What do recent temperature trends portend? A view from western Montana, USA. *Climatic Change*, 98: 133-154. DOI 10.1007/s10584-009-9642-y

Fagre, D.B. and L.A. McKeon. 2010. Documenting Disappearing Glaciers: Repeat Photography at Glacier National Park, Montana, USA. Pages 77-88 *in* Webb, R.H., D.E. Boyer, and R.M. Turner (ed.s), Repeat Photography: Methods and Applications in the Natural Sciences, Island Press, Covelo, CA. 530 pp.

Muhlfield, C.C., J. Giersch, F.R. Hauer, D.P. Peterson, G.T. Pederson, C.C. Downs, and D.B. Fagre. 2011. Climate Change Links Fate of Glaciers and a Rare Alpine Stonefly. *Climatic Change* 106:337-345.

Clark, Adam M., Joel T. Harper, and Daniel B. Fagre. 2015. Glacier-Derived August Runoff in Northwest Montana. *Arctic, Antarctic, and Alpine Research* 47(1):1-16. IP-059157, August 2, 2016

Clark, A.M., D.B Fagre, E.H. Peitzsch, B.A. Reardon and J.T. Harper. 2017. Glaciological Measurements and Mass Balances from Sperry Glacier, Montana, USA Years 2005-2015. *Earth System Science Data* 9:47-61. IP-078667, Oct. 27, 2016

Fagre, D.B., L.A. McKeon, K.A. Dick, and A.G. Fountain. 2017. Glacier margin time series (1966, 1998, 2005, 2015) of the named glaciers of Glacier National Park, MT, USA: U.S. Geological Survey data release, <https://doi.org/10.5066/F7P26WB1>.

Florentine, C., J. Harper, D. Fagre, J. Moore, and E. Peitzsch. 2018. Local topography increasingly influences the mass balance of a retreating cirque glacier. *The Cryosphere* 12:2109-2122.

Fagre, D.B. and C. Martin-Mikle. 2018. A comprehensive inventory of maximum glacial extent in Glacier National Park during the peak of the Little Ice Age: U.S. Geological Survey data release, <https://doi.org/10.5066/P95YJ3CN>. IP- 097739, released July 9, 2018

Martin-Mikle, C.J. and D.B. Fagre. 2019. Glacier recession since the Little Ice Age: Implications for water storage in a Rocky Mountain landscape. *Arctic, Antarctic, and Alpine Research* 51(1):280-289.

Fagre, D.B., C.J. Martin-Mikle, and A.M Clark. 2019. A comprehensive inventory of perennial snow and ice in Glacier National Park in 2005: U.S. Geological Survey data release, <https://doi.org/10.5066/P90F4G50>

O'Neel, S., C. McNeil, L. Sass, C. Florentine, E. Baker, E. Peitzsch, D. McGrath, A. Fountain, and D. Fagre. 2019. Reanalysis of the U.S. Geological Survey Benchmark Glaciers: Long-term insight into climate forcing of glacier mass balance. *J. Glaciology*. 65(253):850-866.

Florentine, C, J. Harper, and D.B. Fagre. 2020. Glacier response to climate change since the Little Ice Age in Glacier National Park, USA. *Global and Planetary Change* 191. <https://doi.org/10.1016/j.gloplacha.2020.103209>

Selected recent publications

- Fagre, D.B., C.W. Charles, C.D. Allen, C. Birkeland, F.S. Chapin III, P.M. Groffman, G.R. Guntenspergen, A.K. Knapp, A.D. McGuire, P.J. Mulholland, D.P.C. Peters, D.D. Roby, and G. Sugihara. 2009. *Thresholds of Climate Change in Ecosystems*. A report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. U.S. Geological Survey, Reston, VA, USA. 177 pages.
- Prato T., Z. Qiu, G.T. Pederson, D.B. Fagre, L. Bengtson, and J.R. Williams. 2010. Potential economic benefits of adapting agricultural production systems to future climate change in Montana's Flathead Valley. *Journal of Environmental Management*. DOI 10.1007/s00267-010-9427-0.
- Prato, T. and D.B. Fagre. 2010. Sustainable Management of the Crown of the Continent Ecosystem. *George Wright Forum* 27:77-93. (50% concept, N/A% data, 40% interpretation, 45% writing).
- Pederson, G.T., S.T. Gray, C.A. Woodhouse, J.L. Betancourt, D.B. Fagre, J.S. Littell, E. Watson, B.H. Luckman and L.J. Graumlich. 2011. The unusual nature of recent snowpack declines in the North American Cordillera. *Science* 333:(6040) 332-335.
- Malanson, G.P., J.P. Rose, P.J. Schroeder, and D.B. Fagre. 2011. Contexts for change in alpine tundra. *Physical Geography* 32:97-113.
- Pederson, G.T., S.T. Gray, T. Ault, W. Marsh, D.B. Fagre, A.G. Bunn, C.A. Woodhouse and L.J. Graumlich. 2011. Climatic controls on the snowmelt hydrology of the northern Rocky Mountains. *J. Climate* 24:1666-1687.
- Malanson, G.P., L.M. Resler, M.Y. Bader, F.K. Holtmeier, D.R. Butler, D.J. Weiss, L.D. Daniels and D. B. Fagre. 2011. Mountain Treelines: A Roadmap for Research Orientation. *J. Arctic, Antarctic and Alpine Research* 43:167-177.
- Peitzsch, E.H., J. Hendrikx, D.B. Fagre and B. A. Reardon. 2012. Examining spring wet slab and glide avalanche occurrence along the Going-to-the-Sun Road Corridor, Glacier National Park, Montana, USA. *Cold Regions Science and Technology*. doi:10.1016/j.coldregions.2012.01.012
- Peterson, D.L., Allen, C.D., Baron, J.S., Fagre, D., McKenzie, D., Stephenson, N.L., Fountain, A.G., Hicke, J.A., Malanson, G.P., Tague, C.L., and van Mantgem, P.J. 2012. Response of Western mountain ecosystems to climatic variability and change: a collaborative research approach. Pages 163-190 In: E. Beever and J. Belant (eds.), Ecological Consequences of Climate Change: Mechanisms, Conservation, and Management. Taylor and Francis Publishing, New York, NY. 302 pp.
- Malanson, G.P., L. Bengtson, and D.B. Fagre. 2012. Geomorphic determinants of species composition of alpine tundra, Glacier National Park, USA. *Arctic, Antarctic, and Alpine Research* 44:197-209.
- Malanson, G.P. and D.B. Fagre. 2013. Contexts for observed change in high-mountain vegetation under ongoing climate change. *Plant Ecology* 214:1309-1319.
- Kang, S., S.W. Running, J.S. Kimball, D.B. Fagre, A. Michaelis, D.L. Peterson, and J.E. Halofsky and S. Hong. 2014. Effects of spatial and temporal climatic variability on terrestrial carbon and water fluxes in the Pacific Northwest, USA. *Environmental Modelling and Software* 51:228-239.

Prato, A. and D.B. Fagre. 2014. Protected Area Management. Pages 385-388 in *Encyclopedia of Natural Resources*; Wang, Y.Q., Editor; Taylor and Francis, New York. DOI: 10.1081/E-ENRL-120048426.

Prato, T., T. Paveglio, Y. Barnett, R. Silverstein, M. Hardy, R. Keane, R. Loehman, A. Clark, D. Fagre, T. Venn, and K. Stockmann. 2014. Simulating Future Residential Property Losses from Wildfire in Flathead County, Montana. Pages 1-40 In: Daniels, J.A. (ed.), *Advances in Environmental Research*, Vol. 33. Nova Science Publishers, Inc., Hauppauge, NY.

Byrne, James M., Daniel Fagre, Ryan MacDonald, and Clint C. Muhlfeld. 2015. Climate Change and the Rocky Mountains. Pages 432-463 in V.I.Grover, A. Borsdorf, J.H. Breuste, P.C. Tiwari, and F.W. Frangetto, eds. *Impact of Global Changes on Mountains: Responses and Adaptation* (1st ed), CRC Press, Boca Raton, FL.

Peitzsch, E.H., J. Hendriks, and D.B. Fagre. 2015. Terrain parameters of glide snow avalanches and a simple spatial glide snow avalanche model. *Cold Regions Science and Technology* 120:237-250.

Malanson, G.P., D. L. Zimmerman, and D.B. Fagre. 2015. Floristic similarity, diversity, and endemism as indicators of refugia characteristics and needs in the West. *Biodiversity* 16(4):237-246. DOI: 10.1080/14888386.2015.1117989, Special Issue: Alpine Biodiversity and Refugia in a Changing Climate.

Malanson, G.P., D.L. Zimmerman and D.B. Fagre. 2017. Distance and environmental difference in alpine plant communities. *Physical Geography*, 38(6): 489-505.

Malanson, G. P., D. L. Zimmerman, M. Kinney, and D.B. Fagre. 2017. Relations of alpine plant communities across environmental gradients: Multilevel versus multiscale analyses. *Annals of the American Association of Geographers*, 107:41–53.

Malanson, G.P, D.B. Fagre, and D.L. Zimmerman. 2018. Scale dependence of diversity in alpine tundra, Rocky Mountains, USA. *Plant Ecology* 219(8):999-1088. <https://doi.org/10.1007/s11258-018-0852-0>.

Malanson, G.P., L. M. Resler, D.R. Butler and D.B. Fagre. 2019. Mountain plant communities: Uncertain sentinels? *Progress in Physical Geography: Earth and Environment* 43(4):521-543 . DOI/10.1177/0309133319843873.

Malanson, G.P., E. Nelson, D. Zimmerman, and D.B. Fagre. 2020. Alpine plant community diversity in species-area relations at fine scale. *Arctic, Antarctic, and Alpine Research* 52:41-46. DOI: 10.1080/15230430.2019.1698894.

Fagre, D.B. and K.M. Milone. 2021. Alpine Vegetation Trends in Glacier National Park, Montana 2019: U.S. Geological Survey Data Release, <https://doi.org/10.5066/P98N9D20>. Released Aug. 11, 2021

Peitzsch, E., J. Hendriks, D. Stahle, G. T. Pederson, K. Birkeland, and D. Fagre. 2021. A regional spatiotemporal analysis of large magnitude snow avalanches using tree rings. *Natural Hazards Earth Systems Science* 21: 533-557.

Peitzsch, E.H., G.T. Pederson, K.W. Birkeland, J. Hendrikx, and D.B. Fagre. 2021. Climate drivers of large magnitude snow avalanche years in the U.S. northern Rocky Mountains. *Scientific Reports* 11: article number 10032. (May 11, 2021). <https://doi.org/10.1038/s41598-021-89547-z>