

BRIAN BUMA

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APPOINTMENTS

Assistant Professor, University of Colorado, Denver Department of Integrative Biology	2018 – current
Assistant Professor, University of Alaska Southeast Department of Natural Science	2013 – 2018
Affiliate Professor, University of Alaska Fairbanks Department of Natural Resources	2014 – current

EDUCATION

University of Colorado, Boulder- Ph.D. (2013)	Dept. of Ecology and Evolutionary Biology
Western Washington University- M.A. (2005)	Science Education
Western Washington University- B.S. (2003)	Biology, minor in Chemistry

PUBLICATIONS

*Student advisee. **Postdoc advisee. †Visiting scholar in Buma lab

48. Pawlik L†, **Buma B**, Samonil P, Kvacek J, Galazka A, Malik I, Kohout P. Impact of trees and forests on the Devonian landscape and weathering processes with implications to the global Earth's system properties - A critical review. *Earth-Science Reviews*. *In press*.

47. **Buma B**, Schultz C. Disturbances as Opportunities: Can we learn from disturbance-response parallels in social and ecological systems to better adapt to climate change? *Journal of Applied Ecology*. *In press*.

46. Booth A, Sifford C, Siebert C, **Buma B**. Coarse wood inhibits debris flow runout in forested southeast Alaska. *Earth Surface Processes and Landforms*. *In press*.

45. **Buma B**, Weiss S, Hayes K*, Lucash M. Reburning increasing across the US West, with a limited amount of negative feedbacks. *Environmental Research Letters*. 15:034026

44. Kulakowski D, **Buma B**, Guz J, Hayes K*. 2019. The ecology of forest disturbances. Reference Module in Earth Systems and Environmental Science. <https://doi.org/10.1016/B978-0-12-409548-9.11878-0>

43. Wiles G, Charlton J, Wilson R, D'Arrigo R, **Buma B**, Krapek J*, Gaglioti B, Wiesenberger N, Oelkers R. 2019. Yellow-cedar blue intensity tree ring chronologies as records of climate and forest-climate response, Juneau, Alaska, USA. *Canadian Journal of Forest Research*.

49(12): 1483-1492

42. **Buma B**, Bisbing S, Wiles G, Bidlack A. 2019. Primary succession observations over a century do not support textbook explanations of facilitation/sequential change. *Ecology*. 100(12): e02885

41. McWethy DB, Schoennagel T, Higuera PE, Krawchuk M, Harvey BJ, Metcalf EC, Schultz C, Miller C, Metcalf AL, **Buma B**, Virapongse A, Kulig JC, Stedman RC, Ratajczak Z, Nelson CR, Kolden C. 2019. Rethinking resilience to wildfire. *Nature Sustainability*. 2:797–804

40. Bisbing S, **Buma B**, Oakes L, Krapek J*, Bidlack A. 2019. From canopy to seed: Loss of snow drives directional changes in forest composition. *Ecology and Evolution*. 9(14): 8157-8174.

39. **Buma B**, Battelori E, Bisbing S, Holz A, Hennon PE, Mortiz M, Saunders SE, Creutzburg MK, DellaSala DA, Gregovich D, Krapek J*, Zaret K, Bidlack A. 2019. Emerging freeze and fire dynamics in temperate rainforests. *Austral Ecology*. 44: 812-826.

38. Johnson A*, Kruger L, Noel J, Gregovich D, **Buma B**. 2019. Impacts of Submerging and Emerging Shorelines on Various Biota and Indigenous Alaskan Harvesting Patterns. *Journal of Coastal Research*. 35(4): 765-775.

37. **Buma B**, Thompson T. 2019. Long-term exposure to more frequent disturbances increases baseline carbon in some ecosystems: Mapping and quantifying the disturbance frequency-ecosystem C relationship. *PLOS One*. <https://doi.org/10.1371/journal.pone.0212526>

36. Higuera P, Metcalf A, Miller C, **Buma B**, McWethy D, Metcalf E, Ratajczak Z, Nelson C, Chaffin B, Stedman R, McCaffrey S, Schoennagel T, Harvey B, Hood S, Schultz C, Black A, Campbell D, Haggerty J, Keane R, Krawchuk M, Kulig J, Rafferty R, Virapongse A. 2019. Integrating subjective and objective dimensions of resilience in fire-prone landscapes. *BioScience*. 69(5): 379-388.

35. **Buma B**, Harvey B, Gavin D, Kelly R, Loboda T, McNeil B, Marlon J, Meddens AJH, Morris JL, Raffa K, Shuman B, Smithwick E, McLauchlan K. 2019. The value of linking short and long-term perspectives to understand spatially-explicit ecosystem resilience. *Landscape Ecology* 34(1): 17-33.

34. McNicol G**, Bulmer C, D'Amore DV, Sanborn P, Saunders S, Giesbrecht I, Gonzalez-Arriola S, Bidlack AL, Butman D, **Buma B**. 2019. Large, climate-sensitive soil carbon stocks mapped with pedology-informed machine learning in the North Pacific coastal temperate rainforest. *Environmental Research Letters*. 14 014004

33. Sommerfeld A, Senf C, **Buma B**, D'Amato AW, Despres T, Diaz-Hormazabal, Fraver S, Frelich LE, Gutierrez AG, Hart SJ, Harvey BJ, He HS, Hlasny T, Holz A, Kitzberger T, Kulakowski D, Lindenmeyer D, Mori AS, Muller J, Paritsis J, Perry GLW, Stephens S, Svoboda M, Tuner MG, Veblen TT, Seidl R. 2018. Patterns and drivers of recent disturbances across the temperate forest biome. *Nature Communications*. 9: 4355.

32. **Buma B**. 2018. Transitional climate mortality: Slower warming may result in

increased climate-induced mortality in some systems. *Ecosphere*. 9(3): e02170.

31. Krapek J*, **Buma B**. 2018. Persistence following punctuated range extension: limited dispersal of migrating tree despite habitat ahead of its range. *Journal of Ecology* 106: 911-924.

30. **Buma B**, Costanza JK, Riitters K. 2017. Determining the size of a complete disturbance landscape: Multi-scale, continental analysis of forest change. *Environmental Monitoring and Assessment* 189: 642. <https://doi.org/10.1007/s10661-017-6364-x>

29. Krapek J*, Hennon PE, D'Amore DV, **Buma B**. 2017. Despite available habitat, migration of climate-threatened tree appears punctuated with past pulse tied to Little Ice Age climate period. *Diversity and Distributions*. 23(12): 1381-1392.

28. Gill N, Kulakowski D, Sangermano F, **Buma B**. 2017. *Populus tremuloides* seedling establishment: An underexplored vector for forest type conversion after multiple disturbances. *Forest Ecology and Management*. 404: 156-164.

27. Riitters K, Costanza JK, **Buma B**. 2017. Scaling domains of tree cover disturbance patterns in North America, 2000 – 2012. *Ecological Indicators*. doi.org/10.1016/j.ecolind.2017.05.022

26. **Buma B.**, Livneh B. 2017. Key landscape and biotic indicators of watersheds sensitivity to forest disturbance. *Environmental Research Letters*. 12:074028

25. **Buma B**, Bisbing S, Krapek J*, Wright G. 2017. A foundation of ecology re-discovered: 100 years of succession on the William S Cooper permanent plots shows importance of contingency in community development. *Ecology*. 98(6): 1513-1523.

24. **Buma B**, Hennon PE, Harrington CA, Popkin JR, Krapek J, Lamb M, Oakes LE, Saunders SC, Zeglen S. 2017. Emerging broad-scale mortality driven by climate warming and loss of snowpack. *Global Change Biology*. 23(7): 2903-2914.

23. Bidlack A, Bisbing S, **Buma B**, D'Amore DV, Hennon P, Huette T, Krapek J, Mulvey R, Oakes LE. 2017. Alternative interpretation and scale-based context for *No evidence of recent (1995-2013) decrease in yellow-cedar in Alaska* (Barrett and Pattison 2017). *Canadian Journal of Forest Research*. 47(8): 1145-1151.

22. Fellman JB, **Buma B**, Hood E, Edwards RT, D'Amore DV. 2017. Linking LiDAR with streamwater biogeochemistry in coastal temperate rainforest watersheds. *Canadian Journal of Fisheries and Aquatic Sciences*. 74(6):801-811

21. **Buma B**, Krapek J*, Edwards RT. 2016. Watershed-scale forest biomass distribution in a perhumid temperate rainforest as driven by topographic, soil, and disturbance variables. *Canadian Journal of Forest Research*. 46(6): 844-854.

20. Mayer AL, **Buma B**, Davis A, Gagne SA, Loudermilk EL, Scheller R, Schmiegelow F, Wiersma Y, Franklin J. 2016. How landscape ecology informs global land change science and policy. *BioScience*. 66(6): 458-469.

19. Kranabetter JM, KK McLauchlan, SK Enders, JM Fraterrigo, PE Higuera, JL Morris, EB Rastetter, R Barnes, **B Buma**, DG Gavin, LM Gerhart, L Gillson, P Hietz, MC Mack, B McNeil, S Perakis. 2016. A framework to assess biogeochemical response to ecosystem disturbance using nutrient partitioning ratios. *Ecosystems*. 19: 387-395.
18. Krapek J*, **Buma B**. 2015. Yellow-cedar: Climate change and natural history at odds. *Frontiers in Ecology and Environment*. 13: 280-281.
17. **Buma B**, Livneh B. 2015. Potential effects of forest disturbances and management on water resources in a warmer climate. *Forest Science*. 61: 895-903.
16. **Buma B**, Barrett T. 2015. Signs of disturbance disequilibrium and directional change in the world's largest temperate rainforest. *Global Change Biology*. 21: 3445-3454.
15. **Buma B**. 2015. Disturbance interactions: Characterization, prediction, and the potential for cascading effects. *Ecosphere*. 6:art70.
14. Livneh B., J.S. Deems, **B. Buma**, J.J. Barsugli, D. Schneider, N.P. Molotch, K. Wolter, and C.A. Wessman, 2015. Catchment response to bark beetle outbreak in the upper Colorado River basin. *Journal of Hydrology*. 523: 196-210.
13. **Buma B**, Johnson AC*. 2015. Disturbance interactions mediated by topography: Wind exposure, landslide susceptibility, and yellow cedar decline in southeast Alaskan temperate rainforests. *Geomorphology*. 228, 504-511.
12. **Buma B**, Poore B, Wessman CA. 2014. Interacting disturbances and their effect on carbon, charcoal, and further implications for carbon sequestration in forests. *Ecosystems*. 17(6): 947-959.
11. **Buma B**, Hennon PE, Bidlack AL, Baichtal JF, Ager TA, Streveler G. 2014. Correspondence regarding "The problem of conifer species migration lag in the Pacific Northwest region since the last glaciation" by Elias, S.A., 2013, *Quaternary Science Reviews* 77, 53-69.
10. McLauchlan, K.K., P.E. Higuera, D.G. Gavin, S.S. Perakis, M.M. Mack, H. Alexander, J. Battles, F. Biondi, **B. Buma**, D. Colombaroli, S.K. Enders, D.R. Engstrom, F.S. Hu, J. Marlon, J. Marshall, M. McGlone, J. Morris, L. Nave, B.N. Shuman, E.A.H. Smithwick, D. Urrego, D. Wardle, C. Williams, and J.J. Williams. 2014. Reconstructing disturbances and their biogeochemical consequences over multiple timescales. *BioScience*. 64(2): 105-116.
9. **Buma B**. 2014. Nutrient responses to ecosystem disturbances from annual to multi-millennial timescales. *New Phytologist*. 1: 13-15.
8. **Buma B**, Brown C, Donato D, Fontaine J, Johnstone J. 2013. The impacts of changing disturbance regimes on serotinous plant populations and communities. *BioScience* 63(11): 866-876.
7. **Buma B**, Wessman CA. 2013. Forest resilience, climate change, and opportunities for adaptation: A specific case of a general problem. *Forest Ecology and Management*. 306: 216-225.

6. **Buma B**, Pugh ET, Wessman CA. 2013. Effect of a major insect outbreak on phenological and LAI trends in southern Rocky Mountain forests. *International Journal of Remote Sensing*. 34(20): 7249-7274.

5. **Buma B**. 2013. Don't give up just yet: Maintaining species, services, and systems in a changing world. Invited commentary on: Sandler R. *Climate Change and Ecosystem Management. Ethics, Policy, and Environment*. 16(1): 1-4.

4. **Buma B**, Wessman CA. 2013. Management, science, and disturbances as opportunities for adaptive transformation of forests. *The International Journal of Climate Change*. 4(3): 77-87.

3. **Buma B**, Wessman CA. 2012. Differential species responses to compounded perturbations and implications for landscape heterogeneity and resilience. *Forest Ecology and Management*, 266:25-33.

2. **Buma B**. 2012. Evaluating the utility and seasonality of NDVI values for assessing post-disturbance recovery in a subalpine forest. *Environmental Monitoring and Assessment*. 184(6):3849-3860.

1. **Buma B**, Wessman CA. 2011. Disturbance interactions can impact resilience mechanisms of forests. *Ecosphere*. 2(5):art64.

PUBLICATIONS IN REVISION/REVIEW

•**Buma B**, Holz A, Diaz I, Rozzi R. The world's southernmost tree and global southern treeline. *Ecography*. *In review*.

•**Buma B**, Pawlik L. Post-landslide soil and vegetation recovery in a dry, montane system is slow and patchy. *Ecosphere*. *In review*.

•Bidlack AL, **Buma B**, et al. Fluvial material exports link terrestrial and marine ecosystems across the North Pacific Coastal Temperate Rainforest Margin. *BioScience*. *In review*.

OTHER PUBLICATIONS

•**Buma B**. 2020. Notes from the Edge of the World. *Earth Island Journal*.
<https://www.earthisland.org/journal/index.php/magazine/entry/notes-from-the-edge-of-the-world>

•DellaSala D, **Buma B**. 2019. Tongass National Forest roadless areas hold keys to Alaska's climate future. 4 pages.

•DellaSala D, **Buma B**. 2019. Analysis of carbon storage in roadless areas of the Tongass National Forest. Comment on DEIS Roadless Rule Removal, to USFS. 22 pages.

•**Buma B**. 2018. On the value of wasting paper. *Science*. 11(360): 10.1126

•Yellow-cedar salvage logging market characterization. Bidlack AL, Clark C, **Buma B**, Bisbing B, VanderNaald B. 2018. USFS report. 12 pages.

- Buma B.** 2018. Grey on Green: The quiet decline of one tree in Alaska's temperate rainforest. Earth Island Journal. July 23, 2018. <https://tinyurl.com/ybe5d6jf>
- Bidlack, A, **Buma B**, Butman D. 2017. Quantifying coastal rain forest carbon transport. Eos. 98. <https://doi.org/10.1029/2017EO077633>.
- Buma B.** 2015. Field Methods in Forest Ecology Laboratory Manual. University of Alaska Southeast. 80 pages.
- Buma B.** 2013. "It takes two to fill our forests with lichens." Juneau Empire
- Hermanson R, Nufio C, Schmidt B, **Buma B.** 2010. Principles of Ecology Laboratory Manual. University of Colorado. Fountain head Press, Texas. 110 pages.

GRANTS AND AWARDS

- Teaching Enhancement Grant. "Bringing Ecology Lecture Outside." **\$2,789.**
- Evaluating Flammability of Reburns in the Boreal Forests of Interior Alaska. Joint Fire Science Program (GRIN award to Katherine Hayes, PhD student). 2020-2021. **\$24,717**
- University of Colorado Denver, travel funds: **\$1500**
- US Department of Agriculture, US Forest Service. Trees on the edge. June 2019 – May 2020. **\$29,916.**
- University of Colorado Denver, Large Grant. Ecosystem succession and the longest running study in the world: Expanding and building on a globally unique ecological research network. May 2019 – August 2020. **\$23,769.**
- NSF Research Experience for Undergraduates. **\$17, 525.** January 2019 – May 2020. Supporting two CU Denver undergraduates
- National Geographic Exploration Grant: Documenting and monitoring climate change effects at the edge of the world. **\$44,933.** Chile, July 2018 – June 2019
- NSF: Linking landslide and windstorm exposure to regional carbon stocks and fluxes in the largest US forest carbon reservoir, southeast Alaska. Collaborative proposal with Adam Booth (Portland State University). **\$606,353.** July 2017 – June 2020
- NSF: Regional impacts of increasing fire frequency and climate change on carbon dynamics and species composition in the boreal forest. Collaborative proposal with Melissa Lucash (Portland State University), Jason Vogel (University of Florida), Vladimir Romanovsky (University of Alaska Fairbanks). **\$1.4 million.** January 2018 – December 2020
- USDA Regional Climate Hub: Integrating tribal and governmental management into regional conservation planning: Alaska yellow-cedar decline and silviculture. 2017 to 2019) **\$56,823**
- US Fish & Wildlife: Yellow-cedar decline and recovery: climate modeling and data assimilation. 2017 - 2018 **\$24,346**
- University of Alaska Southeast Faculty Research Award. 2017. **\$1000.**
- Elmer L Andersen Research grant. 2017. **\$1000.**
- USFS/Alaska Dept. of Forestry – Forestry Internship RSA 2017-2020. **\$29,302.**

- USFS/Alaska Dept. of Forestry – Forestry Internship RSA 2016. **\$4,935.**
- NSF Research Coordination Network: Coastal Rainforest Margins Research Network – understanding materials flux in linked terrestrial and marine ecosystems in the face of climate change (2016-2021). With Allison Bidlack (Alaska Coastal Rainforest Center) & David Butman (University of Washington). **\$498,470.**
- National Geographic Exploration Grant. 2016. Rediscovery of original 1916 William Cooper vegetation succession plots in Glacier Bay, Alaska. **\$7,765.**
- BLaST travel grant. 2015. Training for advanced educational/pedagogical techniques. **\$1,954.**
- NASA RID Grant, 2015-2016. “Improving landslide warning systems for local weather forecasts by linking wind exposure, satellite precipitation data, and local weather forecasts. **\$19,309.**
- University of Alaska Southeast Academic Innovation Funds, 2015. **\$2,419.**
- Alaska Yellow Cedar Decline Impact Assessment and Restoration Baseline, 2015. with Allison Bidlack (Alaska Coastal Rainforest Center) **\$30,007**
- Novus professional development grant. 2015. “Fire effects on black carbon and microbial activities.” Linked proposal with Rebecca Barnes (Colorado College) **\$1,500**
- NASA EPSCoR RID Grant. 2014 - 2015. “Linking LIDAR and stream organic carbon export: Can aboveground biomass and landscape composition be used to predict the export and biogeochemistry of stream organic carbon?” **\$29,919**
- Alaska Space Grant Program. With Laurie Sowa and Robin Gilchrist (Engineering). 2014-2015. “Biomass Energy of Southeast Alaska: Providing Hands on Technology Projects for STEM Undergraduates.” **\$27,888**
- Work on forest resilience was recognized in a radio interview with Quirks and Quarks, the Canadian Broadcast Companies weekly science show.
- NSF, with Carol Wessman, 2011-2013, “Disturbance Interactions, Management, and Implications for Carbon Sequestration,” Author but not co-PI due to graduate status. DEB 1119819, **\$230,591**
- Western Water Assessment/NOAA. 2011-2013. “Snowmelt Perturbations and Water Supply Forecast Errors Across the Colorado Headwaters.” Author but not co-PI due to graduate status. With Jeff Deems, Noah Molotch, Carol Wessman, Klaus Wolter, Joe Basugli, and Tom Painter. **\$348,000.**
- NASA MSU Professional Enhancement Award, 2013. **\$600**
- ESA Ecovision Award, **\$150**
- Co-Investigator: CIRES Innovative Research Project Grant, 2011, **\$14,719**
- CIRES Graduate Fellowship, 2010, **\$14,719**
- USGA travel grant, 2010, **\$300**
- SPOT Planet Action Award 2009, ~**\$8000** (satellite imagery)

Undergraduate Specific Grants (as faculty mentor)

- URECA grant with H. Evoy, 2014, **\$712**
- URECA grant with K. Elmore, 2014, **\$1061**
- URECA grant with A. Stewart, 2016, **\$2400**

ADVISING/MENTORING

- Annelise Rue-Johns. Primary research advisor. Range edges: Geography, climate, and disturbance. PhD program, University of Colorado Denver.
- Michelle Deprenger-Levin. Committee member. MS program, Conservation and spatial patterns of rare plants. University of Colorado Denver.
- Lara Duran (*ongoing*). Primary research advisor. Post-fire regeneration and remote sensing. MIS program, University of Colorado Denver.
- Kyle Turchick (*ongoing*). Primary advisor. Carbon and landslide/wind disturbance regimes. MS program at the University of Colorado, Denver.
- Katherine Hayes (*ongoing*). Primary advisor. Fire regime change in the boreal forest. PhD program at the University of Colorado, Denver.
- Jon Martin (*ongoing*). Committee member. Forest management and deer populations. PhD program at the University of Alaska Fairbanks.
- Gavin McNicol (2018). Postdoctoral advisor. High spatial resolution soil carbon quantification across coastal Alaska and Canada.
- Kara Neel (*finished*). Redwood fire/charcoal quantification. Outside committee member (California Polytechnic University).
- John Krapek (*finished*). Primary advisor. Dynamics of yellow cedar founder populations. MS (defended Nov. 5, 2016).

PRESENTATIONS:

*: Postdoctoral Advisee; **: Graduate Student in Buma lab, †: Undergraduate Student in Buma lab

- Pawlik L, **Buma B**, Samonil P, Kvacek J, Galazka A, Kohout P, Malik I. Biological weathering by the Devonian trees. EGU General Assembly 2020. Online (as a result of COVID-19).
- Buma B**, Hayes K**. Evaluating flammability of reburns in the boreal forests of Interior Alaska. Alaska Fire Science Consortium. April 2020.
- Turchick K**, Vascik B, Booth A, **Buma B**. Drivers of fine-scale carbon/biomass distribution in landslide systems - Disturbances, soil, or slope? AGU. December 2019.
- Booth A, Sifford C, de Guzman D, Siebert C, **Buma B**. Coarse wood inhibits debris flow runout in forested southeast Alaska. AGU. December 2019.
- Buma, B**, K Hayes**, MS Lucash and S Weiss. Rates of short-interval fires increasing across the U.S. West. Oral presentation. Association for Fire Ecology Conference. November 2019.
- Hayes, K** and **B Buma**. Effects of spatial heterogeneity on successional trajectories following repeat disturbances in boreal Interior Alaska. Poster. American Geophysical Union. San Francisco, CA. December 2019
- Olson, K†, **B Buma** and K Hayes**. Fine-scale observations of permafrost after repeat fires in Interior Alaska. Poster. American Geophysical Union. San Francisco, CA. December 2019.
- Kodicherla, V†, JA Shabaga, J Vogel, K Hayes**, and **B Buma**. Soil Respiration in very high frequency boreal wildfires as a function of species. Poster. American Geophysical Union. San Francisco, CA. December 2019.
- Hayes, K**, **B Buma**, MS Lucash and S Weiss. Continued repeat burning in the boreal causes continued ecosystem transformation. Oral presentation. Association for Fire Ecology Conference. November 2019.
- Buma, B**, K Hayes**, S Weiss and MS Lucash. Overlapping and interacting fires, a double whammy: Short-interval burns are becoming more frequent across the US West but pace suggests negative feedbacks and spatial patterning. Oral presentation. American Geophysical Union. San Francisco, CA. December 2019.
- Buma B**. 2019. Forests at the Edge of the World. National Geographic Closer Look Series,

Washington DC.

- Buma B.** 2019. When do plants matter? Keynote presentation. European Geosciences Union meeting, Kathmandu, Nepal.
- Hayes K**, **Buma B.** 2019. Effects of spatial heterogeneity on successional trajectories following repeat disturbances in boreal Interior Alaska. AGU.
- Buma B**, Holz A, Rozzi R, Diaz I. 2019. The worlds southernmost treeline: Data from a never surveyed before area indicates complex response to climate change. Ecological Society of America.
- Caviness TE, Rozzi R, Squeo FA, **Buma B.** 2019. Evaluation of invasive species presence at America's southernmost forested island: Horn Island, Cape Horn Biosphere Reserve, Chile. Ecological Society of America.
- Buma B**, Batllori E, Bisbing S, Holz A (presenter), Saunders S, Bidlack A, Creutzberg M, DellaSala D, Gregovich D, Hennon PE, Krapek J, Mortiz MA, Zarat K. 2019. Emergent freeze and fire disturbance dynamics in temperate rainforests. Ecological Society of America.
- Vascik B, Booth A, **Buma B.** 2019. Estimating Amount and Fate of Aboveground Biomass and Carbon Mobilized by Mass-wasting Events in SE Alaska. AGU.
- Organized international symposium (2019): Disappearing snow and altered ecosystems. Attracted researchers from Asia, Europe, and North and South America. International Association for Landscape Ecology, Milan, Italy.
- Co-Organized international symposium (2019): Forest disturbances as drivers of tree species range shifts. With Juha Honkaniemi (Finland). International Association for Landscape Ecology, Milan, Italy.
- Buma B**, Bidlack AL, Lader R. 2019. Widespread snow loss driving mass mortality of a forest – but might it be temporary? International Association for Landscape Ecology, Milan, Italy.
- Vascik B, Booth A, **Buma B.** 2019. Predicting debris flow inundation via semi-empirical modeling in SE Alaska. GSA. (poster)
- Buma B.** 2019. Snow loss on the North Pacific coast. Invited Seminar, Colorado State University
- Buma B**, Lucash M, Hayes K**, Weiss S. 2019. The predictable and not so predictable spatial distribution of fires across the US West. US-IALE. (oral)
- Hayes K**, **Buma B.** Landscape Context Mediates the effect of Shortening Fire Intervals in Boreal systems. US-IALE (oral)
- Turchick K**, Buma B. Linking Landslide Disturbance Regimes to Carbon Distribution. US-IALE (poster).
- Buma B.** 2019. The Emerald Edge: Management and change. Environmental Science and Management seminar, University of Texas A&M.
- Buma B.** 2018. Mapping and modeling carbon on the remote north Pacific coast. Geography and Environmental Science seminar, University of Colorado Denver.
- Buma B.** 2018. Emerging drivers of change. Colorado State University, invited seminar.
- Buma B.** 2018. Climate change and emerging disturbance. University of Denver, invited seminar.
- Buma B**, Bisbing S, Bidlack A, Wiles G. 2018. Much ado about nothing? The surprising lack of succession on the longest running primary succession plot network in the world at Glacier Bay, Alaska. Guild of Rocky Mountain Ecologists and Evolutionary Biologists annual meeting, Nederland, Colorado.
- Buma B**, Hood E. 2018. Climate change in southeast Alaska. University of Alaska Southeast Thursday community lecture series.
- Buma B**, Booth A. 2018. Landslides, wind, and big carbon. Sitka Science Community Series lecture, Sitka, AK.
- Bisbing S, **Buma B**, Oakes L, Krapek J**, Bidlack A, Brousil M. 2018. Multiscale climatic and topographic characteristics of low-snow mortality and regeneration in yellow-cedar suggest directional change in forest composition. US-International Association for Landscape Ecology,

Chicago, IL

- Buma B**, Bisbing S, Krapek J**, Wiles G, Bidlack A, Wright G. 2018. Space, stochasticity, succession, and the limits of chronosequence methods. Why 101 year old history matters to primary succession communities and ecosystems. US-International Association for Landscape Ecology, Chicago, IL
- McNicol G*, **Buma B**, Giesbrecht I, Arriola SG, Bidlack A. 2018. Meso-scale drivers and stocks of soil organic carbon in temperate rainforests, and a spatially explicit assessment of carbon across the north Pacific coast. US-International Association for Landscape Ecology, Chicago, IL
- Girard A, Saunders S, Alaback P, Lertzman K, **Buma B**, Klassen H. 2018. A comparative analysis of structural characteristics in old-growth coastal temperate floodplain forests. US-International Association for Landscape Ecology, Chicago, IL
- Buma B**. 2017. The longest running successional study in the world: The ecology of Glacier Bay, Alaska. Mendenhall Winter Lecture Series, Juneau, Alaska.
- Buma B**. Interactions between disturbances: Describing and anticipating complex regimes. Invited talk. IUFRO World Congress 2017, Freiburg, Germany.
- Buma B**, Krapek J**, Bidlack AL, Hennon PE, Oakes LE, Saunders S, Zeglen S. 2017. Current range and decline model of a climate threatened species: Development and current status. Yellow-cedar climate regional summit, Juneau, Alaska.
- Buma B**. 2017. Transitional mortality: An emerging dynamic in climate-boundary ecosystems. Yellow-cedar climate regional summit, Juneau, Alaska.
- Charlton J, Cruz AJ, Lummus MM, Loadholt K, Messerich C, Wiles G, **Buma B**, Krapek J**. 2017. Yellow cedar growth response to decadal climate shifts at Cedar Lake, Juneau, Alaska. Geological Society of America, Seattle, Washington. (poster)
- Buma B**, Bisbing S, Krapek J**, Wright G, Bidlack AL, Wiles G. 2017. 101 years of succession in Glacier Bay. (oral) Ecological Society of America, Portland, Oregon.
- Wolf K, Barnes RT, **Buma B**. 2017. C stocks and fluxes in fire disturbed landscapes of Colorado. (poster). Ecological Society of America, Portland, Oregon.
- Girard A, Saunders S, Alaback P, **Buma B**, Klassen H, Lertzman K. 2017. A comparative analysis of structural characteristics in old growth North Pacific temperate floodplain forests. (poster) North American Forest Ecology Workshop, annual meeting, Edmonton, AB, Canada.
- Buma B**. Long-term successional research, chronosequences, and permanent plots. 2017. Glacier Bay National Park invited talk.
- Buma B**. Emerging disturbances in high latitude forests. 2017. International-US Association for Landscape Ecology (oral). Baltimore, Maryland.
- Wolf K, Barnes R, **Buma B**, Gilbertson A. 2017. C Stocks and Fluxes in Fire- Disturbed Landscapes of Colorado. Gordon Conference (poster).
- Barnes R, Wolf K, Whittinghill K, Gilbertson A, **Buma B**. 2016. Carbon stocks and fluxes in fire disturbed landscapes of Colorado. AGU (oral), San Francisco, California.
- Buma B**, Juday G, Morimoto M. 2016. Repeat photographs and surveys over 100 years of change. (oral) NPS Centennial Science meeting, Fairbanks, Alaska.
- Buma B**. 2016. North Pacific coast forests: Emerging disturbances and overall growth. (oral) Invited Speaker, Evening at Egan lecture series, Juneau, Alaska.
- Buma B**, Juday G. 2016. 100 years of succession on the Cooper succession plots in Glacier Bay, Alaska. (oral) Glacier Bay National Park, Gustavus, Alaska.
- Buma B**, Jacobs A. 2016. Forest landslides in southeast Alaska: Impacts, prediction, and evaluation. (oral) NASA Goddard Space Flight Center, Greenbelt, Maryland.
- Buma B**, Riitters K, Costanza JK. 2016. How big is a complete (disturbance) landscape? US-International Association for Landscape Ecology (oral). Asheville, North Carolina.
- Bisbing S, **Buma B**, Krapek J**. 2016. Microclimate drivers of decline and forest compositional

shifts in yellow cedar forests of southeast Alaska. US-International Association for Landscape Ecology (oral). Asheville, North Carolina.

•Riitters K, Costanza JK, **Buma B**. 2016. Modeling North America tree cover disturbance at multiple scales. US-International Association for Landscape Ecology (oral). Asheville, North Carolina.

•**Buma B**. 2016. The shifting North Pacific temperate rainforests: From individual trees to the regional biome. Invited speaker, Western Washington University. Bellingham, Washington.

•**Buma B**, Bisbing S, Bidlack A, VanderNaald B, Clark C. 2015. Alaska yellow cedar: Harvest and restoration baseline. USFS Regional Meeting (oral), Juneau, Alaska.

•**Buma B**, Livneh B. 2015. Quantifying the sensitivity of water yield to forest disturbances across a diverse set of unmanaged watersheds throughout the continental United States. AGU (oral), San Francisco, CA.

•Livneh B., Deems J., **Buma B**, Barsugli J., Schneider D., Molotch N., Wessman C., Wolter K. 2015. Hydrologic impacts of land cover disturbances in the Upper Colorado River Basin. AGU (oral), San Francisco, CA.

•Barnes B, **Buma B**, Wolf K, Fehsenfeld T, Kehlenbeck M. 2015. After the Burn: Forest carbon stocks and fluxes across fire disturbed landscapes in Colorado, USA. AGU (poster), San Francisco, CA.

•Hennon P, Zeglen S, Trubilowisz J, Sunders S, Floyd B, Harrington C, D'Amore D, **Buma B**, Bidlack A. 2015. A range wide climate vulnerability assessment of yellow-cedar along a 20 degree latitudinal span of the Pacific Coast temperate rainforest. International Association for Landscape Ecology World Congress (oral), Portland, Oregon.

•Saunders S, Klassen H, **Buma B**, Hennon P, Alaback P, MacKinnon A. 2015. Implications of projected climate change for relative roles of disturbance, climate, and site drivers on stand level dynamics across a plot network of the perhumid coastal temperate rainforest. International Association for Landscape Ecology World Congress (oral), Portland, Oregon.

•Krapek J**, **Buma B**, Verbyla D, D'Amore D, Hennon P. 2015. Establishment patterns of yellow-cedar at a current range edge: A climate-threatened tree's migration north and east, and implications for conservation planning. International Association for Landscape Ecology World Congress (oral), Portland, Oregon.

•**Buma B**, Barrett T. 2015. Regional scale disequilibrium in the perhumid North Pacific temperate rainforest. International Association for Landscape Ecology World Congress (oral), Portland, Oregon.

•**Buma B**, Fellman J, Edwards RT, Hood E. 2014. Linking forest and aquatic carbon in Berners Bay, Alaska EPSCoR annual conference (poster).

•Johnson A*, Kruger L, **Buma B**, Schrader B. 2014. Geomorphology and sustainable indigenous populations. American Water Resources Association Meeting (oral) Juneau, Alaska.

•**Buma B**. 2014. Disturbance research in Alaska and Colorado. Novus network: Linking disturbance ecology across temporal scales (oral). Estes Park, Colorado.

•Johnson A*, Kruger L, **Buma B**, Schrader B. 2014. Geomorphology and indigenous populations of Southeast Alaska. AWRA National Meeting (oral), Virginia.

•**Buma B**, Brown CD, Johnstone JF, Fontaine JB, Donato DC. 2014. Serotiny and resilience to fire: Who are the winners and losers? Ecological Society of America (oral), Sacramento, CA.

•Downes Z, Wiles G, Lawson D, Wiesenberg N, Connor CL, **Buma B**, Barclay D, Frank DC, Nelson W. 2014. Dating glacial history of the first millennium CE in Muir Inlet, Glacier Bay National Park and Preserve, southeast Alaska. Geological Society of America (oral), Vancouver BC.

•**Buma B**, Johnson AC*. 2014. Wind and landslide interactions in southeast Alaskan temperate rainforests. International Association for Landscape Ecology (oral), Anchorage, Alaska.

•**Buma B**, Livneh B. 2014. Responding to forest disturbances: Policy Implications. Invited

Presentation, International Association for Landscape Ecology (oral), Anchorage, Alaska.

•**Buma B**, Livneh B, Wessman CA. 2014. Forest disturbances, management actions, and a changing climates implications for water supplies. Invited Presentation (oral), Global Land Project Open Science Meeting, Berlin, Germany.

•**Buma B**, Beaudreau A, Bidlack AL, Tallmon D, VanderNaald B, Pyare S. 2013. A new resource for integrated temperate rainforest ecosystem research: The Berners Bay glacier-to-estuary research area. Pacific Northwest Climate Science Conference (poster), Seattle.

•Poore R, Wessman CA, **Buma B**. 2013. The effects of fire severity on black carbon additions to forest soils – 10 years post fire. AGU (poster).

•Livneh B, Deems JS, **Buma B**, Barsugli JJ. 2013. Using quasi-dynamic land cover to investigate hydrologic disturbance from beetle-kill and dust in the Upper Colorado river basin. AGU (oral).

•**Buma B**, Poore R, Wessman CA. 2013. Compound disturbances and their impact on post-fire carbon and charcoal pools. International Association for Landscape Ecology (oral), Austin TX.

•Livneh, B, Deems JS, and **Buma B**. 2013. National Centers for Atmospheric Research (NCAR) Seminar, Boulder (oral), CO. Deciphering the impacts of competing hydrologic disturbance factors in the Upper Colorado River Basin.

•**Buma B**, Wessman CA. 2012. Fire catalyzed regime shifts, carbon sequestration, and climate change: A case for active management? 5th International Fire Ecology and Management Congress (oral). Portland, OR.

•Livneh, B., J.S. Deems, **B. Buma**, J.J. Barsugli, D. Schneider, N. Molotch, and C. Wessman. 2012. Interpreting changes to Upper Colorado River Basin hydrologic response via alternate climatic and land-cover scenarios (oral), AGU

•Livneh, B., J.S. Deems, **B. Buma**, J.J. Barsugli, D. Schneider, and C. Wessman. 2012. Upper Colorado River Basin Water Conference. Modeling Hydrologic Impacts of Bark Beetles and Desert Dust on Tributary Catchments of the Upper Colorado River Basin (oral). EGU

•**Buma B.**, Wessman CA 2012. Ecosystem services may outlast their ecosystems: Regional carbon stocks minimally affected by multiple disturbances and coniferous-to-deciduous regime change (oral). Ecological Society of America.

•**Buma B**, Wessman CA. 2012. Ecosystems and ecosystem services may have differing resilience to increasing disturbance rates and disturbance interactions. 4th International Conference on Climate Change (invited oral). Seattle WA.

•**Buma, B**, Wessman CA. 2012. Resistance and resilience mediate disturbance interactions: A review and modeling exercise. International Association of Landscape Ecology (poster), Newport.

•Wessman, CA, Muller, **B, Buma**, B, Bagher, M, Flohr, T, Heris M. 2012. Assessing the benefits of green infrastructure. International Association of Landscape Ecology (oral), Newport, RI.

•**Buma, B**, Flohr, T, Wessman CA, Muller, B, Bagher, M, Heris M. 2012. Urban phenology and ecosystem services. Front Range ecology forum (oral), Ft. Collins, CO.

•**Buma, B**, Wessman CA. 2011. Compounding disturbances and their impact on regeneration of subalpine tree species. Ecological Society of America (oral).

•**Buma, B**, Wessman CA. 2011. Multiple disturbances in a subalpine forest, impact on resilience mechanisms, and implications for ecosystem recovery. International Association of Landscape Ecology (oral).

•**Buma B**. 2011. Multiple disturbances and subalpine forest regeneration. CIRES Graduate Student Association (oral).

•**Buma, B**, Pelz, K. 2011. MPB, fuel loadings, and the loss of forest resilience? Western Water Assessment Symposium (invited oral), Boulder CO.

• **Buma B**. Multiple disturbances can reduce coniferous forest resilience. CIRES Rendezvous (poster), Boulder CO.

•**Buma B**. 2011. Disturbance interactions and forest resilience mechanisms. Front Range ecology

forum (oral), Ft. Collins, CO.

- **Buma B.** 2010. Compounding disturbances and their impact on subalpine forest and landscape structure. International Association of Wildland Fire (poster), Spokane, WA.

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS (ACTIVE)

- National Geographic Explorer (<https://www.nationalgeographic.org/find-explorers/brian-j-buma>)
- Explorers Club Fellow
- Fulbright Specialist

- Ecological Society of America
- International Association of Landscape Ecology (executive committee member)
- Alaska Climate Adaptation Science Center Senior Scientist
- Alaskan Coastal Rainforest Center
- NSF Novus research coordination network (biogeochemical-disturbance research)
- NSF Coastal Rainforest Margins research network coPI/steering committee (multinational biogeochemical linkages across terrestrial-aquatic systems)

TECHNICAL

- Remote sensing platforms: Landsat, MODIS, Sentinel-2, LiDAR, aerial imagery, ASTER, and others.
- Phenological analysis including MODIS data management (MRT) and TIMESAT/MATLAB software
- Invasive species management and outplanting of native species, Kauai.
- Spatial fire modeling (Flammap, Farsite, Randig) and fire effects modeling (FOFEM)
- Black carbon/charcoal quantification in forest soils (KMD digestion)
- Carbon and nitrogen elemental analysis (Carlo-Erba/Costech EA)
- LiDAR based forest biomass and biogeochemistry modeling (terrestrial and aquatic)
- GIS for ecological applications (ArcGIS, ENVI, R, and ERDAS)
- R applications (statistics, GIS, remote sensing, dynamic spatial disturbance modeling)
- USDA Forest Service Vegetation Simulator (FVS)
- Citizen Science (Project Budburst; Adventure Science)

SYNERGISTIC ACTIVITIES

- Juneau Icefield Research Project: Research Faculty (2015 – present)
- Senior Scientist, USGS Alaska Climate Science Center (2016 – present)
- Visiting scientist exchange program: Colorado College with Dr. Barnes, charcoal/carbon budgeting and soil incubation experiments. (2014-2016)
- "Disturbance Dynamics in Temperate Rainforests" symposium chair, International Association for Landscape Ecology World Congress (in July 2015)
- Novus NSF RCN workshop (Paleo-neo biogeochemical network), Sept. 7-11 2014, Estes Park, Colorado
- Alaskan Coastal Rainforest Center associate faculty
- Novus NSF RCN workshop (Paleo-neo biogeochemical network), May 21-25 2013, HJ Andrews Experimental Forest.

- NSF Workshop Invited participant, WIS²DOM: Weaving Indigenous and Sustainability Sciences: Diversifying our Methods Workshop, Olympia, WA, February 2013
- US Forest Service Climate Change and Management Program meeting, October 2012
- 4th Annual AIBS congressional district visit participant, August 2012
- PBB501 “Teaching phenology” class, NEON, July 2012.
- Invited participant, NEON Inc. Scaling workshop, Boulder, Colorado, June 2012
- NSF Workshop Invited participant, PROBE (Paleo Reconstructions of Biogeochemical Environments) at KSU/Konza LTER, April 2012. See *Eos*, Vol. 93, No. 47 for more information.

CLASSES DESIGNED AND TAUGHT

- 2000 level: Introduction to Botany
- 2000 level: Temperate Rainforest Ecosystems
- 2000 level: Field Methods in Forest Ecology

- 3000 level: Temperate Rainforest Ecology
- 3000 level: Natural Resource Management
- 3000 level: Fire Ecology
- 3000 level : Interdisciplinary Perspectives on Climate Change (300 level, cotaught with Political Science faculty)
- 3000 level: Principles of Ecology

- 4000 level: Landscape Ecology and Biogeography
- 4000 level: Forest Ecosystem Ecology
- 4000 level: Independent Research in Biology/Ecology (multiple)

- 5000 level: Graduate Spatial Statistics (Independent Study Faculty, UAF)
- 5000 level: Landscape Ecology
- 5000 level: Research Seminar
- 5000 level: Professional Seminar

- Other:
- 1000 level: General Biology lab (as graduate TA)
- 2000 level: General Ecology lab (as graduate TA)

MAJOR UNIVERSITY SERVICE POSITIONS

- CU Denver Integrative Biology Outcomes Committee (2018-present)
- CU Denver Integrative Biology Graduate Advisory Committee (2018-present)
- CU Denver CLAS EPCC committee (2018-2019)
- CU Denver New Student Orientation, Meet and Greet, Convocation, and other ad hoc opportunities
- Strategic Pathways, University of Alaska statewide restructuring committee (2016-2018)
- Clarence and Verle Kramer Endowment and Internship coordinator (2013 – 2018)
- Geography 5-Year Program Review lead (2016-2018)
- Research Committee chair (2014-2018)
- Grant coordinator search committee, Arts and Sciences (2015-2016)
- Faculty search committee, Natural Sciences (2014-2015)
- University of Alaska Foundation scholarship review (2015-2016)

- Meet the Scientist community outreach (2014)
- Glacial Wood Identification and Write-up, UAS Geology (2013-2014)
- Faculty Handbook Committee (2013-2014)
- Library Forest Science collection selection (2013, 2015, 2016)

NON-UNIVERSITY SERVICE POSITIONS

•National Geographic Educational Resources Development consultant	Current
•National Geographic Explorer's Club Advisory Panel member	Current
•Alaska Climate Adaptation Science Center senior scientist	Current
•NA-International Association for Landscape Ecology. National Fundraising Chair.	Current
•NA-International Association for Landscape Ecology. Executive Committee Member	Current
•International Association for Landscape Ecology. Policy Committee Member	Current
•Juneau Urban Tree Association member	2013 - 2018
•US Forest Service, Juneau Spatial Ecology Working Group	2013-2018
•Sense about Science (senseaboutscience.org) member, volunteer, reviewer	2013 - 2018
•Climate Literacy and Energy Awareness Network (CLEAN) science curricula reviewer	2009 - 2017
•LiDAR consulting, City and Bureau of Juneau	2014 - 2015
•US-International Association for Landscape Ecology. 2014 International Conference	2013 - 2014
<i>Local fundraising lead.</i>	
•Alaska/NASA Undergraduate Space Grant proposal review	2013
•US Forest Service Forest Vegetation Simulator bootstrap programming update team	2012
•Hydrologic Science Symposium, 2013 Committee member	2012- 2013
•LWEEP (Laboratory water and energy efficiency program)	2008 – 2013
•Online Climate Change Education Content Administration	2012
•Conservation Northwest (formerly Northwest Ecosystem Alliance)	2002-2008

PEER-REVIEWS PROVIDED FOR

Ecological Monographs, Oikos, Environmental Modeling and Assessment, Ecological Applications, NASA, Carbon Balance and Management, Environmental Conservation, Remote Sensing, Sustainability Science, US Forest Service, International Journal of Wildland Fire, Global Change Biology, PLOS One, Soil Science Society of America Journal, NSF EAR, BioScience, Landscape Ecology, Frontiers in Ecology and Environment, Canadian Journal of Forest Research, Diversity and Distributions, NSF, Ecology, Ecological Modeling, Arctic, Antarctic, and Alpine Research, Journal of Ecology, Forest Ecology and Management

AWARDS/HONORS

- University of Alaska Southeast, Excellence in Research Award (2016-2017)