

Assessment of the effects of climate change on the distribution of the western flycatcher (*Empidonax occidentalis*) in the Pacific Northwest

R. H. D. M. L. B. D. J. M.

Department of Ecology and Evolutionary Biology, University of California Los Angeles, CA, U.S.A.

Department of Psychology, University of Lethbridge, Lethbridge, AB, Canada

Department of Biology, University of Northern Colorado, Greeley, CO, U.S.A.

Department of Biological Sciences, University of Windsor, Windsor, ON, Canada

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The western flycatcher (*Empidonax occidentalis*) is a common bird species in the Pacific Northwest of North America. It is a migratory species that breeds in the Pacific Northwest and winters in Central America. The species is currently experiencing a range expansion into the Pacific Northwest, which is likely due to climate change. This study assesses the effects of climate change on the distribution of the western flycatcher in the Pacific Northwest. We use a combination of field observations and species distribution models to assess the effects of climate change on the distribution of the western flycatcher. Our results show that the western flycatcher is currently expanding its range into the Pacific Northwest, and that this expansion is likely due to climate change. We also show that the western flycatcher is currently experiencing a decline in population density in the Pacific Northwest, which is likely due to climate change. Our findings suggest that the western flycatcher is currently experiencing a range expansion and a decline in population density in the Pacific Northwest, which is likely due to climate change.

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- Baker, L., & N. (2017). *R*. *Journal of Avian Biology*, 48(9), 1254–1262.
- Baker, & H. (1995). *C*. *Journal of the Royal Statistical Society*, 57(1), 289–300.
- Baker, P., & D. (2014). Praat: Doing phonetics by computer. <https://www.praat.org/>.
- Baker, D. J. (1987). *S*. *Wilson Bulletin*, 99(3), 377–397.
- Baker, E., Ar, T., L., K., & R., F. (2008). *H*. *Journal of Experimental Biology*, 211(3), 317–326. <https://doi.org/10.1242/jeb.013359>.
- Baker, E. F., R., F., & Ar, T. (2013). *D*. *Animal Behaviour*, 86, 1131–1137. <https://doi.org/10.1016/j.anbehav.2013.09.019>.
- Baker, J. M., & B., M. D. (2008). *T*. *Comparative Cognition & Behavior Reviews*, 3, 86–98. <https://doi.org/10.3819/ccbr.2008.30005>.
- Carter, C., & L., R. E. (1970). *A*. *Journal of Theoretical Biology*, 29(3), 427–445. [https://doi.org/10.1016/0022-5193\(70\)90107-4](https://doi.org/10.1016/0022-5193(70)90107-4).
- Carter, S., L., A., B., N. M., H., R., & K., E. A. (2002). *F*. *Proceedings of the National Academy of Sciences of the United States of America*, 99(8), 5664–5668.
- Carter, C. J., F., T. J., & E., I. (2011). *C*. *Wilson Journal of Ornithology*, 123(2), 218–228. <https://doi.org/10.1676/10-076.1>.
- G., N., & Ar, T. (2014). *A*. *BMC Biology*, 12(1), 58. <https://doi.org/10.1186/s12915-014-0058-4>.
- H., J. P., F., M. S., & F., R. (1985). *T*. *Parus atricapillus*.