

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

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## ARTICLE INFO

### Article history:

Received 6 September 2017

Accepted 24 October 2017

First published online 19 March 2018

MS. No.: A17-00725R2

### Keywords:

Assessment

Climate change

Empidonax occidentalis

Setophaga adelaidae

Salpinctes obsoletus

Thryophilus rufalbus

Abstract. The western flycatcher (*Empidonax occidentalis*) is a common bird species in the Pacific Northwest of North America. It is a member of the Setophaga adelaidae group, which includes other species such as *Salpinctes obsoletus* and *Thryophilus rufalbus*. This species is distributed across a wide range of habitats, including forests, shrublands, and open areas. The distribution of this species is influenced by various factors, including climate change. This study assesses the effects of climate change on the distribution of the western flycatcher in the Pacific Northwest. The study uses a combination of field observations and modeling to determine the impact of climate change on the distribution of this species. The results show that climate change is likely to have a significant impact on the distribution of the western flycatcher, with a shift in its range and a decrease in its abundance. The study also identifies the factors that are most likely to influence the distribution of this species, including temperature, precipitation, and habitat availability. The findings of this study have important implications for the conservation of the western flycatcher and other species in the Pacific Northwest.

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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.speech.ku.dk/~praat/>.
- 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. [doi:10.1242/jeb.013359](https://doi.org/10.1242/jeb.013359).
- Baker, E. F., R., F., & Ar, T. (2013). *D*. *Animal Behaviour*, 86, 1131–1137. [doi:10.1016/j.anbehav.2013.09.019](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. [doi:10.3819/ccbr.2008.30005](https://doi.org/10.3819/ccbr.2008.30005).
- Carter, C., & L., R. E. (1970). *A*. *Journal of Theoretical Biology*, 29(3), 427–445. [doi: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. [doi:10.1676/10-076.1](https://doi.org/10.1676/10-076.1).
- G., N., & Ar, T. (2014). *A*. *BMC Biology*, 12(1), 58. [doi:10.1186/s12915-014-0058-4](https://doi.org/10.1186/s12915-014-0058-4).
- H., J. P., F., M. S., & F., R. (1985). *T*. *Parus atricapillus*.