

## Evidence for Geomagnetic Imprinting as a Homing Mechanism in Pacific Salmon

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In the final phase of their spawning migration, Pacific salmon use chemical cues to identify their home river, but how they navigate from the open ocean to the correct coastal area has remained enigmatic. To test the hypothesis that salmon imprint on the magnetic field that exists where they first enter the sea and later seek the same field upon return, we analyzed a 56-year fisheries dataset on Fraser River sockeye salmon, which must detour around Vancouver Island to approach the river through either a north or south passageway. We found that the proportion of salmon using each route could be predicted by geomagnetic field drift (secular variation); the more the field at a passage entrance diverged from the field at the river mouth, the fewer fish used the passage. Secular variation accounted for as much as 44% of the variability in the migratory route used; including an interactive effect of sea surface temperature we could account for 66% of the variability in the route used by returning salmon. These results provide the first empirical evidence of geomagnetic imprinting in any animal, imply that forecasting salmon movements may be possible using geomagnetic models, and identify a likely homing mechanism for salmon and other marine migrants.

### REFERENCE

Putman, N.F., K.J. Lohmann, E.M. Putman, T.P. Quinn, A.P. Klimley, and D.L.G. Noakes. 2013. Evidence for geomagnetic imprinting as a homing mechanism in Pacific salmon. *Curr. Biol.* 23(4): 312-316.