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Following the Compass Home

For centuries, humans have been studying the historic dispersal of our species across the planet. We can trace the movement of populations, now using genetic samples, with extraordinary detail.

One thing you can conclude from all this data: Humans are sensitive to many things that might affect migration, but not to the Earth's magnetic field. The instruments we use to detect the planet's magnetism have steadily grown more sophisticated, but we are blind to our place in the magnetosphere — the space around the earth influenced by its magnetic field.

Consider, in contrast, sockeye salmon, whose [migration in the Pacific Northwest has been analyzed in a new study](#) based on location data garnered over 56 years. The question about salmon has always been: how do they find their home river when they return to spawn? Part of the answer is the stream's chemical signature, but chemical cues cannot guide a salmon from the mid-Pacific.

The [new study published in Current Biology](#) offers a more complete answer. By using old fishing records, scientists have been able to compare the routes salmon take with annual variations in the intensity of the Earth's magnetic field. According to their findings, a salmon leaving its home river carries with it an imprint of the river's magnetic identity. And when it returns, it instinctively performs a feat of historic magnetic analysis. It follows the magnetic signature that resembles most closely the imprint it carries from several years before, no matter how the magnetic field has varied since.

What makes this study groundbreaking is its conclusion that the geomagnetic imprint the salmon carry is learned, not inherited. Like bees and birds and many other creatures, salmon are alive to an invisible force as pervasive as gravity. Humans may lack this sensitivity, but we have bees and birds and salmon to remind us that there are other ways to see the world.