Collective navigation can facilitate passage through human-made barriers by homeward migrating Pacific salmon

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1 Introduction

Long-distance migration is an iconic and threatened behaviour [1]. Migratory species navigate with incredible precision to and from highly spatially restricted locations [2]. To solve these challenging navigational problems, species use mechanisms ranging from an innate sun compass [3] and magnetic maps [4] to learned olfactory cues [5,6]. However, long-distance migrations are threatened by human influence [7]. Fences, highways and other developments block terrestrial migration pathways [8], light pollution interferes with aerial migrations [9] and dams and de-watering impede passage both upstream and downstream (e.g. Norrgård et al. [10]). In light of these impacts, it is essential to understand the mechanisms of navigation in order to predict and mitigate human impacts on migratory populations.

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