



## Animal Culture and the Conservation of Migratory Species

Orcas foraging © Rob Lott

### THE IMPORTANCE OF KNOWLEDGE SHARING

Ecological connectivity is essential for the survival of wildlife and the functionality of ecosystems. Connectivity is important for maintaining diversity and providing opportunities for adaptation to climate change across all biomes and spatial scales. One key way in which connectivity is maintained across wild populations is through the sharing of ecological knowledge, between individuals and across generations. The importance of shared ecological knowledge has become ever more apparent as overexploitation and habitat fragmentation continues to drive the rapid decline in biodiversity.

Many migratory species, such as cranes, whales and fishes depend – at least to some extent – on social learning for migration, to navigate between ecological patches and achieve connectivity. Recognizing the importance of social learning and animal culture for practical conservation, and for the wider work of CMS, is critical for enabling the effective conservation of migratory species across the full extent of their ranges. Connectivity conservation is an important tool for helping governments to achieve the economic, development and environmental goals of the 2030 Agenda for Sustainable Development.

### What is Animal Culture?

Animal culture is defined as information or behaviours that are shared within a group or community and are acquired through social learning.<sup>1,2</sup> The underlying processes of social learning can be defined as learning that is influenced by observation of, or interaction with, another animal or its products<sup>3</sup> (e.g., tools or nests). Animal cultures can last across multiple generations, or can be ephemeral within a generation, like a ‘fad’. Social learning can influence how species forage, migrate and communicate. Social learning and culture have been identified across many vertebrate taxa.<sup>2</sup> There is evidence for social learning from chimpanzees to sperm whales, passerine birds and storks, to coral reef fish. Beyond the genes inherited by offspring from their parents, the emergent understanding of how social learning and culture impact their characteristic traits and behaviour presents a new paradigm for the conservation of migratory species.

### How does culture influence biological processes?

Conservation efforts are generally focused on protecting species from extinction, preserving biological diversity, and maintaining habitats and ecosystems. However, animal culture can influence behaviour within and between groups, and even across entire populations, impacting survival and reproduction rates, and response to anthropogenic change. Stable culture may be useful to help delineate populations, and knowledge of social learning can be utilized to increase conservation efficiency (See case study A).

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## Why is animal culture important for conservation in our changing world?

Ecosystems are facing ever-increasing challenges and anthropogenic impacts. Culture may not always have immediate or obvious conservation value. Nevertheless, considering the processes of cultural transmission can better inform conservation strategies. The maintenance of cultural capacity<sup>4</sup> within populations can help provide resilience to some of these rapid changes. Resilience and adaptation to environmental change can improve survivorship and is increasingly important for conservation.<sup>5</sup> Resilience can be argued to have two components: firstly, through resistance and sensitivity to disturbance; and secondly, in terms of capacity to recover (i.e., retuning back to equilibrium after disturbance).<sup>6</sup> Social learning can lead to innovations spreading in response to anthropogenic threats,<sup>5</sup> generating resilience.<sup>1</sup> However, animal culture also has the potential to inhibit the adoption of useful behaviours when there is a high degree of conformity, preventing the spread of adaptive behaviour.<sup>7</sup> Cultural transmission within groups and across populations can therefore greatly impact resilience to human activities and influence the effectiveness and efficiency of conservation practices.



Inserting a blade of grass into the ear has been socially transmitted across one community of chimpanzees, creating a local custom. © Edwin van Leeuwen

## CASE STUDY A: CHANGING THE GAME FOR CONSERVATION

Better consideration and utilization of socially learned behaviours within managed populations can have lasting impacts on population viability.<sup>8</sup> Attempts at re-introducing captive-born Golden Lion Tamarins (*Leontopithecus rosalia*), initially showed only a 13% success rate.<sup>9</sup> Re-introduced animals that survived through additional provisioning of food and nests lived long enough to learn skills needed in the wild. Those individuals passed on the learned behaviours socially to their offspring, who subsequently had a 70% survival rate,<sup>10</sup> suggesting that social learning can have substantial impacts on survivorship across generations during re-introduction programmes.<sup>2</sup> Social transmission of learned behaviours also impacts animals that migrate thousands of kilometres. Translocated groups of big horn sheep gradually learned from each other to migrate across the plains of America to forage more effectively.<sup>23</sup> By “surfing the green wave” of new seasonal growth of vegetation, groups of migrating bighorn sheep benefitted from their shared knowledge and maximized their foraging of nutritiously valuable foods.<sup>23</sup> This highlights how culture can underpin migration patterns and conservation strategies across large areas.



Golden Lion Tamarin and Bighorn Sheep © Canva.com

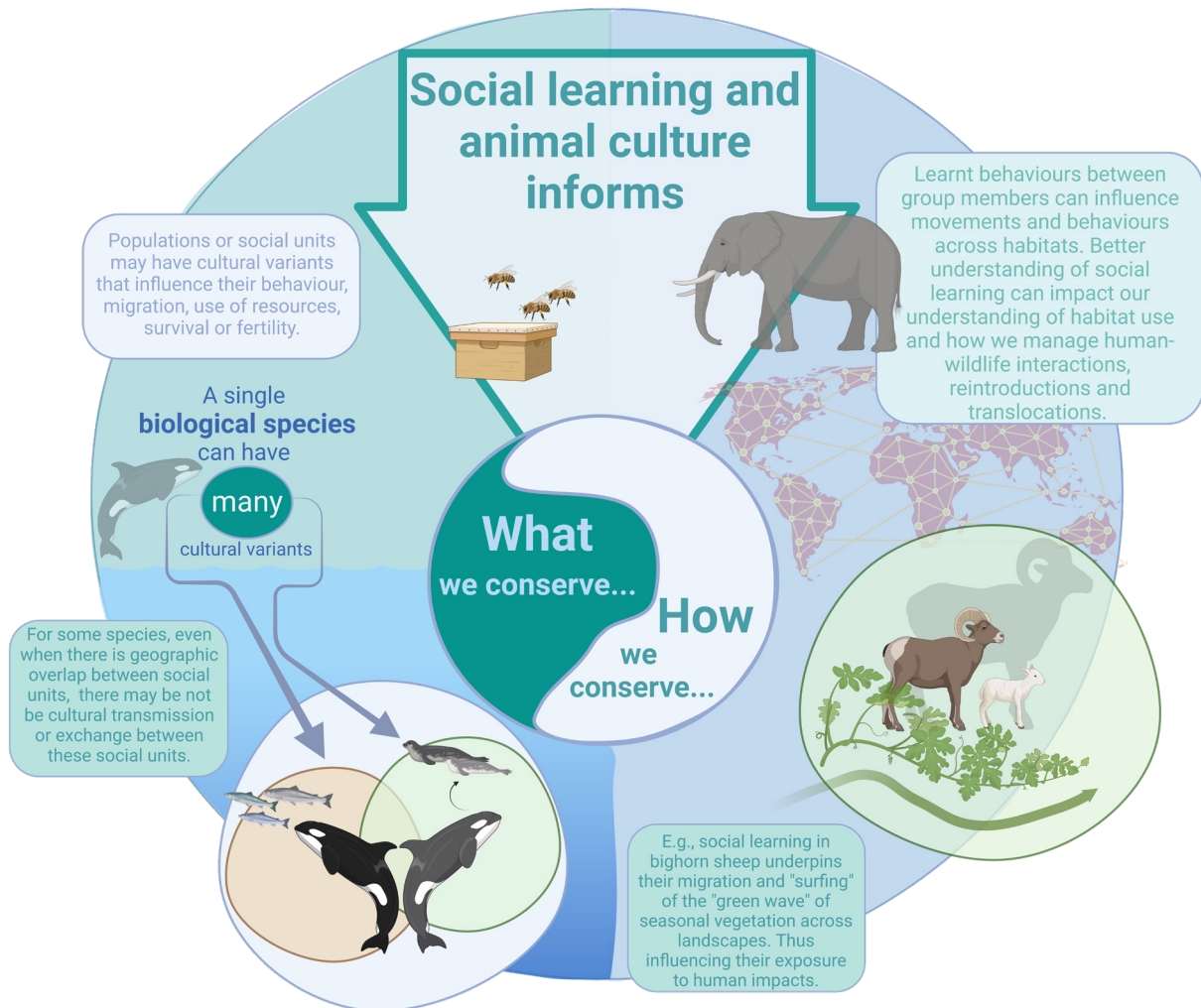
## Case Study B: Resilience and Vulnerability on Land and at Sea

**Resilience:** There is evidence that in some species older females can act as repositories of knowledge in dynamic environments.<sup>11</sup> Research demonstrates that both post-reproductive killer whales and older elephant matriarchs may transmit social knowledge, such as providing foraging information, with positive impact on reproductive success within their social group.<sup>11,12</sup>

**Vulnerability:** While some species demonstrate a high degree of flexibility and can adapt behaviour regularly through social learning, others demonstrate strict conformity within social groups that can constrain adaptation. For example, fish-eating Southern Resident Killer Whales have highly specialized, socially learned foraging strategies and distinctive vocal dialects that offspring learn from their mothers.<sup>13,14</sup> Social learning generates vulnerability in this population through conservative specialization on a declining chinook salmon population,<sup>15</sup> demonstrating how stable, vertically transmitted cultures can be important for the delineation of conservation units.<sup>16</sup>

# Animal Culture and the Conservation of Migratory Species

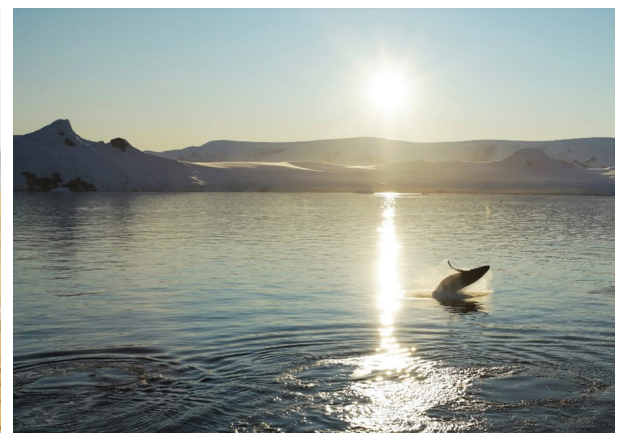
**Human/wildlife interactions:** Socially learned behaviours can also exacerbate human-wildlife conflicts.<sup>2</sup> For example, elephants are known to forage on cultivated food crops and adults can teach others how to avoid deterrents such as electric fences, creating a cultural arms race in human-wildlife conflict as groups learn from informed individuals.<sup>18</sup> Dynamic solutions to support local stakeholders depend on the understanding of how behaviour is shared in these populations.<sup>19</sup> Similarly, increasingly frequent occurrences of killer whales interacting with and damaging boats in the Mediterranean and North Atlantic may have a social learning component that is yet to be determined.<sup>20,21,22</sup> Understanding how such behaviours can be transmitted across a social group and how likely they are to persist in a population can inform management strategies and help address emerging and novel challenges. A key aspect for success in managing human-wildlife interaction is incorporating indigenous and local knowledge into management strategies.



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Elephants form close social bonds and may share ecological knowledge' © Canva.com



Humpback whale song can be culturally transmitted across oceans © Isla Keesje Davidson

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## About CMS

The Convention on the Conservation of Migratory Species of Wild Animals (CMS), also known as the Bonn Convention, works for the conservation of a wide array of endangered migratory animals worldwide through negotiation and implementation of agreements and species action plans. It has 133 Parties (as of 1 January 2023).

CMS engages all relevant stakeholders in addressing threats to migratory species in concert with all other aspects of wildlife conservation and management.

## CMS Instruments

Animals receive protection under CMS through listing on its two Appendices, through global or regional agreements and through action plans.

For more Fact Sheets please visit: <http://www.cms.int/en/publications/factsheets>



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