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**DEADLINE: Thursday 5th April 2024**

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**EXAMPLE TEMPLATE:**

ORAL / POSTER:

**Regime shift tipping point in hare population collapse associated with climatic and agricultural change during the very early 20th century.**

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Animal populations at northern latitudes may have cyclical dynamics that are degraded by climate change leading to trophic cascade. Hare populations at more southerly latitudes are characterized by dramatic declines in abundance associated with agricultural intensification. We focus on the impact of historical climatic and agricultural change on a mid-latitude population of mountain hares, *Lepus timidus hibernicus*. Using game bag records from multiple sites throughout Ireland, the hare population index exhibited a distinct regime shift. Contrary to expectations, there was a dynamical structure typical of northern latitude hare populations from 1853 to 1908, during which numbers were stable but cyclic with a periodicity of 8 years. This regime was replaced by dynamics more typical of southern latitude hare populations from 1909 to 1970, in which cycles were lost and numbers declined dramatically. Destabilization of the autumn North Atlantic Oscillation (NAO) led to the collapse of similar cycles in the hare population, coincident with the onset of agricultural intensification (a shift from small-to-large farms) in the first half of the 20th century. Similar, but more recent regime shifts have been observed in Arctic ecosystems and attributed to anthropogenic climate change. The present study suggests such shifts may have occurred at lower latitudes more than a century ago during the very early 20th century. It seems likely that similar tipping points in the population collapse of other farmland species may have occurred similarly early but went undocumented. As northern systems

are increasingly impacted by climate change and probable expansion of agriculture, the interaction of these processes is likely to disrupt the pulsed flow of resources from cyclic populations impacting ecosystem function.

**Keywords:** Agricultural intensification; climate change; game bag; landscape homogenization; North Atlantic Oscillation; population dynamics.

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