MARA PREDATOR CONSERVATION PROGRAMME

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KENYA WILDLIFE TRUST

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The impact of livestock and human activity on lion presence in community conservancies

Background

Large carnivores such as lions (Panthera leo) are increasingly confined to landscapes where people and livestock live alongside wildlife. In Kenya, nearly 70% of wildlife occurs outside formally protected areas, particularly within pastoralist rangelands. Community conservancies in the Maasai Mara aim to balance conservation and livelihoods by combining wildlife tourism with managed livestock grazing.

However, it remains unclear how lions respond to livestock and human presence inside these mixed-use conservation landscapes. Understanding these responses is critical to guide grazing management, reduce conflict, and support coexistence.

This study investigated how cattle, sheep and goats, human settlements, and environmental features influence lion presence and abundance across seven community conservancies in the Maasai Mara.



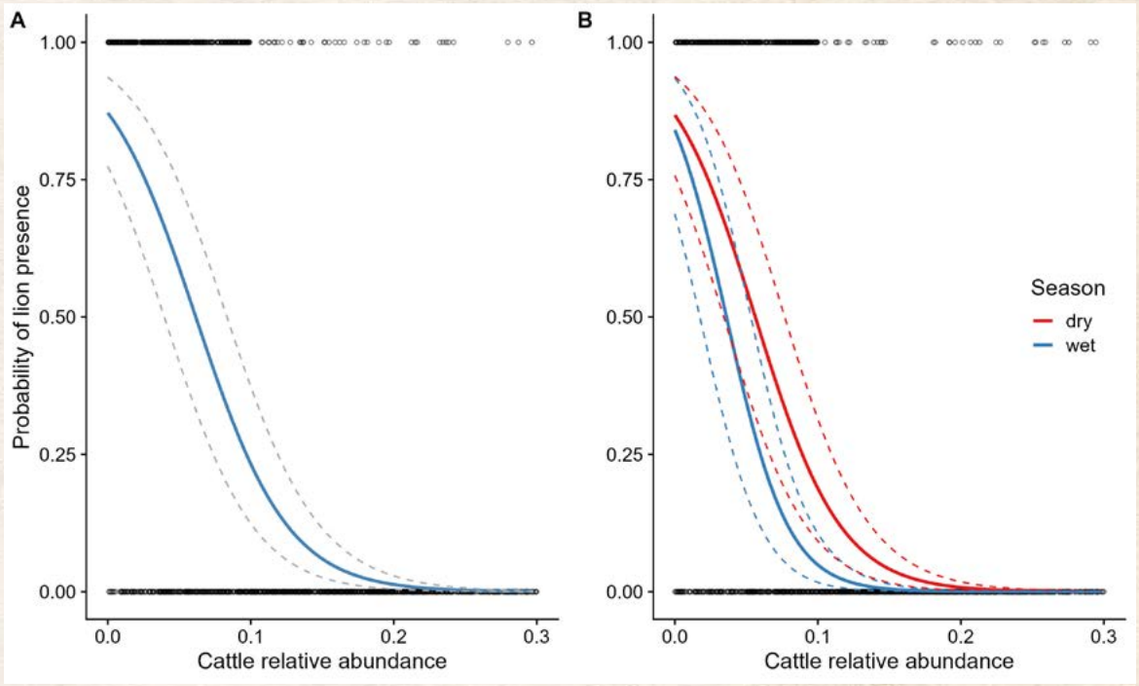
Study design and data collection

Between 2015 and 2023, MPCP conducted 13 systematic ground surveys across 904 one-kilometre grid cells in seven community conservancies of the Maasai Mara.

All sightings of lions, livestock, and other wildlife were recorded using the CyberTracker mobile app within a 100 m detection range, alongside driving effort data to control for sampling intensity.

Data were analysed using Bayesian spatial models (INLA) that accounted for spatial autocorrelation, variation in survey effort, and seasonal dynamics.

A sensitivity analysis restricted to days without livestock tested whether reduced lion observations reflected true avoidance or short-term concealment.



Key findings

1. Livestock presence strongly reduced lion occurrence.

• Cattle relative abundance was the strongest negative predictor of lion presence.

• Lions were far less likely to occur in grid cells with frequent or high cattle use.

2. Avoidance persisted even when cattle were absent.

• Lions continued to avoid areas that were regularly grazed, indicating long-term spatial avoidance rather than temporary hiding.

3. Other human pressures further reduced lion presence.

• Higher densities of bomas (homesteads) and sheep and goats suppressed lion occurrence.

• The combined footprint of livestock and settlements creates a "landscape of fear" for lions.

4. Environmental factors had weaker but consistent effects.

• Lions preferred riverine and wooded habitats and were less likely to occur in open areas or far from rivers.

• Lion presence was lower during the wet season, when livestock activity peaks and prey are more dispersed.

5. Lion abundance was not strongly linked to these pressures.

• While presence was clearly affected, abundance estimates showed weaker relationships, likely reflecting pride-level avoidance and social dynamics.

Implications

These results demonstrate that human activities, particularly livestock grazing, are reshaping lion distribution even within community conservancies where conservation is a core land use.

Although retaliatory killing is rare inside conservancies, lions avoid heavily grazed areas, effectively creating human-driven landscapes of fear.

This displacement concentrates lions into smaller refuges, potentially increasing competition, affecting reproduction, and raising conflict risks when prides move closer to settlement boundaries.

Recommendations

1. Implement spatial grazing management

• Limit livestock densities within core lion habitats, especially near rivers and woodlands.

• Enforce grazing boundaries and rotational systems to reduce prolonged pressure on key wildlife areas.

2. Protect and maintain lion refuges

• Safeguard riverine corridors and dense vegetation that serve as critical refuges for lions.

• Avoid bush clearance and maintain habitat heterogeneity within conservancies.

3. Strengthen coexistence planning

• Incorporate spatial data on lions and livestock into conservancy grazing plans.

• Support adaptive, evidence-based management to balance livestock productivity with wildlife persistence.

4. Continue long-term monitoring

• Sustain coordinated surveys to track changes in lion distribution, livestock density, and habitat use.

• Evaluate the demographic effects of displacement, including potential changes in pride stability and cub survival.

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