

MARA PREDATOR CONSERVATION PROGRAMME



MANAGEMENT | 2025
REPORT



CONTENTS

BACKGROUND	3
Study design and data collection	4
Key Findings	6
Recommendations	8

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THE IMPACT OF TOURIST CAMPS ON LION DENSITY IN THE MAASAI MARA

Background

Wildlife tourism is one of the most important sources of conservation funding in Kenya and remains essential for sustaining protected areas and supporting community livelihoods. Nowhere is this more evident than in the Maasai Mara, where tourism revenue underpins conservancy payments to landowners, conservation initiatives, and the protection of key wildlife habitats in the Masai Mara National Reserve and the surrounding conservancies.

However, rapid expansion of tourist accommodation and infrastructure can negatively influence wildlife, particularly large carnivores which are sensitive to disturbance. Lions are a flagship species for tourism in the Mara, yet little is known about how the growing concentrations of tourist camps affect lion populations and their spatial ecology.

This study used long-term monitoring of individually known lions combined with detailed mapping of camps to quantify how camp density shapes lion density, distribution, and potential displacement across the Maasai Mara ecosystem.



Study design and data collection

Between 2014 and 2022, the Mara Predator Conservation Programme conducted eight 3-month lion surveys during the dry season across **2,363 km²** of the Maasai Mara protected areas.

Methods included:

- Utilising existing lion density data
- Mapping all tourist camps and lodges, including establishment year and size within the National Reserve and the adjoining conservancies

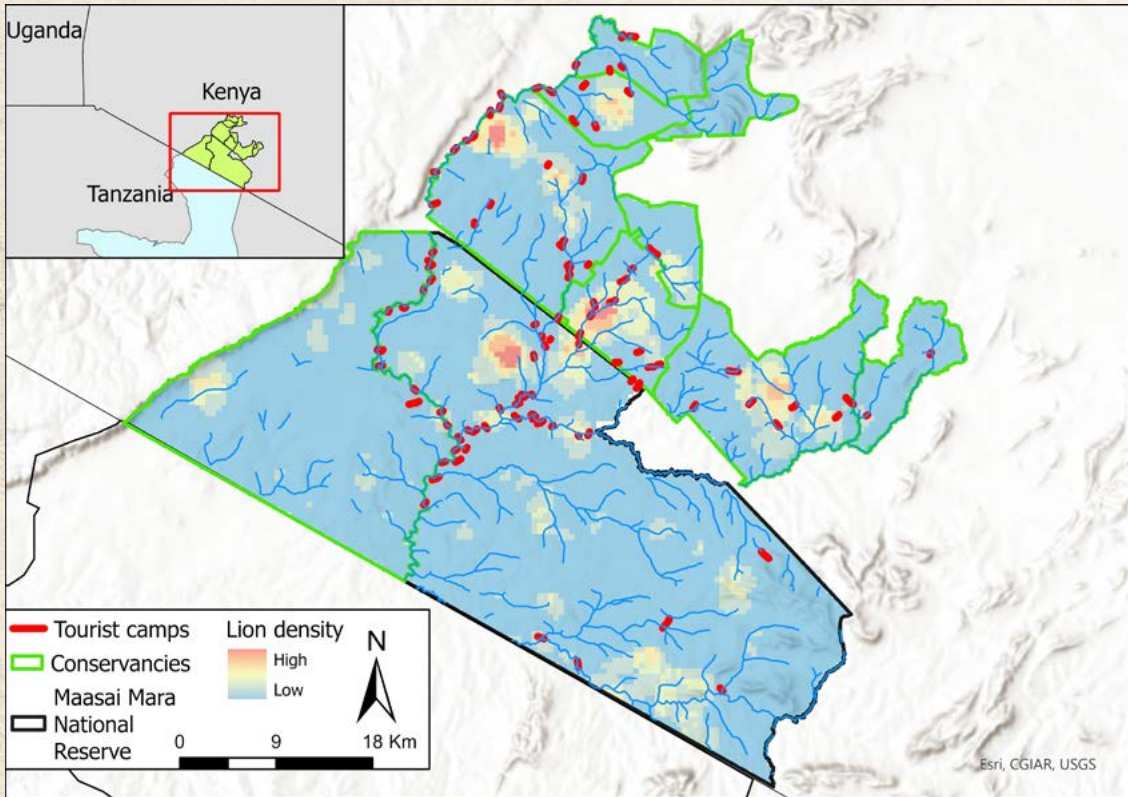


Figure 1. Accumulated lion density in the Maasai Mara for 2014-2022 shows distinct hotspots. Tourist camps (red) are mainly situated along the rivers (blue) and tend to be located away from, or on the periphery of lion hotspots

- estimating camp density using kernel density weighted by camp length

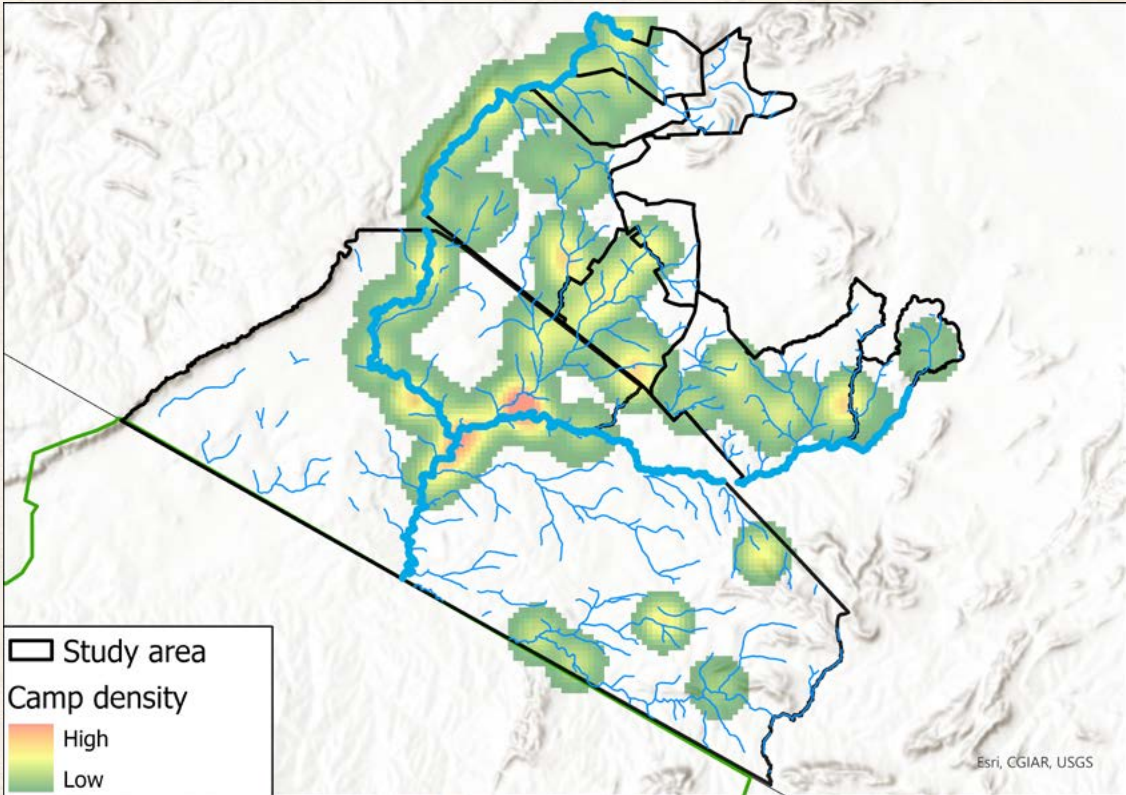


Figure 2. Estimated camp kernel density in 2022. The highest camp densities are concentrated along the major rivers, Mara and Talek (highlighted in bold blue).

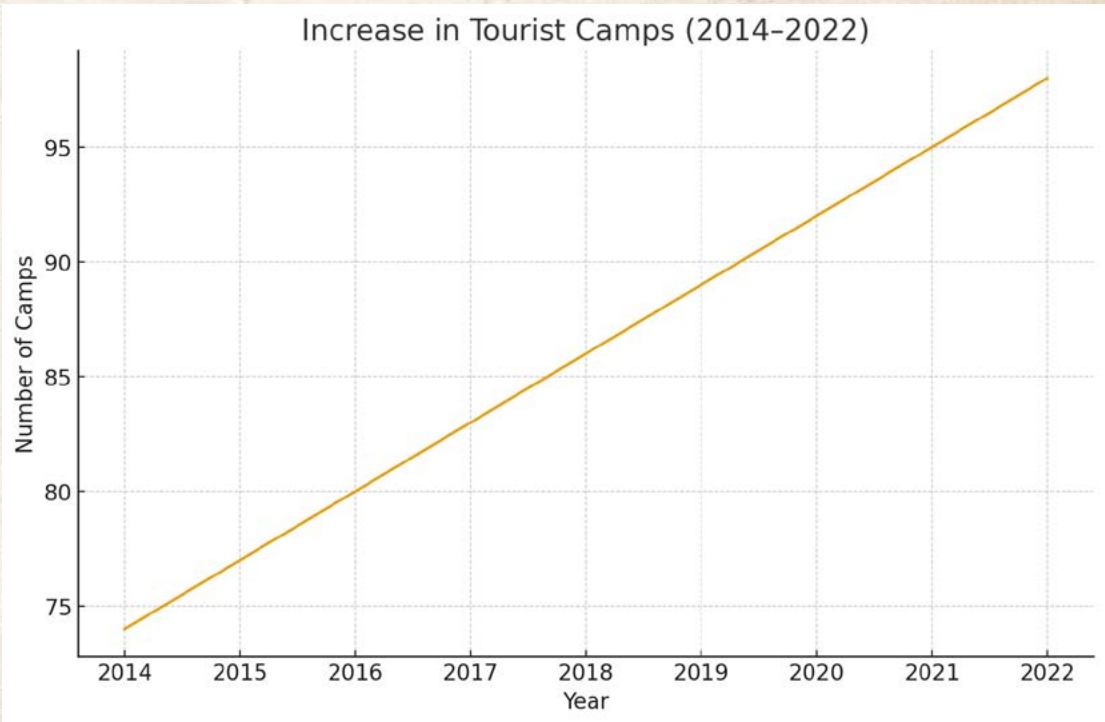


Figure 3. 98 camps were recorded in 2022, an increase of 32 percent since 2014.

We assessed:

- Maximum lion density under different camp densities
- Displacement effects immediately after new camps were established
- Relationships with vegetation and river proximity

Key findings

1. Lion density was substantially lower in areas with high camp density.

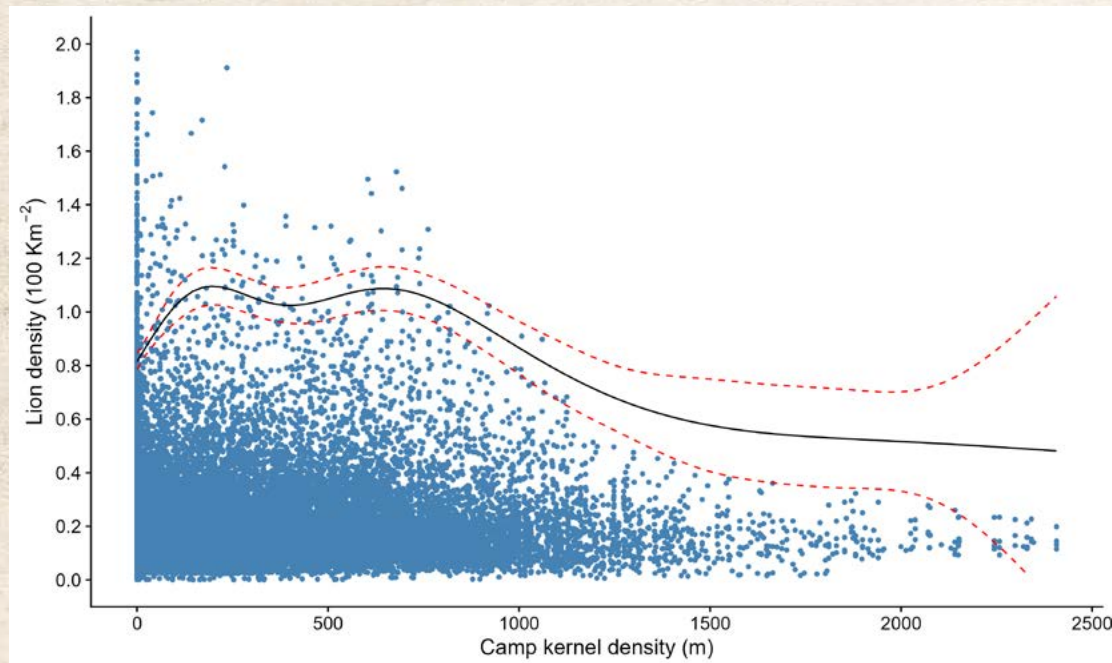


Figure 4. Maximum lion density declined steeply with increasing camp density.

These effects were independent of:

- Prey availability
- Vegetation cover
- Or proximity to rivers

2. Camps impose strong spatial limits on lion carrying capacity.

Areas without camps supported the highest lion densities.

Above a threshold of approximately **700 metres in kernel-density equivalent (700 metres camp length per 0.25 km² grid cell)**, lion density declined sharply.

3. New camps displaced lions almost immediately.

When new camps were added:

- Lion density decreased in the same grid cells the following year

This indicates direct displacement effects.

4. Highest density camp clusters create high-impact exclusion zones

Large clusters of camps generate persistent human-dominated zones that lions avoid, effectively reducing usable lion habitat inside protected areas.

5. Displacement increases competition and potential demographic impacts

As lions move out of camp-dense areas, they compress into remaining habitat, potentially increasing:

- Intraspecific competition
- Territorial overlap
- Cub mortality risk
- Conflict at the edges of protected areas

Implications

Tourist camps deliver crucial conservation benefits by providing revenue, employment, and incentives for protecting wildlife. Nevertheless, at high densities, camps are a significant conservation pressure for lions.

Impacts include:

- Lost carrying capacity in core habitats
- Displacement into lower-quality areas
- Greater competition among prides
- Increased risk outside protected areas

Persistent high-density camp zones may reduce long-term viability of lions in the Greater Mara Ecosystem, even though tourism aims to protect them.

Recommendations

1. Limit high-density camp clusters

- Prevent new camps in areas already above the 700m kernel-density threshold
- Avoid large agglomerations of camps and infrastructure
- Prioritise strategic placement to avoid further concentration

2. Spread tourism activity across the landscape in accordance with the Masai Mara National Reserve and the Narok County Spatial Plan

- Encourage distribution of activities between protected units
- Support alternative areas with suitable habitat but low visitation
- Diversify tourism benefits across communities

3. Apply spatial planning tools to guide camp approvals

- Use kernel-density predictive modeling to assess proposed camp impacts before licensing
- Incorporate camp footprint, size, and proximity to river habitat during the planning phase
- Require evidence-based position linked to wildlife sensitivity

4. Maintain camp-free lion refuges

- Protect key lion territories without commercial accommodation
- Retain wilderness zones that maintain natural pride structure and demography as described in the ecosystem and National Reserve management plans.

5. Integrate tourism planning into lion conservation strategies

- Management plans should explicitly address tourism impacts on lions
- Camp placement should align with lion (and other sensitive wildlife) ecology, not only tourism opportunity.

Conclusion

Tourism remains central to funding conservation, livelihoods, and community benefits across the Mara. This study demonstrates that high densities of tourist camps can undermine those same conservation goals by lowering lion density and reducing effective habitat even inside protected areas.

A more strategic, lower-density, and better distributed tourism model will:

- Preserve lion populations,
- Maintain ecological integrity,
- And ensure long-term sustainability of both tourism and conservation investments.

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