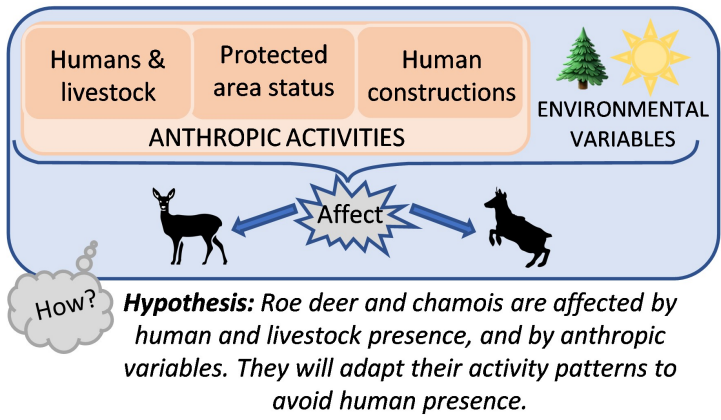


Effect of anthropic pressure on large mammals in the Pyrenees: an occupancy model approach with *Capreolus capreolus* and *Rupycapra pyrenaica*.

Inés de la Cueva¹, Marta Prat², Mariona Ferrandiz ^{1,3}, Bernat Claramunt-López ^{1,3}
¹ CREAM, ² WildLandscapes International , ³ BABVE-Universidad Autónoma de Barcelona

INTRODUCTION

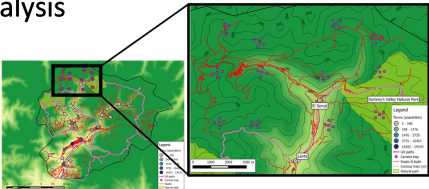
- Conservation strategies must take into account the effect of anthropic activities
- Mountains are biological hotspots and socially and culturally diverse areas
- Large herbivores maintain grassland plant diversity and are keystone species of the alpine ecosystem



METHODS

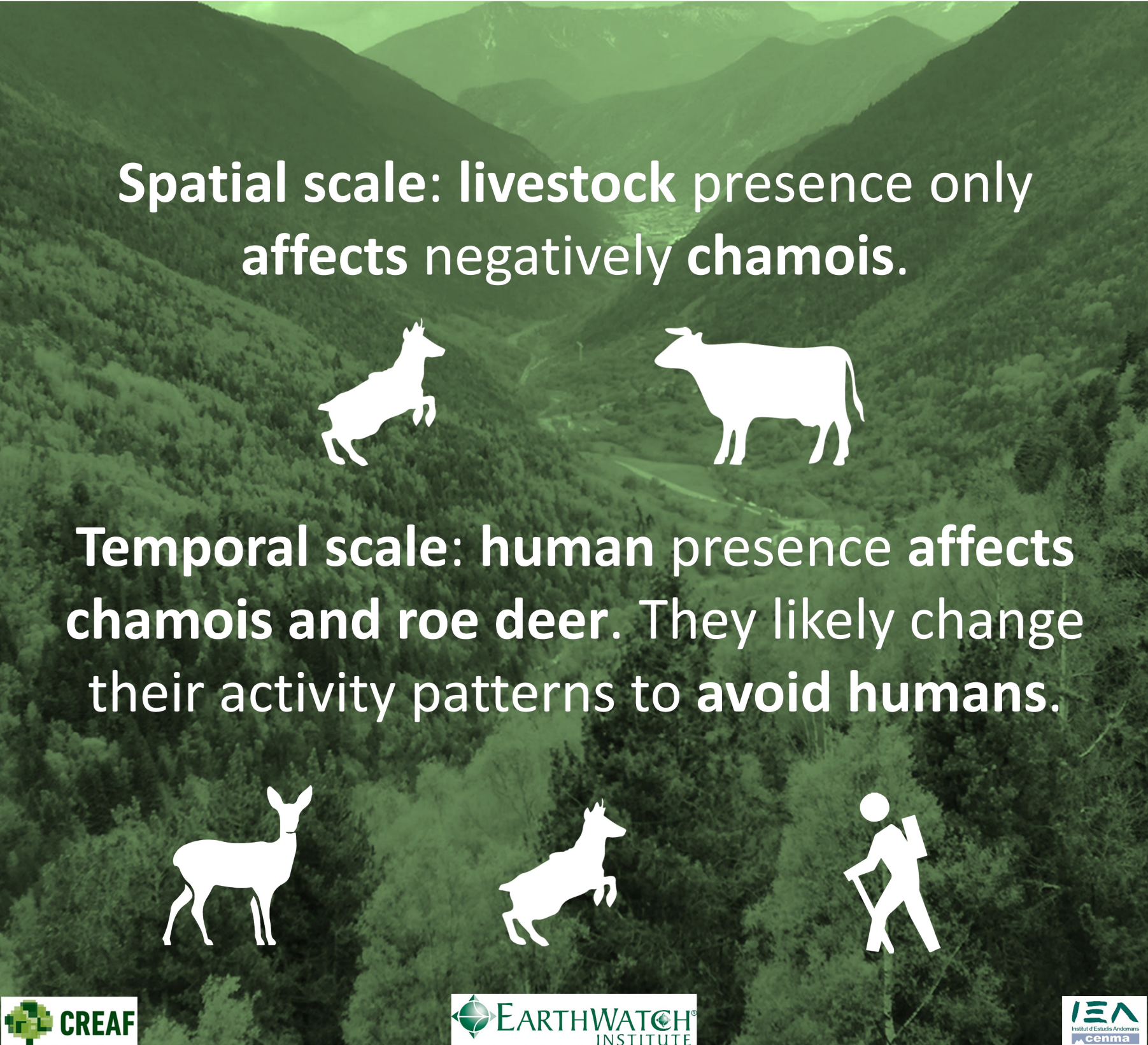
- Ordino Valley (Andorra, Pyrenees): pine and birch forest
- Small and medium size mammals
- Free ranging livestock in summer
- Natural Park + roads & trails
- 60 camera traps in 12 stations from 1659 to 2506 m.a.s.l.
- 6 seasons of 30 days from May to November 2016 & 2017
- Single species multi-season models with 24h survey periods
- Evaluating the effect of site and survey covariates (Table 1)
- Activity pattern analysis

Map of the study area, showing the nearest towns, main roads, mountain trails, GR paths, the Natural Park and the position of the camera traps.



ANTHROPIC	ENVIRONMENTAL	METEOROLOGIC
Distance to nearest main roads and mountain trails (m)	Habitat type (pasture, rocky area or forest)	Daily minimum temperature (°C)
Distance to nearest population (m)	Orientation (°)	Daily maximum temperature (°C)
Distance to nearest GR footpath (m)	Elevation (m)	Daily average temperature (°C)
Natural Park	Slope (°)	Daily accumulated rainfall (l/m²)
Human presence (%)	Site covariates	Survey covariates
Domestic animal presence (%)	Season covariates	

Table 1. Table with the variables tested in the statistical analysis



RESULTS

Roe deer:

- Spatially not anthropic effect
- Colonisation towards lower elevations
- Less pictures taken by the cameras in pastoral habitats and higher elevations
- No overlap with humans' activity (Fig.2.A)

Chamois:

- Positive impact of livestock on extinction and detection
- Average occupancy decrease in summer and increase in autumn (more evident in 2016) (Fig.1.A)
- Average decrease in detection from spring to autumn (more evident in 2017) (Fig.1.B)
- No overlap with humans' activity (Fig.2.B)

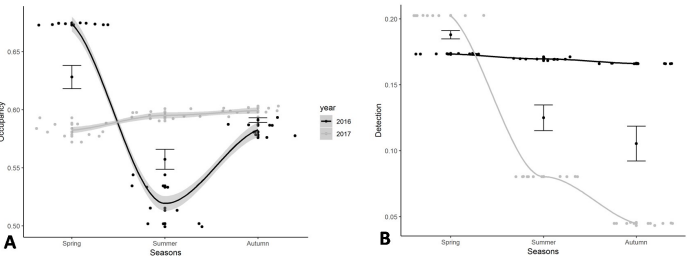


Fig. 1. A. Occupancy and **B.** detection of chamois in the three seasons of 2016 and 2017. The errorbars represent the average occupancy between the two years.

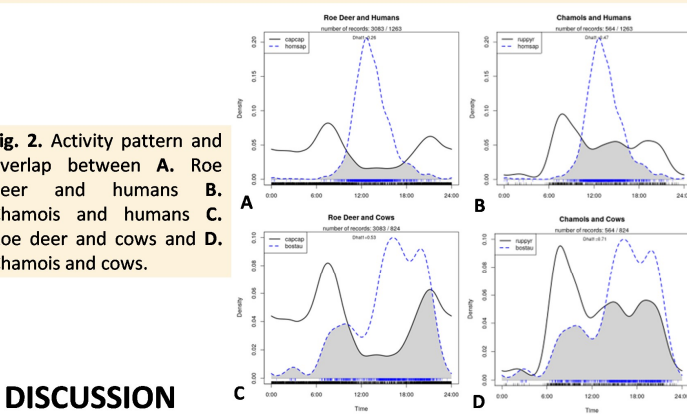


Fig. 2. Activity pattern and overlap between **A.** Roe deer and humans **B.** Chamois and humans **C.** Roe deer and cows and **D.** Chamois and cows.

DISCUSSION

- Low level of human activity + forested areas + behavioural plasticity = no human presence effect
- Differentiated feeding strategies = no livestock impact
- In summer leaves study area to feed in grasslands or to avoid cattle
- Snowfall in spring = stays in study area. Increased primary production = remains in grasslands
- Avoid time when human presence is higher