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Paris Orly 20-22 November 2024

Monitoring of the breeding population of yellow-legged gull using GPS and its influence on operations at Barcelona Airport

Albert Cama, Ferran Navàs, Carme Rosell

acama@minuartia.com
www.minuartia.com

The yellow-legged gull (*Larus michahellis*)

J.T. Barcelona-El Prat Airport

The yellow-legged gull is considered one of the species with the highest collision risk.

Increase in breeding population near the airport.

Aim of the sudy

- **To understand the way of life of seagulls through the use of GPS transmitters to generate tools for operational safety management:**
  - Know the main resources that sustain them (what allows them to maintain a large population in the area?)
  - Identify the risk trajectories they carry out (which movements of this population generate risks for the operation?)

2020: the beginning

Search for nests on rooftops.

Incidence of COVID-19.

2020: the beginning

Practice on harnesses deployment.

Crucial to prevent damage to animals and data loss.

Four specimens housed in the facilities of the WCS were used.

2020: the beginning

... also chicks still in the nest.

2020: the beginning

No GPS were installed.

Three chicks were ringed in a nest, which travelled up to 77 km away

2021: captures and equipment with GPS

Six breeding individuals were tagged with GPS in four nests.

Catches should be made before hatching.

Four individuals were captured and tagged with GPS feeding at neighbor rubbish facility.

2021: captures and equipment with GPS

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2021: captures and equipment with GPS

And after all this work, the first results started to arrive!

Results: data collected 2021

265,754 locations between May and December 2021.

Data every 5 minutes including:

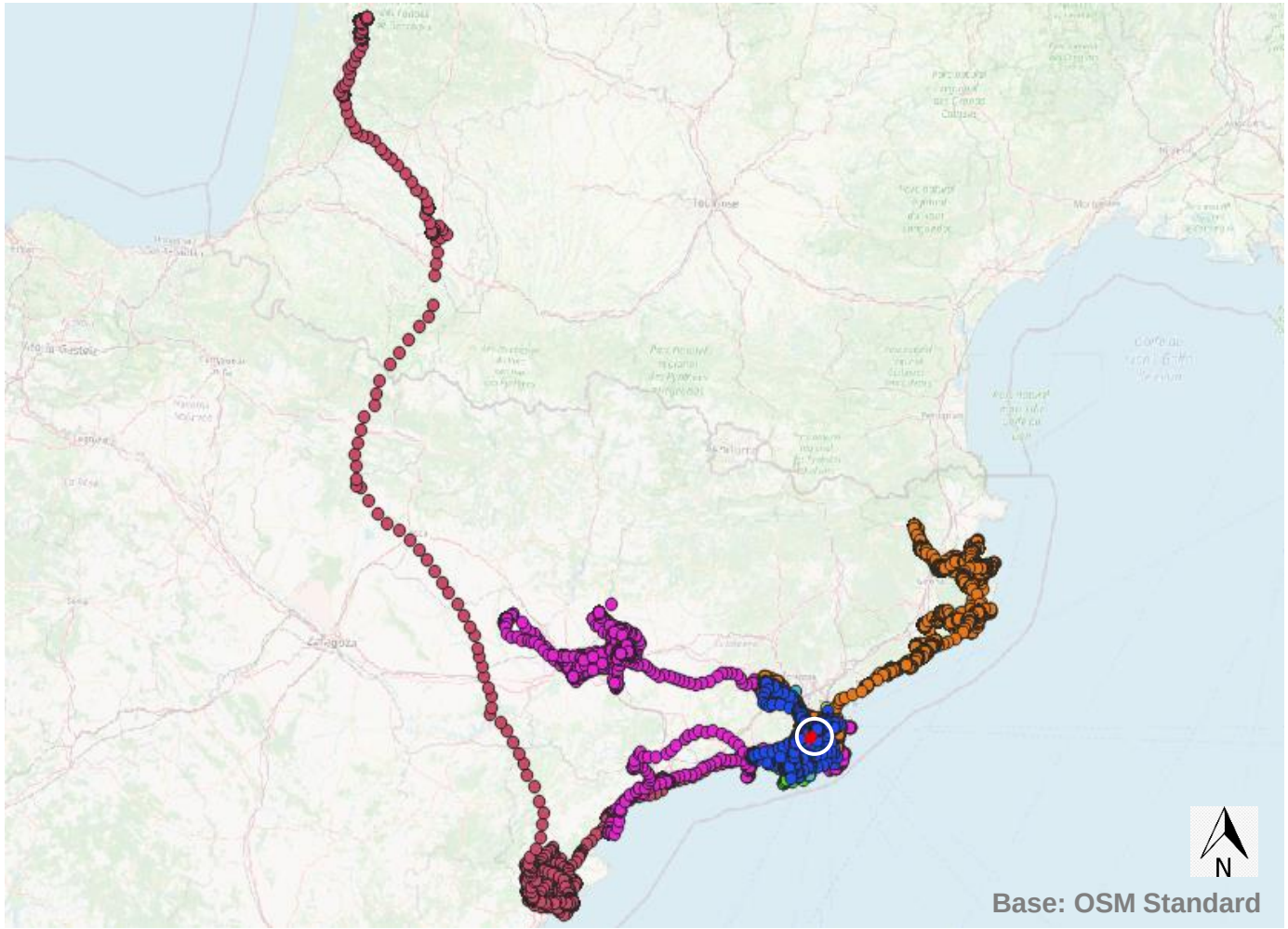
. Location

. Speed

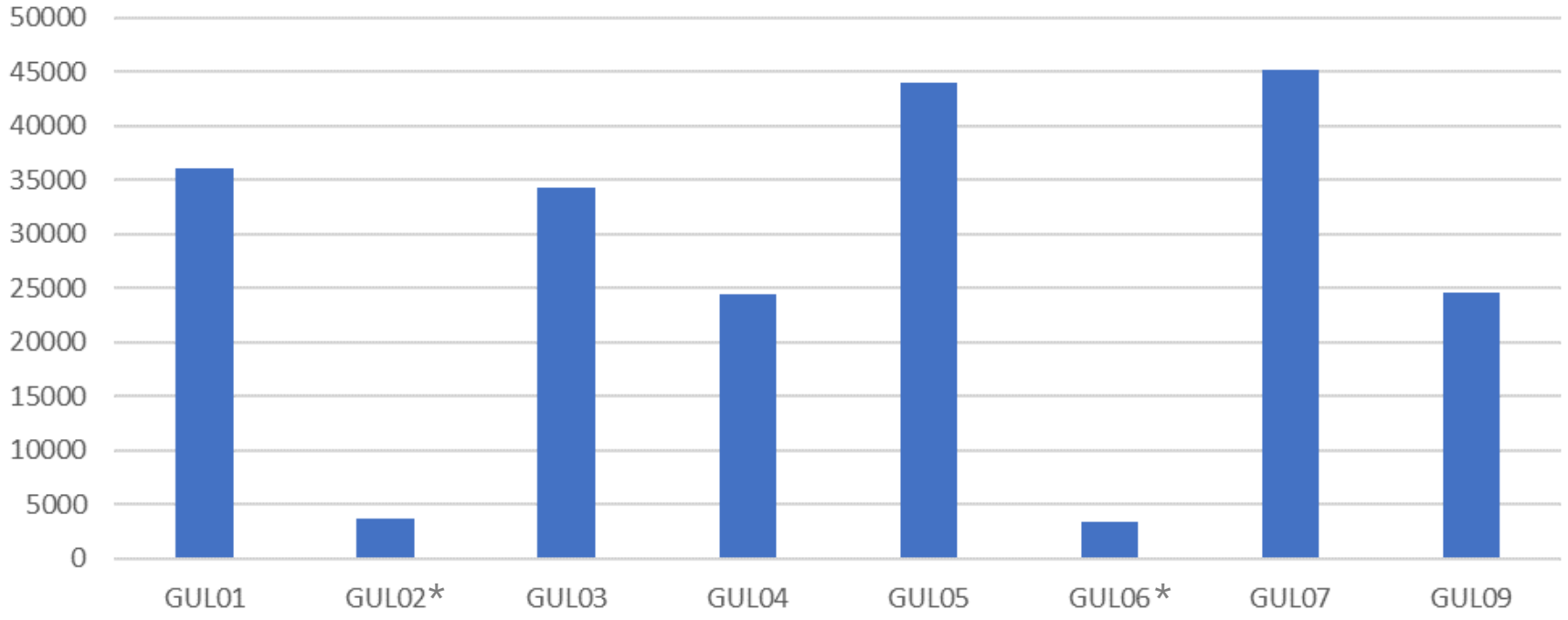
. Flight height

8 operating GPS.

Continuous because of solar panels.



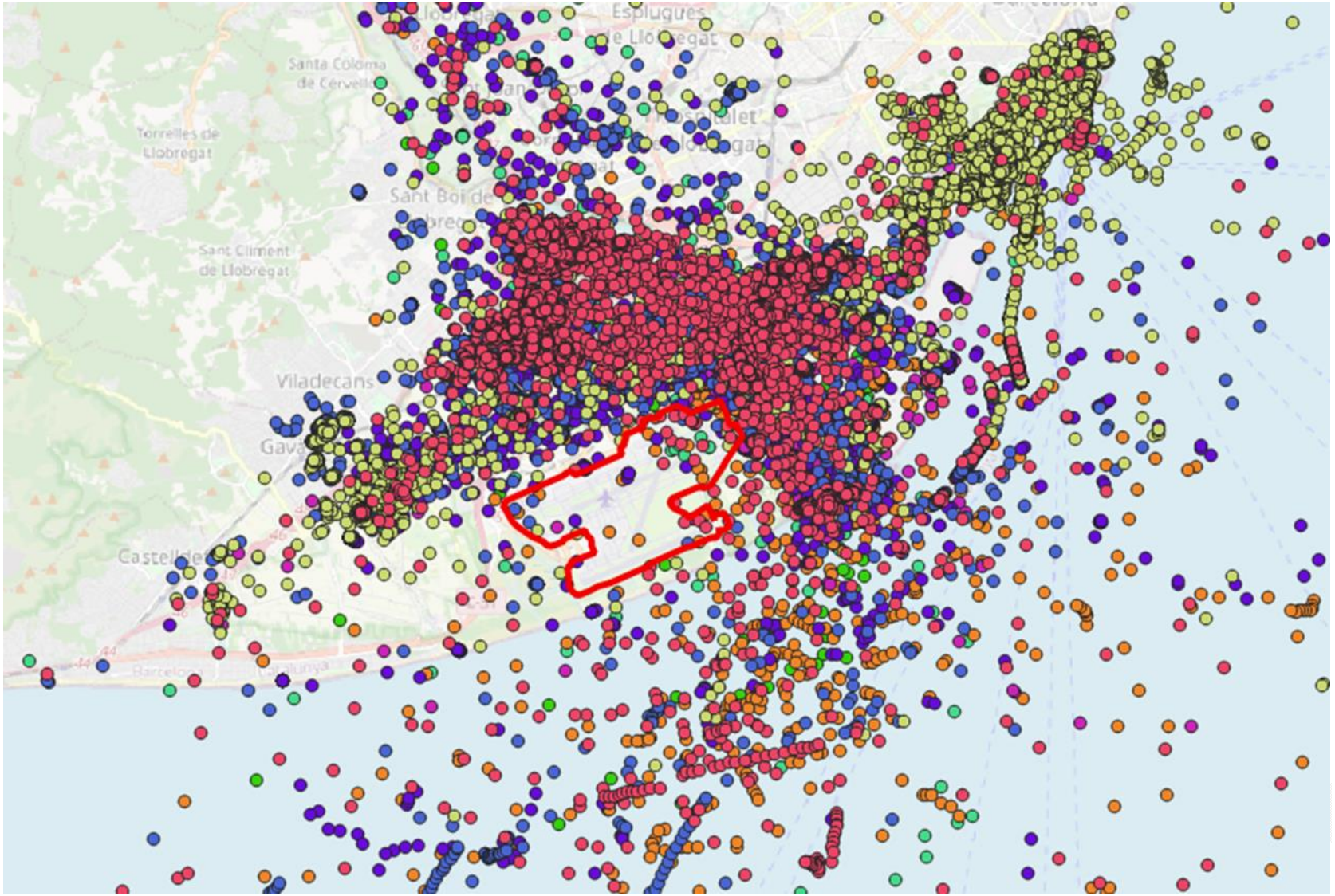
Number of locations by individual



* Accidental death

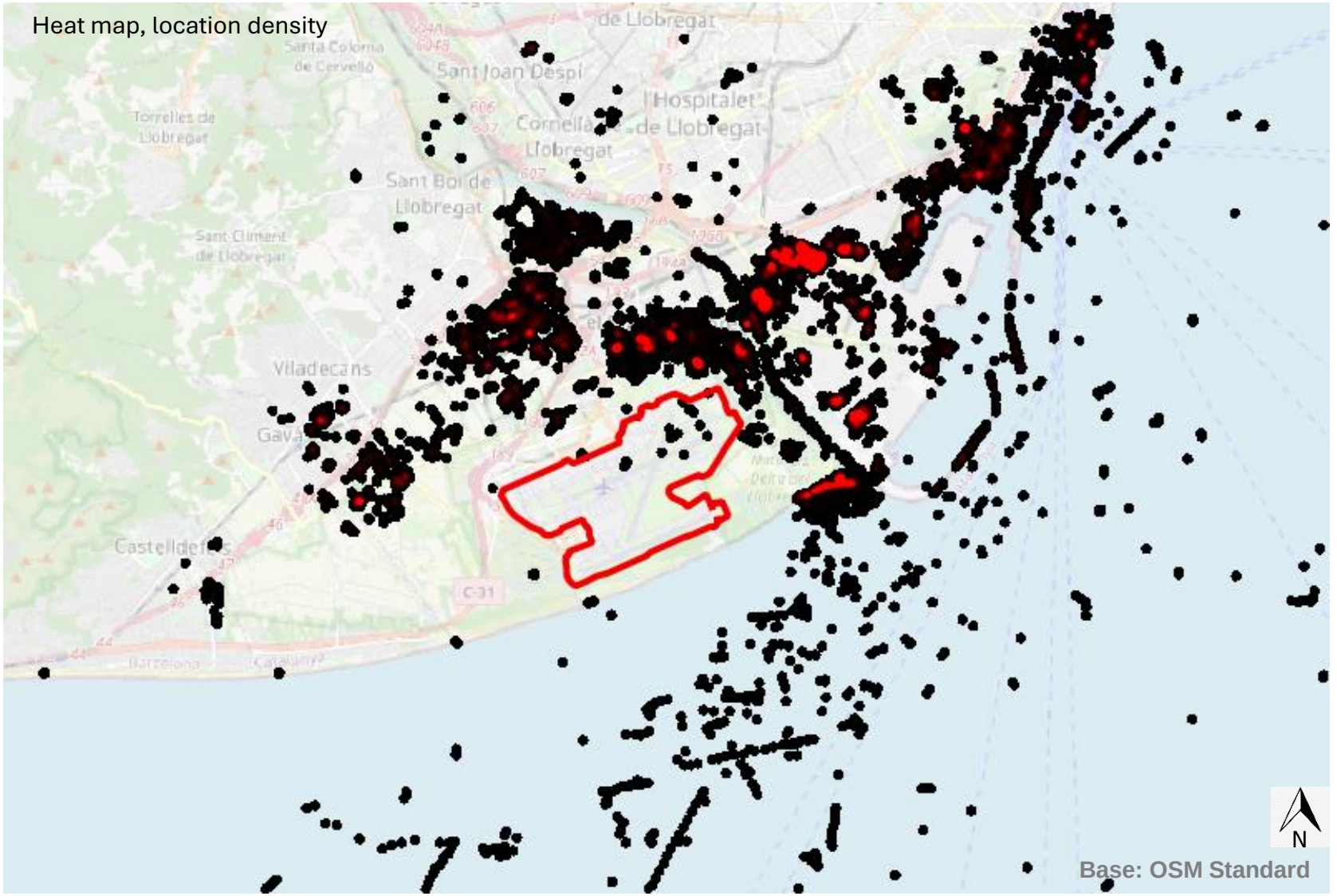
Locations in the study area

218,079 locations



Roosting and feeding areas

Speed < 5 km/h



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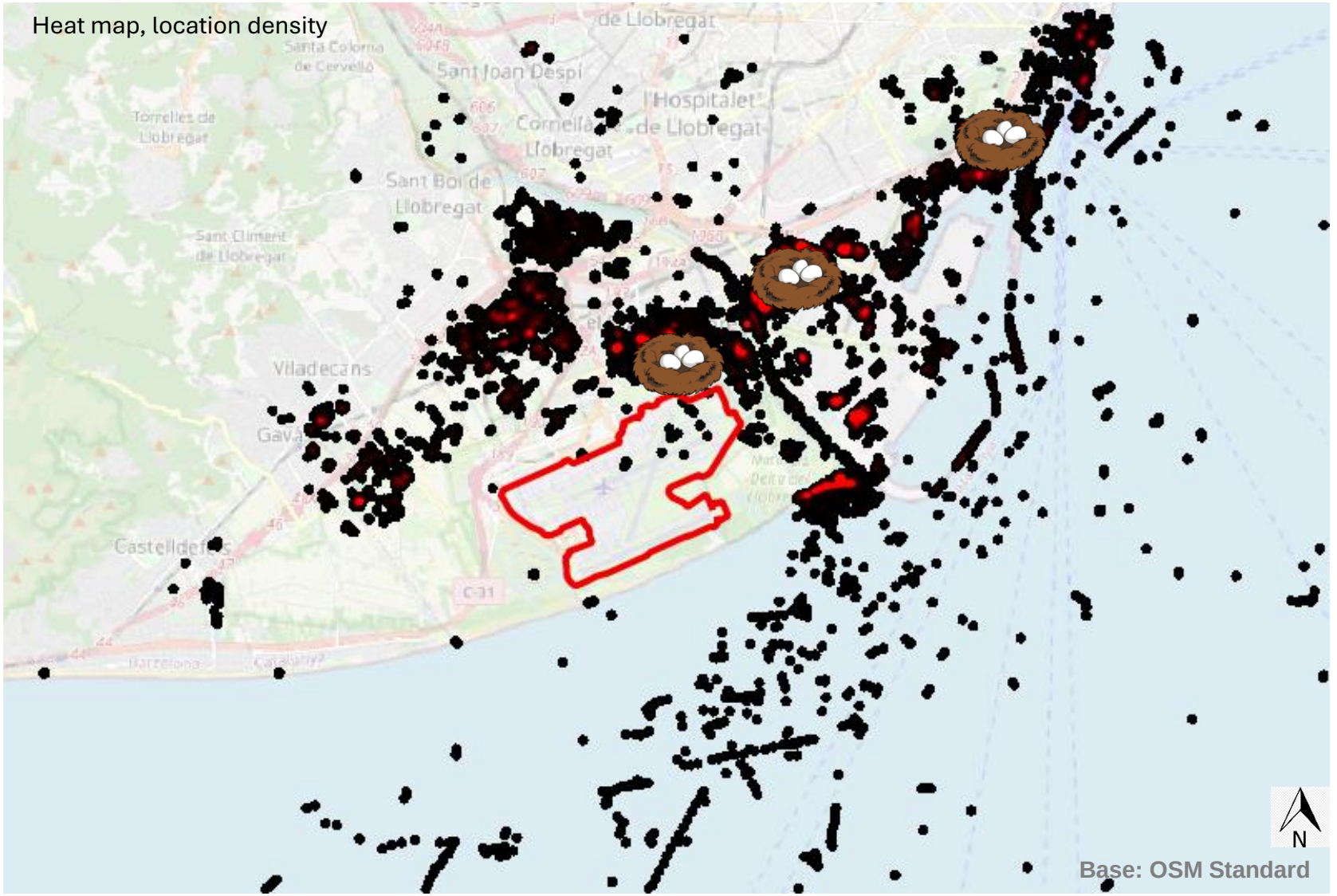
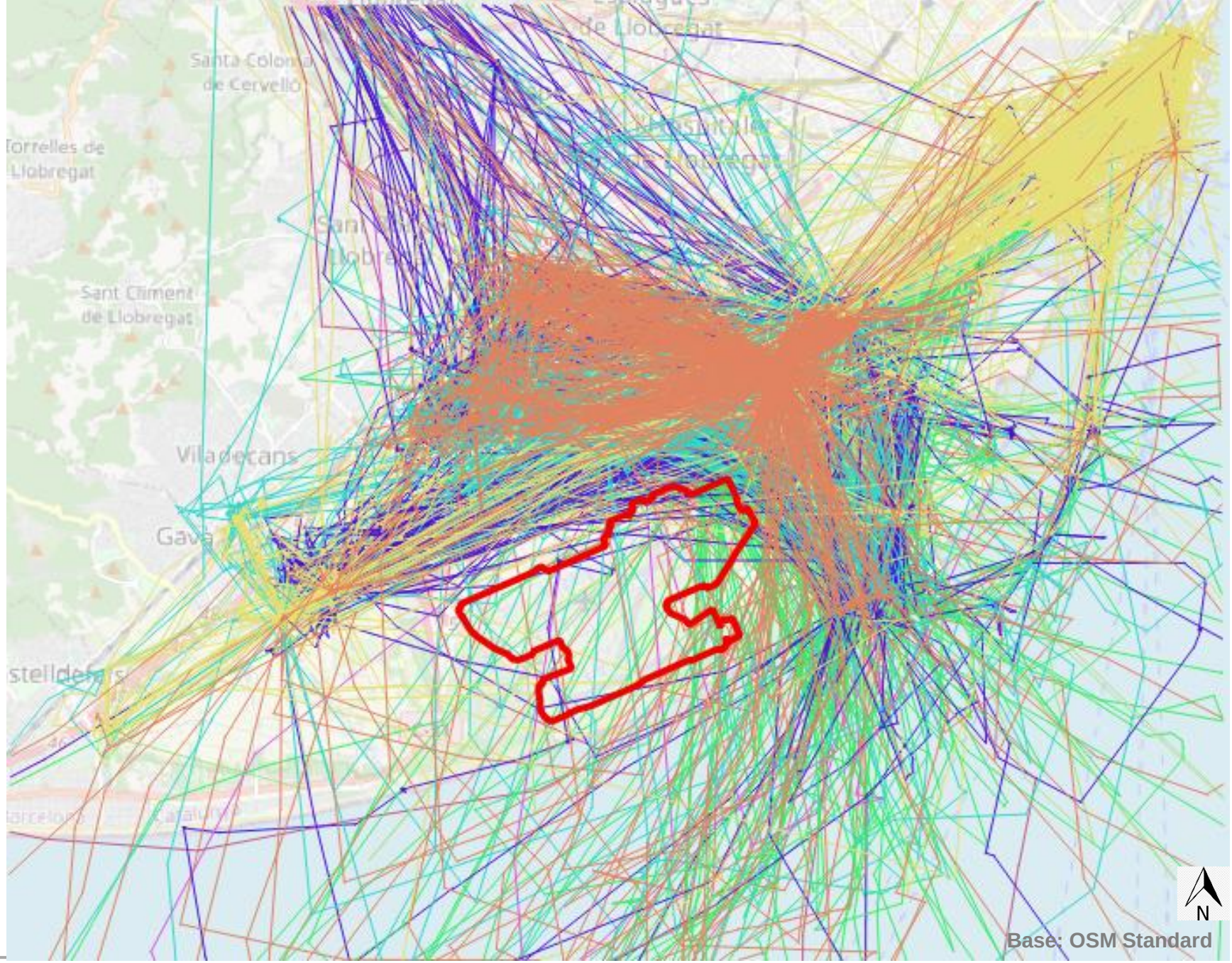


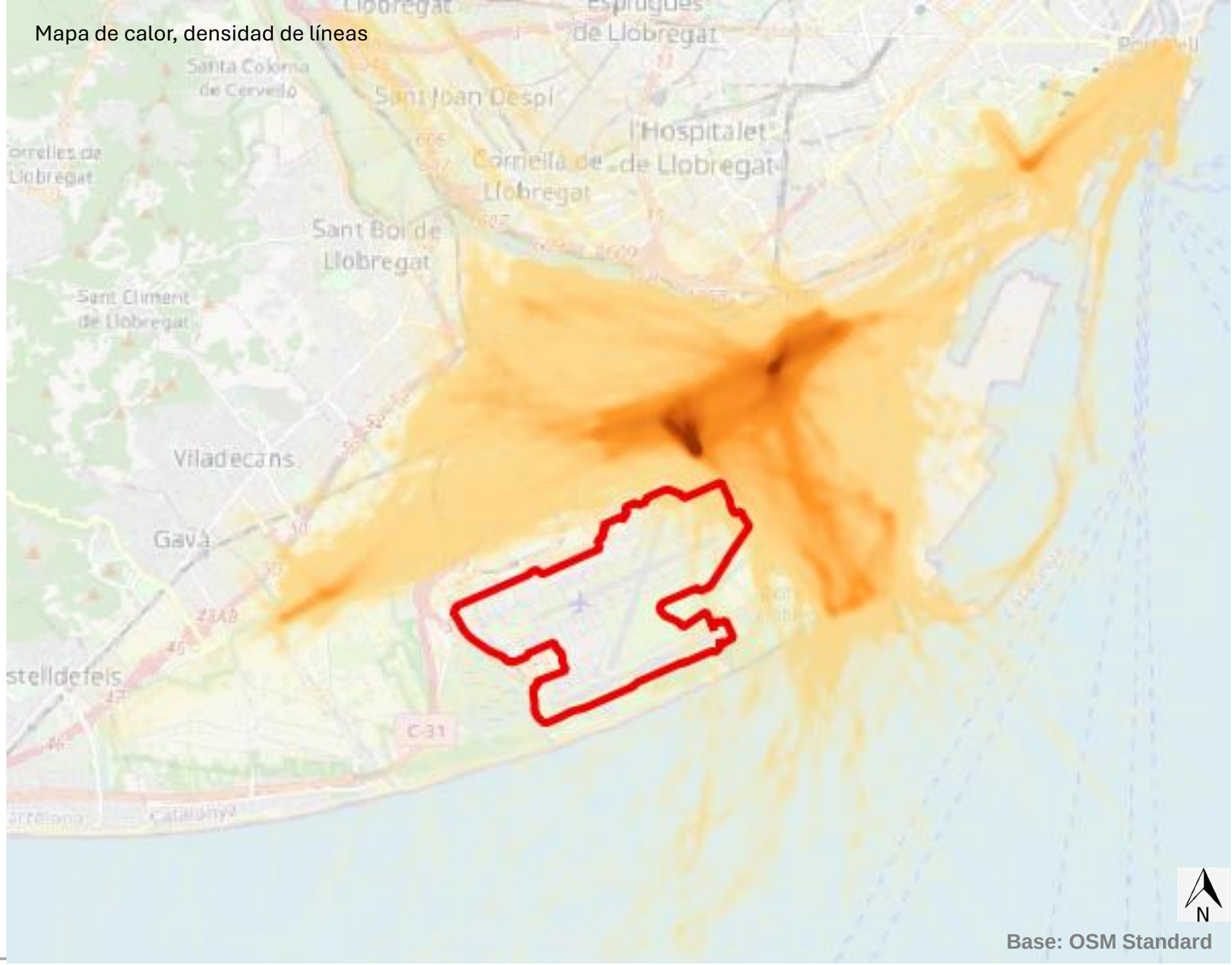
Trajectories

215,686 Trajectories between points



Preferential passage areas

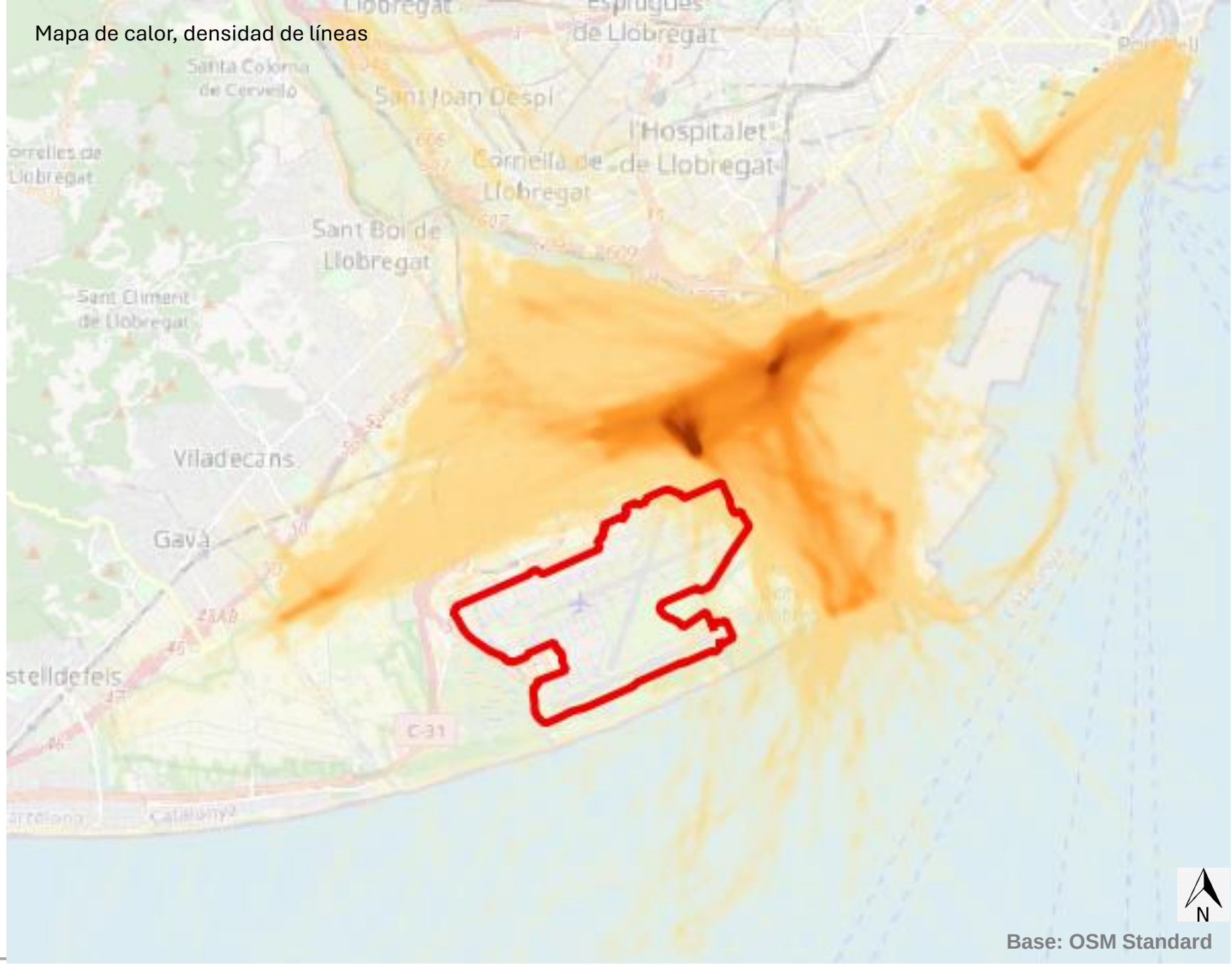
Speed > 5 km/h



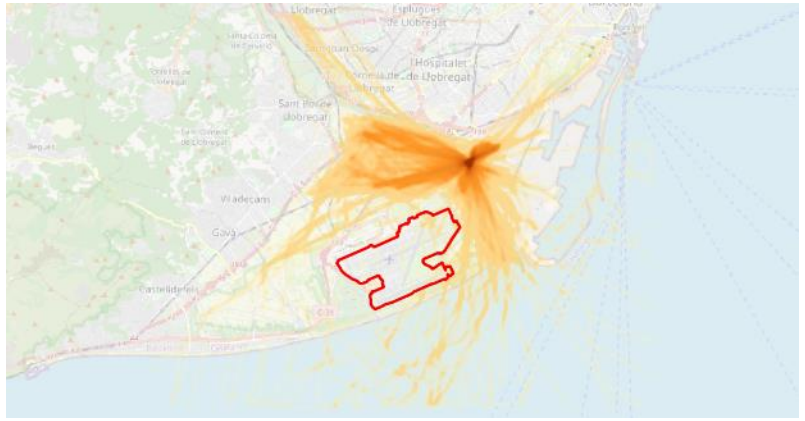
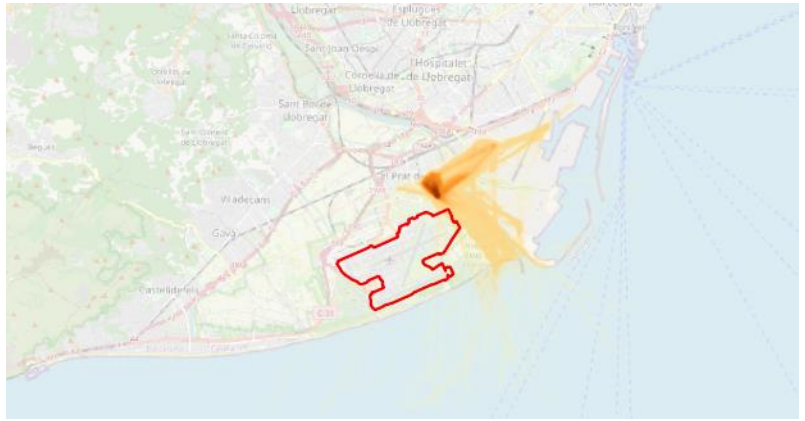
Preferential passage areas

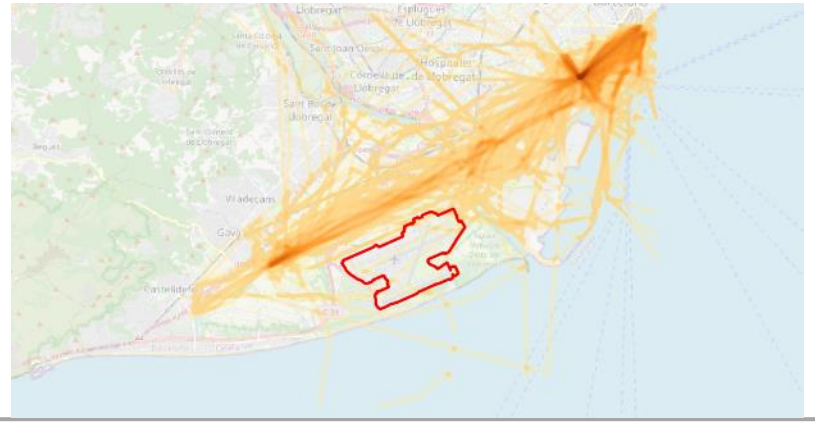
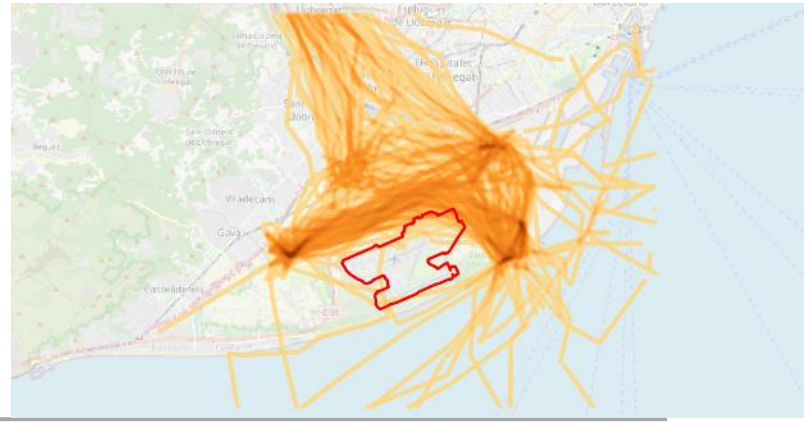
Speed > 5 km/h

WCS work is very successful!

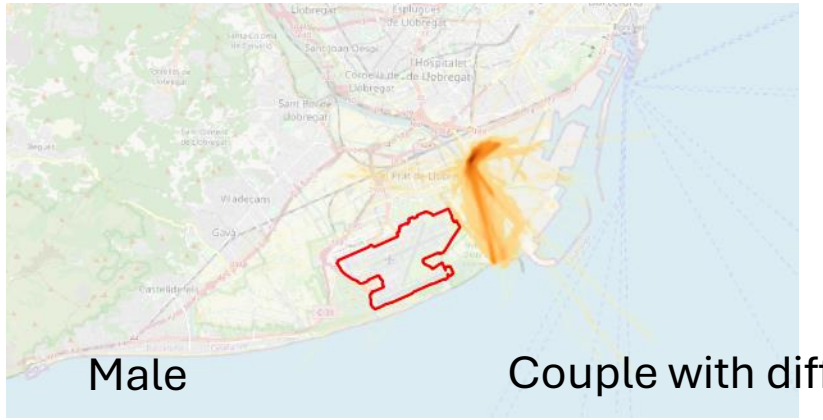


Individual differences

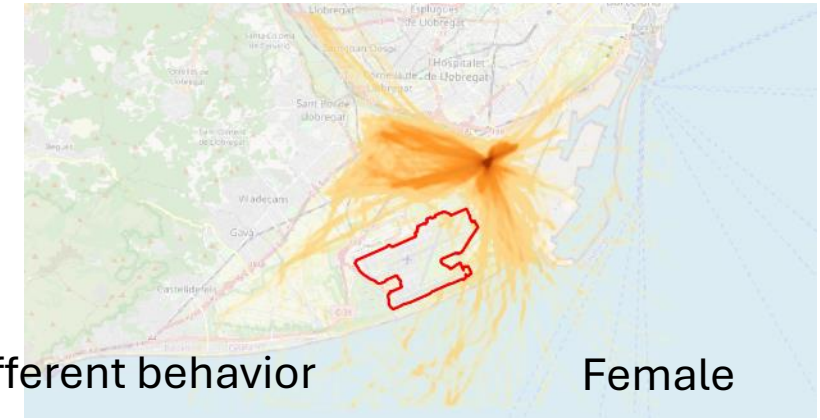




Individual differences



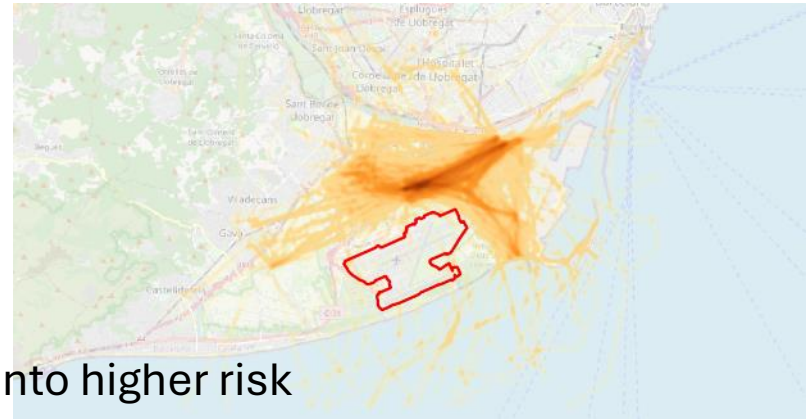
Male

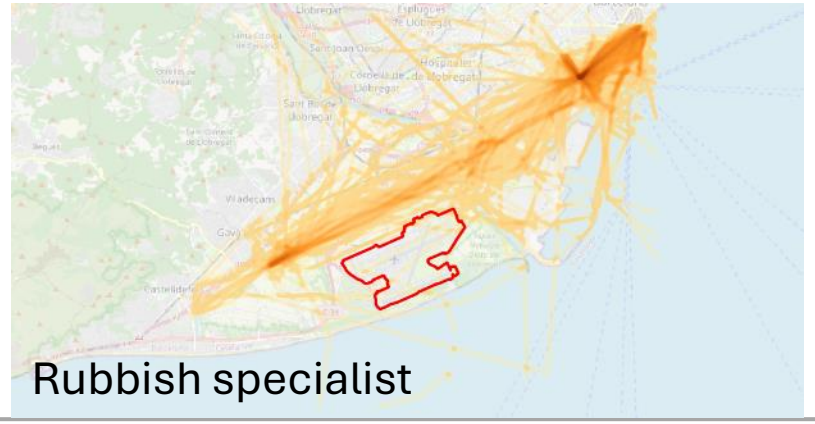


Couple with different behavior

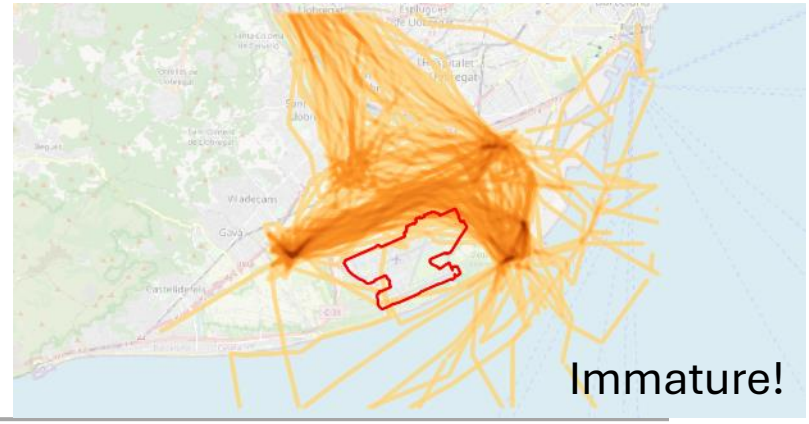
Female

The most marine, the ones getting into higher risk





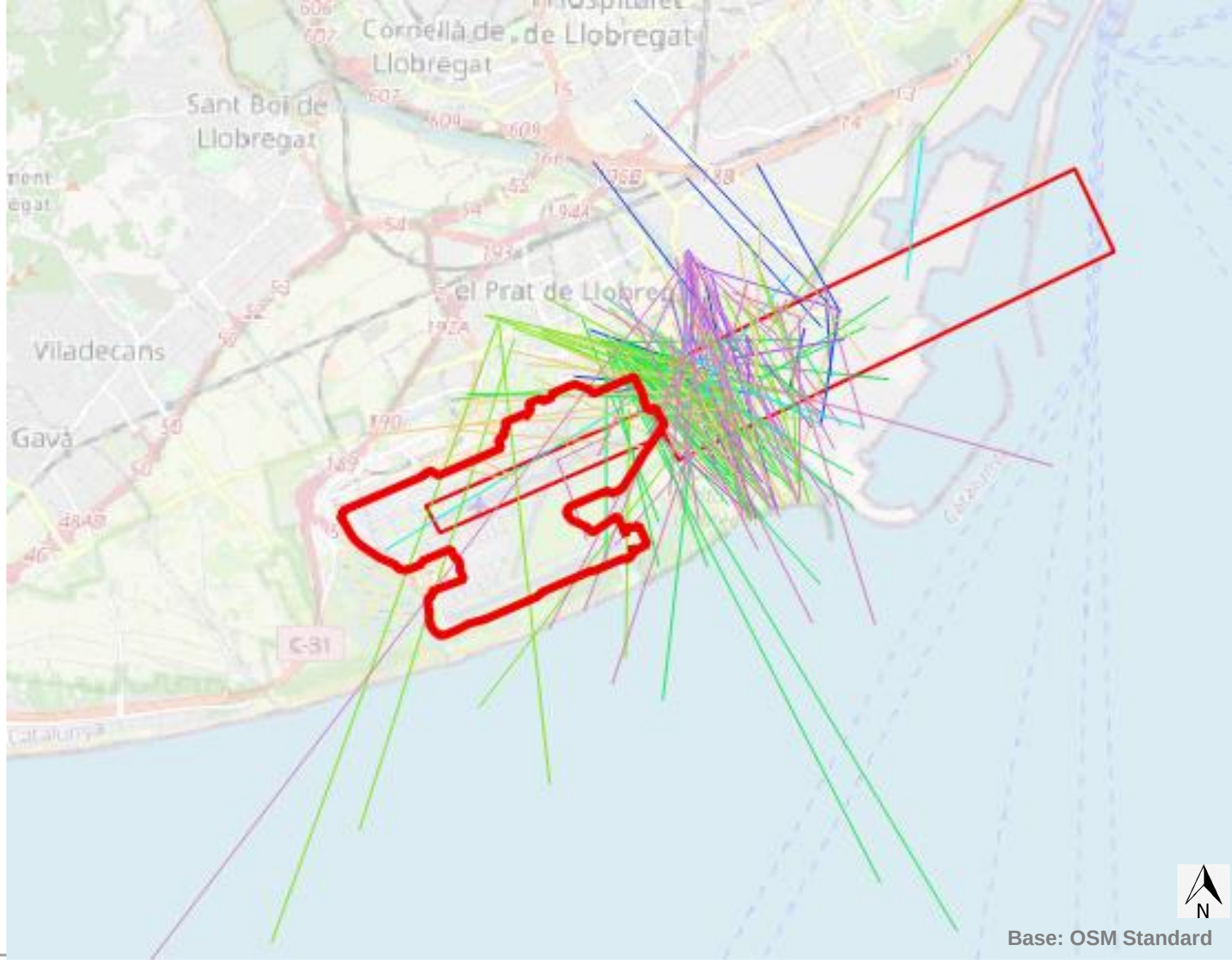
Rubbish specialist



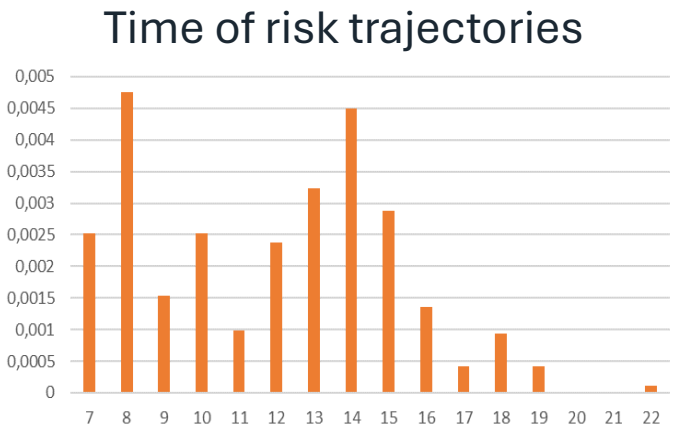
Immature!

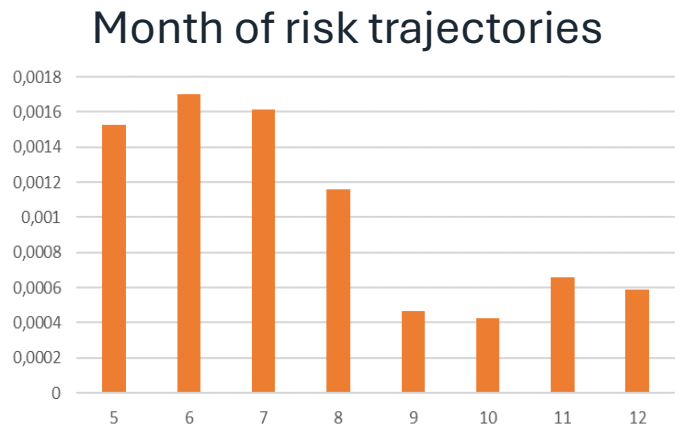
Crossing of risk areas

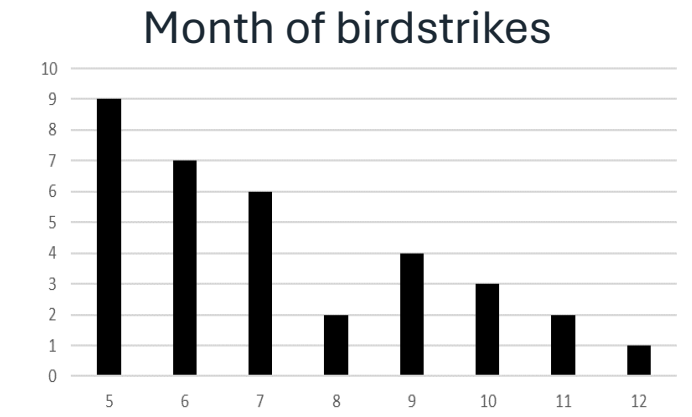
0.1% of the movements (250 trajectories) cross the approach or runway 24R at risky heights.

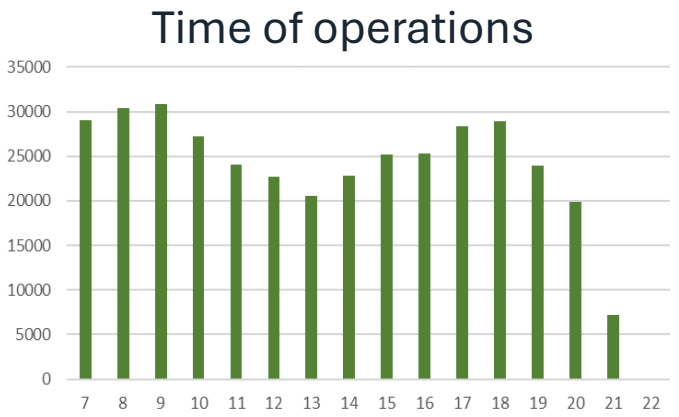


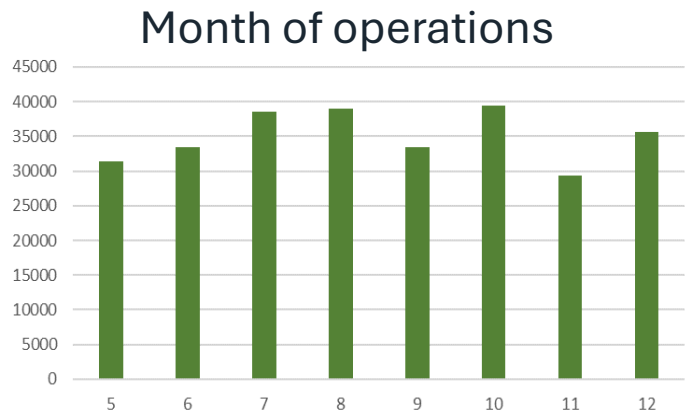
Characterization of risk trajectories





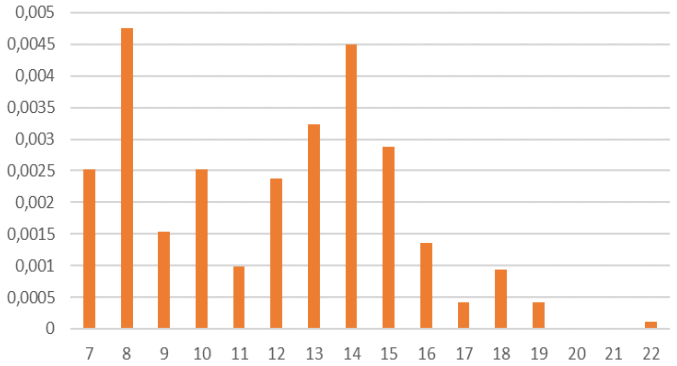




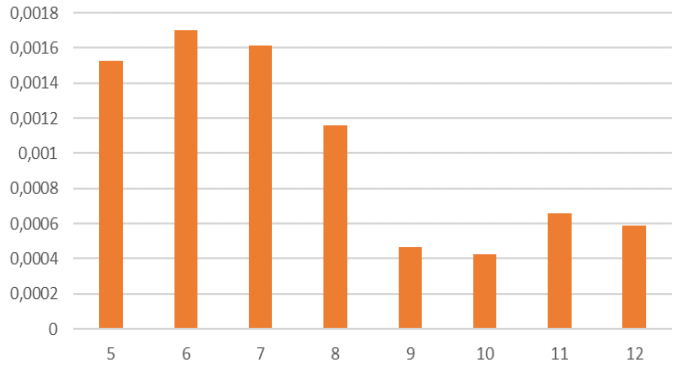


Characterization of risk trajectories

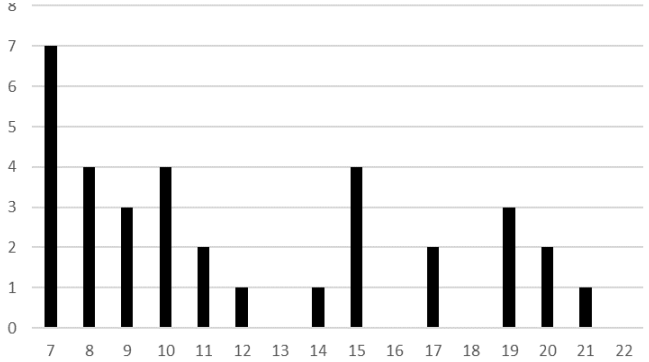
Time of risk trajectories



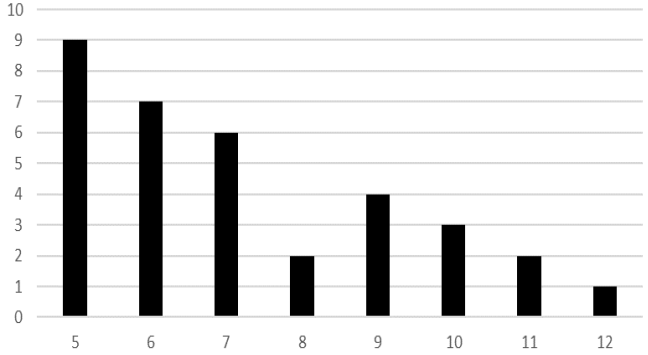
Month of risk trajectories



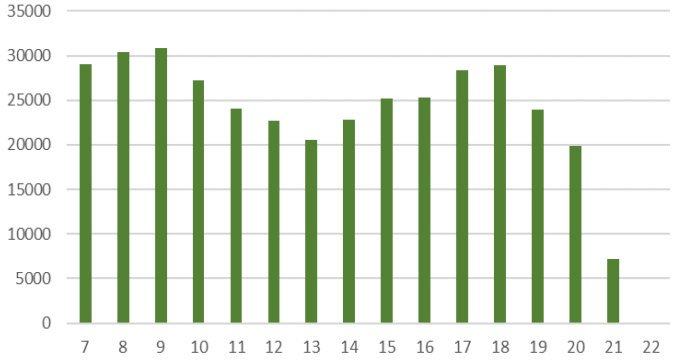
Time of birdstrikes



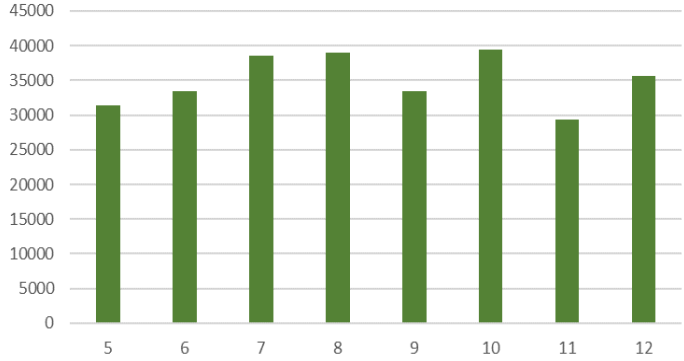
Month of birdstrikes



Time of operations



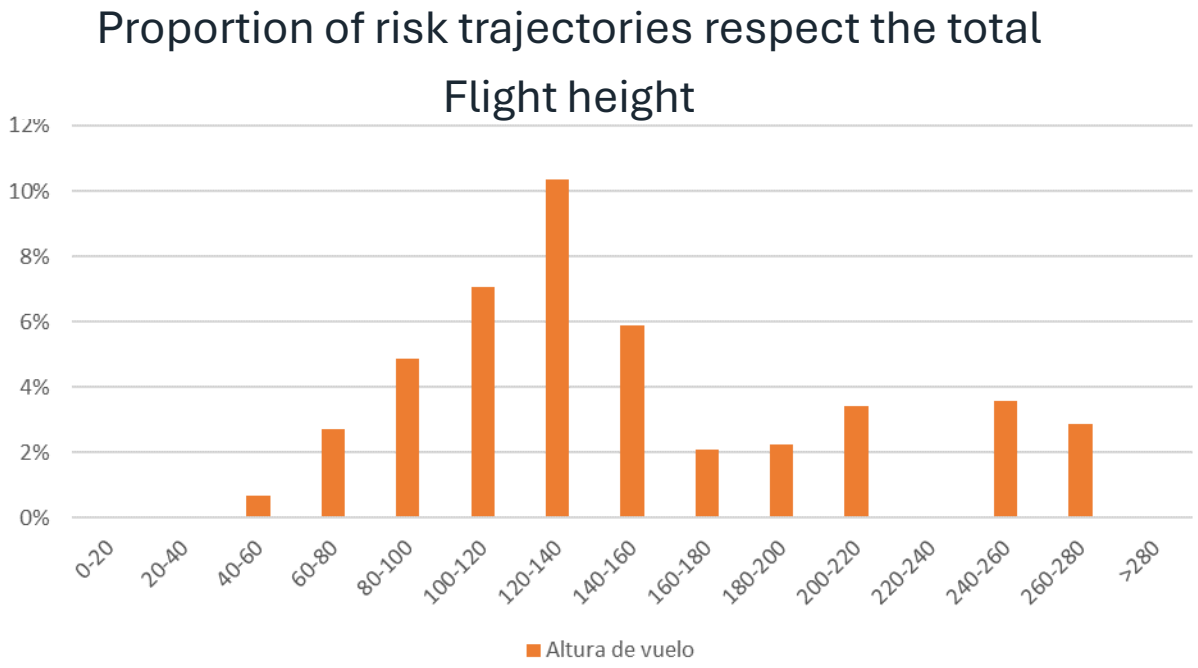
Month of operations



Characterization of risk trajectories

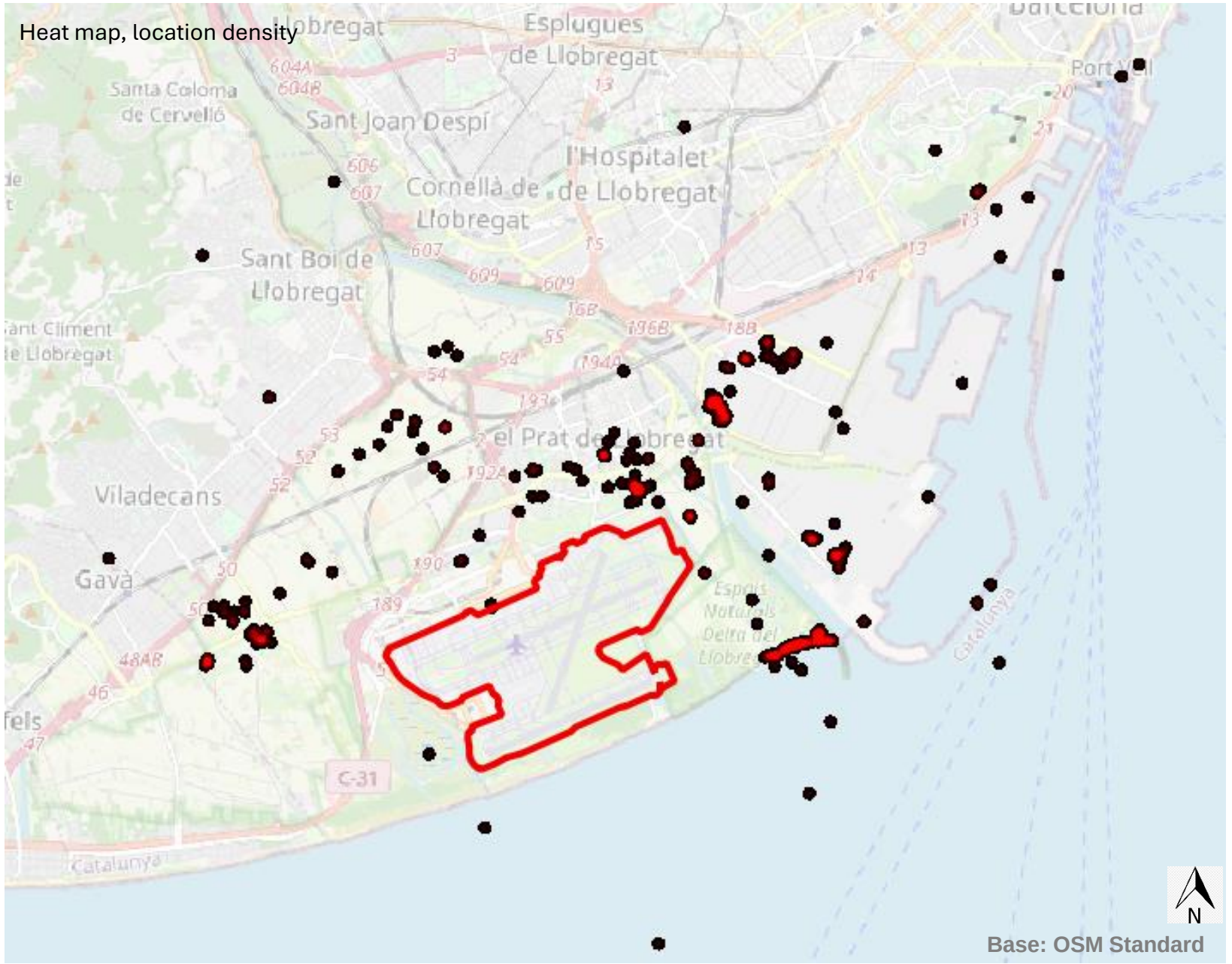
A very high proportion of all trajectories at 80 - 160 meters high cross risk areas!

Incidence of long-range movements



Origin and destination areas

Where were they an hour before and after crossing the risk area?



Origin and destination areas

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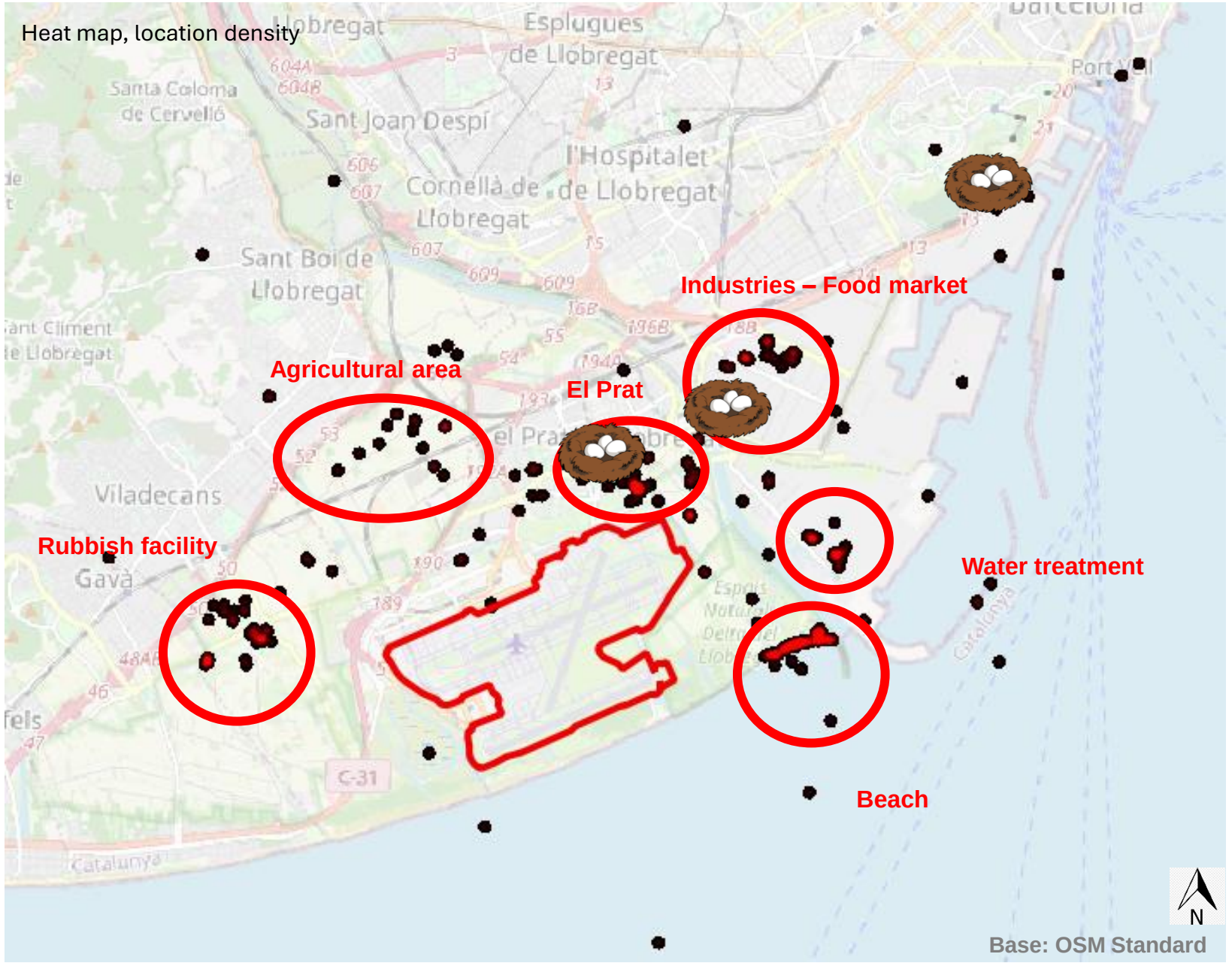


Origin and destination areas

Where were they an hour before and after crossing the risk area?

Some very far away!

Heat map, location density

Base: OSM Standard

Conclusions

- **The WCS's work prevents the entry of yellow-legged gulls into the airport grounds.**
- **The vast majority of movements occur outside risk areas.**
- **Great variability of individual behavior.** It is a very adaptable species, fact that allows it to take advantage of its environment.
- **A higher incidence of immature birds is suggested**, but the available data is very low.
- **The movements of greatest concern are those of larger range** between their main breeding, resting and feeding areas.
- **Great relevance of the movements between the feeding sites inland and at sea**, especially in the early morning and early afternoon, associated with the return to port of the purse seine and trawl fleets, respectively.

Applied management conclusions

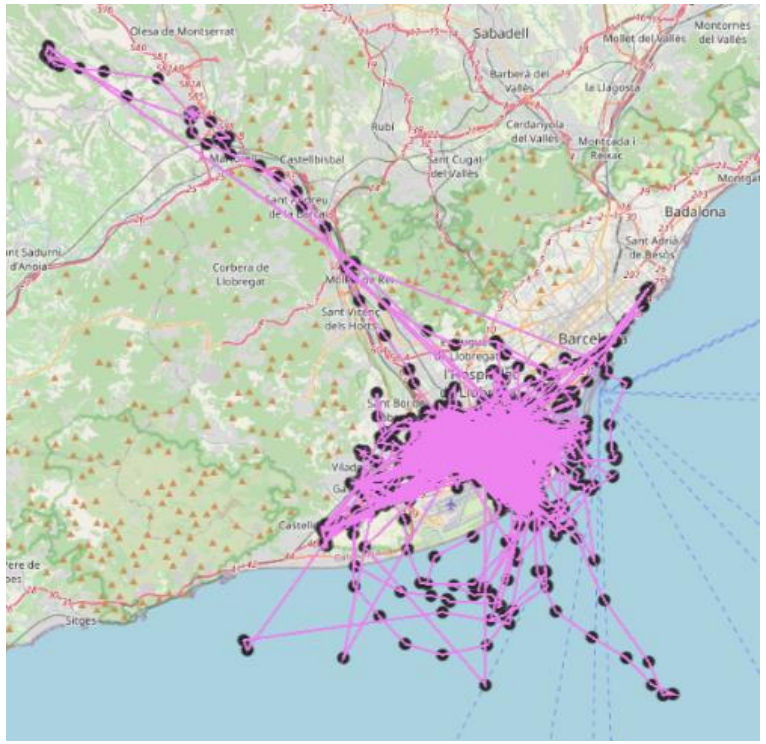
- **No resource seems to have a key relevance.** The sum of all of them allow the development of a large enough population. Consequently, an unusual individual event becomes usual.
- **The mortality of the gull population is very high:**
  - Population growth is due to high productivity and not to adult survival as is the case in “natural” populations.
  - Removal of adult birds should not show an effect on population control. As it already occurs without any effect on the population.
  - On the contrary, **acting on the food sources that allow a very high production of chicks is key in population management**.

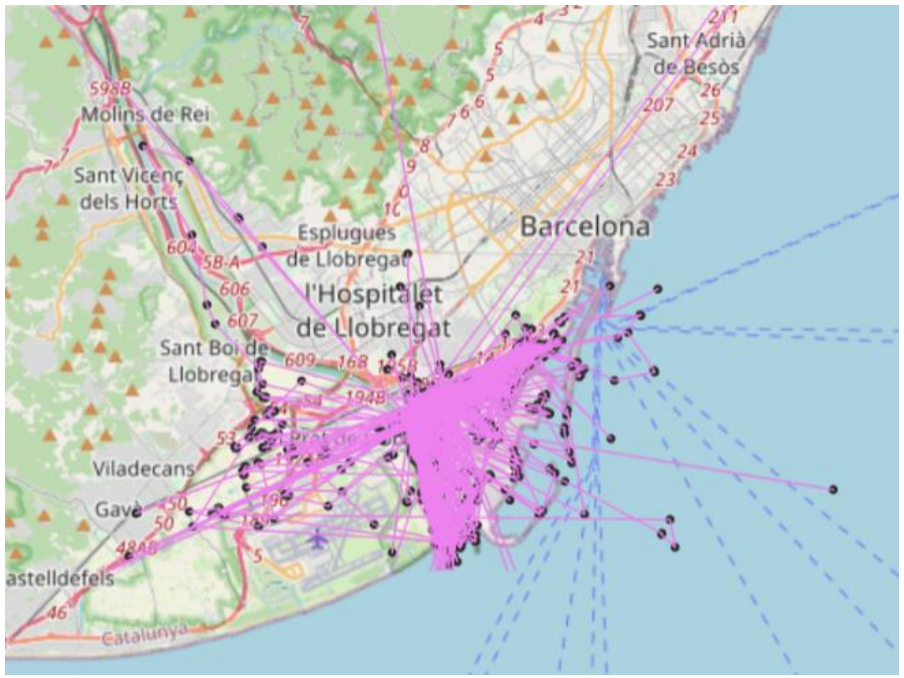
Data collected up to July 2024

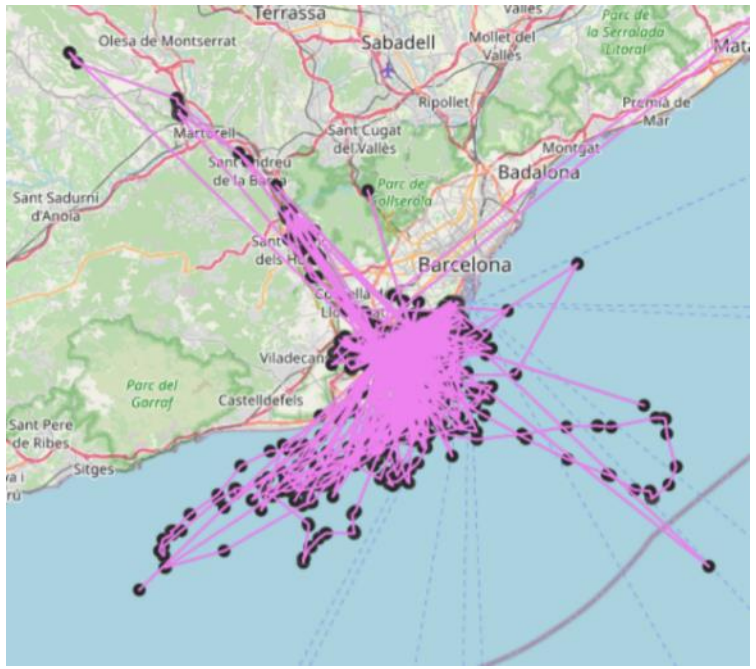
6 GPS operational as of 2022.

3 GPS operational until July 2024.

Some specimens more settled in the area...

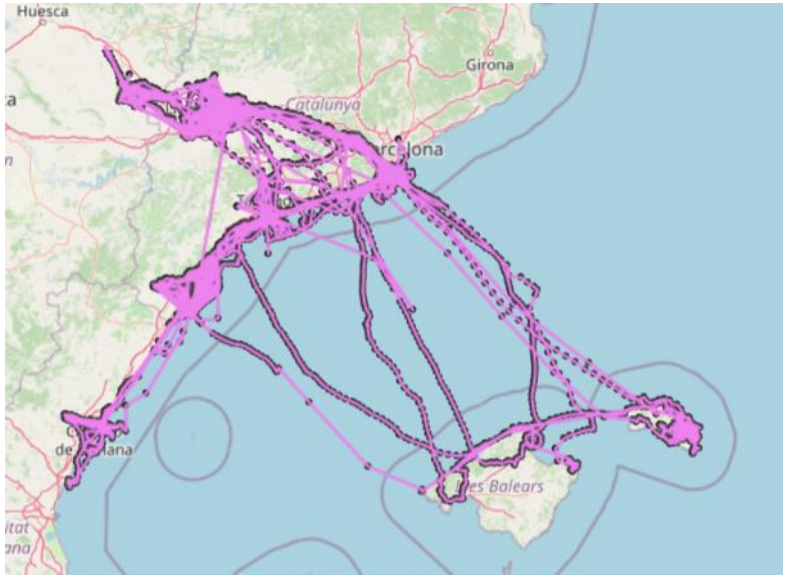


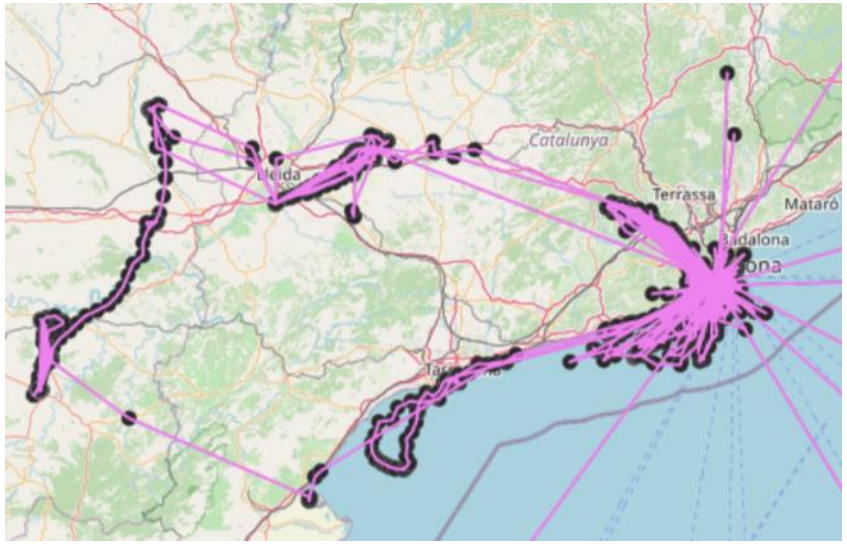


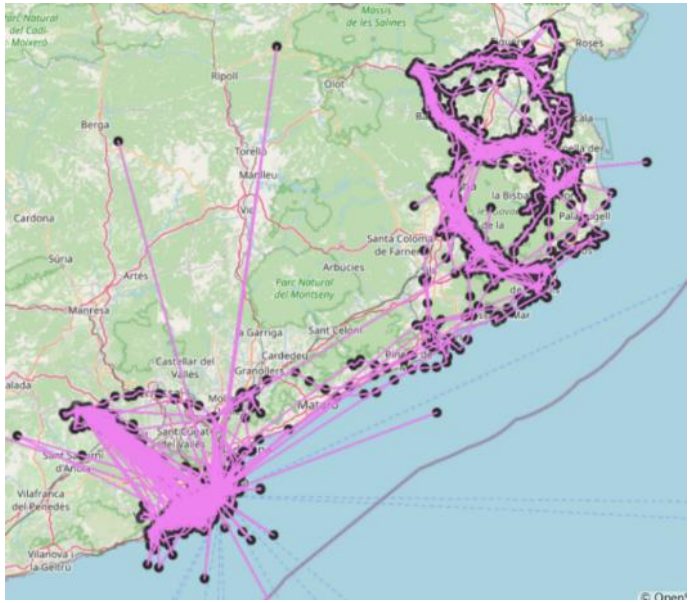


Data collected up to July 2024

... but others more exploratory.







Results of similar projects in the area

Ackownledgements

- J.T. Barcelona-El Prat Airport.
  - División de Seguridad Operacional y Medio Ambiente. Juan José Hita.
  - Departamento de Seguridad Operacional. Noelia Bravo & Montse Molina.
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  - Alfonso Arisó, Hugo Framis and the rest of wildlife control technicians.
- Prat de Llobregat City Council.
  - Environment Area. Pau Esteban.
- Organizations that provided us with access to their roofs to carry out the search for nests and captures:
  - Agencia de Residuos de Catalunya, Planta de Transferencia de Residuos de Viladecans, Gestió de Residus i Biodiversitat SL, Mercabarna, Cervezas DAMM, Vueling, Comunidades particulares de vecinos
- Institut de Ciències del Mar, Consejo Superior de Investigaciones Científicas
  - Joan Navarro
- And to the seagulls that contributed to this study!

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Minuartia

Más información:
acama@minuartia.com
www.minuartia.com