![SEGRE logo]

SEGRE Project

2025

Seguiment General de Rapinyaires Forestals

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Introduction:

Forest-dwelling diurnal raptors, as top predators in the food chain, are highly sensitive to ecosystem changes. Most species reach sexual maturity late, reproduce at low rates, and have long lifespans, making them particularly vulnerable to threats[1]. Heaviliy depending on forest cover throughout their life cycle and largely territorial, these species are bioindicators of the ecological health of their environment, their presence and abundance in an area reflecting habitat quality, prey availability, and broader environmental conditions. Thus, variations in their populations or territory sizes may indicate changes in forest ecosystems and help estimate the impact of human activities.

Woodland raptors' ideal habitat is a mosaic of forested areas and open grasslands. Relying on forest cover for feeding, reproduction, and nesting, they are strongly affected by its drastic decreasing, and habitats loss[2]. In Catalonia, this decline is due to various human-related factors, including intensive agriculture, deforestation, pollution and wildfires, which destroy thousands of hectares of forest— over 4,019 hectares of forested land, in 338 forest fires, just in summer 2025[3]—as well as drought, which compromises trees and forest health, as consequences of global warming.

For a long time subject to negative perceptions, raptors have progressively attracted growing interest theses last decades. Yet until recently, forest-dwelling raptors were poorly monitored, with fragmented data, and no standardised methodology. The **SEGRE project** was created to compensate this by implementing a consistent monitoring protocol and to provide reliable data to support decision-making within conservation and legal frameworks (e.g. EU Directives)[4].

The SEGRE project (SEguiment General de Rapinyaires en Espais naturals protegits) aims to do the general monitoring of forest raptors. This method has been established in 2019 by the **Catalan Institute of Ornithology** with the support of the Provincial Council of Barcelona and the Department of Climate Action, Food and Rural Agenda of the Generalitat de Catalunya, and integrated to the Observatory of Natural Heritage and Biodiversity[4,5]. Focusing on breeding populations throught a defined protocol, it produces standardised data across protected areas of Catalonia. All observations are pooled to estimate potential territories per detected pair within surveyed squares. Conducted annually, this programme aims to estimate raptors distribution and abundance, and establish long-term trends, allowing to detect variations in the populations dynamics, compare between protected areas and to assess the impact of anthropogenic pressures. This method is ideal as it is simple to implement, low in resource demands, and suitable for long-term use. Furthermore, raptors, despite their size, are elusive and occur at low densities over wide ranges, making such a systematic monitoring essential.

This project enhances knowledge of raptor species and populations in Catalonia, and contributes to their conservation. Even though it started in 2019, 2021 was the first year collecting proper data for all species and locations, following the established protocol. Since 2022, the volunteers of **Montseny Bird Station** are taking part in this project, now monitoring three sampling areas within the Montseny Natural Park and Biosphere Reserve.

This report presents the SEGRE project results for these areas in **2025**.

Materials and Methods:

This project's methodology is based on mapping territories from a fixed observation point. Each sampling area is defined using the 2.5 × 2.5 km UTM grid. This monitoring has been carried out by volunteers since 2022 in **Montsoriu Castle** (square code DG62_02) and **Sant Pere Desplà** (DG53_20) sampling areas, located in Arbùcies, and since 2023 in **Fontmartina** (DG52_11), located in Fogars de Montclús. 2025 marks the fourth and third year of monitoring in these squares, respectively.
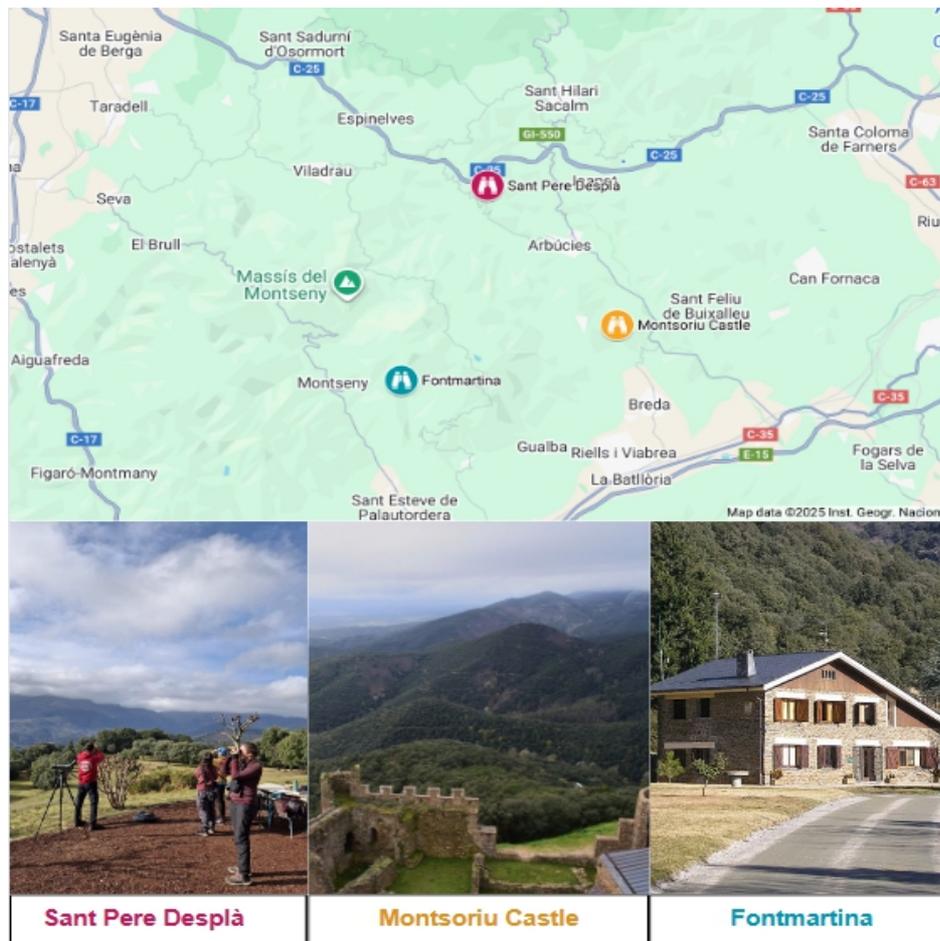
Figure 1: The three different sampling areas and their location within Montseny Natural Park

Surveys take place from March to July, a period of high activity allowing optimal detection of individuals and breeding pairs present in the territory. To cover the entire breeding season, each sampling area must be surveyed four times. These censuses must be conducted within four defined periods: **1 March-15 April, 16 April-15 May, 16 May-15 June, and 16 June-15 July**.

This schedule aims to align censuses dates with the peaks of reproductive activity for the different raptor species. Additionally, while one census must be conducted in each period for each square, a **minimum interval of 15 days** is required between consecutive visits to the same area. In order to standardise the data as much as possible across years and between observers, it is preferable to plan censuses within the first 15 days of each period. This also leaves time to postpone a census in case the weather conditions are not optimal. Indeed, to maximise the detection and identification of species, it is important to carry out the census in the best possible weather conditions: heavy rain, strong wind or fog reduce not only visibility but also bird activity.

To obtain abundance indices for raptor species in the different sampling areas, a single observation point is selected to cover the entire area. It must offer good visibility of the surroundings, and optimise raptor detection. While the highest point may initially seem to be the most suitable, this is not necessarily the case: what matters most is to have the greatest possible contrast between the birds and the background, detection and identification being easier against the sky than against a forested background, for example. Similarly, the optimal orientation is north-west, to avoid interference from the sun. This observation point is also chosen to allow the widest possible coverage of the area, without causing any disturbance to the birds. If an active nest is detected from this location, no approach to the nest is made, and the number of eggs or chicks is recorded only if they are visible from the observation point. Each census must be carried out from this same

location. Once this precise observation point has been determined, its coordinates are sent to the project coordinator, and it will remain the same throughout the censuses and in the following years.

From this location, observers actively and constantly watch for raptors for three hours, ideally **from 9 a.m. to 12 p.m**. This period was defined to cover the time of the day raptors are the most active, as thermals are formed and territorial and foraging activities reach their peak. In addition to raptors, four corvid species must also be reported if observed, as their nests can sometimes be reused by raptor pairs: the Northern Raven (*Corvus corax*), the Carrion Crow (*Corvus corone*), the Alpine Chough (*Pyrrhocorax graculus*), and the Red-billed Chough (*Pyrrhocorax pyrrhocorax*).

Any individual observed must be counted, identified, located on the map and its behaviour detailed. The start and end times of each observation are noted, from the detection of the individual until it can no longer be seen from the observation point. A "comments" section also allows to add further details to the sighting. A number is assigned to each observation, and this same number is then reported as precisely as possible on the map.
The behaviour is described and ranked using codes, following a hierarchy of importance, as presented in the table below (*Fig. 2*):

Behaviour	
Code	**Description**
Obs.	Observation in the adequate period and habitat.
Territ.	Territorial marking, mating flight (flight up and down and/or grabbing claws).
AdCrits.	Adult vocalizations.
Còpula	Copulating.
ConstNiu	Transporting material to build the nest.
AdNiu	If you found the nest with the adults.
PollNiu	If you found the nest with the chicks.
Poll	If you found nestlings.
AdPres	Adult bringing prey to the nest.
Migrant	Migrating (usually going in one direction, flying high, typically North).

Figure 2: Different breeding relative behaviours code and description, ranked by increasing order of importance

If different behaviours are observed during a single sighting, only the highest ranked one, as indicated in the reference table, is reported. In this case, it is the location where that specific behaviour occured that is marked on the map. For an individual simply flying across the area, for example, then its closest position to the observation point is recorded.

All information obtained is entered on the standardised field sheet. For each census, a field sheet is filled in with the date, the name and code of the sampling square, observers' names, the start and end times, and, if necessary, any interruption time, as well as the census period (*Fig. 3*).

Independently of the field sheet, a sighting list is created using the NaturaList application from the start to the end of each session. This list includes all individuals observed or heard in the area during the census, including not only raptors but also all other bird species.
Unlike the SEGRE census, this list focuses on individuals rather than observations. This means that to estimate as accurately as possible the actual number of individuals, it is recommended, in case of doubt, to record either the minimum number of individuals that can be confidently identified as distinct, or the maximum number detected simultaneously. Once completed, the list is synchronised with the Ornitho.cat database portal.

Figure 3: SEGRE project standardised field sheet main section

In addition to the details of each observation and their location on the map, weather conditions are also recorded, with the rain, cloudiness, visibility, temperature and wind described and categorised into ranges according to the reference table below (*Fig. 4*):

	Wind intensity		
Code		Description	Speed (km/h)
0	Calm	Smokes rises vertically	<1
1	Light air	Smoke drift indicates wind direction	1-5
2	Light breeze	Leaves rustle	6-11
3	Gentle breeze	Leaves constantly moving	12-19
4	Moderate breeze	Small branches begin to move	20-28
5	Fresh breeze	Small trees in leaf begin to sway	29-38
6	Strong breeze	Large branches in motion	39-49
7	High wind	Whole trees in motion	50-61
8	Gale	Some broken twigs from trees	62-74
9	Strong gale	Slight damage to homes	75-88

Figure 4: Wind intensity scale

If no individuals are observed during the census, the field sheet is still completed for that day, including all relevant information and meteorological conditions.

While the binoculars are the only required equipment, a spotting scope can also be very useful to help identfy detected individuals. However, it cannot be used to search for raptors and detect them, as it would alter the methodology. In the same way, a camera with adequate zoom has proven to be useful, along with a raptor identification guide.
Unlike in 2024, we did not have the opportunity to use a spotting scope for most of this year's censuses, during which many individuals were detected at a considerable distance from the observation point and could not be formally identified. Yet, at least one person with a camera was present at each census.

In order to reduce bias as much as possible, it is preferable for the observers to remain the same throughout the censuses and over the years. However, since the Montseny Natural Park Bird station functions with a succession of one-year volunteers from the European Solidarity Corps, this is difficult to achieve. To compensate and still maintain a certain consistency, at least one observer was present at each census, just like the previous year.

After each session, all the data must be entered through this website: "https://monitoratge.ornitologia.org". Even though the data are reported online, all the files must be kept for safety. Any question can be adressed to segre.ico@gmail.com or by calling Elisenda Peris at 666 191 077.
It is important that all observers follow all these common guidelines so that the data remain comparable over years and across the different sampling areas.

In this report, in order to allow comparison with the previous year's data and to maintain consistency with the project's methodology, the results are presented in terms of observations. A single observation may include several individuals (between one and three, specifically for this year), and starts at the time of detection and ends when no individuals remain in sight. Otherwise, it will be specified as "observed individual". In the same way, an "observed individual" may be the same bird appparearing in multiple observations, for example if it moves back and forth within the field of view.

Results:

During this year, we carried out a total of twelve censuses, four in each of the three areas, covering all the periods required by the protocol. Each census lasted three hours, without any interruption. However, out of the twelve surveys, three started later, in Monstoriu Castle, due to the castle's opening time. Thus, in this area, the 1st, 2nd, and 3rd censuses started 36, 60, and 23 minutes later, respectively, than the protocol's scheduled start time.

In total, across all sites, **192 observations** were recorded (218 observed individuals), for 10 different raptor species and 1 corvid species. This does not include 24 observations (28 observed individuals) for which species identification was not possible due to observation conditions or distance.
In decreasing order of the number of observations, the following species were detected: the **Common Buzzard** *Buteo buteo* (65 observations, 77 individuals), the **Eurasian Sparrowhawk** *Accipiter nisus* (43 observations, 46 individuals), the **Common Kestrel** *Falco tinnunculus* (22 observations, 27 individuals), the **Short-toed Snake Eagle** *Circaetus gallicus* (11 observations and individuals), the **Booted Eagle** *Hieraaetus pennatus* (6 observations, 7 individuals), the **Peregrine Falcon** *Falco peregrinus (*5 observations and individuals*)*, the **Northern Goshawk** *Accipiter gentilis* (4 observations, 5 individuals), and **Western Marsh Harrier** *Circus aeruginosus* (3 observations, 4 individuals). 2 *Accipiter sp.* (*A. nisus/A. gentilis)* observations were recorded, for 4 individuals that couldn't be reliably identified to species level. The less frequently observed species were the **European Honey-buzzard** *Pernis apivorus* (2 observations, 2 individuals) and the **Osprey** *Pandion haliaetus (*1 observation, 1 individual*)*.
The **Northern Raven** *Corvus corax* was the only corvid species observed, with 28 observations for 38 individuals detected.

In comparison with the previous year, no Black Kite *Milvus migrans* nor Eurasian Griffon Vulture *Gyps fulvus* was seen during the surveys; although occasional sightings of migrating Griffon Vultures were reported in Fontmartina during the appropriate period, but outside the census sessions. The Western Marsh Harrier, Osprey, and Peregrine Falcon, which had been recorded in 2023 but not in 2024, were detected again during this year's surveys. Among corvids, while the

Northern Raven was present in each square, no Carrion Crow *Corvus corone* was observed this year, unlike the previous one.

1 - Common Buzzard
2 - Eurasian Sparrowhawk
3 - Northern Raven
4 - Common Kestrel
5 - Short-toed Snake Eagle
6 - Booted Eagle
7 - Peregrine Falcon
8 - Eurasian Goshawk
9 - Western Marsh Harrier
10 - European Honey-buzzard
11 - Osprey

Figure 5: The eleven species recorded in 2025 during SEGRE Project

Buteo buteo	Common Buzzard	Aligot comú
Accipiter nisus	Eurasian Sparrowhawk	Esparver
Falco tinnunculus	Common Kestrel	Xoriguer
Circaetus gallicus	Short-toed Snake Eagle	Àguila marcenca
Hieraaetus pennatus	Booted Eagle	Àguila calçada
Accipiter gentilis	Northern Goshawk	Astor
Falco peregrinus	Peregrine Falcon	Falcó pelegrí
Circus aeruginosus	Western Marsh Harrier	Arpella comuna
Pandion haliaetus	Osprey	Àguila pescadora
Pernis apivorus	European Honey-buzzard	Aligot vesper
Corvax corvax	Northern Raven	Corb comú

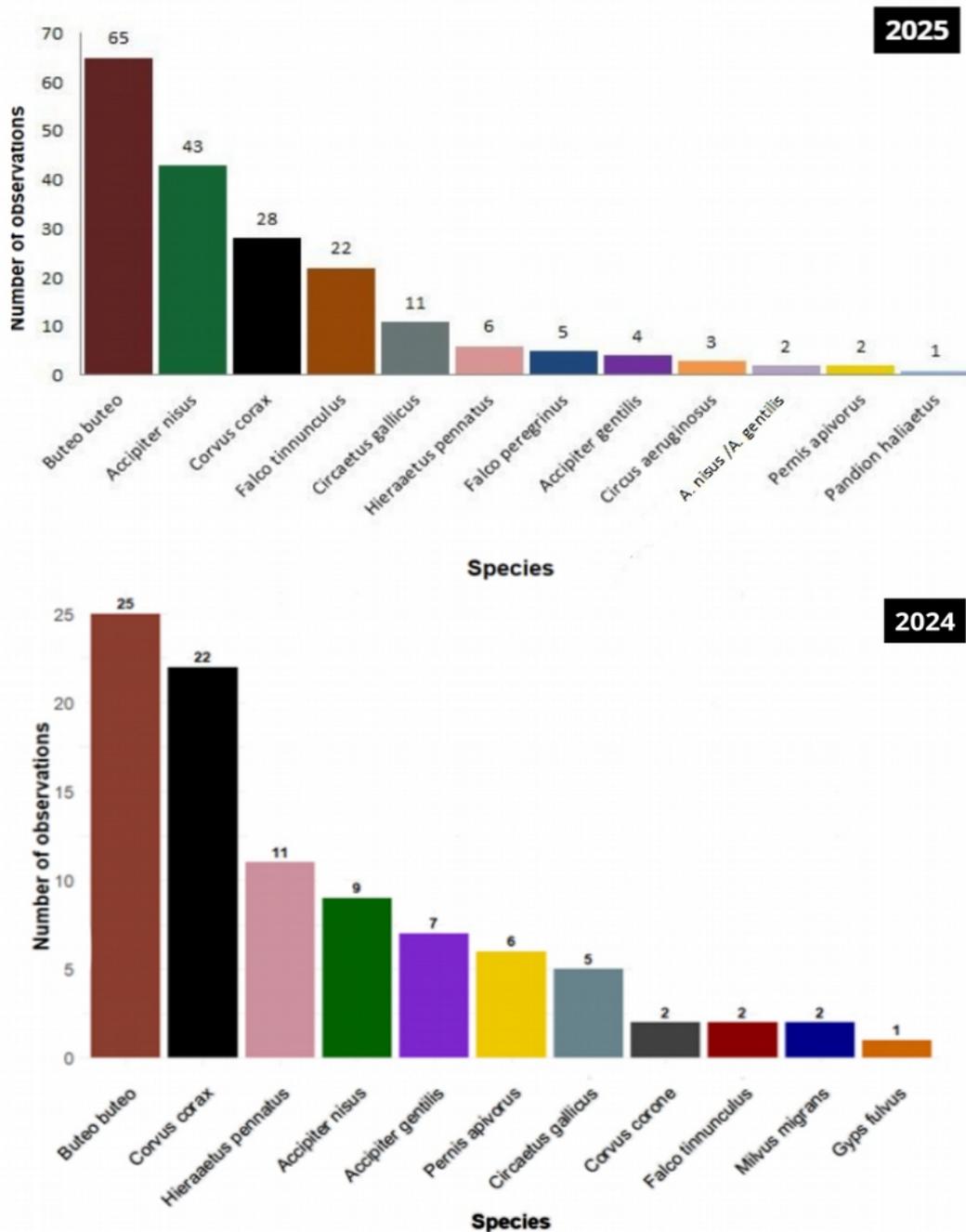*Figure 6: English and Catalan translations of species' scientific name*

Figure 7: Frequency of all observed raptor and selected corvid species in all three squares combined during SEGRE project, in 2025 (above) and 2024 (below)[6].

Fontmartina was the square with the highest raptor diversity with 9 different species, followed by Montsoriu Castle with 7 species, and Sant Pere Desplà with 5 species, excluding unidentified raptors.

The Common buzzard, Eurasian Sparrowhawk and Short-toed Snake Eagle were observed in all areas, whereas most of the other species were present in two out of three squares: the Common Kestrel, Booted Eagle and Western Marsh Harrier were detected in Fontmartina and Montsoriu, while the Northern Goshawk and Peregrine Falcon were recorded in Fontmartina and Sant Pere Desplà. This year, the European Honey-buzzard was seen only in Montsoriu Castle, and a single Osprey individual was observed flying over Fontmartina. While most species are potentially breeding in the sampling areas, the Western Marsh Harriers and Osprey were observed migrating exclusively. Indeed, these species depend on wetlands for breeding, yet none of the three areas contains suitable wetland habitats for them.

The most frequently observed species, the Common Buzzard, was present in all three areas. In Fontmartina, it was followed by the Eurasian Sparrowhawk, Common Kestrel, and Short-toed Snake Eagle. In Montsoriu Castle, it was followed, with almost the same number of observations, by the Common Kestrel, then the Eurasian Sparrowhawk and Booted Eagle. In Sant Pere Desplà, the Common Kestrel was absent, and the second and third most frequently observed species were the Eurasian Sparrowhawk and Peregrine Falcon.
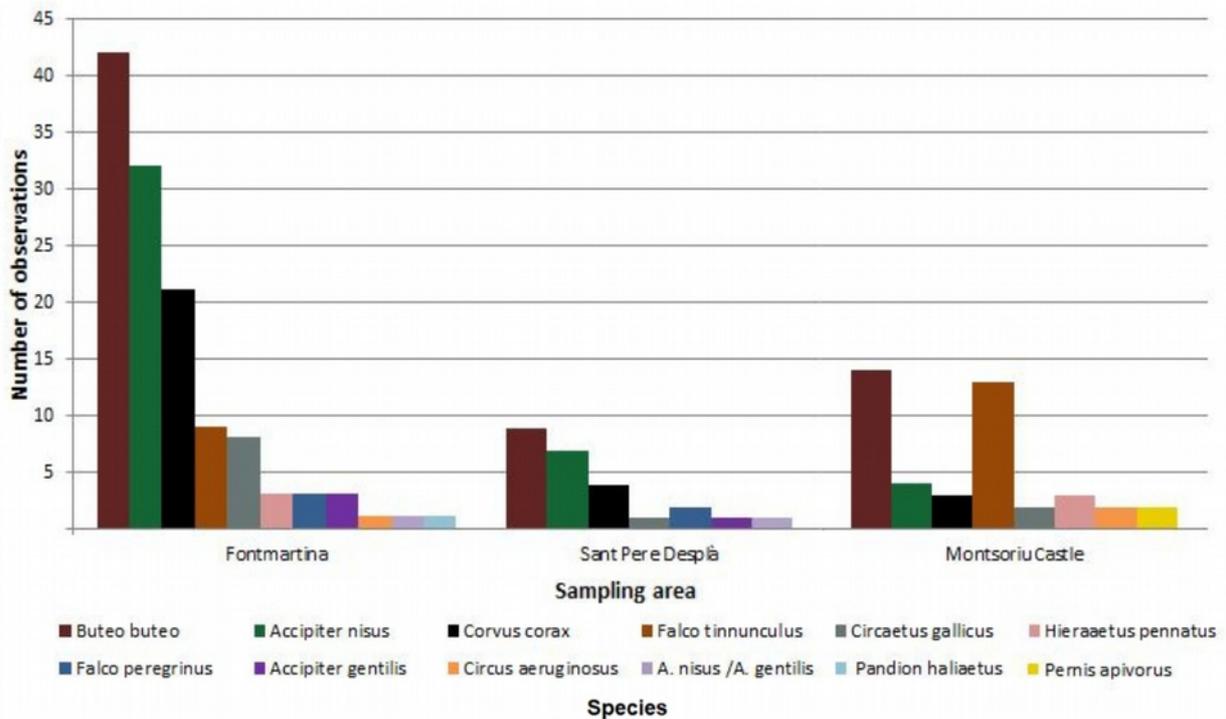

Figure 8: Frequency and distribution of all observed raptor and selected corvid species, per sampling area during the SEGRE project in 2025

The number of individuals observed varied considerably between the three squares: as in the previous year, Fontmartina was the most frequented area, with a total of 138 observations (163 individuals) over the four surveys, including 21 Northern Ravens and 14 unidentified raptors. It was followed by Montsoriu Castle with 49 observations (56 individuals), including 3 Northern Ravens and 6 unidentified raptor observations, and by Sant Pere Desplà with 29 observations (36 individuals), including 4 Northern Ravens and 4 unidentified raptor observations.
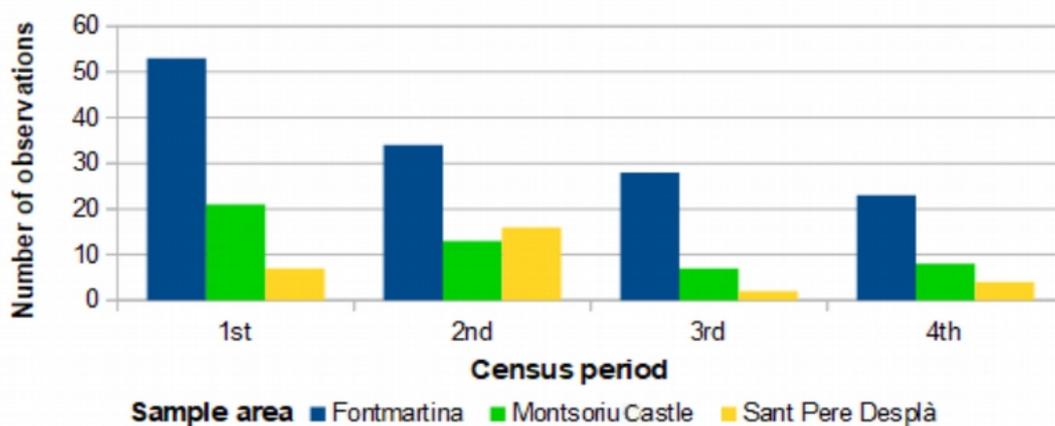

Figure 9: Total number of observations per sample area and per census during SEGRE project in 2025

As a general trend across the four censuses, all three areas showed a declining trend in the number of observations over the season. The decline was particularly marked in Fontmartina and Montsoriu Castle between the first and second censuses, remaining low afterwards in Montsoriu Castle, while continuing to decrease more gradually in Fontmartina, with a consistent downward pattern. In contrast, Sant Pere Desplà displayed greater variability, reaching its peak in the second census before dropping to similarly low values. Overall, the data indicate a global decrease in activity over the survey period.

Over the 192 sightings, 171 were recorded as observations, meaning that the individual was simply flying over the area in the appropriate period and suitable habitat for breeding, not flying particularly high or in a straight direction, as a migratory individual would usually do: four sightings involved birds migrating, simply crossing the area.

Some breeding-related behaviours were observed: territorial behaviour (including both mating and fighting behaviours) in 9 observations, alduts doing vocalisations in 6 observations, and adults carrying prey in 2 observations. To be noted that "common calls" of species such as the Common Buzzard and Northern Raven, which were frequently heard, were not reported as vocalisations but as observations, their calls being noted as details in the comment section.
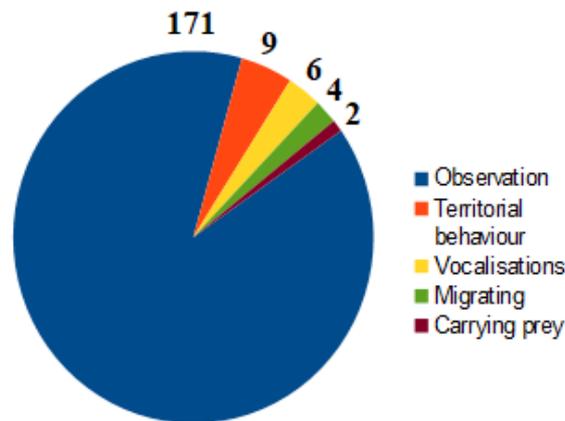

Figure 10: Distribution of the different behaviour categories observed among all species over all the censuses in 2025

Figure 11: Short-toed Snake Eagle flying over Fontmartina with a snake in the bill, on the 26th of June (4th census)

Conclusion:

For the third consecutive year, we carried out the twelve censuses required by the SEGRE project protocol, in our three sampling sites within Montseny Natural Park. In total, **192 sightings** were recorded, including **10 raptor and 1 corvid species**. The most frequently observed raptors were the Common Buzzard, Eurasian Sparrowhawk, and Common Kestrel, recorded at unusually high numbers compared to previous years (*Fig. 12*). The Common Buzzard, Eurasian Sparrowhawk, Short-toed Snake Eagle and Northern Raven were present in all three areas, while most other potential breeding species were detected in two.

Overall, species distribution did not show a clear preference for any particular site so far, although some species appeared absent from specific areas when taking previous years' data into account; notably the Common Kestrel, never observed in Sant Pere Desplà since the start of the project, and the European honey buzzard, still absent in Fontmartina. Looking at data from previous years, no species seem to be strictly site-specific, as those recorded in only one area in certain years were detected in different areas in others, suggesting variability in site use. As this is only the third year with consistent data for all sites, further data will be needed to identify possible subhabitat preferences per species. Only the Osprey and European Honey-buzzard were recorded in individual sites this year, which is not surprising for the osprey, a relatively rare migratory species in this part of Catalonia[7]. No new species were recorded, although some that had been absent in 2024 but seen in previous years were observed again this year (*Fig. 12*).
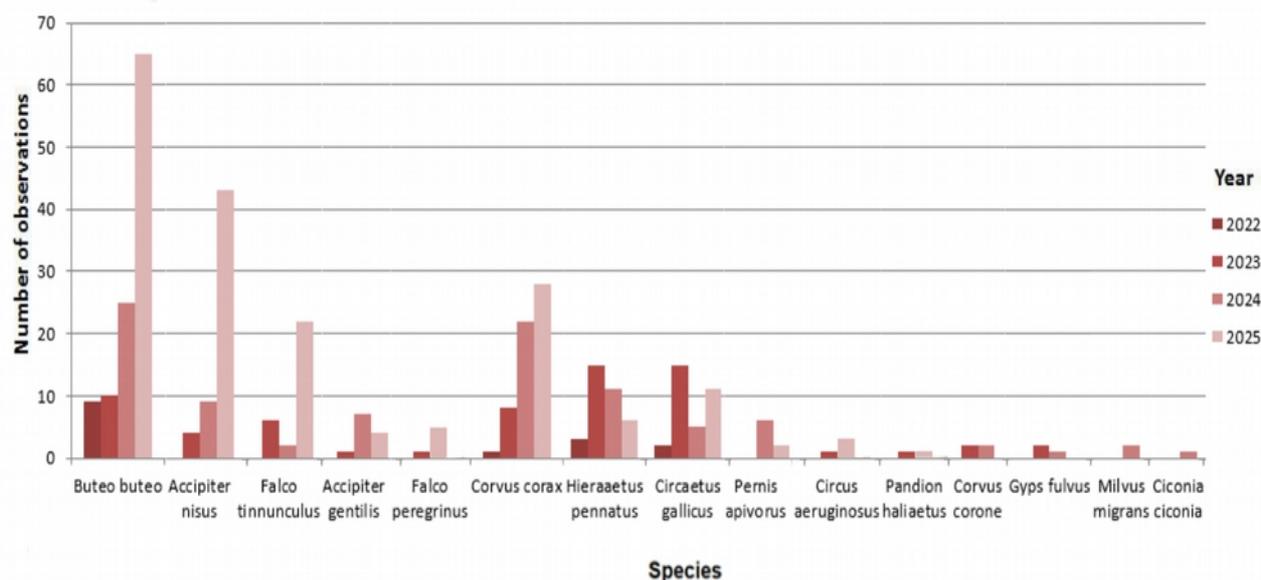

Figure 12: Number of observations of all detected and precisely identified species across the three sampling areas (no survey in Fontmartina in 2022), per year, since the start of the project

While the most frequently observed behaviour among individuals was simple flight over the area, some were also seen or heard vocalising, or displaying territorial interactions. A few individuals were seen carrying prey, suggesting the presence of a nearby nest and use of the area for breeding.

Observation numbers in 2025 were consistently higher than in 2024 and previous years across all zones, especially in Fontmartina and Montsoriu Castle, which saw strong increases at the start of the survey, followed by a sharp decline after the second census. Sant Pere Desplà peaked during the second census. In contrast, the 2024 censuses showed a steady decline, culminating in a pronounced drop during the fourth survey. The 2025 decrease occurred earlier, with a clearer separation between the first and second halves of the censuses, possibly reflecting environmental or seasonal differences between the two years. Fontmartina consistently recorded the highest numbers and diversity of sihtings, underlining its importance as a key area within the study sites.

Overall, all zones showed greater activity and total counts in 2025, suggesting more favourable environmental conditions. This breeding season experienced less drought and higher precipitation than in 2024, which likely improved prey availability and therefore, breeding success[8]. This contrast suggests a correlation between weather conditions and species activity, possibly explaining such a difference between these two years, and even previous years, the drought having intensified since 2021 before reaching its critical peak in 2024[9]. Further censuses and comparisons across other monitored areas will help determine whether this reflects a general trend or a site-specific pattern.

This year, in order to cover a larger observation area in Fontmartina and reduce blind spots from the main viewpoint (at the bench), the observer team was divided between two locations, with one person moving between them to record sightings as they occured. At least one observer remained at the bench, facing the south-east side of the square, while another stayed near the kitchen, to get a better view of the northern slopes and the area above the house. Many individuals were seen coming from this direction, with sightings concentrated along the north-eastern side, following the mountains edge. This setup allowed to be constantly checking all main observation angles. Although the number of sightings in Fontmartina was particularly high this year, the overall increase across all zones—more than twice the number of observations in Fontmartina compared to 2024—suggests that this rise is more likely related to environmental factors than to this small methodological adjustement.

In addition, to ensure that survey dates meet the protocol requirements regarding timing and minimum intervals, it may be helpful for the project leader to prepare a pre-established schedule of the sessions, at the start of the project, based on the calendar of periods on the ICO website[10]. This schedule could then be updated progressively with the minimum 15-day gap between censuses after each session, and take into account constraints such as the specific places opening days, weather conditions, or overlapping project activities.

It is advisable to contact the Monstoriu Castle coordinator as soon as possible before the beginning of each period, to arrange the session in advance and keep flexibility in case of poor weather.

This year's SEGRE project provided more data, valuable for long-term monitoring of raptor populations. In the continuity of previous years, further data will help refine observations, establish or confirm trends, and contribute to improving knowledge and conservation of Catalonia's raptor species.

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