



INTERNATIONAL  
BEARDED VULTURE  
MONITORING

Annual report 2019

---

## International Bearded Vulture Monitoring- IBM





# Imprint

---

**Author**

Mirco Lauper

**Version**

28/09/2020

**Recommended form of citation**

Lauper, M. (2019): Annual Report 2019 - International Bearded Vulture Monitoring (IBM); ed. Vulture Conservation Foundation. pp 1-40.

**Contact**

[ibm@4vultures.org](mailto:ibm@4vultures.org)

**IBM-members**

ASTERS  
 ENVERGURES ALPINES  
 JUNTA DE ANDALUSIA  
 LPO GRANDS CAUSSES  
 LBV – LANDESBUND FÜR VOGELSCHUTZ BAYERN  
 NATIONALPARK HOHE TAUERN  
 PARC NATIONAL DE LA VANOISE  
 PARC NATIONAL DU MERCANTOUR  
 PARC NATUREL RÉGIONAL DE CORSE  
 PARC NATUREL RÉGIONAL DU VERCORS  
 PARCO NATURALE ALPI COZIE  
 PARCO NATURALE ALPI MARITTIME - WAON  
 PARCO NAZIONALE DELLO STELVIO / NATIONALPARK STILFSEERJOCH  
 GENERALITAT VALENCIA  
 STIFTUNG PRO BARTGEIER / FONDATION PRO GYPAËTE  
 VAUTOURS EN BARONNIES  
 THE VULTURE CONSERVATION FOUNDATION

**Associated organisations**

PARC NATIONAL DES CÉVENNES  
 PARC NATIONAL DES ÉCRINS  
 REGIONE AUTONOMA VALLE D'AOSTA & PARCO NAZIONALE GRAN PARADISO



**Table of content**

<b>1</b>	<b>The IBM &amp; its administration .....</b>	<b>6</b>
<b>2</b>	<b>Summary.....</b>	<b>7</b>
<b>3</b>	<b>Key facts.....</b>	<b>9</b>
<b>4</b>	<b>IBM-standards.....</b>	<b>10</b>
4.1	Age class .....	10
4.2	Dropout versus breeding failures.....	10
4.3	Reproduction.....	11
<b>5</b>	<b>Releases .....</b>	<b>12</b>
5.1	Pilot project in Maestrazgo (ESP).....	12
5.2	Release sites 2019 .....	13
<b>6</b>	<b>Reproduction in the wild .....</b>	<b>14</b>
6.1	Breeding season 2018/2019.....	14
<b>7</b>	<b>Observations .....</b>	<b>19</b>
7.1	IBM-network & -monitoring area.....	19
7.2	Visual observations .....	20
7.2.1	Ornitho.ch data .....	23
7.3	Unusual observations.....	23
7.3.1	Identified observations .....	24
7.3.2	Non-identified observations .....	24
7.4	Individual identification.....	24
7.5	Population estimate based on IOD 2019 .....	28
<b>8</b>	<b>Markings .....</b>	<b>30</b>
8.1	Rings .....	30
8.2	Markings 2019 .....	31
8.2.1	Released birds .....	31
8.2.2	Wild-hatched birds.....	31
8.3	GPS-tagged birds .....	33
8.3.1	Released GPS-tagged birds .....	33
8.3.2	Extraordinary excursions.....	34
8.3.3	Wild-hatched GPS-tagged birds .....	35
<b>9</b>	<b>Dropouts .....</b>	<b>37</b>
9.1	Mortalities .....	38
9.1.1	GT061 .....	38
9.1.2	Tantermozza (W46).....	38
9.1.3	Gea (W276) .....	38
9.1.4	Buisson (BG1030) .....	38
9.1.5	Monna (BG1017) .....	38
9.1.6	Europe (BG1014).....	39
9.1.7	Siles (BG1037) .....	39
9.1.8	Bonifatu2018 (W271).....	39
9.2	Recaptures.....	39
9.2.1	Verdi (BG 1028) .....	39
<b>10</b>	<b>Acknowledgements .....</b>	<b>40</b>

# 1 The IBM & its administration

The international Bearded Vulture monitoring (IBM) is an expanding international network to coordinate the monitoring activities for European Bearded Vulture populations, to unify and manage data collections in a shared database (IBM-database) and to discuss conservation strategies and priorities for this species on an international level.

In 2019 the IBM comprised 17 IBM-partners and 3 associated organisations. The lead partner was the Vulture Conservation Foundation (VCF) and the IBM-database was managed by Mirco Lauper, while additional administrative work was carried out by Franziska Lörcher and José Tavares. These costs, as well as the costs for rings, database hosting, database upgrade etc. were covered by a budget of 45'000 Euros. The budget was financed by the fee of each IBM-partner and additional funds from MAVVA, which for the third consecutive year allowed to reduce the partner fee substantially, from 3'000 Euros to currently 1'600 Euro for partners which are releasing birds and 800 Euros for the other partners.

In order to inform the IBM-partners about important news, the latest observations and the development of the Bearded Vulture reproduction in the wild, 8 short reports *IBM Update & Reminder* were sent out in 2019. During the steering committee meetings by phone in April and September 2019, as well as a physical SC-meeting in Canillo (Andorra) in November 2019, important topics were discussed, and major decisions were taken jointly.

## 2 Summary

22 juvenile Bearded Vultures could be released in France (2 Corsica, 4 in the Pre-Alps (Vercors and Baronnies), 5 in the Massif Central) and Spain (2 in Maestrazgo, 9 in the Sierra de Cazorla, Andalusia), thanks to a high breeding success in the captive breeding programme (EEP) in 2019. All 22 released birds have been individually marked with country-specific rings, bleached feathers and GPS-tags in order to follow their life history and spatial behaviour. Additionally, it was possible to mark 5 wild-hatched juveniles in France (Altitude, Aravis2019, Emparis, Pierro, Sixt Buet) and another 2 juveniles in Andalusia, Spain (Jovan, Hans) with rings and solar powered GPS/GSM tags. As the proportion of wild-hatched Bearded Vultures in the Alpine population is increasing, the IBM-network intensifies the effort to mark wild birds and thus get insight into their spatial behaviour and survival rates. In 2019, GPS-data from 10 wild-hatched and 45 released Bearded Vultures was collected in the WildlifeMonitor.

In the Alpine range, a new record number of 39 wild hatchlings fledged in 2019 (14 FRA, 12 CHE, 10 ITA, 3 AUT). This results in an overall productivity of 72%, with 58 occupied territories and 50 clutches. As in the previous year, the productivity was the highest in the north-western Alps (76%), followed by the central Alps (70%) and was lower in the south-western and eastern Alps (67%). For 7 out of 50 breeding territories it was the first successful reproduction and for Lechtal (AUT) it was the first and at the same time northernmost reported breeding attempt in the Alps in the reintroduction project. In 43 out of 50 nests with breeding activity a hatchling was reported, resulting in a 78% breeding success, which is considerably higher than in 2018 (66%).

On Corsica, no successful breeding has been reported from 5 occupied territories, even though breeding was reported in 4 of them with a failure after the hatch in Asco (FRA). In the Massif Central, nesting behaviour from two released male birds (Layrou and Adonis) has been observed for the second consecutive year. It still remains the first occupied territory in this area.

Observation data of 1'875 Bearded Vulture sightings has been reported from 6 countries (AUT, CHE, ESP, FRA, ITA, LIE). In 37% of the cases the observed birds could be identified, resulting in the visual identification of 44 released and 9 wild-hatched individuals (31 males and 17 females). Together with individual based information from the reproduction monitoring and the International Observation Days (IOD) a total of 160 individuals were identified on individual level (Alps = 118, Pyrenees = 11, Corsica = 14, Spain = 17). Another 1'601 observations from ornitho.ch were imported into the IBM database. Currently this interface is implemented, that data from other European ornitho databases can be included.

The Bearded Vulture populations were estimated to vary between 256-344 individuals in the Alps, 4-5 in the Massif Central, 5-7 in Aude, 32-40 in Spain (without Pyrenees), 0 in Bulgaria and 6-11 in Morocco. These estimates are based on observations collected by 1'046 observers at 696 sites in 7 countries (AUT, BRG, CHE, FRA, GER, ITA, MAR) during the IOD on the 12.10.19.

Dropouts of 4 released and 5 wild-hatched birds have been reported in France (4), Spain (3), Italy (1) and Switzerland (1). In at least three cases, anthropogenic factors were responsible for the cause of death (powerlines, shooting). Higher mortality in the first few years is a well-known phenomenon and in 7 out of 9 cases the birds were in their first (5) or second (2) calendar year. Moreover, due to close monitoring, especially such cases are detected in time and are therefore documented. Thanks to this close monitoring and the fast reaction of the local team in Spain the weakened juvenile bird Verdi (BG1028) could be caught in time. However, damages to the feathers and continued signs of weakness lead to the decision to keep it in captivity and not release it again.

## 3 Key facts

### 22 releases in Europe

- France: 11 Bearded Vultures released
  - 2 birds on Corsica, 2 in Baronnies, 2 in Vercors and 5 in Grands Causses
- Spain: 11 Bearded Vultures released
  - 2 birds in Maestrazgo and 9 in Parque Natural de Cazorla

### Reproduction

- Alpine range: 58 occupied territories, 50 clutches, 39 fledglings
  - Productivity varied between 76% (NW-Alps) and 67% (Central and eastern Alps)
- Massif Central: first territory occupied by two male nesting birds since 2018 (Layrou & Adonis)
- Corsica: 5 occupied territories, 4 clutches, 1 dead hatchling (Asco), 2 egg extractions in Bonifatu territory (both eggs were extracted and chicks hatched (one male, one female))

### Monitoring and the IBM-database

- 1'875 observations from 6 countries
  - 37% of the observed birds could be identified on individual level
  - 53 individuals (31 males and 17 females) could be identified (9 of them are wild-hatched birds)
- 1'601 ornitho.ch observations were imported to the IBM-database in 2019 (15'771 since 1991)
- 160 individuals with known origin in the Alps (N=118), the Massif Central & French Pyrenees (N=11), Corsica (N=14) and Spain (N=17) were identified on individual level
- IOD 2019: 1'046 observers occupied 696 sites and reported 832 Bearded Vulture observations during the International Bearded Vulture Observation Days
- Population size estimates based on IOD 2019 data: 256-344 individuals in the Alpine range, 4-5 in the Massif Central (FRA), 5-7 in Aude (Pyrenees FRA), 32-40 in Spain (without Pyrenees), 0 in Bulgaria and 6-11 in Morocco.

### Markings & telemetry

- All 22 released birds have been marked with a solar powered GPS-tag
- 7 wild hatchlings were ringed and equipped with GPS-tag: Altitude (FRA), Aravis2019 (FRA), Emparis (FRA), Pierro (FRA), Sixt Buet (FRA), Jovan (ESP) and Hans (ESP).
- GPS data of 45 released and 10 wild-hatched birds was stored in the WildlifeMonitor

### 9 Dropouts

- 8 mortalities: 4 released birds (Buisson, Europe & Monna in FRA; Siles in ESP) and 4 wild-hatched birds (GT061 (ITA), Tantermozza (CHE), Bonifatu2018 (FRA), Gea (ESP))
- 1 recapture: Verdi (BG1028) was recaptured and could not be released again

## 4 IBM-standards

The IBM-standards should serve as guidelines for the definitions used for public communications and statistics within the international network of the IBM. Below you find a short overview over the most important definitions, that are based on previous work by Richard Zink in 2009 (Table 1).

### 4.1 Age class

*Table 1: Calendar years (cy) should be used as IBM-standard for age classification. This table should serve as a general standard for the age determination of unknown and known birds recorded in the IBM-database. Grey shaded = potentially breeding birds (see "checked pairs" below).*

Entry in the IBM (life stage)	Calendar year (cy)	Real age (years)		Life history event
		Jan-Feb	Mar-Dec	
juvenile (1. cy)	1	-	0	hatch
immature (2. cy)	2	0	1	non-territorial
immature (3. cy)	3	1	2	non-territorial
subadult (4. cy)	4	2	3	non-territorial
subadult (5. / 6. cy)	5	3	4	potential nesting
adult ( $\geq 6$ . cy)	6	4	5	potential breeding
adult ( $\geq 6$ . cy)	$\geq 7$	5	$\geq 6$	potential breeding

### 4.2 Dropout versus breeding failures

Dropouts include all incidents where individuals have been removed from the population (mortality, recapture). This also applies to birds that could be rereleased after the recapture. A recapture is in any case the last solution, which is why it must be assumed that these birds would not have survived without human intervention and would have died under natural conditions.

However, if a hatchling dies at less than 80 days of age, this loss is referred to as breeding failure and it is therefore not included in the dropout statistics.

Age	< 80 days	> 80 days	Type
hatch	→ mortality / recapture		→ breeding failure
hatch	→ mortality, recapture		→ dropout

### 4.3 Reproduction<sup>1</sup>

Table 2: IBM-standards for reproduction statistics based on previous work by R. Zink (2009).

Potential territory	Area occupied by at least 2 birds showing territorial behaviour → all territories entered in the IBM-database
Territorial pair <sup>2</sup>	Pair <sup>2</sup> occupying a territory with at least one nest → territories with nest or egg-lay date entered in the IBM-database
Checked pair <sup>2</sup>	Pair <sup>2</sup> monitored during the breeding season → territories with nest or egg-lay date entered in the IBM-database → age classification: subadult (5. / 6. cy) or adult (≥ 6. cy)
Breeding pair <sup>2</sup>	Cases of verified egg-laying → date of egg-laying entered in the IBM-database
Breeding success	$\frac{\textit{fledglings}}{\textit{breeding pairs}}$
Productivity	$\frac{\textit{fledglings}}{\textit{checked pairs}}$

<sup>1</sup> Based on: Monitoring guide (Protocol) Draft Version 0.2 (2009) by Richard Zink

<sup>2</sup> Definition of a pair: At least two birds occupying a territory with at least one nest or confirmed fledge

## 5 Releases

In 2019, a total of 22 Bearded Vultures that have been reared in six different zoos and captive breeding centres of the EEP (European Endangered Species Programme) were released in the western Pre-Alps, in the Massif Central, on Corsica as well as in two projects in Spain. The possibility to reintroduce such an extraordinary high number of juveniles is the result of very successful captive breeding in 2019.

Four birds were released in the Baronnies (FRA) and Vercors (FRA) in the Pre-Alps. Another five juveniles were released in the Massif Central (FRA). The release of nine juveniles in the French Pre-Alps (two birds in Baronnies and two in Vercors) and the Massif Central (five birds) as well as the release of two juveniles in Maestrazgo (ESP) is part of a long-term goal to restore the genetic exchange between the three separated Bearded Vulture populations of the Alps, the Pyrenees and Andalusia. The connection of these populations is still non-existent, since the extinction of the Alpine (around 1900) and Andalusian (1980) Bearded Vulture population and is vital to re-establish the European meta-population. In order to enforce the local reintroduced population in Andalusia, nine juveniles have been released in this region in 2019.

The release of two juveniles on Corsica (FRA) is one of the actions taken in order to address the dramatic decrease of the population and secure the survival of this unique genetic pool. The Bearded Vulture population of Corsica is one of the last surviving genetic pools of the former meta-population and has been declining during the last 25 years to currently only five territorial pairs.

All 22 released birds took off for their first flight (Table 3). The average age at the first flight was 122 days with a minimum of 106 (Vainilla, BG1029) and a maximum of 136 days (Boira, BG1040).

### 5.1 Pilot project in Maestrazgo (ESP)

Since 2018 captive bred Bearded Vultures are reintroduced in the Maestrazgo region. Furthermore, in the Maestrazgo region a unique pilot experiment is being tested: The aim is to evaluate the behaviour of non-breeding adults or floaters from the Pyrenees (where the population has grown and the number of non-breeders is significant) that are translocated to the release site in Tinença de Benifassà Natural Park. This experiment will take place from 2019 until 2023, with the aim of translocating 20 adult birds that are clearly identified as non-breeders in the Pyrenees. Since 2018 three adult floaters (2018: Otal, Esera; 2019: Gabas) were translocated, and only one bird (Otal) stayed in the area, while Esera and Gabas flew back to the area where they were captured in the Pyrenees. To prevent the birds from flying back directly after the hard-release, the discussion is ongoing to acclimatise them in aviaries in the future. The Vulture Conservation Foundation stresses that this is very much an experiment that will regularly be evaluated to ensure this action is not having a negative impact on the population in the Pyrenees.

## 5.2 Release sites 2019

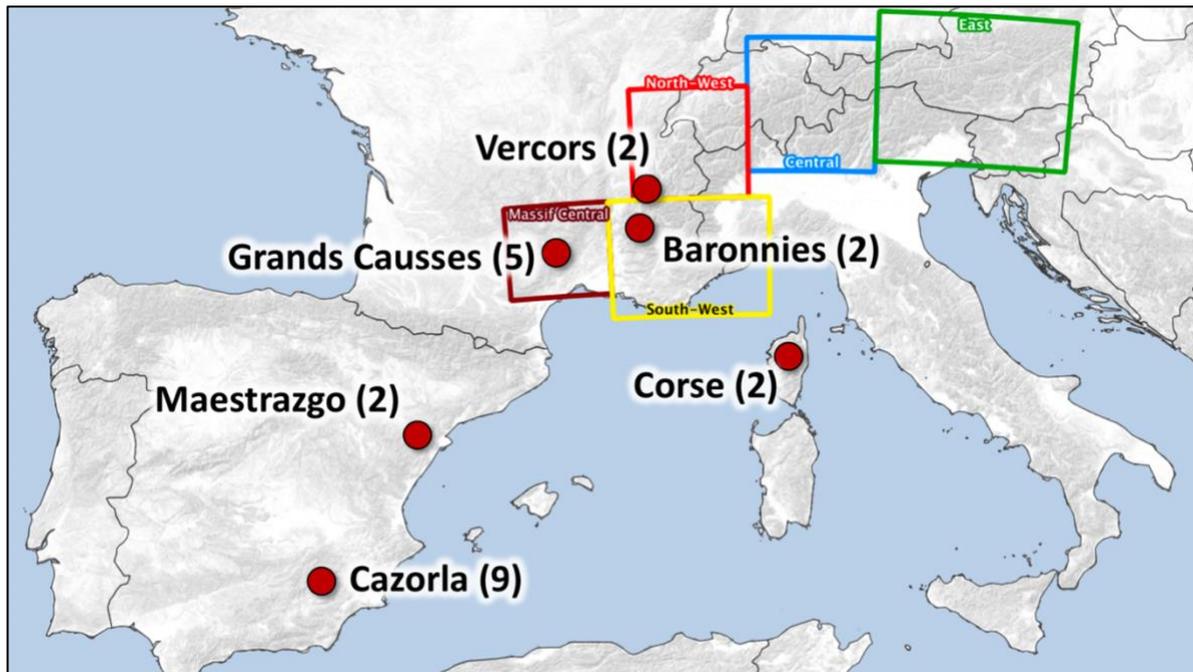


Figure 1: 22 Bearded Vultures were released at six sites in Spain and France (mainland and Corsica). The releases of nine birds in the pre-Alps (Baronnies and Vercors) and the Massif Central are part of the long-term project GypConnect with the aim to re-establish genetic exchange between the Alpine and Pyrenean population. With a similar objective, two birds were release in Maestrazgo (ESP), an area that should serve as “stepping-stone” between the Pyrenean and Andalusian population. The release of two juveniles on Corsica (FRA) is one of the actions taken in order to address the dramatic decrease of the local population and secure the survival of this unique genetic pool.

Table 3: Details about 22 Bearded Vultures that have been released within the IBM monitoring area and Andalusia. The release site of the Maestrazgo project is called Tinença de Benifassà. Birds that died or had to be recaptured in 2019 are written with grey letters (more information see Table 16).

	Place release	BirdID	Name	Sex	Hatch	Fledge	Age at first flight	Place hatch	Date release
	Baronnies, Léoux Valley	BG1027	<b>Carmen</b>	f	21/02	23/06	122	Ostrava Zoo	25/05
	Baronnies, Léoux Valley	BG1031	<b>Pamela</b>	f	25/02	22/06	117	Green Balkans	25/05
	Corsica, Niolo Valley	BG1041	<b>Orba</b>	f	13/03	22/07	131	Nuremberg	10/06
	Corsica, Niolo Valley	BG1042	<b>Cintu</b>	m	14/03	29/06	107	RFZ Haringsee	10/06
FRA	Grands Causses,Frépestel	BG1014	<b>Europe</b>	m	29/01	03/06	125	CC Guadalentín	06/05
	Grands Causses,Frépestel	BG1015	<b>Lausa</b>	f	04/02	08/06	124	CC Guadalentín	06/05
	Grands Causses,Frépestel	BG1017	<b>Monna</b>	f	08/02	09/06	121	CF Vallcallent	06/05
	Grands Causses,Frépestel	BG1030	<b>Buisson</b>	m	24/02	02/07	128	RFZ Haringsee	03/06
	Grands Causses,Frépestel	BG1032	<b>Cévennes</b>	m	27/02	02/07	125	CC Guadalentín	03/06
	PNR Vercors, Trechenu-Creyers	BG1022	<b>Mistral</b>	m	14/02	24/06	130	RFZ Haringsee	18/05
	PNR Vercors, Trechenu-Creyers	BG1026	<b>Elvio</b>	m	20/02	27/06	127	CC Guadalentín	18/05
	Tinença de Benifassà	BG1033	<b>Bassi</b>	m	01/03	23/06	114	CF Vallcalent	06/06
	Tinença de Benifassà	BG1040	<b>Boira</b>	f	09/03	23/07	136	CC Guadalentín	06/06
	PN Castril, Granada	BG1028	<b>Verdi</b>	m	21/02	20/06	119	CF Vallcalent	23/05
	PN Castril, Granada	BG1029	<b>Vainilla</b>	f	22/02	08/06	106	CC Guadalentín	23/05
ESP	PN Cazorla, Guadalentín	BG1018	<b>Kika</b>	f	08/02	20/06	132	RFZ Haringsee	08/05
	PN Cazorla, Guadalentín	BG1023	<b>Tramaya</b>	f	16/02	11/06	115	CC Guadalentín	24/05
	PN Cazorla, Guadalentín	BG1025	<b>Trashumancia</b>	f	18/02	20/06	122	Breeding Centre Goldau	24/05
	PN Carzola, Guadalentín	BG1036	<b>Huesitos</b>	f	07/03	11/07	126	CC Guadalentín	10/06
	PN Cazorla, Guadalentín	BG1037	<b>Siles</b>	f	07/03	15/07	130	Chomutov	10/06
	PN Cazorla, Guadalentín	BG1047	<b>Arroyo Frío</b>	m	25/03	20/07	117	CC Guadalentín	27/06
	PN Cazorla, Guadalentín	BG1049	<b>Stelvio 50</b>	m	27/03	13/07	108	CC Guadalentín	27/06

ø122 [106-136]

## 6 Reproduction in the wild

### 6.1 Breeding season 2018/2019

During the breeding season 2018/2019 the IBM partners reported 60 territorial pairs and 4 trios that showed breeding or nesting behaviour. Three of these territories were occupied for the first time in 2019: two in France (Val d'Entrauns, Pra de Pis) and one in Switzerland (Tinizong). Furthermore, in 12 of the occupied territories no clutch had been reported in previous years (Figure 2).

In the Alpine range 50 of 58 breeding units produced a clutch with a total of 43 birds hatching in these nests (86% hatch rate). Finally, 39 young Bearded Vultures fledged by the end of the summer: 14 in France, 12 in Switzerland, 10 in Italy and 3 in Austria. This is a new record number of wild fledglings for the Alps and nine fledglings more than in the previous year (Figure 3). Furthermore, it was the first breeding attempt for six of the 38 successful breeding territories and the successful reproduction in Lechtal (AUT) is the northernmost reproduction since the repopulation of the Alps with the first successful breeding in 1997.

On Corsica, breeding was reported in four out of five territories. Nevertheless, as the only hatchling died, no chick fledged in the wild in 2019 (Figure 2). As reproduction success was very low in previous years, it has been decided to preserve the unique genetic information in the captive breeding program. Therefore, both Bearded Vulture eggs were extracted from one nest and the chicks were raised in the EEP.

In the Massif Central, the two released male birds (Adonis 2014 & Layrou 2013) are showing territorial behaviour (nesting and copulation) since 2018. Even though, this couple will not be able to reproduce in this constellation it is a first sign for settling territorial birds in the region.

Similar as in previous years, the reproduction success (and productivity) varies considerably among regions with only two fledglings in the eastern (67%), four in the south-western (67%), 14 in the central (70%) and 18 in the north-western Alps (78%). The overall breeding success of 78%, however, was higher than in the last four years and considerably higher than in 2018 (66% breeding success). Furthermore, there was a considerable increase (+11%) of the overall productivity from 62% in 2018 to 73% in 2019 (Figure 4). This is the highest productivity measured since 2000 where only four pairs were actually breeding in the Alps. While breeding success describes the ratio between fledglings and clutches, productivity, defined as the ratio of fledglings over checked breeding pairs or trios, also takes into account territories occupied by mature birds that are not breeding. Therefore, productivity might be very low in a struggling population, despite high breeding success, and is thus a more accurate measure for reproductive success.

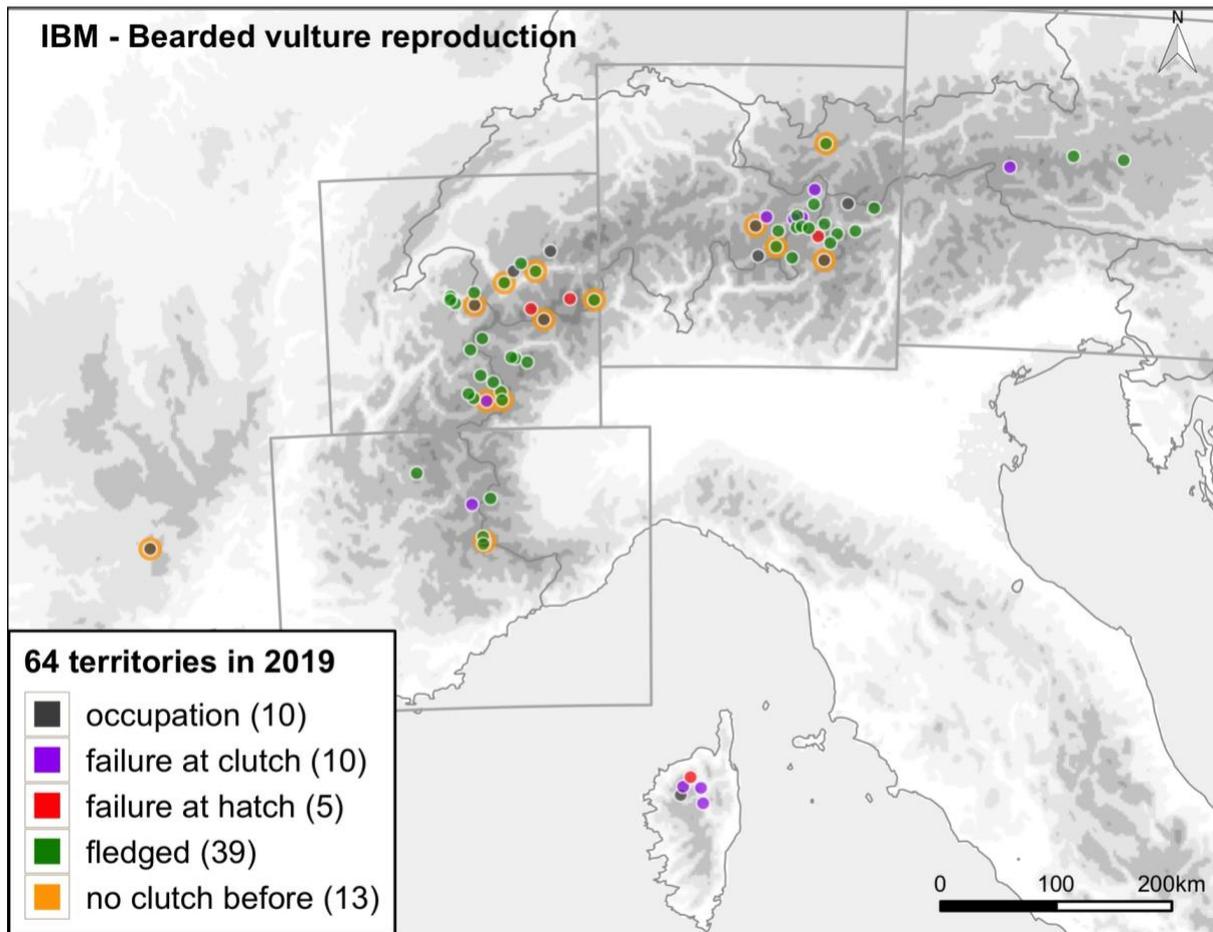


Figure 2: Reproduction status in 64 occupied territories in the Alpine range, Corsica and the Massif Central. A new breeding record of 39 fledglings was reported from the Alpine range, while there was no breeding success on Corsica in 2019. A successful reproduction in the “Lechtal” territory (AUT) is the most northern reproduction since the reintroduction of the Bearded Vulture in the Alps. In the Massif Central, the two released male birds, Layrou and Adonis, are occupying a territory (Jonte amont) for the second year. Territories where no clutch has been observed in previous years (mostly new established territories with young territorial birds) are marked with an orange outline. The rectangles represent the 4 monitoring zones: south-western Alps, north-western Alps, central Alps and eastern Alps, from left to right.

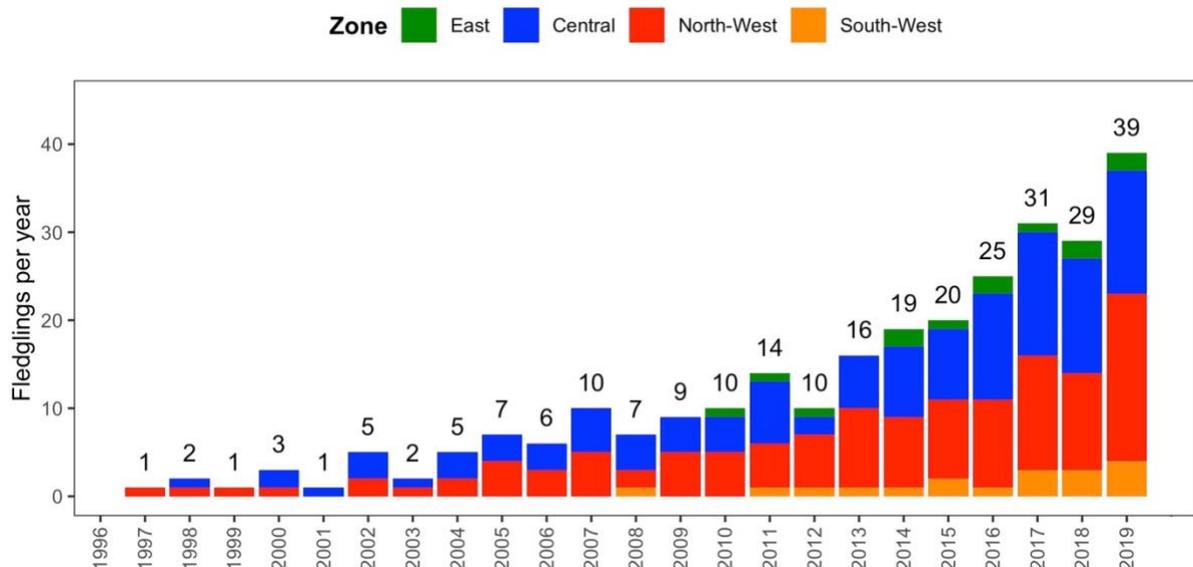


Figure 3. Fledglings per year and Alpine region, since the first reproduction in 1997.

Table 4: Breeding statistics for the season 2018/2019. See Table 2 for further details about the IBM-standards for breeding statistics.

	Zone	Potential territories	Territorial pairs	Checked pairs	Breeding pairs	Hatches	Fledglings	Failures	Breeding success	Productivity
Alpine range	<b>2019</b>	<b>58</b>	<b>54</b>	<b>54</b>	<b>50</b>	<b>43</b>	<b>39</b>	<b>11</b>	<b>78%</b>	<b>72%</b>
	East	3	3	3	3	2	2	1	67%	67%
	Central	23	20	20	19	15	14	5	74%	70%
	North-West	26	25	25	22	21	19	3	86%	76%
	South-West	6	6	6	6	5	4	2	67%	67%
	<b>2018</b>	<b>53</b>	<b>48</b>	<b>47</b>	<b>44</b>	<b>33</b>	<b>29</b>	<b>15</b>	<b>66%</b>	<b>62%</b>
	East	3	3	3	3	3	2	1	67%	67%
	Central	22	19	19	19	13	13	6	68%	68%
	North-West	23	21	20	17	14	11	6	65%	55%
	South-West	5	5	5	5	3	3	2	60%	60%
	<b>2017</b>	<b>52</b>	<b>46</b>	<b>46</b>	<b>42</b>	<b>32</b>	<b>31</b>	<b>11</b>	<b>74%</b>	<b>67%</b>
	East	3	3	3	3	1	1	2	33%	33%
	Central	21	19	19	18	15	14	4	78%	74%
North-West	22	19	19	17	13	13	4	76%	68%	
South-West	6	5	5	4	3	3	1	75%	60%	
<b>Corsica</b>										
	<b>2019</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>0%</b>	<b>0%</b>
	<b>2018</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>50%</b>	<b>20%</b>
<b>Massif Central</b>										
	<b>2019</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0%</b>	<b>0%</b>
	<b>2018</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0%</b>	<b>0%</b>

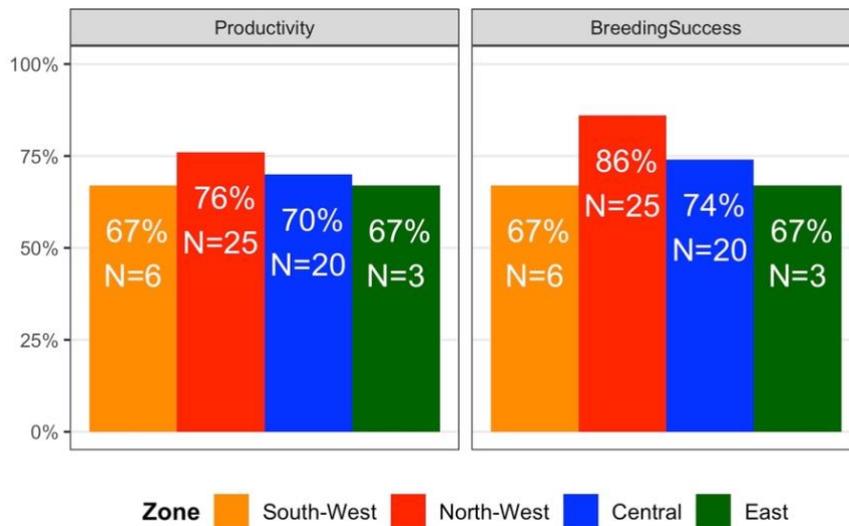


Figure 4: Productivity and breeding success vary within the different alpine zones with the highest productivity and breeding success in the north-western Alpine. Note that sample size (breeding territories) N varies considerably among regions. See Table 2 for further details about the IBM-standards for breeding statistics.

Table 5: Reproduction in the eastern and central Alpine range. Territories with no clutch in previous years are marked with an asterisk (\*).

	Territory	Nest	Parent 1	Parent 2	Parent 3	Clutch	Hatch	Fledge	Failure	Chick	First clutch	First fledge	Total clutches	Total fledglings
<b>Alps total</b>	<b>58</b>	<b>53</b>	<b>58</b>	<b>58</b>	<b>4</b>	<b>50</b>	<b>43</b>	<b>39</b>	<b>11</b>	<b>43</b>	<b>1996</b>	<b>1997</b>	<b>400</b>	<b>273</b>
<b>Eastern Alps</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2001</b>	<b>2010</b>	<b>32</b>	<b>13</b>
<b>AUT</b>	Gastein/Rauris	known	Andreas Hofer	Alexa	-	10/01 (±10)	10/03 (±10)	25/07	-	Kruml6 (W291)	2003	2010	17	6
	Katschberg	known	Hubertus 2	Romariss	-	16/01 (±3)	14/03 (±3)	15/07	-	Katschberg2019 (W295)	2010	2012	10	7
	Prägraten	known	adult	adult	-	01/03 (±10)	-	-	14/05	-	2018	-	2	0
<b>Central Alps</b>	<b>23</b>	<b>20</b>	<b>23</b>	<b>23</b>	<b>0</b>	<b>19</b>	<b>15</b>	<b>14</b>	<b>5</b>	<b>15</b>	<b>1998</b>	<b>1998</b>	<b>162</b>	<b>118</b>
<b>AUT</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2019</b>	<b>2019</b>	<b>1</b>	<b>1</b>
	Lechtal *	known	adult	adult	-	18/01 (±20)	19/03 (±20)	17/07 (±1)	-	Lechtal2019 (W324)	2019	2019	1	1
<b>CHE</b>	<b>14</b>	<b>13</b>	<b>14</b>	<b>14</b>	<b>0</b>	<b>12</b>	<b>8</b>	<b>8</b>	<b>4</b>	<b>8</b>	<b>2007</b>	<b>2007</b>	<b>83</b>	<b>60</b>
	Albula	known	Tantermozza	Diana-Stelvio	-	24/12 (±1)	20/02 (±1)	06/06 (±1)	-	Albula2019 (W281)	2008	2008	12	9
	Bergün	known	wild-hatched (≥6.cy)	wild-hatched (≥6.cy)	-	05/03 (±6)	-	-	20/04	-	2016	2016	4	3
	Buffalora	known	Ingenius	Retia	-	10/01 (±8)	05/03 (±8)	27/06 (±10)	-	Buffalora2019 (W304)	2017	2017	3	2
	Foraz	known	wild-hatched (≥6.cy)	GT031	-	15/01 (±7)	01/03 (±10)	22/06 (±7)	-	Foraz2019 (W311)	2012	2014	8	6
	Maloja	-	Rurese	Folio	-	-	-	-	-	-	2015	2016	4	1
	Ofenpass	known	Livigno	Ortler	-	19/01 (±5)	10/03 (±5)	02/07 (±8)	-	Ofenpass2019 (W305)	2007	2007	10	9
	Ova Spin	known	wild-hatched (≥6.cy)	wild-hatched (≥6.cy)	-	01/01 (±3)	24/02 (±3)	15/06	-	Ova Spin2019 (W283)	2015	2018	4	2
	Pontresina *	known	adult	adult	-	01/02 (±20)	25/03 (±20)	25/07 (±15)	-	Pontresina2019 (W322)	-	-	-	-
	Poschiavo	known	GT057	GT038	-	13/01 (±1)	08/03 (±2)	02/07 (±8)	-	Poschiavo2019 (W308)	2013	2013	7	7
	Sinestra	known	Samuel	Moische-Livigno	-	15/01 (±10)	-	-	03/03 (±30)	-	2012	2013	8	6
	Spöl	known	adult	adult	-	10/02 (±4)	-	-	20/03 (±6)	-	2014	2014	6	4
	Tantermozza	known	Zebra	adult	-	05/01 (±9)	-	-	10/03 (±15)	-	2007	2007	13	9
	Tinizong *	known	adult	adult	-	-	-	-	-	-	-	-	-	-
Trupchun	known	adult	adult	-	10/02 (±8)	20/03 (±5)	08/07 (±10)	-	Trupchun2019 (W306)	2017	2019	3	1	
<b>ITA</b>	<b>8</b>	<b>6</b>	<b>8</b>	<b>8</b>	<b>0</b>	<b>6</b>	<b>6</b>	<b>5</b>	<b>1</b>	<b>6</b>	<b>1998</b>	<b>1998</b>	<b>78</b>	<b>57</b>
<b>ITA</b>	Livigno	known	Cic	Moische	-	24/01	19/03	12/07	-	Livigno2019 (W298)	1999	2000	21	17
	Ortler	known	adult	Jo	-	23/01	18/03	08/07	-	Stelvio2019 (W296)	2016	2017	4	2
	Planeil	-	Blick	adult	-	-	-	-	-	-	2013	-	5	0
	Schnals	known	subadult (5./6.cy)	adult	-	17/01 (±1)	13/03 (±1)	04/07	-	Schnals2019 (W293)	2013	2018	3	2
	Sondalo *	-	adult	adult	-	-	-	-	-	-	-	-	-	-
	Val Martello	known	adult	Temperatio	-	18/01 (±1)	13/03 (±1)	15/06 (±1)	-	Martello2019 (W294)	2015	2015	5	5
	Valle del Braulio	known	Tell	Stift	-	10/12 (±1)	02/02 (±1)	-	26/02 (±16)	Braulio2019 (W286)	1998	1998	22	15
	Zebra	known	Heinz-Serraglio	Felice	-	23/12 (±3)	15/02 (±3)	17/06 (±1)	-	Zebra2019 (W287)	2002	2002	17	15

Table 6: Reproduction in the north- and south-western Alpine range. Territories with no clutch in previous years are marked with an asterisk (\*).

	Territory	Nest	Parent 1	Parent 2	Parent 3	Clutch	Hatch	Fledge	Failure	Chick	First clutch	First fledge	Total clutches	Total fledglings
NW Alps	26	24	26	26	3	22	21	19	3	21	1996	1997	178	123
	8	6	8	8	1	6	6	4	2	6	2007	2007	32	23
CHE	Bagnes	known	adult	adult	-	15/01 (±30)	15/03 (±30)	-	03/06	Bagnes2019 (W315)	2016	2016	3	2
	Coude du Rhône *	known	adult	adult	-	01/02 (±30)	01/04 (±30)	02/09	-	Norbert (W318)	-	-	-	-
	Derborence_down	-	Swaro	Gilbert	-	15/01 (±30)	15/03 (±30)	13/07 (±30)	-	Derborence_down2019 (W326)	2012	2012	8	7
	Derborence_Vérouet	-	Pablo	Guillaume	Gildo	-	-	-	-	-	2007	2007	9	6
	Leukerbad	known	adult	wild-hatched (≥6.cy)	-	-	-	-	-	-	2012	2015	4	2
	Saas *	known	subad / adult (?)	subad / adult (?)	-	18/02 (±30)	18/04 (±30)	01/07 (±1)	-	Saas2019 (W317)	-	-	-	-
	Sionne *	known	subad / adult (?)	adult	-	20/01 (±30)	22/03 (±30)	17/07 (±2)	-	Tseuzier (W320)	-	-	-	-
Zermatt	known	Smaragd	adult	-	01/01 (±20)	01/03 (±20)	-	30/05	Zermatt2019 (W323)	2016	2016	4	3	
	12	12	12	12	1	11	10	10	1	10	1996	1997	120	80
FRA	Andagne	known	Nonno Bob	adult	-	30/01 (±7)	22/03 (±7)	19/07	-	Désiré (W325)	2011	2014	6	2
	Aravis	known	wild-hatched (≥6.cy)	wild-hatched (≥6.cy)	-	30/12 (±3)	19/02 (±3)	27/06 (±1)	-	Aravis2019 (W280)	2006	2009	14	8
	Bargy	known	wild-hatched (≥6.cy)	wild-hatched (≥6.cy)	adult	28/01 (±5)	23/03 (±3)	25/07	-	Pierro (W301)	1996	1997	23	18
	Bargy BIS	known	wild-hatched (≥6.cy)	adult	-	23/01 (±1)	19/03 (±2)	06/07 (±3)	-	Flysch (W297)	2016	2017	4	3
	Bourg-Saint-Maurice	known	adult	adult	-	31/12	03/03 (±3)	27/06	-	Dédé (W312)	2016	2017	4	3
	Passy *	known	adult	adult	-	-	-	-	-	-	-	-	-	-
	Peisey-Nancroix	known	adult	adult	-	04/01 (±1)	08/03	12/07	-	Altitude (W313)	2005	2005	15	12
	Pra de pis *	known	adult	adult	-	23/01	-	-	26/02	-	2018	-	-	-
	Pralognan	known	adult	adult	-	26/01 (±3)	22/03	17/07	-	Arvi (W316)	2018	2018	2	2
	Sixt Fiz	known	adult	adult	-	14/01 (±2)	09/03 (±2)	08/07 (±1)	-	Sixt Buet (W285)	2007	2009	13	8
Termignon	known	adult	adult	-	24/12	17/02	21/06	-	Pelua (W310)	2002	2002	18	13	
Val disère	known	adult	adult	-	21/01	12/03 (±6)	06/07	-	Ayla (W314)	1999	2002	20	11	
	6	6	6	6	1	5	5	5	0	5	2010	2012	26	20
ITA	Bionaz *	known	adult	adult	-	-	-	-	-	-	-	-	-	-
	Chamoussière	known	Michegabri	adult	-	24/02	20/03	22/07	-	Chamoussière2019 (W300)	2011	2012	9	7
	Usseglio *	known	adult	subadult (5./6.cy)	-	15/02 (±1)	13/04 (±1)	18/08	-	Belavri (W288)	-	-	-	-
	Val di Rhemes	known	adult	adult	adult	30/01	08/04 (±2)	05/07 (±3)	-	Rhemes2019 (W307)	2010	2012	9	7
	Valdigne	known	adult	adult	-	02/01 (±5)	28/02 (±5)	30/06 (±4)	-	Valdigne2019 (W321)	2010	2019	2	1
Valnontey	known	adult	adult	-	29/12	23/02 (±1)	16/06 (±1)	-	Valnontey2019 (W282)	2015	2015	5	4	
SW Alps	6	6	6	6	1	6	5	4	2	5	2008	2008	27	18
FRA	Bonette	known	adult	Bellemotte	-	10/01 (±2)	04/03 (±1)	04/07 (±1)	-	Salso (W289)	2017	2017	3	3
	Chambeyron-Ubayette	known	Stephan	Cuneobirding	-	28/02 (±4)	-	-	20/04 (±4)	-	2016	-	4	0
	Malaval	known	Basalte	adult	adult	10/01 (±1)	06/03 (±1)	01/07	-	Emparis (W284)	2018	2018	2	2
	Source de la Tinée	known	Rocca	Girasole	-	15/01 (±8)	19/03 (±1)	21/07	-	Gypse (W299)	2013	2015	6	5
	Source de l'Ubaye	known	Sereno	GT036	-	15/01 (±7)	11/03 (±7)	07/07 (±3)	-	Altair (W292)	2008	2008	10	8
	Val d'Entraunes *	known	Tenao (5./6.cy)	adult	-	12/03	06/05	-	27/05	Entraunes2019 (W309)	-	-	-	-

Table 7: Reproduction in Corsica and the Massif Central. The IBM does not include reproduction data for Corsica before 2018. For the first time a Bearded Vulture territory was reported from the Massif Central. However, both territorial birds are males. Territories with no clutch in previous years are marked with an asterisk (\*).

	Territory	Nest	Parent 1	Parent 2	Parent 3	Clutch	Hatch	Fledge	Failure	Chick	First clutch	First fledge	Total clutches	Total fledglings
Corsica	5	4	5	5	0	4	1	0	4	1	2018	2018	6	1
FRA	Asco	known	Asco 1	Asco 2	-	20/01 (±4)	07/03	-	19/03	Asco2019 (W290)	2018	-	2	0
	Bonifatu	known	Bonifatu 1	Bonifatu 2	-	29/01 (±4)	-	-	11/03	-	2018	2018	2	1
	Fango	-	Fango 1	Fango 2	-	-	-	-	-	-	-	-	0	0
	Popolasca	known	Popolasca 1	Popolasca 2	-	15/01 (±10)	-	-	14/03	-	2019	-	1	0
Restonica	known	Restonica 1	Restonica 2	-	15/01 (±15)	-	-	09/04	-	2019	-	1	0	

Info: Eggs were extracted from nests in the territories "Bonifatu", "Popolasca" and "Restonica". Data reported to IE

Massif Central	1	1	1	1	0	0	0	0	0	0	-	-	0	0
FRA	Jonte amont *	Capelan 1	Layrou (≥6.cy) ♂	Adonis (≥6.cy) ♂	-	-	-	-	-	-	-	-	-	-

Info: Two male birds built a nest.

# 7 Observations

## 7.1 IBM-network & -monitoring area

Bearded Vulture observations are collected within the area of the International Bearded Vulture Monitoring (IBM) network. Regional coordinators from national parks, regional nature parks or NGO's (Table 8) are responsible for a certain area (20 areas in 2019, see Figure 5), where the professionals collect and validate reported Bearded Vulture observations that are later stored in the IBM-database.

In 2019, two new organisations became partner of the IBM-network: The Landesbund für Vogelschutz (LBV, Nr. 40) is the first partner organisation in Germany and the second organisation with main focus on the eastern Alpine range. This is an important step in order to intensify the monitoring effort in the eastern regions of the Alps and opens the possibility for an additional release site in the eastern Alpine region. The Junta de Andalusia (Nr. 41), with its own Bearded Vulture breeding station, has already contributed many birds for release within the IBM network. It has therefore been decided to intensify the good collaboration and to expand the IBM-network in the very south of Spain.

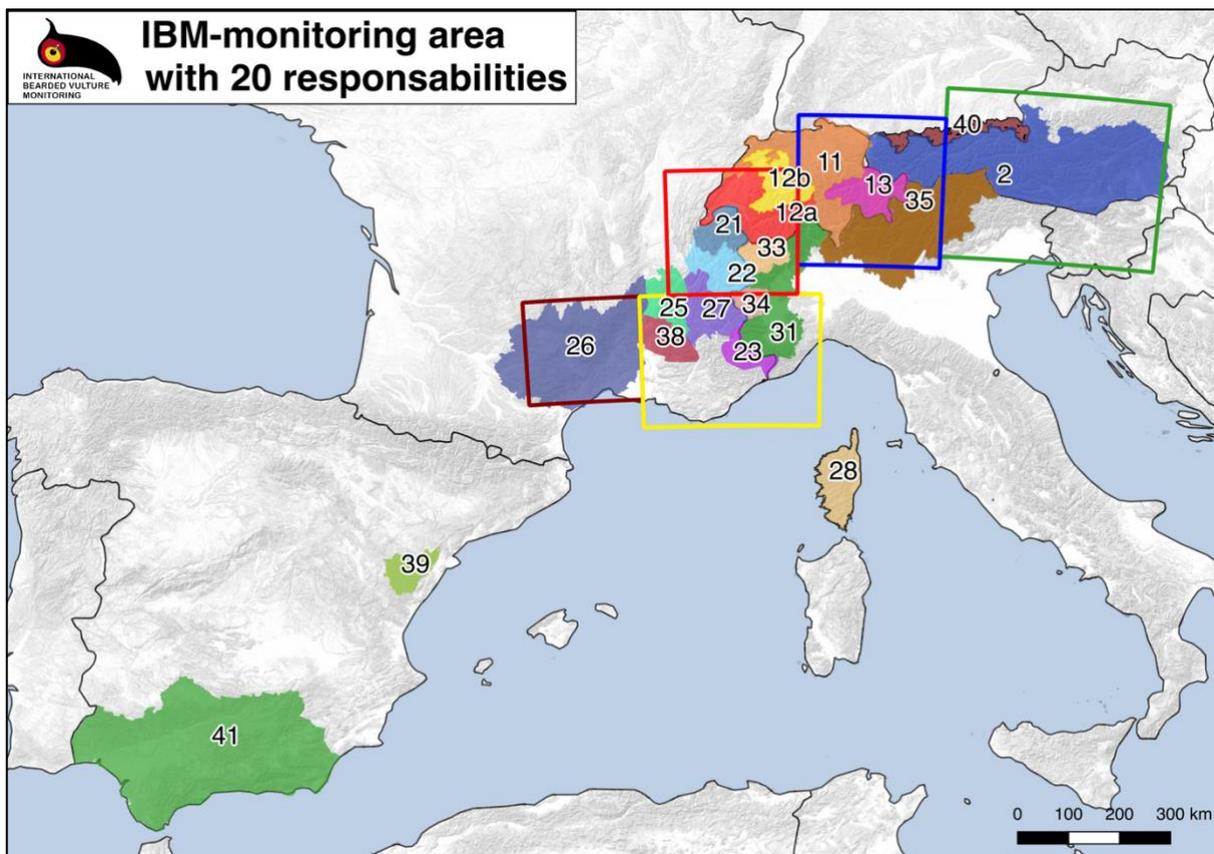


Figure 5: 20 Areas of responsibility that form the International Bearded Vulture Monitoring Network. The Junta de Andalucía (41) and the Landesbund für Vogelschutz - LBV (40) both became IBM-partners in 2019.

Table 8: IBM-partners and associated organisations (\*) that collect data within their area of responsibility.

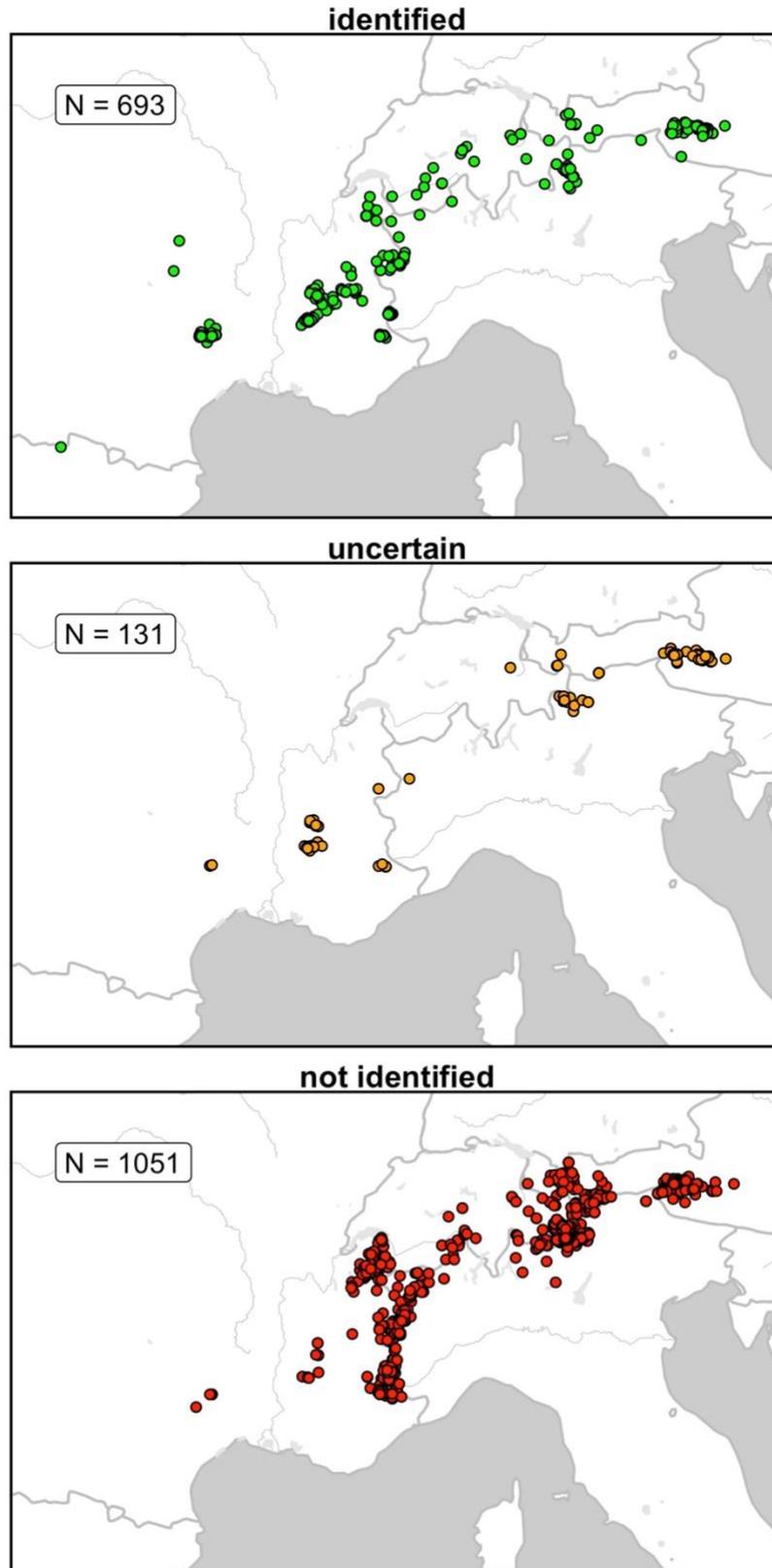
Collecting centre ID	Responsible organisation	Country
2	<i>Hohe Tauern National Park</i>	AUT
11	<i>Stiftung Pro Bartgeier Central</i>	CHE
12a	<i>Stiftung Pro Bartgeier north-west</i>	CHE
12b	<i>Stiftung Pro Bartgeier south-west</i>	CHE
13	<i>Stiftung Pro Bartgeier east</i>	CHE
21	ASTERS	FRA
22	<i>Parc National de la Vanoise</i>	FRA
23	<i>Parc National du Mercantour</i>	FRA
25	<i>Parc Naturel Régional des Vercors</i>	FRA
26	<i>LPO Grands Causses</i>	FRA
26	<i>National Park of Cevennes *</i>	FRA
28	PNR de Corse	FRA
38	<i>Association Vautours en Baronnies</i>	FRA
39	<i>Envergures Alpines *</i>	FRA
31	<i>Parco Naturale Alpi Marittime</i>	ITA
33	<i>Regione Autonoma Valle d'Aosta *</i>	ITA
34	<i>Parco Naturale Alpi Cozie</i>	ITA
35	<i>Parco Nazionale dello Stelvio</i>	ITA
39	<i>Maestrazgo - Els Ports</i>	ESP
41	<i>Junta de Andalucia</i>	ESP
40	<i>Landesbund für Vogelschutz - LBV</i>	GER

## 7.2 Visual observations

In 2019, 1'875 Bearded Vulture observations from 6 different countries in Europe have been registered in the IBM-database. For 693 (37%) observations it was possible to identify the observed individual, for 131 (7%) cases there are hypotheses about the bird's identity, while it was not possible to identify the individuals in 1'051 (56%) observations (Figure 6).

48 individuals (9 of them wild-hatched) were identified by at least one visual observation, while some birds have been observed several times in 2019. Two birds have even been observed over 50 times in 2019. The most frequently observed birds are Clapas (BG975, Baronnies 2018) with 73 and Mison (W230, Bagnes 2017) with 50 observations (Table 9).

## 1875 observations in 2019



© IBM - Status Apr 2020

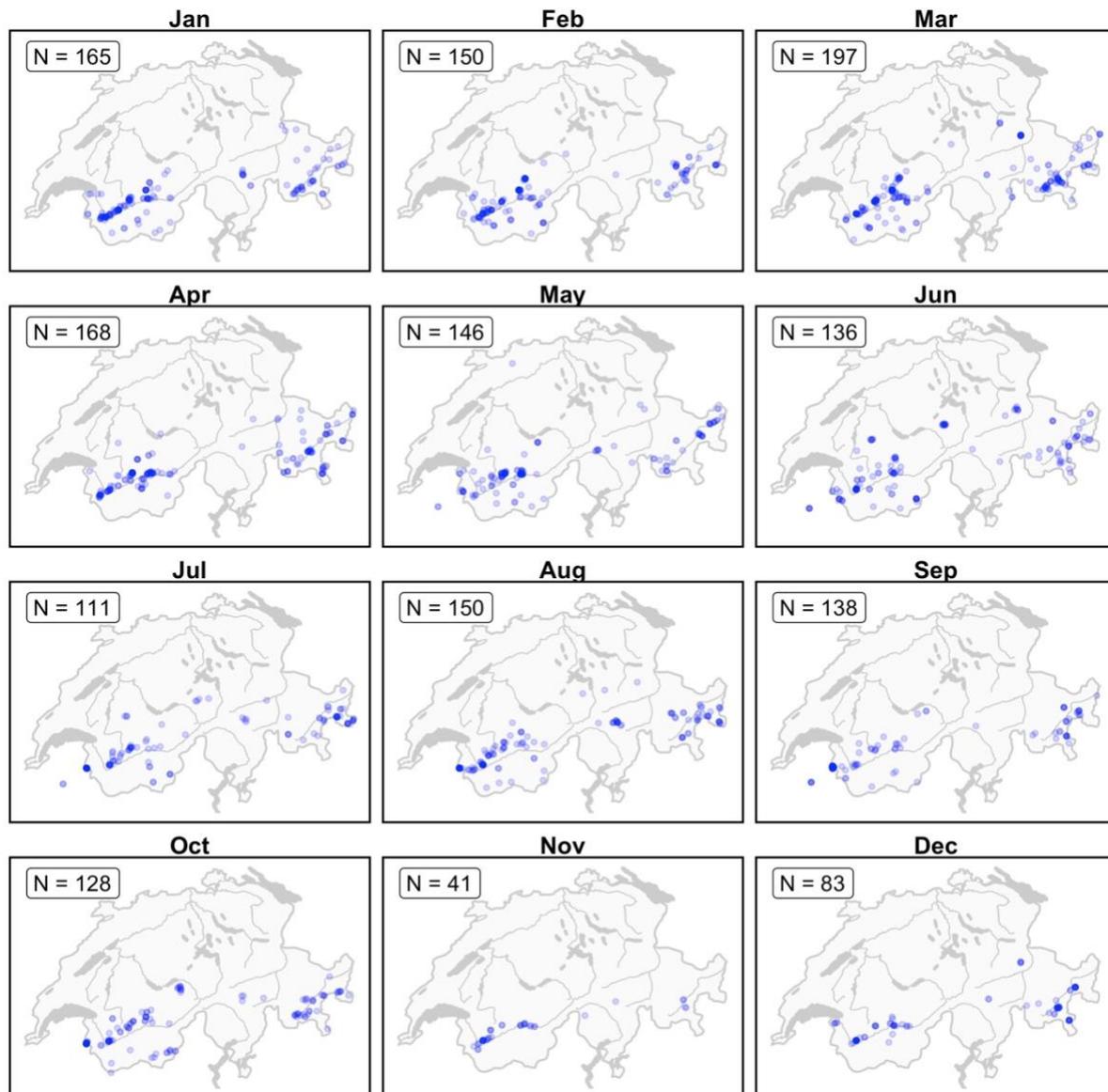
Figure 6: Overview of 1'875 Bearded Vulture observations that have been reported in 2019. In 37% of all observations the observed bird could be identified on the individual level (693 identifications).

Table 9: Overview of all 1'875 observations from 6 different countries reported in the IBM-database for the year 2019. The older a bird is and the more often it has been observed, the darker it is highlighted in green. The longer a bird has not been observed before 2019, the darker it is highlighted in red.

Bird	Sex (m/f)	Age (cy)	Last observation before 2019	Observed total	AUT	CHE	ESP	FRA	ITA	LIE	Observed in 2019
Adonis (794)	m	6	07.12.18	265	-	-	-	43	-	-	43
Alexa (100)	f	32	26.10.18	94	5	-	-	-	-	-	5
Andreas Hofer (260)	m	24	13.10.18	68	4	-	-	-	-	-	4
Arcana (954)	f	3	05.12.18	75	-	-	-	36	-	-	36
Belavri (W288)	u	1	-	30	-	-	-	-	30	-	30
Caeli (998)	m	2	10.11.18	10	-	3	-	-	5	-	8
Calandretto (948)	m	3	07.12.18	21	-	-	1	7	-	-	8
Carmen (1027)	f	1	-	35	-	-	-	35	-	-	35
Cévennes (1032)	m	1	-	11	-	-	-	11	-	-	11
Charlie (910)	f	4	29.07.18	89	38	-	-	-	-	-	38
Cic (186)	m	27	12.12.18	154	-	-	-	-	1	-	1
Cierzo (899)	m	4	13.11.18	20	-	1	-	-	-	-	1
Clapas (975)	m	2	05.12.18	93	-	-	-	73	-	-	73
Drumana (980)	m	2	27.12.18	37	-	-	-	2	1	-	3
Elvio (1026)	m	1	-	10	-	-	-	10	-	-	10
Europe (1014)	m	1	-	1	-	-	-	1	-	-	1
Felice (375)	f	19	12.12.18	67	-	-	-	-	5	-	5
Felix2 (793)	m	6	21.03.18	79	42	-	-	-	-	-	42
Finja (1003)	f	2	18.10.18	13	-	7	-	-	-	-	7
Fortuna (843)	m	5	10.07.18	33	3	-	-	-	-	-	3
Fredueili (1001)	m	2	18.10.18	9	-	-	-	1	2	-	3
Gerlinde (759)	f	7	11.05.18	183	-	-	-	3	-	-	3
Girun (904)	f	4	04.05.18	95	-	-	-	1	1	-	2
Gypsy (W209)	m	3	08.09.18	10	5	-	-	2	-	-	7
Heinz-Serraglio (W45)	u	13	12.12.18	8	-	-	-	-	4	-	4
Johannes (964)	m	3	15.10.18	17	-	4	-	-	-	-	4
Kasimir (991)	m	2	17.11.18	14	11	-	-	-	-	-	11
Kirsi (764)	m	7	30.11.18	77	-	-	-	19	-	-	19
Kruml5 (W245)	u	2	15.12.18	13	1	-	-	-	2	-	3
Kruml6 (W291)	u	1	-	4	4	-	-	-	-	-	4
Lapie (W251)	m	2	-	4	-	-	-	4	-	-	4
Lausa (1015)	f	1	-	22	-	-	-	22	-	-	22
Layrou (761)	m	7	27.12.18	267	-	-	-	31	-	-	31
Lea (840)	m	5	08.12.18	64	26	-	-	-	-	-	26
Léoux (950)	f	3	07.04.18	19	-	-	-	-	4	-	4
Lucky (909)	m	4	12.09.18	62	3	-	-	-	-	-	3
Madagaskar (665)	m	9	22.06.14	52	1	-	-	-	-	-	1
Mison (W230)	f	3	29.12.18	198	-	-	-	50	-	-	50
Mistral (1022)	m	1	-	13	-	-	-	13	-	-	13
Moische (146)	f	29	12.12.18	193	-	-	-	-	1	-	1
Neige (W198)	m	4	01.07.18	12	-	-	-	2	-	-	2
Pamela (1031)	f	1	-	23	-	-	-	23	-	-	23
Pelua (W310)	u	1	-	1	-	-	-	1	-	-	1
Roman (854)	m	5	03.10.17	53	-	-	-	-	27	-	27
Sardona (624)	m	10	18.06.18	114	-	3	-	-	-	-	3
Sempach 2 (841)	f	5	06.01.18	39	-	-	-	1	-	-	1
Simay (983)	m	2	11.12.18	51	-	-	-	9	4	-	13
Stift (393)	f	18	17.09.18	28	-	-	-	-	4	-	4
Tell (283)	m	23	23.11.17	74	-	-	-	-	4	-	4
Tenao (755)	m	7	18.12.18	95	-	-	-	15	-	-	15
Trudi (842)	f	5	27.07.18	50	-	1	-	-	-	-	1
Veronika (321)	f	21	17.08.18	89	-	2	-	-	-	-	2
Volcaire (905)	m	4	25.12.18	126	-	-	-	18	-	-	18
unknown					310	16	-	202	653	1	1182
<b>Total</b>		<b>31/17</b>			<b>453</b>	<b>37</b>	<b>1</b>	<b>635</b>	<b>748</b>	<b>1</b>	<b>1875</b>

### 7.2.1 Ornitho.ch data

Another 1'601 Bearded Vulture observations have been reported on the swiss ornithologist reporting platform *ornitho.ch*. Even though these observations were not validated by professional observers such as the regional IBM-coordinators, these observations deliver information about Bearded Vulture hotspots and future focal areas (Figure 7).



© IBM - Status Apr 2020

Figure 7. All observations classified as Bearded Vulture observations on *Ornitho.ch* in 2019. The points are shown with 20% coverage, so five overlapping observations appear in dark blue.

## 7.3 Unusual observations

### 7.3.1 Identified observations

#### 7.3.1.1 Lausa and Europe

During September the two juvenile birds Lausa (BG1015; 25.09.2019) and Europe (BG1014; 21.09.2019) were observed several kilometres north from their release site in the “Parc Naturel Régional de Volcans d’Auvergne”. Observations in these regions are rather rare and indicate that the young animals are exploring their new environment, see also 8.3.2.2 for Lausa. Both birds were released in Grands Causses (FRA) on the 6.05.2019.

#### 7.3.1.2 Calandretto in the Pyrenees

Calandretto (BG0948) was observed in the Pyrenees in the “Parque Natural Posets-Maladeta” on 24.11.2019. This was already his second trip to Spain after a first short trip in 2018 before returning to the Grand Causses (FRA) where he stayed from December 2018 to March 2019. As the young male has lost his GPS-tag in May 2019, this observation was a great relief for the releasing team in Grands Causses.

### 7.3.2 Non-identified observations

#### 7.3.2.1 White Bearded Vulture

On the 5.11.2019 an uncoloured Bearded Vulture was photographed in Val di Rhemes in the Aosta valley (ITA) by a wildlife photographer André Roveyaz (picture). The same individual was first observed on 11.06.2019 in Valgrisenche (ITA) and then again at the end of October 2019 in the area of Brissogne, Les Laures Valley (ITA). White Bearded Vultures seem to be relatively common in some mountain ranges such as the High Atlas in Morocco or the Himalayas but are a relatively unusual sight in the Alps.



## 7.4 Individual identification

Thanks to the sophisticated marking system of the IBM, it was possible to identify 160 Bearded Vultures in 2019 (Annexe Table 10, Table 11 and Table 12). Data from observations, the reproduction monitoring, telemetry as well as the IOD were used to gain valuable information about Bearded Vultures on the individual level.

This information allows to draw conclusions about the life history of individuals, which forms the basis for survival analyses in order to better understand and manage the reintroduction process of this endangered species. Furthermore, such life history data is essential for population modelling and predictions about the development of the Bearded Vulture population.

Table 10. List of all birds that have been identified in 2019 with "origin" in the eastern and central Alpine range. Wild-hatched birds are marked with a prefixed "W" or "GT" in the BirdID. "Identification" describes the data basis that was used for their record: r = reproduction, i = IOD, t = telemetry, o = observation. Sorted by their region of origin (territory or release site). \* = territory of hatch from juvenile birds from 2019.

Name	BirdID	Sex	Hatch	Death	Age (cy)	Origin (release site / territory / country)	Zone	Territory (2019)	Identification
<b>Eastern and central Alpine range</b>									<b>63</b>
Kruml6	W291	u	2019		1	Gastein/Rauris		Gastein/Rauris (AUT)*	r,o,i
Kruml5	W245	u	2018		2	Gastein/Rauris			o,t
Katschberg2019	W295	u	2019		1	Katschberg		Katschberg (AUT)*	r
Felix2	793	m	2014		6	NP Hohe Tauern, Debantal			o,i,t
Fortuna	843	m	2015		5	NP Hohe Tauern, Dorfertal			o,t
Lea	840	m	2015		5	NP Hohe Tauern, Dorfertal			o,i,t
Smaragd	675	m	2011		9	NP Hohe Tauern, Habachtal		Zermatt (CHE)	r,i
Romaris	528	f	2007		13	NP Hohe Tauern, Kals	AUT	Katschberg (AUT)	r
Hubertus 2	446	m	2004		16	NP Hohe Tauern, Kals		Katschberg (AUT)	r
Caeli	998	m	2018		2	NP Hohe Tauern, Mallnitz			o,i,t
Kasimir	991	m	2018		2	NP Hohe Tauern, Mallnitz			o,t
Rurese	559	m	2008		12	NP Hohe Tauern, Rauris		Maloja (CHE)	r
Andreas Hofer	260	m	1996		24	NP Hohe Tauern, Rauris		Gastein/Rauris (AUT)	r,o,i
Alexa	100	f	1988		32	NP Hohe Tauern, Rauris		Gastein/Rauris (AUT)	r,o,i
Charlie	910	f	2016		4	NP Hohe Tauern, Untersulzbachtal			o,i
Lucky	909	m	2016		4	NP Hohe Tauern, Untersulzbachtal			o,t
Temperatio	495	f	2006		14	NP Stifiserjoch, Martell		Val Martello (ITA)	r
Ortler	439	f	2004		16	NP Stifiserjoch, Martell		Ofenpass (CHE)	r,i
Stift	393	f	2002		18	NP Stifiserjoch, Martell	ITA	Valle del Braulio (ITA)	r,o,i
Retia	357	f	2000		20	NP Stifiserjoch, Martell		Buffalora (CHE)	r,i
Lechtal2019	W324	u	2019		1	Lechtal	AUT	Lechtal (AUT)*	r,i
Viva-Albula	W281	u	2019		1	Albula		Albula (CHE)*	r
Waylai-Buffalora	W304	u	2019		1	Buffalora		Buffalora (CHE)*	r
Noel-Leya	797	m	2014		6	Calfeisen, Vaettis			t
Schils	802	m	2014		6	Calfeisen, Vaettis			t
Madagaskar	665	m	2011		9	Calfeisen, Vaettis			o
Ingenius	621	m	2010		10	Calfeisen, Vaettis		Buffalora (CHE)	r,i
Sardona	624	m	2010		10	Calfeisen, Vaettis			o,i
Gitte-Foraz	W311	u	2019		1	Foraz		Foraz (CHE)*	r
Finja	1003	f	2018		2	Melchsee-Frutt			o,t
Fredueli	1001	m	2018		2	Melchsee-Frutt			o,i,t
Johannes	964	m	2017		3	Melchsee-Frutt			o,t
Gierzo	899	m	2016		4	Melchsee-Frutt			o,t
Ewolina	838	f	2015		5	Melchsee-Frutt			t
Sempach 2	841	f	2015		5	Melchsee-Frutt			o,t
Trudi	842	f	2015		5	Melchsee-Frutt			o,t
Blick	524	m	2007		13	NP Engadin, Zernez		Planeil (ITA)	r
Samuel	526	m	2007		13	NP Engadin, Zernez	CHE	Sinestra (CHE)	r,i
Folio	463	f	2005		15	NP Engadin, Zernez		Maloja (CHE)	r
Felice	375	f	2001		19	NP Engadin, Zernez		Zebbru (ITA)	r,o,i
Veronika	321	f	1999		21	NP Engadin, Zernez			o,t
Gildo	299	f	1998		22	NP Engadin, Zernez		Derborence_Véroutet (CHE)	r
Tell	283	m	1997		23	NP Engadin, Zernez		Valle del Braulio (ITA)	r,o,i
Cic	186	m	1993		27	NP Engadin, Zernez		Livigno (ITA)	r,o,i
Jo	169	f	1992		28	NP Engadin, Zernez		Ortler (ITA)	r
Moische	146	f	1991		29	NP Engadin, Zernez		Livigno (ITA)	r,o,i
Aithon-Ofenpass	W305	u	2019		1	Ofenpass		Ofenpass (CHE)*	r
Heinz-Serraglio	W45	u	2007		13	Ofenpass		Zebbru (ITA)	r,o,i
Ova Spin2019	W283	u	2019		1	Ova Spin		Ova Spin (CHE)*	r
Anna-Pontresina	W322	u	2019		1	Pontresina		Pontresina (CHE)*	r
Poschiavo2019	W308	u	2019		1	Poschiavo		Poschiavo (CHE)*	r
Tantermozza	W46	m	2007	10.05.19	12	Tantermozza		Albula (CHE)	r
Annelies-Trupchun	W306	u	2019		1	Trupchun		Trupchun (CHE)*	r
Livigno2019	W298	u	2019		1	Livigno		Livigno (ITA)*	r
Moische-Livigno	W11	f	2002		18	Livigno		Sinestra (CHE)	r
Livigno	W08	m	2000		20	Livigno		Ofenpass (CHE)	r,i
Fleck	W296	u	2019		1	Ortler		Ortler (ITA)*	r
Schnals2019	W293	u	2019		1	Schnals		Schnals (ITA)*	r
Altkaser-Martello	W294	u	2019		1	Val Martello	ITA	Val Martello (ITA)*	r
Diana-Stelvio	W07	f	2000		20	Valle del Braulio		Albula (CHE)	r,i
Stelvio	W02	u	1998		22	Valle del Braulio			i
Zebbru2019	W287	u	2019		1	Zebbru		Zebbru (ITA)*	r
Zebbru	W12	m	2002		18	Zebbru		Tantermozza (CHE)	r,i

Table 11. List of all birds that have been identified in 2019 with "origin" in the north- and south-western Alpine range. Wild-hatched birds are marked with a prefixed "W" or "GT" in the BirdID. "Identification" describes the data basis that was used for their record: r = reproduction, i = IOD, t = telemetry, o = observation. Sorted by their region of origin (territory or release site). \* = territory of hatch from juvenile birds from 2019.

Name	BirdID	Sex	Hatch	Death	Age (cy)	Origin (release site / territory / country)	Zone	Territory (2019)	Identification	
<b>North-western and south-western Alpine range</b>										
Mison	W230	f	2017		3	Bagnes			o,t	
Norbert	W318	u	2019		1	Coude du Rhône	CHE	Coude du Rhône (CHE)*	r,i	
Derborence_down2019	W326	u	2019		1	Derborence_down		Derborence_down (CHE)*	r	
Saas2019	W317	u	2019		1	Saas		Saas (CHE)*	r	
Désiré	W325	u	2019		1	Andagne		Andagne (FRA)*	r,i	
Aravis2019	W280	u	2019		1	Aravis		Aravis (FRA)*	r,t	
Gypsy	W209	m	2017		3	Aravis			o,t	
Neige	W198	m	2016		4	Aravis			o,t	
Pierro	W301	u	2019		1	Bargy		Bargy (FRA)*	r	
Lapie	W251	m	2018		2	Bargy			o,t	
Gemapi	W196	f	2016		4	Bargy			t	
Flysch	W297	u	2019		1	Bargy BIS		Bargy BIS (FRA)*	r	
Bourg-St-Maurice2019	W312	u	2019		1	Bourg-Saint-Maurice	FRA	Bourg-Saint-Maurice (FRA)*	r	
Pablo	359	m	2000		20	Haute-Savoie, Bargy		Derborence_Vérouet (CHE)	r	
Swaro	459	m	2005		15	Haute-Savoie, Doran		Derborence_down (CHE)	r	
Gilbert	440	f	2004		16	Haute-Savoie, Doran		Derborence_down (CHE)	r	
Altitude	W313	u	2019		1	Peisey-Nancroix		Peisey-Nancroix (FRA)*	r,i,t	
Pralognan2019	W316	u	2019		1	Pralognan		Pralognan (FRA)*	r	
Sixt Buet	W285	u	2019		1	Sixt Fiz		Sixt Fiz (FRA)*	r,t	
Pelua	W310	u	2019		1	Termignon		Termignon (FRA)*	r,o	
Iserre2019	W314	u	2019		1	Val dlsère		Val dlsère (FRA)*	r	
Chamoussière2019	W300	u	2019		1	Chamoussière		Chamoussière (ITA)*	r	
Tseuzier-Sionne	W320	u	2019		1	Sionne	Sionne (CHE)*	r		
Belavri	W288	u	2019		1	Usseglio	ITA	Usseglio (ITA)*	r,o,i	
Rhemes2019	W307	u	2019		1	Val di Rhemes		Val di Rhemes (ITA)*	r	
Valdigne2019	W321	u	2019		1	Valdigne		Valdigne (ITA)*	r	
Valnontey2019	W282	u	2019		1	Valnontey		Valnontey (ITA)*	r	
Carmen	1027	f	2019		1	Baronnies, Léoux Valley			o,t	
Pamela	1031	f	2019		1	Baronnies, Léoux Valley			o,i,t	
Clapas	975	m	2018		2	Baronnies, Léoux Valley			o,i,t	
Drumana	980	m	2018		2	Baronnies, Léoux Valley			o,t	
Simay	983	m	2018		2	Baronnies, Léoux Valley			o,i,t	
Léoux	950	f	2017		3	Baronnies, Léoux Valley			o,t	
Girun	904	f	2016		4	Baronnies, Léoux Valley			o,i,t	
Volcaire	905	m	2016		4	Baronnies, Léoux Valley			o	
Salso	W289	u	2019		1	Bonette		Bonette (FRA)*	r	
Emparis	W284	u	2019		1	Malaval		Malaval (FRA)*	r,t	
Tenao	755	m	2013		7	PN du Mercantour, Vignols	FRA	Val dEntraunes (FRA)	r,o,i,t	
Rocca	516	m	2007		13	PN du Mercantour, Vignols		Source de la Tinée (FRA)	r	
Guillaumes	411	f	2003		17	PN du Mercantour, Vignols		Derborence_Vérouet (CHE)	r	
Gelas	279	f	1997		23	PN du Mercantour, Vignols			i	
Elvio	1026	m	2019		1	PNR Vercors, Trechenu-Creyers				o,i,t
Mistral	1022	m	2019		1	PNR Vercors, Trechenu-Creyers				o,t
Gerlinde	759	f	2013		7	PNR Vercors, Trechenu-Creyers				o
Kirsi	764	m	2013		7	PNR Vercors, Trechenu-Creyers				o,i
Bellemotte	708	f	2012		8	PNR Vercors, Trechenu-Creyers			Bonette (FRA)	r,i
Stephan	616	m	2010		10	PNR Vercors, Trechenu-Creyers			Chambeyron-Ubayette (FRA)	r,i
Gypse	W299	u	2019		1	Source de la Tinée		Source de la Tinée (FRA)*	r	
Altair	W292	u	2019		1	Source de IUbaye		Source de IUbaye (FRA)*	r	
Roman	854	m	2015		5	PN Alpi Marittime, Argentera			o,i,t	
Girasole	549	f	2008		12	PN Alpi Marittime, Argentera		Source de la Tinée (FRA)	r	
Nonno Bob	548	m	2008		12	PN Alpi Marittime, Argentera		Andagne (FRA)	r,i	
Cuneobirding	491	f	2006		14	PN Alpi Marittime, Argentera		Chambeyron-Ubayette (FRA)	r,i	
Michegabri	488	m	2006		14	PN Alpi Marittime, Argentera		Chamoussière (ITA)	r	
Sereno	348	m	2000		20	PN Alpi Marittime, Argentera		Source de IUbaye (FRA)	r,i	

Table 12: List of all birds that have been identified in 2019 with "origin" in the Massif Central, the French Pyrenees, Corsica and Spain. Wild-hatched birds are marked with a prefixed "W" or "GT" in the BirdID. "Identification" describes the data basis that was used for their record: r = reproduction, i = IOD, t = telemetry, o = observation. Sorted by their region of origin (territory or release site). \* = territory of hatch from juvenile birds from 2019.

Name	BirdID	Sex	Hatch	Death	Age (cy)	Origin (release site / territory / country)	Zone	Territory (2019)	Identification
<b>Massif central and French Pyrenees</b>									<b>11</b>
Arcana	954	f	2017		3	Grands Causses, Trévezel			o,i,t
Calandreto	948	m	2017		3	Grands Causses, Trévezel			o,t
Layrou	761	m	2013		7	Grands Causses, Trévezel		Jonte amont (FRA)	r,o,i,t
Buisson	1030	m	2019	04.07.19	1	Grands Causses, Frépestel			t
Cévennes	1032	m	2019		1	Grands Causses, Frépestel	FRA		o,i,t
Europe	1014	m	2019	04.10.19	1	Grands Causses, Frépestel			o,t
Lausa	1015	f	2019		1	Grands Causses, Frépestel			o,i,t
Monna	1017	f	2019	20.07.19	1	Grands Causses, Frépestel			t
Adonis	794	m	2014		6	Grands Causses, Frépestel		Jonte amont (FRA)	r,o,i,t
Basalte	716	m	2012		8	Grands Causses, Frépestel		Malaval (FRA)	r,i
Roc Genèse	GT086	m	2016		4		FRA	Pyrenees	t
<b>Corsica</b>									<b>14</b>
Bonifatu2018	W271	u	2018	11.12.19	1	Bonifatu			t
Cintu	1042	m	2019		1	Corsica, Niolo Valley			t
Orba	1041	f	2019		1	Corsica, Niolo Valley			t
Ercu	958	m	2017		3	Corsica, Niolo Valley			t
Luna	959	f	2017		3	Corsica, Niolo Valley			t
Muntagnolu	890	m	2016		4	Corsica, Niolo Valley			t
Asco 1		u					FRA	Asco (FRA)	r
Asco 2		u						Asco (FRA)	r
Bonifatu 1		u						Bonifatu (FRA)	r
Bonifatu 2		u						Bonifatu (FRA)	r
Fango 2		u						Fango (FRA)	r
Popolasca 2		u						Popolasca (FRA)	r
Restonica 1		u						Restonica (FRA)	r
Restonica 2		u						Restonica (FRA)	r
<b>Andalusia &amp; Maestrazgo</b>									<b>17</b>
Huesitos	1036	f	2019		1	PN Carzola, Guadalentín			i
Suerte Somera	990	f	2018		2	PN Castril, Granada			i
Guadalquivir	751	m	2013		7	PN Cazorla, Canalejas			i
Vera	752	f	2013		7	PN Cazorla, Canalejas			i
Tono	486	m	2006		14	PN Cazorla, Centenares			i
Arroyo Frío	1047	m	2019	27.06.19	1	PN Cazorla, Guadalentín			i
Kika	1018	f	2019		1	PN Cazorla, Guadalentín	ESP		i
Siles	1037	f	2019	10.06.19	1	PN Cazorla, Guadalentín			i
Iruela	984	m	2018		2	PN Cazorla, Tornillos de Gualay			i
Cleo	967	f	2017		3	PN Cazorla, Tornillos de Gualay			i
Pozo Alcón	888	m	2016		4	PN Cazorla, Tornillos de Gualay			i
Miguel	800	m	2014		6	PN Cazorla, Tornillos de Gualay			i
Hans	W302	m	2019		1				i
Bassi	1033	m	2019		1	Tinença de Benifassà			t
Boira	1040	f	2019		1	Tinença de Benifassà	ESP		t
Alos	992	m	2018		2	Tinença de Benifassà			t
Amic	995	m	2018		2	Tinença de Benifassà			t

## 7.5 Population estimate based on IOD 2019

With a favourable weather situation at 91% of the 696 occupied observation sites, more than 1'146 participants joined the IOD 2019 and reported 832 Bearded Vulture observations. Monitoring a mobile species such as the Bearded Vulture on a European wide scale, is challenging and would not be possible without the effort and expertise of the regional coordinators of all IBM-partners and associated organisations. Furthermore, experts that are familiar with the local situation, form a key function in order to give an estimate about the population size in their region and also identifying individual birds. Thanks to this international collaboration, it was possible to compile, evaluate and summarise the observations and estimates over the monitoring area in order to get an overview of the age class distribution and to compare the estimates on the alpine scale with the predicted population size from demographic modelling (Schaub et al. 2009)<sup>3</sup>.

The Alpine population was estimated to vary between 256 and 344 individuals - on average slightly lower than the model estimate of 320 individuals. However, the estimation varies almost 1/3 of the total population, which is big variance. However, similar as in the previous years, the estimated age class distribution is fairly well in line with the predicted values of the demographic model<sup>1</sup> with a slight underestimate of the number of subadult birds, which are difficult to identify correctly in the field (53% adults, 9% subadults, 19% immature, 14% juveniles). The population estimate, as well as the age class distribution are based on observation data collected during the focal day (12.10.19) combined with the estimated number of individuals that have not been observed but are supposed to be present in the specific region (territorial birds, in some exceptional cases also their fledglings, GPS-tagged birds (N = 18-22 in 2019) etc.).

The small population of the Massif Central is estimated to vary between 4-5 individuals, and at least 5, possibly 7, individuals have been observed in the Aude region of the French Pyrenees. The Spanish IBM-partners estimated the Bearded Vulture population in Andalusia and Castilla y León with a minimal and maximal number of 32 and 40 Bearded Vultures, respectively. Same as in 2018, no Bearded Vultures have been observed in Bulgaria where the species has been considered extinct since 1972. For the first time, the IOD was conducted in the High Atlas in Morocco with an estimated number of 6-11 Bearded Vultures.

71 Bearded Vultures could be identified on an individual level, while another 17 birds were identified with high probability. Each of these identifications provides valuable information about the life-history and survival rates of these birds and contributes to the unique data collection of the IBM, which is monitoring the development of the Bearded Vulture reintroduction project since 1999. Such individual based information on an international scale is unique and allows to estimate survival rates and to follow the bird's life-history - important key elements in order to monitor the development of the Bearded Vulture project.

---

<sup>3</sup> Schaub, M., Zink, R., Beissmann, H., Sarrazin, F., & Arlettaz, R. (2009). When to end releases in reintroduction programmes: demographic rates and population viability analysis of Bearded Vultures in the Alps. *Journal of Applied Ecology*, 46(1), 92-100.

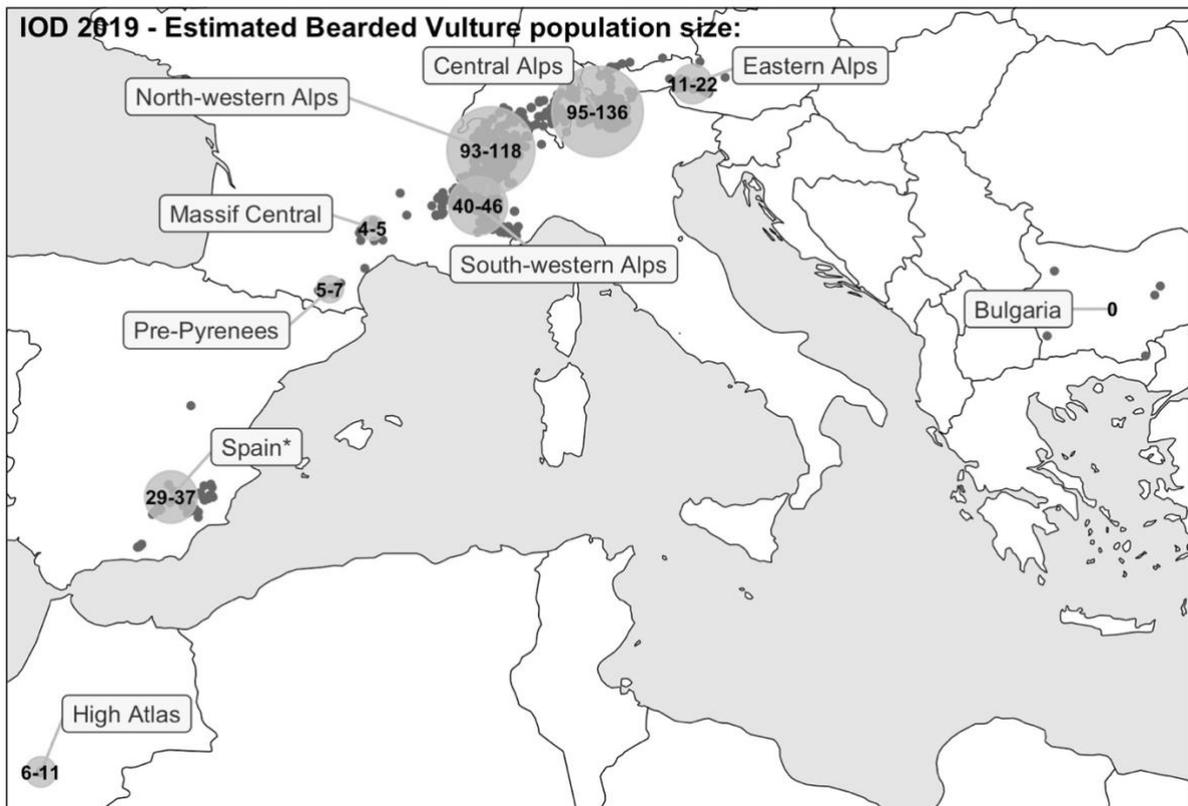


Figure 8. Overview of the estimated Bearded Vulture population size on the regional level within the monitoring area of the IOD 2019. Estimates of the populations size are based on estimates derived from observations during the focal day of the IOD 2019 and an estimated number of birds that were not observed but should be present in the region (mostly territorial birds). \*The estimate for Spain is based on observation data from the occupied observation sites (grey dots) without taking the Bearded Vulture population of the Spanish Pyrenees into account. In Spain Bearded Vultures roam between mountainous areas in the south and in central and northern Spain. The next southern population of the populations in southern Spain, is the critically endangered population of the High Atlas (MAR). No IOD was organised in Corsica (FRA) where a small population of 4 breeding pairs survived. Since 2016 a restocking program is ongoing on Corsica to support this small island population. Since their extinction in 1972 no Bearded Vultures are present in Bulgaria

\*\* The complete IOD 2019 report can be found online on [www.qyp-monitoring.com](http://www.qyp-monitoring.com)\*\*

## 8 Markings

Individual based monitoring makes the International Bearded Vulture Monitoring unique among monitoring projects of this scale. By the end of 2019, more than 56'000 Bearded Vulture observations were stored in the IBM-database, 30% of them from identified individuals. The marking of released and wild-hatched birds is of major importance to follow the life history and reveal the behavioural patterns of the individuals in order to understand the demography and track the development of the reintroduction process. Therefore, young Bearded Vultures are marked with rings (chapter 8.1), some feathers are bleached (chapter 8.2) as well as GPS-tags (chapter 8.3) before they are released into the wild (Figure 10).

### 8.1 Rings

Since 2015, one silver aluminium ring and a black plastic ring with white letters (“Darvic ring”), both with two-digit codes (bi-directional), were used to mark Bearded Vultures (Figure 9). Their large letters should ensure that the codes are easily readable with binoculars and also on pictures. Since uniqueness of the codes is important for clear identification, unique two-digit codes (unidirectional) were used from 2016 onwards. Two rings with inverted identical codes but different orientation improves legibility, as it is more likely to be able to read both characters of the code. After it has been observed that the Darvic rings of some birds fell off or slipped from their position, it was decided to use two aluminium from 2017 onwards (see annual report 2017 for more details). The right aluminium ring is marked with a country-specific code of the national ringing centre (Table 13), while the left IBM-ring is marked with the two-digit code and IBM-contact details.

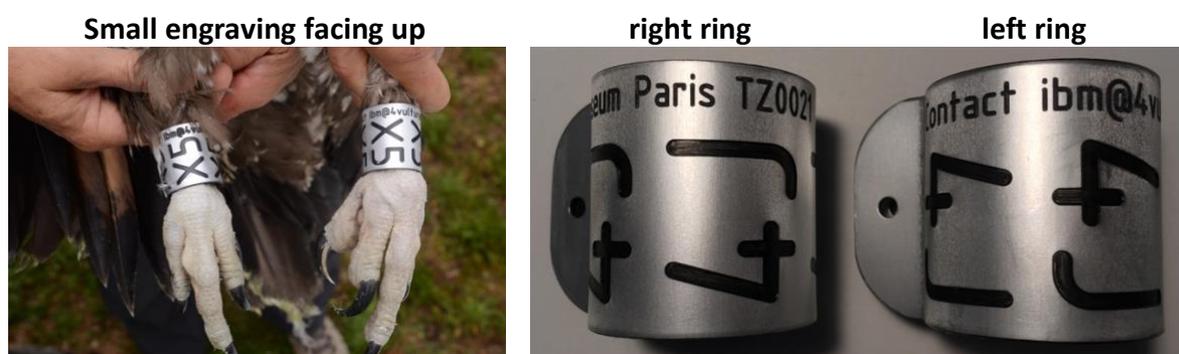


Figure 9: IBM-ringing system since 2017: 2 Aluminium rings with large two-digit code and a smaller engraving for the national code (right) and aluminium standard IBM-engraving (left) facing up.

Table 13: Engravings for the country-specific national code (####) and the IBM-standard ring.

Country	Right aluminium ring	Left aluminium ring
AUT	AB#### KLIVV.AT AB#### KLIVV.AT	Contact ibm@4vultures.org
CHE	Vogelwarte Helvetia Sempach GYP####	Contact ibm@4vultures.org
ESP	Contact ibm@4vultures.org	Contact ibm@4vultures.org
FRA	Museum Paris TZ#### 4vultures.org	Contact ibm@4vultures.org
ITA	INFS OZZANO (BO) ITALY MC#### ring.ac	Contact ibm@4vultures.org

## 8.2 Markings 2019

### 8.2.1 Released birds<sup>4</sup>

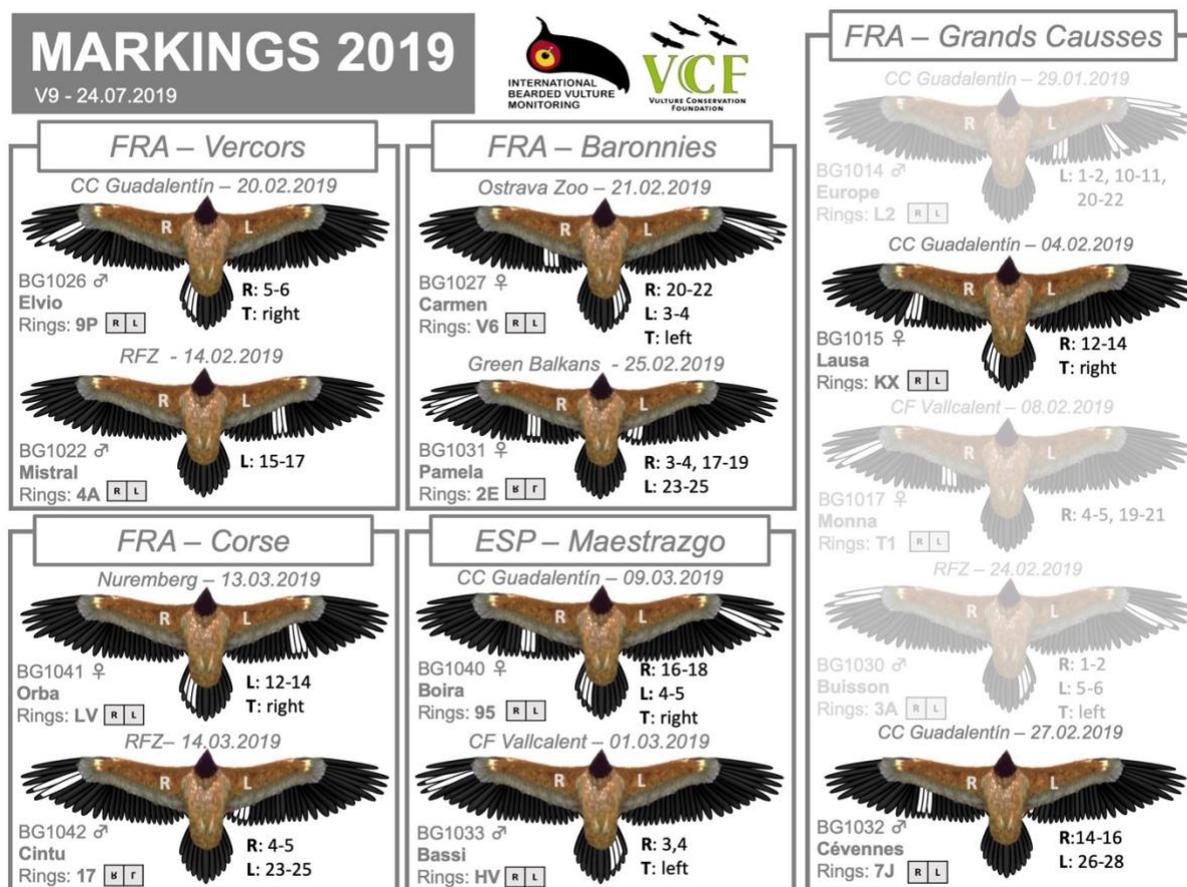


Figure 10: Marking patterns of the 13 Bearded Vultures released in 2019.

### 8.2.2 Wild-hatched birds

With the increasing number of wild birds that fledge every year (Figure 3), the proportion of wild-hatched Bearded Vultures in the Alpine population is increasing. A comparative analysis of GPS-data of 9 wild-hatched and 89 released juvenile Bearded Vultures indicates that, behavioural patterns of these two groups of juveniles differ considerably, at least during October in their first year of life (IBM presentation at the annual meeting 2019, in Andorra). Wild hatchlings tend to (A) fly less far away from their nest and (B) spend more time within 5km radius around their nest, compared to released birds in relation to the same distances to their release site.

The IBM-network plans to intensify its efforts to mark wild hatched animals in the future, as marking of wild hatchlings delivers insight into their behaviour and survival and which are keystone factors to follow and understand the developments of the Bearded Vulture reintroduction project. In 2019 seven wild-hatched birds have been marked in France (5) and Andalusia, Spain (2) (Table 14).

<sup>4</sup> Download this file on: [www.gyp-monitoring.com](http://www.gyp-monitoring.com) --> Downloads --> Marking pattern

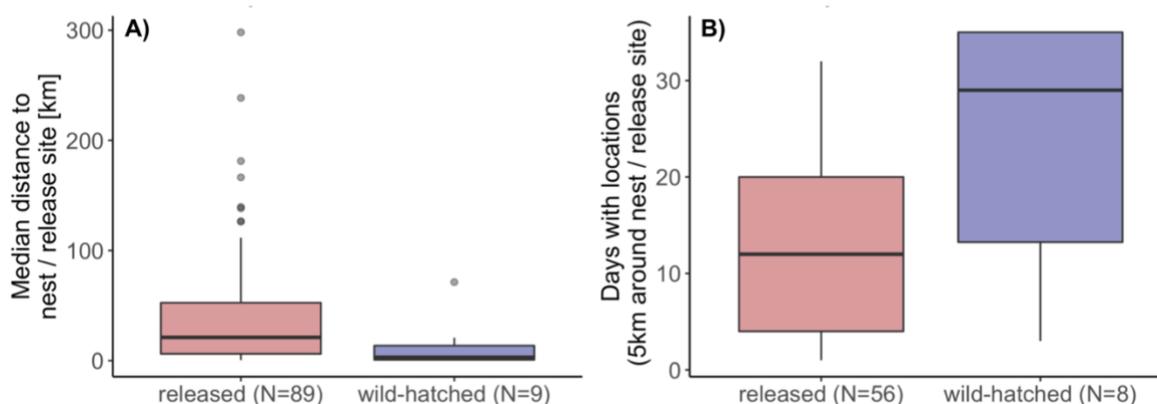


Figure 11. Behavioural differences revealed by analysing movement patterns (GPS-data) of 9 wild-hatched and 89 released juvenile Bearded Vulture during October (IBM presentation at the annual meeting 2019, in Andorra). Wild hatchlings tend (A) to fly less far away from their nest and (B) spend more time within 5km radius around their nest. For released birds, measurements were taken in relation to distances to their release site instead of nest site. Boxplot: Black, horizontal line = median; upper and lower box border encompass 50% of the data-points (1. and 3. Quartile); data points outside of the whiskers' range are considered as outliers = dots.

Table 14. Five wild-hatched birds have been ringed by the specialised team of Asters in France in 2019 and another two wild-hatched birds were marked with rings (not IBM-rings) in Andalusia. All birds were equipped with solar powered GPS/GSM tags.

Name	BirdID	Sex	Hatch	Fledge	Territory	Country	Zone	Code	Material / Colour
Altitude	W313	u	2019-03-08	2019-07-12	Peisey-Nancroix	FRA		AL	alu / silver
Aravis2019	W280	u	2019-02-19 ( $\pm 3$ )	2019-06-27 ( $\pm 1$ )	Aravis	FRA	North-West	2H	alu / silver
Pierro	W301	m	2019-03-23 ( $\pm 3$ )	2019-07-25	Bargy	FRA		KV	alu / silver
Sixt Buet	W285	u	2019-03-09 ( $\pm 2$ )	2019-07-08 ( $\pm 1$ )	Sixt Fiz	FRA		19	alu / silver
Emparis	W284	u	2019-03-06 ( $\pm 1$ )	2019-07-01	Malaval	FRA	South-West	HX	alu / silver
Jovan	W303	m	2019-03-29	2019-07-29	Andalusia 1	ESP	Spain	JUA	plas
Hans	W302	m	2019-03-14	2019-07-14	Andalusia 2	ESP		1111580	alu

### 8.3 GPS-tagged birds

In order to gain insight into their life history, the first wild fledglings were ringed in Haute Savoie, France in 2013. Modern monitoring methods, such as GPS-tags, have been continuously developed and well-proven with the reintroduced Bearded Vultures. Such data provide valuable information on mortality (dropout) cases and the spatial behaviour of the released birds. With successful natural reproduction, the proportion of wild-hatched Bearded Vultures in the population is steadily increasing.

In order to gain knowledge about the spatial behaviour of wild-hatched birds, it was therefore decided to mark two wild fledglings (Neige and Gemapi) with GPS-tags for the first time in 2016 and another two juvenile, wild-hatched birds (Mison and Gypsy) in 2017. In 2018 five wild juveniles were marked with a GPS tag (Lapie, Kruml5, Bonifatu2018, Gea and Cano). In 2019, the specialised team of Asters managed to tag four young Bearded Vultures: Altitude (W313), Aravis2019 (W280), Emparis (W284) and Sixt Buet (W285) in France with solar powered GPS/GSM-tags.

In total, movements of 55 Bearded Vultures (10 wild-hatched and 45 released birds) were followed by GPS-tracking and stored in the WildlifeMonitor in 2019 (Table 15). Besides seven adult birds, most of the tagged birds are non-adult individuals. Furthermore, with 33 males and 17 females, the sex-ratio is strongly skewed.

#### 8.3.1 Released GPS-tagged birds

##### 8.3.1.1 Situation in Maestrazgo

Boira (BG1040) and Bassi (BG1033) were released in the Maestrazgo region in 2019 and mainly remained in this area. In contrast, the two Bearded Vultures that were released in the previous year have already made further excursion to the mountains in la Rioja (Amic BG995) or the Pyrenees (Alos BG992). By the end of 2019, Alos was still roaming in the Pyrenees, while Amic found his way back to the Maestrazgo region (Figure 12).

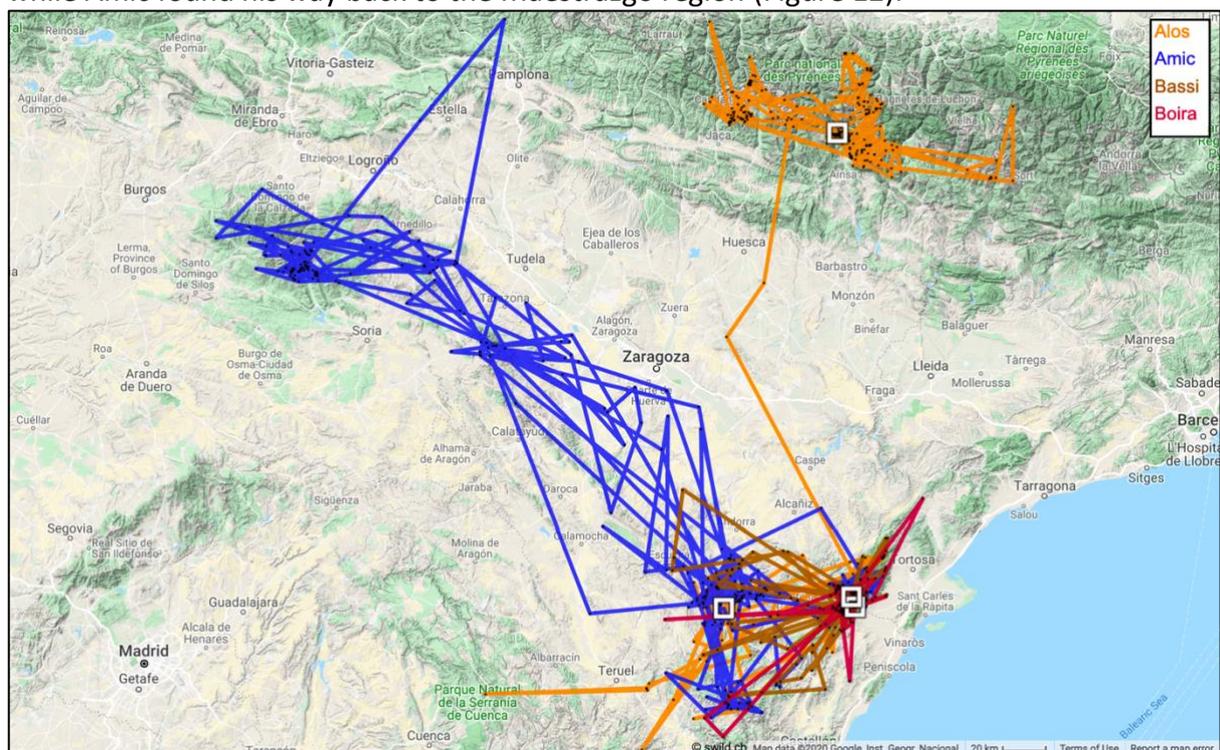


Figure 12: Boira and Bassi were released in Maestrazgo in 2019 and mainly remained in the area, while Alos and Amic did some further excursions. Alos spent his time in the Pyrenees since April 2019. 1 GPS-location per day between the 1.1 and 31.12.2019, with the last location marked with a white rectangle.

### 8.3.2 Extraordinary excursions

Non-adult birds move very spaciouly in their first years, change their residence location regularly and are therefore also called “floater” birds. Occasionally they take longer tours, mostly flying north and leaving the alpine region. Since the feeding and thermal conditions in the lowlands are less ideal, such tours are always associated with a certain risk. Thanks to GPS tracking, these tours can be followed, and it can be checked whether the young birds find their way back on their own as in the case of the immature Finja (Figure 13) and the juvenile Lausa (Figure 14).

#### 8.3.2.1 Finja (BG1003)

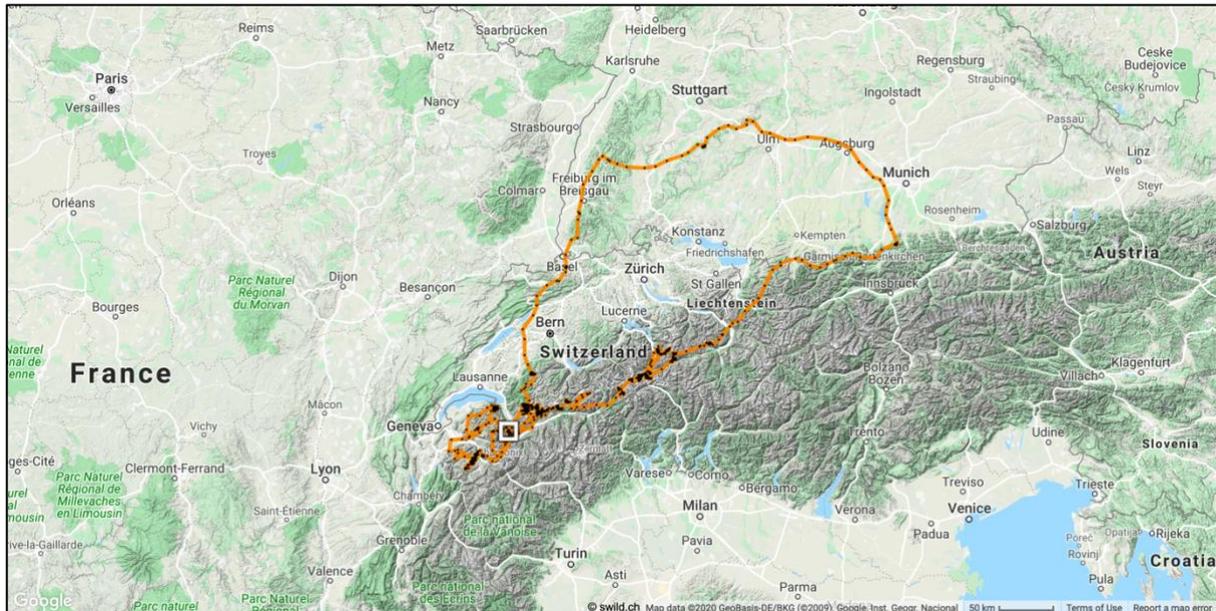


Figure 13: Finja’s excursion to north when she left the Alpine range from the 23.-26.05.2019: 1 GPS location per 20min between 1.5. and 1.6.2019, with the last location marked with a white rectangle.

#### 8.3.2.2 Lausa (BG1015)

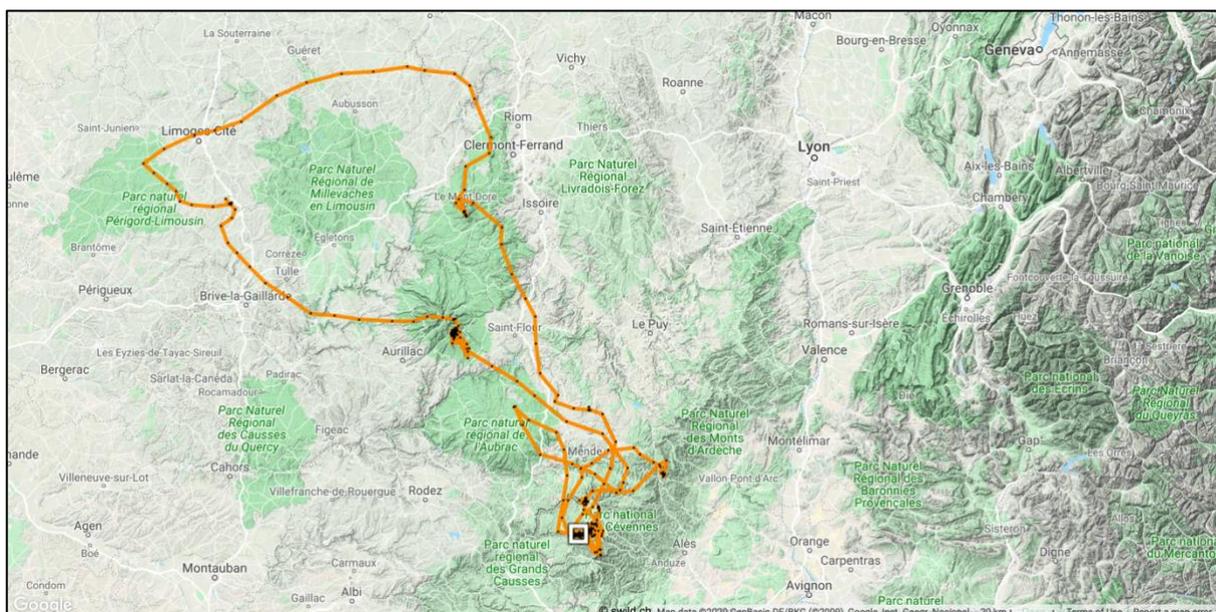


Figure 14: Lausa’s excursion to north from the 24.-31.8.2019. 1 GPS location per 20min between the 1.8. and the 1.9.2019, with the last location marked with a white rectangle.

### 8.3.3 Wild-hatched GPS-tagged birds

#### 8.3.3.1 Altitude, Aravis2019, Emparis and Sixt Buet

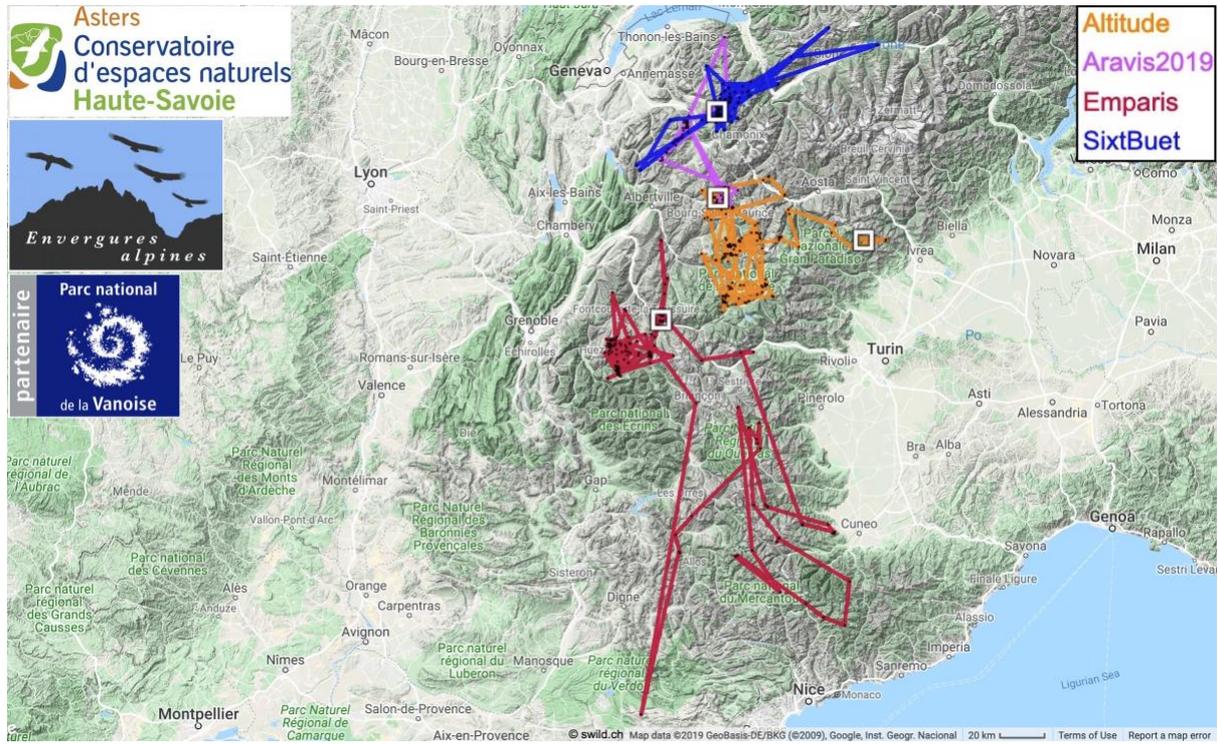


Figure 15: Four wild-hatched Bearded Vultures that were tagged in 2019 by the specialised team from the IBM-partner Asters in the French Alps. One GPS-location per day for the year 2019, with the last location marked with a white rectangle.

Table 15: 55 birds from different age classes could be followed by GPS during 2019 thanks to the support by partner organisations. minDT and maxDT represent the day of the first and last location in 2019 respectively. The number of obtained localisations varies considerably among individuals (287 - 974'863 positions) and mainly depends on tag type used, age of the tag and battery charge level. Low battery in the table means that the tag could not obtain and send data regularly, but the birds are still fine.

Animal	BirdID	Sex	Age (cy)	Date death / comment	Place release	minDT	maxDT	Days with locations	Locations total
Carmen	1027	f	1		Baronnies (FRA)	23/06	31/12	192	3'545
Pamela	1031	f	1		Baronnies (FRA)	22/06	31/12	192	23'724
Cintu	1042	m	1		Corsica (FRA)	29/06	31/12	183	26'929
Orba	1041	f	1		Corsica (FRA)	13/07	31/12	172	22'229
Buisson	1030	m	1	04.07.19	Grands Causses (FRA)	02/07	04/07	0	0
Europe	1014	m	1	04.10.19	Grands Causses (FRA)	03/06	05/10	121	32'133
Lausa	1015	f	1		Grands Causses (FRA)	08/06	31/12	206	35'351
Monna	1017	f	1	20.07.19	Grands Causses (FRA)	09/06	20/07	41	3'559
Bassi	1033	m	1		Maestrazgo (ESP)	23/06	31/12	192	54'126
Boira	1040	f	1		Maestrazgo (ESP)	26/07	31/12	144	768
Elvio	1026	m	1		PNR Vercors (FRA)	27/06	31/12	188	2'593
Mistral	1022	m	1		PNR Vercors (FRA)	24/06	31/12	191	3'348
Altitude	W313	u	1		wild-hatched, Peisey-Nancroix	12/07	31/12	171	1'847
Aravis2019	W280	u	1	fate unknown	wild-hatched, Aravis	27/06	04/09	70	5'670
Emparis	W284	u	1		wild-hatched, Malaval	01/07	31/12	184	6'369
Clapas	975	m	2		Baronnies (FRA)	01/01	31/12	361	3'767
Drumana	980	m	2	fate unknown	Baronnies (FRA)	01/01	26/10	298	222'602
Simay	983	m	2		Baronnies (FRA)	01/01	31/12	358	181'316
Alos	992	m	2		Maestrazgo (ESP)	01/01	31/12	365	5'104
Amic	995	m	2		Maestrazgo (ESP)	01/01	31/12	365	26'450
Finja	1003	f	2		Melchsee-Frutt (CHE)	01/01	31/12	364	974'863
Freduei	1001	m	2		Melchsee-Frutt (CHE)	01/01	31/12	365	704'478
Caeli	998	m	2		NP Hohe Tauern (AUT)	01/01	31/12	365	184'185
Kasimir	991	m	2		NP Hohe Tauern (AUT)	01/01	31/12	364	60'421
Bonifatu2018	W271	u	2	Dec. 2019	wild-hatched, Bonifatu	01/01	24/11	325	61'649
Kruml5	W245	u	2	tag lost	wild-hatched, Gastein/Rauris	01/01	22/02	53	877
Lapie	W251	m	2		wild-hatched, Bargy	01/01	31/12	365	133'554
Léoux	950	f	3		Baronnies (FRA)	01/01	31/12	358	3'372
Ercu	958	m	3	tag lost	Corsica (FRA)	01/01	12/08	222	53'228
Luna	959	f	3		Corsica (FRA)	01/01	31/12	365	2'460
Arcana	954	f	3	only acc and temperature data	Grands Causses (FRA)	01/01	31/12	0	0
Calandroto	948	m	3	tag lost	Grands Causses (FRA)	01/01	20/05	140	10'534
Johannes	964	m	3		Melchsee-Frutt (CHE)	01/01	31/12	365	531'791
Gypsy	W209	m	3		wild-hatched, Aravis	01/01	31/12	365	227'860
Mison	W230	f	3	low battery	wild-hatched, Bagnes	01/01	12/12	333	2'939
Giron	904	f	4		Baronnies (FRA)	11/01	31/12	216	1'291
Muntagnolu	890	m	4		Corsica (FRA)	01/01	31/12	359	1'869
Cierzo	899	m	4		Melchsee-Frutt (CHE)	01/01	31/12	361	47'560
Lucky	909	m	4	low battery	NP Hohe Tauern (AUT)	11/01	18/12	288	1'224
Gemapi	W196	f	4		wild-hatched, Bargy	01/01	31/12	365	99'796
Neige	W198	m	4	low battery	wild-hatched, Aravis	01/01	12/10	285	2'257
Roc Genève		m	4		wild-hatched, Pyrenees	01/01	31/12	364	3'983
Ewolina	838	f	5	low battery	Melchsee-Frutt (CHE)	01/01	16/12	216	2'304
Sempach 2	841	f	5		Melchsee-Frutt (CHE)	01/01	31/12	357	23'634
Trudi	842	f	5	tag lost / dead?	Melchsee-Frutt (CHE)	03/01	19/09	200	767
Fortuna	843	m	5		NP Hohe Tauern (AUT)	01/01	31/12	357	33'861
Lea	840	m	5		NP Hohe Tauern (AUT)	01/01	31/12	352	14'495
Roman	854	m	5		PN Alpi Maritime (ITA)	01/01	31/12	314	1'715
Noel-Leya	797	m	6		Calfeisental (CHE)	01/01	31/12	271	3'859
Schils	802	m	6		Calfeisental (CHE)	01/01	31/12	326	20'541
Adonis	794	m	6	low battery	Grands Causses (FRA)	07/08	08/12	105	287
Felix2	793	m	6	low battery	NP Hohe Tauern (AUT)	08/01	20/12	286	805
Layrou	761	m	7		Grands Causses (FRA)	01/01	31/12	349	21'062
Tenao	755	m	7		PN du Mercantour (FRA)	01/01	31/12	365	1'019
Veronika	321	f	21		NP Engadin (CHE)	01/01	31/12	347	2'484
<b>Total 55 tracked individuals (10 wild-hatched / 45 released birds; 33 male / 17 female)</b>								<b>14'426</b>	<b>3'898'454</b>

## 9 Dropouts

Dropouts include all incidents where individuals have been removed from the population (mortality, recapture). This also applies to birds that have been recaptured and could be released again. A recapture is in any case the last solution, which is why it must be assumed that these birds would not have survived without human intervention and would have died under natural conditions.

However, if a hatchling dies at less than 80 days of age, this loss is referred to as breeding failure and it is therefore not included in the dropout statistics (see IBM-standard, chapter 4.2).

Mortalities of 8 Bearded Vultures have been reported in 2019: in France (4), Italy (1), Switzerland (1) and Spain (2) (Figure 16). Three juveniles (Monna, Buisson, Europe) died in close proximity of their release site in Grands Causses (FRA), the juvenile Siles was found dead in Cuevas del Campo (ESP), a wild-hatched immature (Gea) was found dead in Albacete (ESP) and another wild-hatched immature bird (Bonifatu2018) was found in Nec (Corsica, FRA). Furthermore, two adult wild-hatched male breeding birds (Tantermozza & GT061) were found dead in Val Chamuera (CHE) and Tubre (ITA). While two birds died due to natural causes, at least three mortalities (GT061, Buisson, Europe) were caused by anthropogenic factors (powerlines, shooting). In the case of Verdi, the weakened animal could be recaptured after its release (ESP) and nursed up in captivity (C.C. Guadalentin).

Although much energy is invested in the search for, and investigation of dead animals, the reason of dropout remains unclear in many cases. With 5 released and 4 wild-hatched dropout cases it becomes clear that young Bearded Vultures in particular are exposed to various threats in the wild, but also that at least some of them, such as powerlines, can be addressed with appropriate measures.

Table 16: List of all 8 reported dropouts from 2019.

Name	BirdID	Bird type	Age [cy]	Dropout	Date	Country	Reason	Classification
GT061		wild-hatched	adult	mortality	21.03.19 (±15)	ITA	collision and/or electrocution	anthropogenic
Tantermozza	W46	wild-hatched	13	mortality	10.05.19 (±12)	CHE	Golden eagle attack	natural
Gea	W276	wild-hatched	2	mortality	03.07.19	ESP	head injury / trauma	unknown
Buisson	1030	released	1	mortality	04.07.19	FRA	collision and/or electrocution	anthropogenic
Monna	1017	released	1	mortality	20.07.19	FRA	fell to death	natural
Europe	1014	released	1	mortality	04.10.19	FRA	shot	anthropogenic
Siles	1037	released	1	mortality	06.11.19	ESP	unknown	unknown
Bonifatu2018	W271	wild-hatched	2	mortality	11.12.19	FRA	malnutrition	unknown
Verdi	1028	released	1	recapture	17.08.19	ESP	malnutrition (weakness)	unknown

## 9.1 Mortalities

### 9.1.1 GT061

On the 21.3.2019 an adult Bearded Vulture was found dead with clear signs of electrocution below a powerline in Tubre (ITA). Genetic results revealed that the adult bird (>7.cy) was one of the breeding birds from the territory "Foraz" (CHE) in 2017.

### 9.1.2 Tantermozza (W46)

On the 22.05.2019 the 12-year-old, wild-hatched male Tantermozza (GT047) was found dead in Val Chamuera (CHE). According to the results from the necropsy, the bird most likely died from a territorial fight with a Golden eagle, however the X-ray also revealed three encapsulated shotgun bullets (white points on x-ray on the right). Although the bird survived the shooting, the incident shows that Bearded Vultures in the Alpine region are still exposed to such crimes despite their popularity. Unfortunately, it was neither possible to find the date of the shooting nor the perpetrator. Tantermozza was one of the first wild-hatched Bearded Vultures in Switzerland and one of the breeding birds in the territory "Albula" since 2014.



### 9.1.3 Gea (W276)

On the 03.07.2019 the immature Bearded Vulture Gea was found dead in Albacete (ESP). Investigations revealed that the death was related to a head injury caused by a trauma and excluded poison or shooting as cause of death. Furthermore, no antibiotics or NSAIDs were found in the kidney. However, abnormal or potentially pathological levels of lead (15mg/kg) in bone indicate long-term exposure. Gea hatched in nature in Parque Natural Sierra de Cazorla, Segura y las Villas (ESP) around 3.08.2018.

### 9.1.4 Buisson (BG1030)

On the 4.07.2019, only two days after his first flight, the juvenile Buisson collided with a power line and died due to electrocution. This powerline, which is near the hacking site, was even equipped with visual systems designed to allow birds to identify and avoid it, as collisions with electrical cables are known as one of the biggest threats large raptors like Bearded Vultures face. Buisson was released in Grands Causses, Frépestel (FRA) on the 6th of June 2019.

### 9.1.5 Monna (BG1017)

On the 20.7.2019 the juvenile Bearded Vulture Monna fell to her death from a cliff near the hacking site. After two previous falls, on the 29<sup>th</sup> June and 10<sup>th</sup> July, the LIFE GypConnect team was worried about the strange behaviour but did not manage to capture the bird to examine her and detect what was wrong. After the first falls, she had shown some signs of loss of balance but had also quickly given reassuring signs of her state of health, quickly recovering and flying again. Monna was released in Grands Causses, Frépestel (FRA) on the 6th of June 2019.

### 9.1.6 Europe (BG1014)

On the 4.10.2019 the juvenile Bearded Vulture Europe was found dead in Saint-Jacques-des-Blats (FRA). Investigations revealed that the bird was shot. Europe was released in Grands Causses in the Massif Central on the 06.05.2019.

### 9.1.7 Siles (BG1037)

On the 6.11.2019 the juvenile Bearded Vulture Siles died due to unknown causes and was found in Cuevas del Campo (ESP). The bird was released in Parque Natural Sierra de Cazorla, Segura y las Villas (ESP) on the 10.06.2019.

### 9.1.8 Bonifatu2018 (W271)

On the 11.12.2019 the immature wild-hatched Bearded Vulture Bonifatu2018 was found dead in Nec on Corsica (FRA). Neither fractures nor bullets were found during x-ray investigations and lead analysis was negative too. The bird was very slim, but the reason of mortality remains unknown so far. Bonifatu2018 hatched in the breeding territory Bonifatu in 2018.

## 9.2 Recaptures

### 9.2.1 Verdi (BG 1028)

On the 17.08.2019 Verdi had to be recaptured in la Gineta (ESP) as he showed strange behaviour and seemed weak. The bird was very slim and apparently suffered from malnutrition. Verdi was not released again and remains in captivity in the breeding centre C.C. Guadalentin (ESP).

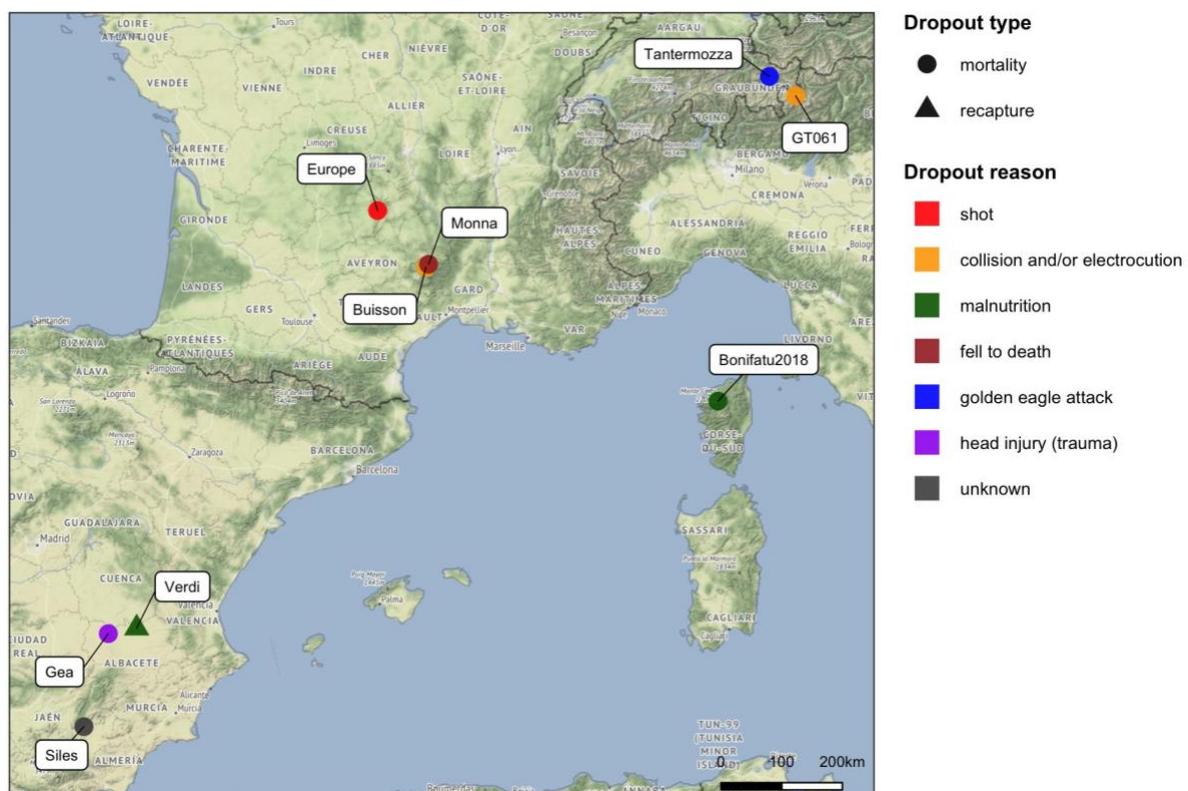


Figure 16. 8 dropouts and 1 recapture of Bearded Vultures in 2019.

# 10 Acknowledgements

Thanks to all the field workers, assistants, wild-keepers, hunters, ornithologists and non-professional observers who report Bearded Vulture sightings and valuable information during the reproduction monitoring. Furthermore, thanks to the regional coordinators of the IBM-network and associated organisations who enter the data in the IBM, coordinate the monitoring network within their area of responsibility and contribute to this report with their inputs. Also, thanks to the valuable inputs by Franziska Lörcher (VCF) and Katja Rauchenstein (IBM) during the review of this report.

Only thanks to the financial support of the IBM-partners and the funding organisations MAVA and LIFE the IBM-data collection could be summarised and published in this report.