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The Bearded Vulture in the Alps – importance of protected areas and long term monitoring

Andreas Schwarzenberger, Jens Laass, Richard Zink

Abstract

Following the extinction of the bearded vulture (*Gypaetus barbatus* L.) in the Alps, a reintroduction program was started in the National Park Hohe Tauern, Austria in 1986. Currently the program is carried by 14 partners from the whole Alpine range many of them represent protected areas. Since the first breeding attempt in 1996, 92 wild born birds have fledged in the Alps. The most important tool for the evaluation of the program´s success is the collection of observations and reproduction events. These records are the basis for analysis of the distribution of observations and breeding pairs throughout the Alps in regards to protected areas. More than half of all reported observations (61%) and 65% of all reproduction events occurred in protected areas. Major differences could be detected between countries. In Austria and France considerably more observations have been reported from inside protected areas than outside, whereas for Switzerland and Italy the opposite was found. Considering reproduction, in Italy and Austria a vast majority of reproduction events occurred inside protected areas. In France the events are more or less equally distributed between protected and non-protected areas, whereas in Switzerland, with the least amount of protected areas of all countries in the Alps, most reproduction events (61%) have been detected in areas without a special protection status. Beside specific behavioural characteristics (e.g. natal philopatry), a series of different reasons can be identified for the uneven distribution of bearded vulture observations and reproduction events, like focus of public awareness following the releases and consequently higher observation activities in the release area. But for the monitoring and the management of a reintroduced species like the bearded vulture protected areas have proven to be essential, as they have provided long-term support and participation in the creation and maintenance of this multinational monitoring system.

Keywords

Bearded vulture, reintroduction project, Alps, protected areas, long term monitoring

Introduction

The bearded vulture (*Gypaetus barbatus*, L.) is one of Europe´s largest scavenging raptors living in mountain areas of Europe, Africa and Asia. Due to food shortage and human persecution it went extinct in the Alps between the late 19th and early 20th century (MINGOZZI & ESTÈVE 1997). An international reintroduction program was started in 1986, based on the release of young bearded vultures born and reared in captivity (FREY 1992). Up to 2012 in total 184 birds have been released in the Austrian, French, Italian and Swiss Alps, the vast majority within protected areas. In 1997, the first successful breeding in the Alps after the extinction took place in Haute Savoie, France. Since then 92 bearded vultures have fledged in the wild. By now some of them are already part of successful breeding pairs. In 2006 the average number of wild born birds has exceeded the average number of released birds per year (ZINK 2010).

Methods

From the beginning of the project observation data have been collected by local and national responsible specialists. In 2000 the International Bearded Vulture Monitoring (IBM), featuring a central storage and management of all available monitoring data, was installed (ZINK & FREY 2005). In the first years most of the observations were located near the release sites. With a rising number of released birds and an increasing popularity of the re-introduction project, observations are now covering large areas of the Alpine Arc. Currently almost 55.000 observations are documented in the central online data base.

Most observations are reported by professional ornithologists and hundreds of voluntary birdwatchers, but also especially employees of protected areas. Systematic observations regularly done at the release sites have not been entered into the database to avoid additional biasing since the establishment of the IBM. For this study observation data of the last 10 years (01.01.2003 and 31.12.2012) have been used, based on the International Bearded Vulture Monitoring.

Reproduction data are collected based on an active monitoring of breeding birds conducted by dedicated monitoring specialists, park wardens and other persons in charge. The first breeding attempt was documented in 1996. For the analysis reproduction data we defined reproduction events as events where at least the production of a clutch has been documented. All collected reproduction events from 1996 to 2012 were used. Frame of reference is the Alpine Convention (1991).

All observation and reproduction data have been kindly provided by the partners of the IBM (Nationalpark Hohe Tauern, Stiftung Pro Bartgeier, Parco Nazionale dello Stelvio/Nationalpark Stilfserjoch, Provincia di Sondrio, Ufficio Faunistico, Regione Autonoma Valle d'Aosta & Parco Nazionale Gran Paradiso, Parco Naturale Alpi Marittime, A.S.T.E.R.S., Parc National de la Vanoise, Parc National les Ecrins, Parc National du Mercantour, Parc Naturel Régionale du Vercors, LPO Grands Causses, Vulture Conservation Foundation, AlpArc, see also www.gyp-monitoring.com). Data of boundaries of the protected areas (as of 2004) have been provided by AlpArc http://www.alparc.org/.

Results

Distribution of observations

In the years 2003 to 2012 a total of 22.165 observations from the Alpine region have been documented in the IBM database. The highest number of observations has been reported from France (6574), followed by Austria (6517), Italy (5803) and Switzerland (3241) (tab.1). Considering the area covered by the Alps in each country, the observations of bearded vultures are quite evenly distributed. 61% of the reported observations have been located in protected areas in the Alps. Austria is the country with the highest percentage (88%) of bearded vulture sightings within protected areas, for Switzerland (18.5% of the Swiss Alps are designated as protected area) only 15% of all observations have been located within protected areas. This suggests an even distribution of observations within and outside of protected areas. A similar situation was found for Italy where 42% of all observations have been located in protected areas which comprise 45% of Italy´s Alps. For Austria and France the bearded vulture observations are clearly concentrated in the protected areas. For Italy and Switzerland the ratio of observations within protected area is very similar to the proportion of protected areas in each country´s Alpine region.

No difference in the distribution has been found for the different age classes of bearded vultures on an Alpine scale.

Table 1: Distribution of bearded vulture observations (2003-2012) within and outside protected area (as of 2004) per country.

Country	Protected area				Sum	
	N outside	% outside	N inside	% inside	N	%
Austria	790	12,1%	5727	87,9%	6517	29,4%
France	1833	27,9%	4741	72,1%	6574	29,7%
Germany	12	44,4%	15	55,6%	27	0,1%
Italy	3354	57,8%	2449	42,2%	5803	26,2%
Liechtenstein	1	100,0%		0,0%	1	0,0%
Slovenia	1	50,0%	1	50,0%	2	0,0%
Switzerland	2746	84,7%	495	15,3%	3241	14,6%
Sum	**8737**	**39,4%**	**13428**	**60,6%**	**22165**	**100,0%**

Reproduction

Since 1996 151 breeding events have been recorded in the Alps. Out of these, 92 young bearded vultures have fledged in the wild. The first wild born bird fledged in Haute Savoie (France) in 1997, until 2012 a total of 70 reproduction events have been documented in France, 46% of all events recorded, followed by 45 events in the Italian Alps, 23 in Switzerland and 13 in Austria (tab. 2).

Of 151 breeding events 98 (65%) have been located within protected areas, but relevant differences have been noted among the countries (tab. 2). Based on the proportion of protected areas in each country, reproduction events are more often located in protected areas in all four countries then expected from an even distribution.

Of 151 documented reproduction events 92 (61%) have been successful. On an Alpine scale bearded vultures have been equally successful breeding within (60%) and outside (62%) protected areas. On a country scale breeding has been more often successful inside protected areas in Italy (74% inside vs. 33% outside). Whereas the opposite was documented for Switzerland, where 71% of reproduction events outside a protected area have resulted in fledged birds, but only 56% of events inside protected areas were successful. In the French Alps breeding success was more or less equal inside and outside of protected areas. For Austria only three successful breeding events have been documented, two of which within Nationalpark Hohe Tauern.

Table 2: Distribution of bearded vulture breeding events (1996-2012) within and outside protected area (as of 2004) per country. Breeding events are defined by a documented clutch at least.

Country	Protected area				Sum	
	N outside	% outside	N inside	% inside	N	%
Austria	3	23,1%	10	76,9%	13	8,6%
France	33	47,1%	37	52,9%	70	46,4%
Italy	3	6,7%	42	93,3%	45	29,8%
Switzerland	14	60,9%	9	39,1%	23	15,2%
Sum	**53**	**35,1%**	**98**	**64,9%**	**151**	**100,0%**

Discussion & Conclusion

Based on the population modelling by SCHAUB et al. (2009), the Alpine bearded vulture population in 2012 was estimated at 181 individuals. During the 7th International Bearded Vulture Observation Days (5th - 14th October 2012) at least 127 different individuals were identified through an organised effort of 720 observers at 446 sites all over the Alpine arc (SCHWARZENBERGER & ZINK 2013). Though this yearly event has mostly been organized by national parks and other protected areas which are partners of the International Bearded Vulture Monitoring, the resulting observations have been distributed over wide areas of the Alpine arc and show a similar distribution pattern as the complete dataset of observations (2003-2012) available in the international monitoring database, though these records mainly depend on chance observations.

Overall, 61% of all reported observations of bearded vultures and 65% of all reproduction events of the species have been located in protected areas in the Alps, which in 2004 comprised 31% of the area covered by the Alpine arc. Thus protected areas definitely are centres of the known bearded vulture distribution in the Alps. But as considerable differences among the four Alpine countries have been detected, the main reason(s) for this still remain unclear. One of the potential reasons is that - with the exception of two - all release sites of the reintroduction program are located within protected areas. Bearded vultures (as shown also for other large raptor species, e.g. HIRALDO et al. 1979; MILBURN 1979; NEWTON 1979; STEENHOF et al. 1984; GRUBAC 1987; RYMON 1989; GONZÁLEZ et al. 1992; RUDNICK et al. 2008) show strong philopatric behaviour. But this behaviour explains the current distribution of documented bearded vulture pairs only to some extent (ZINK 2010). Another reason for the importance of protected areas for the bearded vulture can be found in the support of protected areas to the monitoring program. With the participation in the reintroduction program, many large protected areas have also become partners of the international bearded vulture monitoring, responsible for the collection of monitoring data in their region. Unfortunately this can also lead to potential bias in the distribution of data, if a whole national monitoring program (e.g. Austria) is managed by a protected area and a clear focus of the monitoring efforts is understandably within the respective park.

Additionally many of the regional partners have established information centres focusing on the biology and behaviour of the bearded vultures and related species which often act as contact point for interested persons, which in turn results in additional chance observations being reported. Finally protected areas attract a lot of people especially interested in nature and wild animals. This often leads to increased (touristic) attendance compared with similar regions outside of protected areas, and in turn to higher numbers of reported observations, as bearded vultures are usually not negatively influenced by the high numbers of people attracted to protected areas.

Finally the habitat suitability as well as the availability of suitable nest sites have been cited as the major factors in the distribution of bearded vulture observations and their reproduction units (Zink 2005). For example a crucially low availability of suitable food sources inside and outside of protected areas, could be a reason for the low number of reproduction events in the Austrian Alps. In comparison Italian protected areas are famous for their abundance of wild ungulates and featured 28% of all recorded reproduction events. The French Alps are known for their very high numbers of livestock. Protected areas definitely can have some influence on the abundance of wild ungulates and livestock.

But regardless of the main reason for the selection of protected areas by bearded vultures, these protected areas and their organisation have proven to be essential for the monitoring and the management of a reintroduced species like the bearded vulture. They have been able to provide long-term support and participation in the creation and maintenance of this multinational monitoring system.

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Contact

Andreas Schwarzenberger
a.schwarzenberger@gmx.at

Jens Laass
j.laass@gmx.at

Richard Zink
Richard.Zink@fiwi.at

IBM-EGS/NPHT
c/o Neuwiesgasse 17
1140 Wien
Austria