The State of Birds in Switzerland Report 2023

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Headlines

After capricious weather with hail storms the previous year, the breeding populations of some species showed marked declines in spring 2022 compared to the previous year. ➲ page 6

The summer of 2022 brought several heatwaves and severe dry periods. Extreme weather conditions are becoming more frequent, potentially affecting bird populations in a lasting way. ➲ page 8

Birds that favour warm climates more frequently show rising population trends than species adapted to cold. The observed changes in population size could be influenced by global warming, among other factors. ➲ page 10

As specialists in a sensitive ecosystem, mountain birds are particularly affected by climate change. ➲ page 12

Every autumn, tens of thousands of raptors pass through the Défilé de l'Écluse southwest of Geneva. Systematic counts from July to the end of November provide information about population trends in central Europe.
➲ page 24

Big changes are taking place under water. Many native invertebrates and fish have been crowded out by invasive species. Waterbirds face a changing food supply. ➲ page 28

Wild animals that had become rare are regaining ground in Europe. They benefit from protected habitats and better protection from persecution. ➲ page 32

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Further information
You can find further information online, including population trends for breeding birds and additional analyses:
www.vogelwarte.ch/state

Monitoring – how did we do without it?

Niklaus Zbinden, head of the monitoring department in the early 80s, recognised the importance of monitoring early on. He set an ambitious goal: reliable population trends for every bird species that regularly breeds in Switzerland. Ideally, a population index would illustrate the year-on-year changes for every species. The overarching objective was to be able to make evidence-based status assessments, such as updates to the Red List, and to have a basis for success monitoring and policy making. On top of this, an early warning system would help to identify potential causes for decline in a timely manner.

Progress was initially slow. Information on trends was compiled from less structured territory count data collected on the local scale. But the extent of yearly population changes was impossible to quantify using these sources. The positive experience of the surveys for the 1993–1996 breeding bird atlas encouraged us to launch the «Monitoring common breeding birds (MHB)» scheme in 1999. The objective was to set up a representative sampling grid that would enable us to document the population trends of over 70 of the most common and widespread bird species across Switzerland. Thanks to the immense dedication of hundreds of fieldworkers, we have since been able to conduct surveys in 267 sample plots every year.

The technology underpinning the MHB scheme steadily progressed. In 2022, we successfully introduced Autoterri, a programme that automatically delineates territories based on observation data. We are now able to carry out all steps digitally, from recording observations to the final analysis. Thanks to these developments, «office work» for fieldworkers has been reduced to a minimum. At the same time, data collection in the field which used to show substantial individual variation, is now much more homogeneous. This allows streamlining the data correction process and reduces the need for corrections.

The MHB scheme is a success story. Since 2001, it has been integrated into the «Biodiversity Monitoring Switzerland (BDM)» programme. Currently, five large cantons have cantonal BDM projects based on the MHB method. Its sister project in Germany has repeatedly benefited from our know-how. The population trends now serve as a basis for calculating mixed indices, e.g. the «woodland birds» index or «Climate Change plus», an index for species that could benefit from climate change. Of course, the MHB data have been and continue to be a treasure trove for statisticians. Many analyses based on these data have made their way into internationally renowned journals, into lectures and textbooks.

Alongside MHB, we launched further projects that gave us population trends for less common breeding birds or species with an uneven spatial distribution. Such projects include the wetland monitoring scheme, surveys of colony-breeding species, and special schemes for birds that are difficult

to survey, such as Eurasian Woodcock. There are some hard nuts we have yet to crack, such as the surveillance of certain birds of prey, owls and White-backed Woodpecker. But overall we have come quite close to achieving our goal of monitoring the populations of all regular breeders. It is an achievement everyone involved can be proud of, most of all the fieldworkers who participate in countless surveys all over Switzerland!

Hans Schmid
Project Leader in the Monitoring Unit,
Swiss Ornithological Institute

Only few countries can estimate the population trend of the Water Pipit. Thanks to the MHB surveys, the trend of its Swiss breeding population is well-documented.

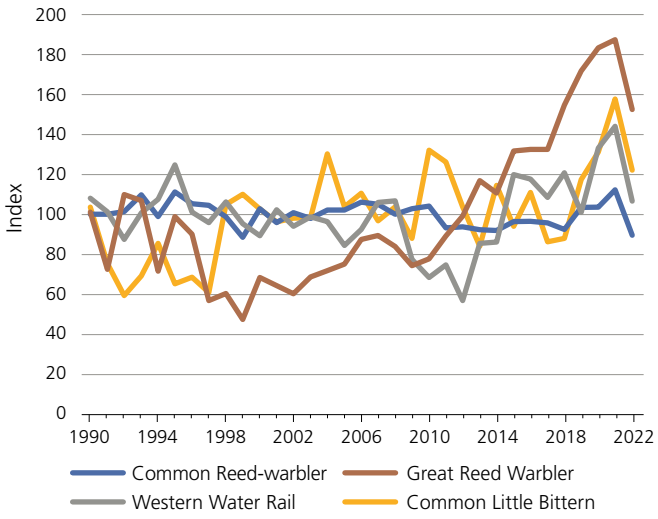
The documented breeding population of Pallid Swifts rose from 25 pairs the previous year to 65 pairs in 2022, thanks to newly discovered colonies in Brig and Geneva.

The situation of breeding birds

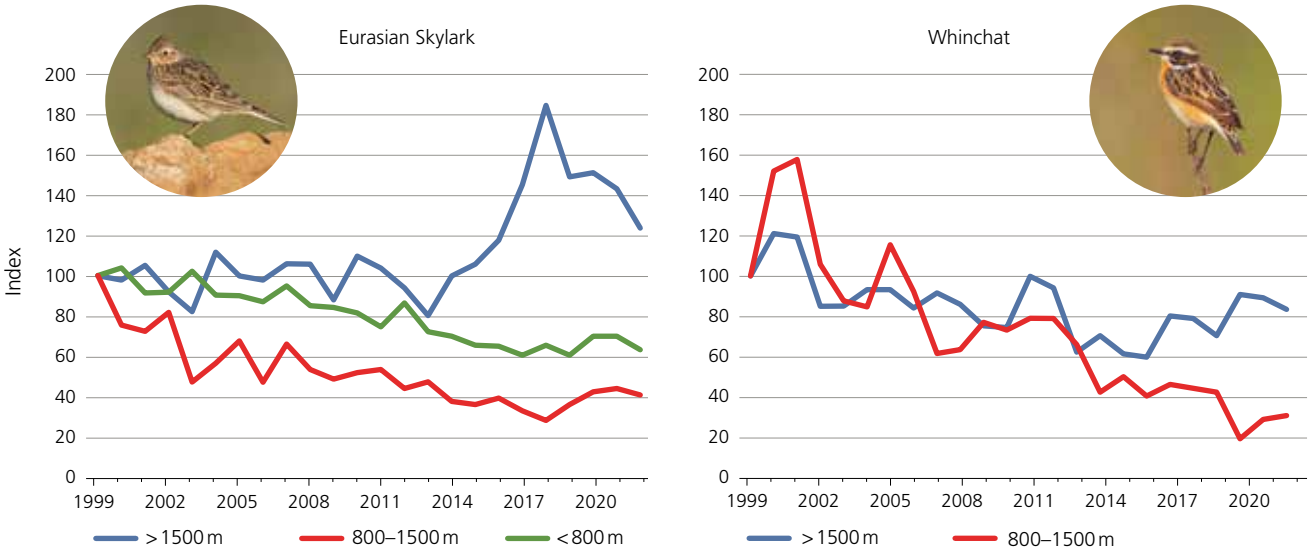
2022 was the warmest and in some areas the sunniest year in Switzerland since records began in 1864. It was also a very dry year, especially in spring and summer. A year earlier, in 2021, spring was cold and wet, followed by a rainy and at times cool summer, with an unusual number of hailstorms in June and July. Many species had lower breeding numbers in 2022 than in 2021 or failed to continue the rising trends of previous years.

Trends differ from last year

Trends took a downturn in 2022 for a remarkable number of birds of open landscapes. For instance, the populations of almost all finches and buntings were smaller in 2022 than the year before. The Corn Bunting was a notable exception. In 2022, Corn Buntings bred in various sites that had been abandoned for several years. The differing trend of Corn Bunting compared to other birds of open landscapes suggests that many Corn Buntings seen here in 2022 came from abroad. This could be linked to the



In many reed breeders, such as the Common Reed-warbler (photo), breeding numbers were lower in 2022 than in 2021. Massive rainfall and local hailstorms towards the end of the 2021 breeding season are likely causes.



Since the start of the «Monitoring common breeding birds (MHB)» surveys in 1999, breeding numbers of Whinchat and Eurasian Skylark have decreased steadily across Switzerland. While we have seen rising trends in MHB plots above 1500 m asl in the last 10 years, numbers at lower elevation are declining. Almost no Whinchats were found below 800 m asl, making it impossible to estimate a trend for this elevation zone.

extreme aridity, which was even more pronounced in wide parts of the species' Mediterranean range than it was in Switzerland. In another noteworthy finding, counts of reed birds were consistently lower in 2022 than in 2021. Many of them were probably still breeding when Switzerland was afflicted by excessive rain and hail in June and July of 2021. Low water levels in spring and summer 2022 may also have contributed to the low counts. Studies indicate that territory numbers of reed breeders and other wetland birds are lower in years with low water levels.

Encouraging trends

For the past several years, we have seen upward trends in some areas for Little Ringed Plover and Common Sandpiper. Both species benefit from extensive river restoration projects. However, the desired effect only unfolds when visitor management concepts are put in place to avoid disturbance.

Two further species have benefited from support efforts in breeding grounds: both Eurasian Scops-owl and Eurasian Wryneck have significantly increased, with 2022 seeing the highest numbers in many years. Mistle Thrush, Eurasian Blackcap and Eurasian Magpie are common species with consistent positive trends. As these species begin breeding early in the year, they were presumably less affected by the difficult conditions in summer 2021. While Magpie numbers continue to grow, the trend of Carrion Crow has plateaued in the last 15 years, indicating that a saturation level has been reached.

Negative trends continue

Several species have ongoing downward trends, with 2022 marking the lowest counts since 1990. The declines of Great Crested Grebe on waterbodies with important populations like Lake Neuchâtel and Lake Sempach are of particular consequence. Losses of European Turtle-dove also continue unabated. The species has disappeared from many former breeding areas. Citril Finches are in decline as well. The literature cites several possible reasons, including the impact of climate change in breeding and wintering grounds. Finally, White Wagtail numbers have reached the lowest level since the start of the MHB monitoring scheme.

Further information
www.vogelwarte.ch/state/breeding

In Switzerland and all over Europe, record temperatures and little precipitation led to drought in summer 2022.

Have we underestimated extreme weather conditions?

The images will remain etched in our minds. In summer 2021, Switzerland was in the grip of fierce storms for weeks. They caused floods, uprooted trees and brought wind and hail that destroyed reedbeds. The following year, 2022, brought three heatwaves with record-high temperatures. Climate change not only leads to a steady rise in temperature, but also to more extreme weather. Heatwaves, droughts and heavy rains are expected to occur more frequently and with greater intensity in the future.

Rare visitors due to severe dryness?

While scientists are looking more closely at the effects of steadily rising temperatures on birds, studies on the impact of extreme weather events are rare. The consequences of extreme weather for bird communities are therefore harder to assess. Birds may respond with behavioural changes in the short term. Studies show that populations move to the peripheries of their range when the centre is afflicted by drought. In 2022, Switzerland experienced an unprecedented influx of European Rollers with sightings in more than 40 sites! This influx coincided with the severe dry period in the species' nearest breeding grounds in southern France.

Extreme weather: blessing or curse?

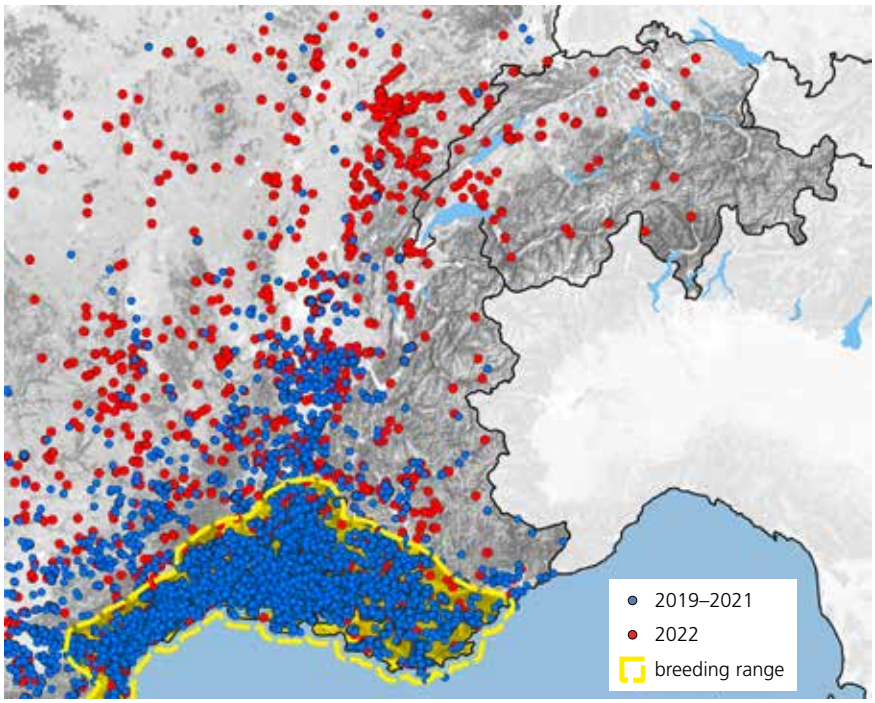
When extreme events occur during the breeding season, birds are often unable to escape. The Common Kingfisher, whose nests are regularly destroyed by floods, is a case in point. Models predict less frequent but heavier rainfall for Switzerland as well as a longer flood season. Studies of Lesser Kestrels in Portugal have shown that isolated droughts can have a much greater effect on breeding success than the gradual rise in average temperature. Long-term trends and isolated events can also reinforce each other. Studies of North American Tree Swallows show that the earlier start of the breeding season significantly increases the risk of a cold spell during the breeding period. Such cold spells reduce the activity of flying insects, which can lead to devastating brood loss.

Besides its direct effects on survival and breeding success, extreme events can permanently change landscapes, thus impacting bird communities in the long run. The massive forest fires in Leuk (2003) and Visp (2011) gave us striking examples of this kind of impact. The places burnt in the fire still stand out from the surrounding areas and were quickly populated by species, some of them rare. Even 16 years on, these areas have species compositions that differ greatly from those present before the fire and in the immediate surroundings.

Studies of Lesser Kestrels in Portugal suggest that gradually rising temperatures will not negatively impact population size in the medium term. In contrast, isolated droughts have led to massive breeding failure in the past due to a lack of large insects.

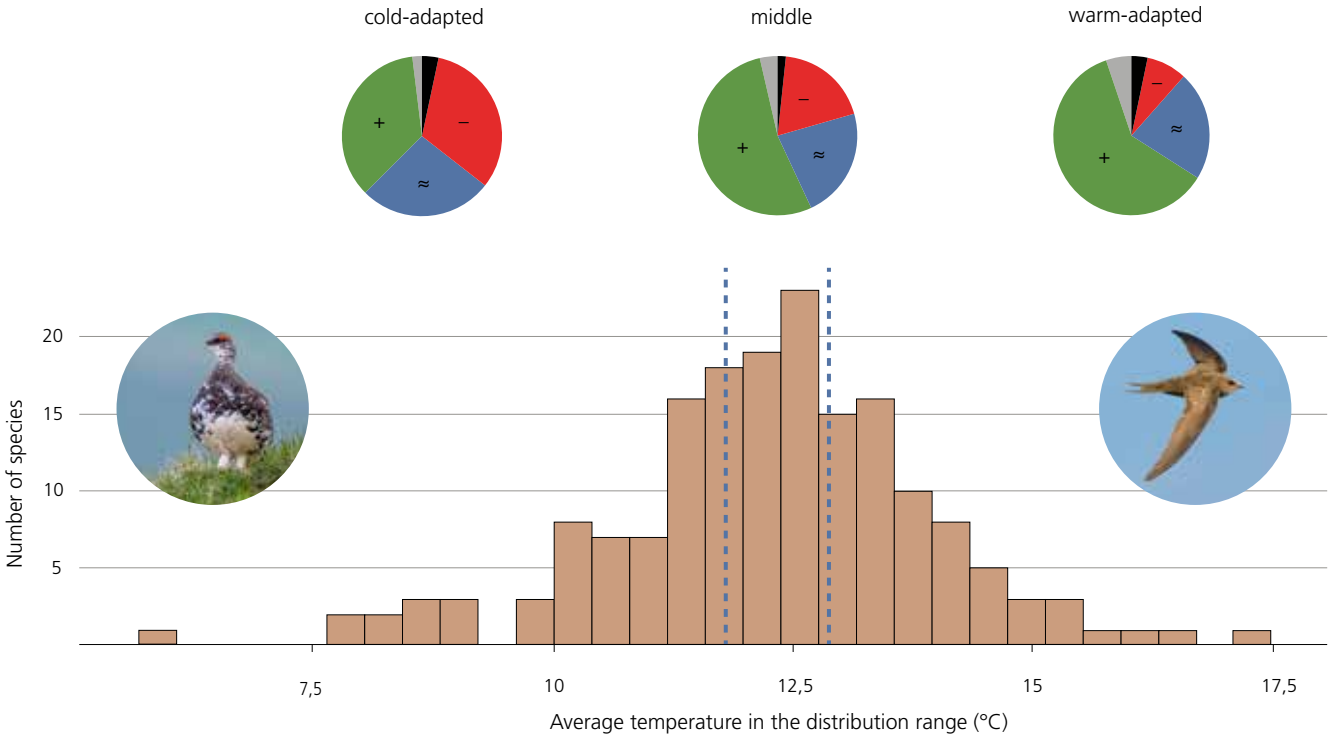
«Extreme» becomes «normal»

Extreme weather events are by definition rare and therefore offer scant data to assess their medium and long-term effects. Climate models predict that freak weather events that once were the rare exception could soon become normal. A study of 109 North American bird species has shown that different species respond to extreme conditions quite differently. For example, long-distance migrants appear to cope more easily with extreme heat than short-distance migrants, at least in the short term. And rare species are less resilient in the face of severe drought than common and widespread species. Rare species are often habitat or food specialists and as such, they are less tolerant of severe fluctuations in their environment. The coming decades will reveal what kind of impact increasing extreme weather events have on birds in Switzerland. In general, extreme weather is considered to be one of the most unpredictable consequences of climate change with potentially underestimated repercussions for biodiversity.



In 2022, young European Rollers dispersed much further north than usual after the breeding season, which led to an unprecedented influx in Switzerland. Persistent drought may have been a contributing factor. Observational data: ornitho.ch & faune-france.org, Map: Natural Earth, Stamen Design & OpenStreetMap.

Only some like it hot



The proportion of Swiss breeding birds with a significant positive trend is largest among species adapted to warm climates (green pie chart segment, top right) and smallest among cold-adapted species (top left). The grey segments represent species newly established as regular breeders since 1990; the black segments are for species that no longer breed in Switzerland. The histogram illustrates the distribution of the mean temperature in the breeding range among Swiss breeding birds. The dashed blue lines demarcate the most cold-adapted and warm-adapted third of the species.

Temperatures in Switzerland have risen steeply since 1990. On average, temperatures in the last 30 years have been 2 °C above the pre-industrial level. Climatic conditions are an important factor in the geographical distribution of species. Together with other factors, climate change affects the numbers of individual species and overall biodiversity.

Average breeding-range temperature as indicator

The average temperature during the breeding season in the entire breeding range, called the Species Temperature Index (STI), is an indicator for a species' temperature preference. For Swiss breeding birds, this value varies between 6 °C for Rock Ptarmigan and 17 °C for Pallid Swift.

Gains in warm-adapted species

About half of Swiss breeding bird species have increased in number since 1990, while 20 % present a negative trend. In the most warm-adapted third, 64 % of species have a positive trend and only 12 % a negative one. The group of new breeders since 1990 also contains a notable number of warm-adapted species (e.g. European Bee-eater with an STI of 15.4 °C). But the exception proves the rule: with a STI of 15.9 °C, the Woodchat Shrike was one of Switzerland's most warm-adapted breeding birds. Its disappearance in the 2000s shows that while temperature matters, suitable habitat is critical too.

Stronger declines in cold-adapted species

In the most cold-adapted third, species with a negative trend (36 %) and those with a positive trend (32 %) are about balanced. The proportion of positive trends in cold-adapted species is thus only half as large as in warm-adapted species.

The SBI® Climate Change plus and minus indices present a similar result. Each is based on the average population trends of 20 species that are expected to do especially well or especially poorly under future climate and land use scenarios. Those 20 species with the most positive forecast already show a strong positive trend on average today. The population sizes of the 20 species worst equipped to cope with future conditions, according to the scenarios, show no clear change so far when compared to 1990 values.

Possible mechanisms

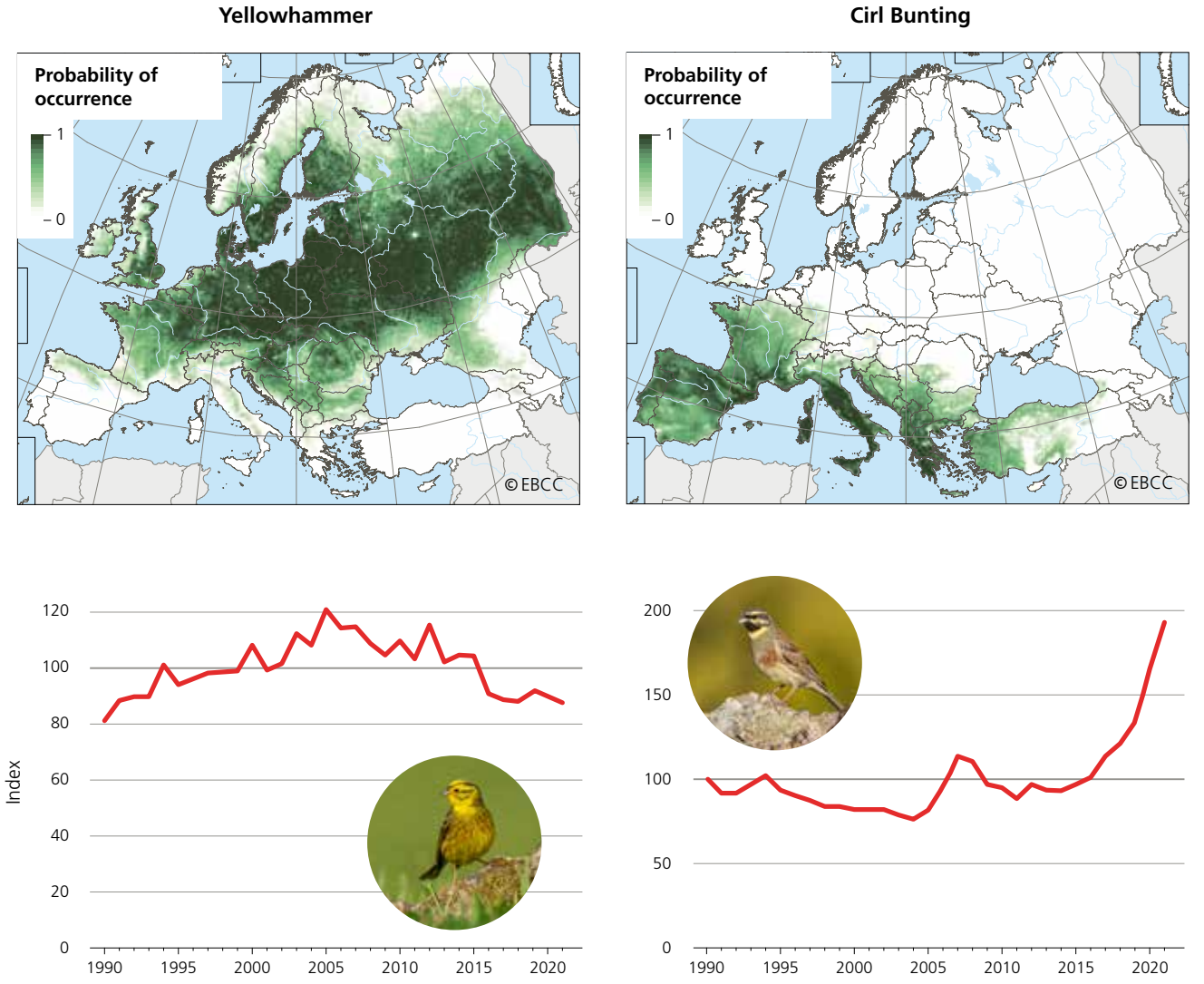
In most cases, it is presumably not the higher temperature in and of itself that allows a bird species to push forth into new areas. Birds are dependent on developments in their habitats and food

supply. Higher temperatures may be the reason, for example, why European Bee-eaters now find a sufficient supply of flying insects during a long enough period for them to breed successfully. According to a recent study, year-on-year variation in spring temperature has a greater influence on the springtime phenology of plants and insects than on birds. Plant and insect phenology is presumably directly correlated with temperature, while birds need to adapt their breeding cycle to the seasonal availability of prey. Starting to breed earlier increases the risk of breeding being disrupted by a late cold spell.

Long-term effects

Species communities and the conditions of interspecific competition will change in the long term. Which species will prevail in the struggle over available resources under altered conditions remains to be seen. We have to assume that some of today's common species will decrease in number in the long term. Successful under past conditions, they may no longer be among the best-adapted species when conditions change.

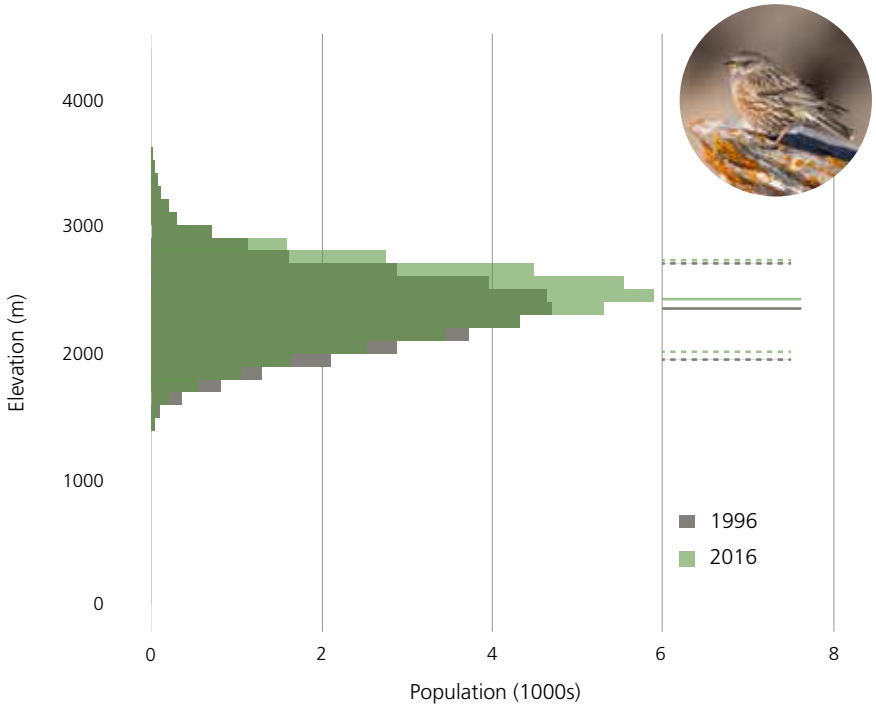
Further information
www.vogelwarte.ch/state/breeding



Switzerland lies in the overlap of Yellowhammer and Cirl Bunting distribution (top). While the Yellowhammer currently has a declining trend in Switzerland, Cirl Bunting numbers have doubled in the past 10 years (bottom).

Things are starting to slip

In the lower elevation of the White-winged Snowfinch's range, snowmelt has begun much earlier over the past 20 years; not so the bird's breeding period.

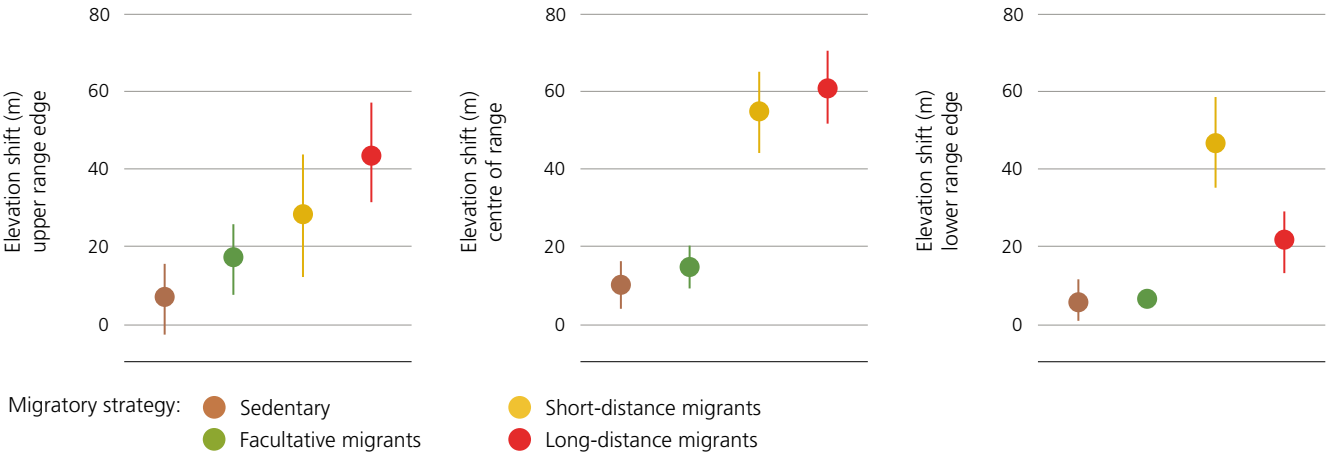


Elevational distributions of the Alpine Accentor in 1993–1996 and 2013–2016 (charts are overlaid). The solid lines indicate the mean distribution, dotted lines delimit the zone in which 80 % of the population occurs. Both the mean distribution and the lower distribution edge have moved upwards, while the upper edge has not. This contraction in elevational extent combined with the shrinking area available with increasing elevation results in the decline of Alpine Accentor. Fig. from Hallman et al., 2022.

Living conditions in the mountains are harsh. Still, evidence for several alpine species shows that there are times when food is abundant: when snowfields melt, insect larvae and other invertebrates flourish at the wet edges. White-winged Snowfinch, Ring Ouzel, Black Redstart, Northern Wheatear and Water Pipit frequent these patches to forage in May and June. Melting snowfields are essential for chick rearing.

Earlier snowmelt

The mean date for the end of snow cover on Weissfluhjoch (2540 m asl, GR) in the 1960s was 17 July. In 2022, the snow had disappeared by early June – one-and-a-half months earlier than in the 1960s. Studies by the Swiss Ornithological Institute reveal that White-winged Snowfinches prefer breeding sites where snowmelt is later than the Swiss average at the same elevation. However, at the lower edge of distribution in particular, fledging dates of White-winged Snowfinch did not advance to the same extent as snowmelt



The analysis of atlas data reveals a correlation between migratory strategy and changes in elevational distribution. Between the 1990s and the 2010s, the upward range shift was most marked in long-distance migrants. This especially applies to the upper range edge. Fig. from Hallman et al., 2022.

between 1999 and 2018. They thus face a reduced supply of protein-rich crane fly larvae, which find ideal conditions to develop on the damp edges of snow patches. Instead, chicks are fed with second-rate prey, leading to slower growth. White-winged Snowfinches appear unable to sufficiently adapt to the changes in their environment. This could be one reason why numbers decreased by about 13 % between 1993–1996 and 2013–2016.

Atlas provides further evidence

For most species, we do not have such detailed studies as for the White-winged Snowfinch. But there are strong indications that higher temperatures, earlier snowmelt and changes in precipitation patterns are impacting many other bird species. Elevational range shifts were studied in 71 species based on the last two Swiss breeding bird atlases (1993–1996 and 2013–2016). 56 % of species shifted their range to higher ground, by an average of 75 m in the 20 years considered. For 23 %, downward shifts were detected. The study also shows that migratory birds shift their ranges upward more quickly than residents and partial migrants.

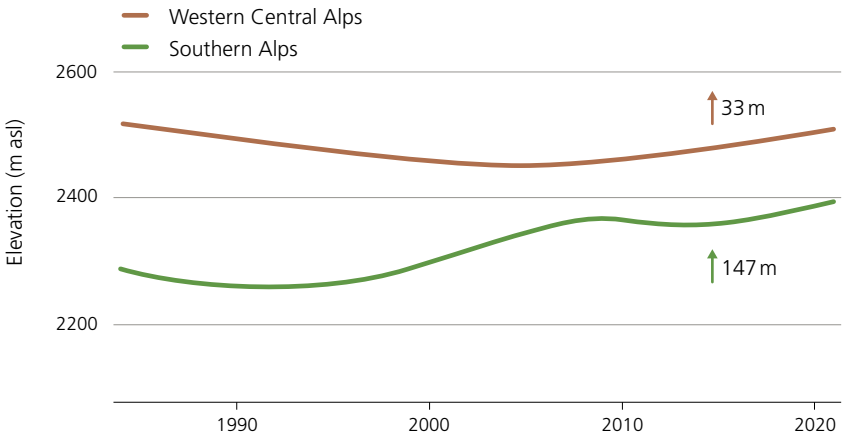
Habitat is shrinking

Mountains cover 70 % of Switzerland, so our country has a special responsibility for alpine species. Five of seven typical alpine birds shifted their ranges upward between 1993–1996 and 2013–2016, none of them downward. In Switzerland, 5600 km^2 lie between 2000 and 2500 m, but only a mere 800 km^2 between 3000 and 3500 m. That means that the higher up species need to move, the smaller the available space becomes. Moreover, the upper distribution limit of these alpine species shifted upward by an average of 1,9 m per year, while the lower limit moved up by 3,1 m per year. Elevational distribution thus contracted for almost half of alpine bird species.

About 30 % of Switzerland is covered by forest, with a large portion lying in the Alps and the Jura mountains. In the category of woodland birds, 21 of 37 species shifted their range upwards. This enables certain species to occupy new areas of woodland at higher elevation. But if the lower distribution edge moves up simultaneously, we again see a contraction of the available space due to the elevation profile.

Elevational shift in Rock Ptarmigan

The Rock Ptarmigan is a prime example of a species perfectly adapted to high mountains. A countrywide analysis of Rock Ptarmigan elevational distribution from 1984 to 2021 showed widely varying regional trends. In the Southern Alps, the average elevation of Rock Ptarmigan observations reflected a marked upward shift lasting until the late 2010s (up to 10 m per year). Since then, the rise has slowed, amounting to 147 m overall in the 37 years between 1984 and 2021. In the Eastern Alps the rise was 50 m over 37 years. In the Western Alps, which is the region with the highest peaks



Average elevation above sea level of Rock Ptarmigan observations in two Swiss alpine regions between 1984 and 2021.

and therefore the highest average elevational distribution of Rock Ptarmigan, no change was apparent for a long time. Only in 2010 did the mean observation height slowly begin to rise (33 m overall in 37 years). North of the Alps, Rock Ptarmigan observations rose by 45 m overall.

These varying regional shifts indicate that the upward movement of Rock Ptarmigan distribution cannot be explained by higher temperatures alone. Other factors such as weather conditions during chick rearing, disturbance by humans (especially in winter), hunting and vegetation succession at the tree line constitute possible causes of elevation shifts and declining numbers.

Undisturbed alpine landscapes must be preserved

The habitat of alpine bird species is limited by the tree line below and the availability of suitable habitat above. The impact of global warming is especially strong in this habitat. To ensure that the species adapted to these special conditions can survive, alpine areas that have been little affected need to be protected from additional adverse effects. This means no new skiing infrastructure in even higher locations, installing solar panels on existing infrastructure to avoid additional development (e.g. near reservoirs and settlements or on avalanche barriers), minimizing disturbance and continuing traditional management of species-rich alpine pastures. Setting aside new, large-scale protection zones for particularly sensitive species would be a valuable intervention. And finally, curbing anthropogenic climate change is urgent and essential.

Their camouflage allows Rock Ptarmigans to blend in with the terrain. Can you spot the two birds on the photo?

Further information
www.vogelwarte.ch/state/breeding

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When the snow melts before the birds moult, the Rock Ptarmigan's perfectly designed camouflage becomes ineffective.

Regular breeders in Switzerland

Population trends for 176 regular breeding birds[1] in Switzerland for the entire survey period (1990–2022) and for the last 10 years (2012–2022). Trends shown as +++ or ––– signify a change by more than a factor of 5, while ++ or –– marks a change between a factor of 2 and 5 and + or – a change by less than a factor of 2. The symbol • means that no statistically significant change was detected. This is the case for populations that are fluctuating or stable, or for which we have insufficient data. The columns NPS 2010 and NPS 2023 show breeding and wintering species of national priority. For better comparability, the categories in the 2010 list (Keller et al. 2010) were changed to match those in the new list (Knaus et al., forthcoming). 1 = breeding bird species of national priority (categories B1 to B3 in Keller et al. 2010); 1G = wintering bird species of national priority (G1 and G2 in Keller et al. 2010).

Species	Trend 1990–2022	Trend 2013–2022	NPS 2010	NPS 2023
Common Quail	•	•		1
Rock Partridge	•	++	1	1
Grey Partridge	–––	–––	1	1
Hazel Grouse	•	•	1	1
Rock Ptarmigan[4]	–	•	1	1
Western Capercaillie	–	•	1	1
Black Grouse	+	•	1	1
Common Eider	•	•		1
Goosander	++	+	1 / 1G	1G
Red-crested Pochard	+++	•	1 / 1G	1G
Common Pochard	•	•	1G	1 / 1G
Tufted Duck	+	•	1 / 1G	1G
Gadwall	++	•	1G	1G
Mallard	+	•	1G	1G
Little Grebe	•	•	1	
Great Crested Grebe	–	–	1 / 1G	1G
Black-necked Grebe	•	•	1G	1 / 1G
Stock Dove	++	++		
Common Woodpigeon	++	+		
European Turtle-dove	––	–	1	1
Eurasian Collared-dove	++	+		
European Nightjar	–	•	1	1
Alpine Swift	++	+	1	1
Pallid Swift	++	•		
Common Swift[2]		+	1	1
Common Cuckoo	+	+	1	
Western Water Rail	•	•		
Corncrake	•	•	1	1
Spotted Crake	++	•		1
Little Crake	+++	•		
Common Moorhen	+	+		
Common Coot	+	•	1G	1G
White Stork	+++	++	1	1
Common Little Bittern	+	+	1	1
Grey Heron	•	•		
Purple Heron	+++	•	1	
Great Cormorant	+++	++	1G	
Little Ringed Plover	•	+	1	1
Northern Lapwing	•	+	1	1
Eurasian Curlew	–––	•	1	1
Eurasian Woodcock	•	•	1	1
Common Snipe	–––	•	1	1
Common Sandpiper	•	+	1	1
Black-headed Gull	––	•	1	1 / 1G
Mediterranean Gull	•	•		
Mew Gull	•	•		

Species	Trend 1990–2022	Trend 2013–2022	NPS 2010	NPS 2023
Yellow-legged Gull	+++	–		
Common Tern	++	•	1	1
Common Barn-owl	–	+	1	1
Eurasian Pygmy-owl	•	•	1	
Little Owl	++	+	1	1
Boreal Owl	–	•	1	
Eurasian Scops-owl	+++	++	1	1
Northern Long-eared Owl[3]	•	–	1	
Tawny Owl[2]		+		
Eurasian Eagle-owl	•	+	1	1
European Honey-buzzard	+	•	1	
Bearded Vulture	+++	++	1	1
Golden Eagle	+	+	1	
Eurasian Sparrowhawk	•	•	1	
Northern Goshawk	+	•	1	
Red Kite	+++	+	1	1G
Black Kite[2]		•	1	
Eurasian Buzzard	+	•	1	
Common Hoopoe	+	•	1	1
European Bee-eater	+++	++		1
Common Kingfisher	+	•	1	1
Eurasian Wryneck	•	+	1	1
Grey-faced Woodpecker	––	–	1	1
Eurasian Green Woodpecker[3]	+	+		
Black Woodpecker	++	+		
Three-toed Woodpecker	•	•	1	
Middle Spotted Woodpecker	++	+	1	1
Lesser Spotted Woodpecker	+	+		
Great Spotted Woodpecker	++	+		
Common Kestrel	++	+	1	1
Eurasian Hobby	+	+	1	
Peregrine Falcon	+	•	1	1
Eurasian Golden Oriole	+	+		
Red-backed Shrike	–	+		1
Woodchat Shrike	–––	•	1	1
Red-billed Chough	++	+	1	1
Yellow-billed Chough[2]		•	1	
Eurasian Jay	+	•		
Eurasian Magpie	++	+		
Northern Nutcracker	•	•	1	
Eurasian Jackdaw	+	•	1	1
Rook	+++	+		1
Common Raven	++	•		
Carrion Crow	++	•	1	
Coal Tit[2]		•	1	
Crested Tit	+	•	1	

Species	Trend 1990–2022	Trend 2013–2022	NPS 2010	NPS 2023
Marsh Tit	+	•	1	
Alpine or Willow Tit[2]		+		
Eurasian Blue Tit	++	•		
Great Tit	+	+		
Woodlark	+	++	1	1
Eurasian Skylark	–	•	1	1
Bearded Reedling	+	•	1	1
Melodious Warbler	+	+	1	
Icterine Warbler	––	•	1	1
Marsh Warbler	•	•		
Common Reed-warbler	•	•		
Great Reed-warbler	++	+	1	
Savi's Warbler	+	+	1	1
Com. Grasshopper-warbler	+	•	1	1
Northern House Martin	–	•	1	1
Barn Swallow	•	•		
Eurasian Crag Martin	++	•	1	
Collared Sand Martin	–	•	1	1
Western Bonelli's Warbler	++	•		
Wood Warbler	––	––	1	1
Willow Warbler	––	–	1	1
Common Chiffchaff	+	+		
Long-tailed Tit	+	•		
Eurasian Blackcap	+	+		
Garden Warbler	–	•	1	1
Barred Warbler	–––	–––		
Lesser Whitethroat	+	+		
Common Whitethroat	+	+	1	1
Short-toed Treecreeper	+	+		
Eurasian Treecreeper	++	•	1	
Eurasian Nuthatch	–	•		
Wallcreeper	•	•	1	
Northern Wren	+	•		
White-throated Dipper	+	•	1	
Common Starling	+	+		
Mistle Thrush	+	+	1	
Song Thrush	+	•		
Eurasian Blackbird	+	•		
Fieldfare	––	–	1	
Ring Ouzel	–	•	1	
Spotted Flycatcher	–	•		
European Robin	+	+		

Species	Trend 1990–2022	Trend 2013–2022	NPS 2010	NPS 2023
Bluethroat	++	•		1
Common Nightingale	+	•	1	
European Pied Flycatcher[2]		•		
Black Redstart	+	+	1	
Common Redstart	•	•	1	1
Rufous-tailed Rock-thrush	–	•	1	
Blue Rock-thrush	•	+	1	
Whinchat	–	+	1	1
Common Stonechat	++	+	1	1
Northern Wheatear	+	+		
Goldcrest	+	•	1	
Common Firecrest	•	•	1	
Alpine Accentor	–	•	1	
Dunnock	+	•		
House Sparrow	+	+		
Eurasian Tree Sparrow	+	•		
White-winged Snowfinch	–	•	1	
Tree Pipit	–	•		1
Meadow Pipit	––	•	1	1
Water Pipit	+	•	1	
Tawny Pipit	+++	•		
Western Yellow Wagtail	+	•	1	1
Grey Wagtail	•	•		
White Wagtail	–	•		
Common Chaffinch	+	•		
Hawfinch	+	•		
Common Rosefinch	+	•		
Eurasian Bullfinch	–	•	1	
European Greenfinch	–	–		
Common Linnet	+	+	1	
Redpoll	–	––		
Red Crossbill[2]		++	1	
European Goldfinch	•	+		
Citril Finch	–	•	1	
European Serin	•	+		
Eurasian Siskin[2]		•		
Corn Bunting	–	•	1	1
Rock Bunting	+	•		
Ortolan Bunting	–––	–––	1	1
Cirl Bunting	+	++	1	1
Yellowhammer	•	–		
Reed Bunting	–	+	1	1

[1] This includes species categorised as regular breeders at least once since 1990 (i.e. the species has bred in Switzerland in at least 9 of 10 consecutive years) for which we have the necessary data. 179 species belong in this category, not counting introduced species (e.g. Mute Swan, Ruddy Shelduck, Common Pheasant). No assessment is possible for White-backed Woodpecker, Collared Flycatcher and Italian Sparrow due to lack of data.
[2] Index starts in 1999
[3] Index starts in 1996
[4] Index starts in 1995

Irregular and exceptional breeders

Since 2000, a further 26 species have bred in Switzerland irregularly or exceptionally. Their breeding populations are documented as consistently as possible (table available online www.vogelwarte.ch/en/projects/population-trends/state-of-birds/breeding-birds/further-analyses/).

Further information
www.vogelwarte.ch/state/breeding

References

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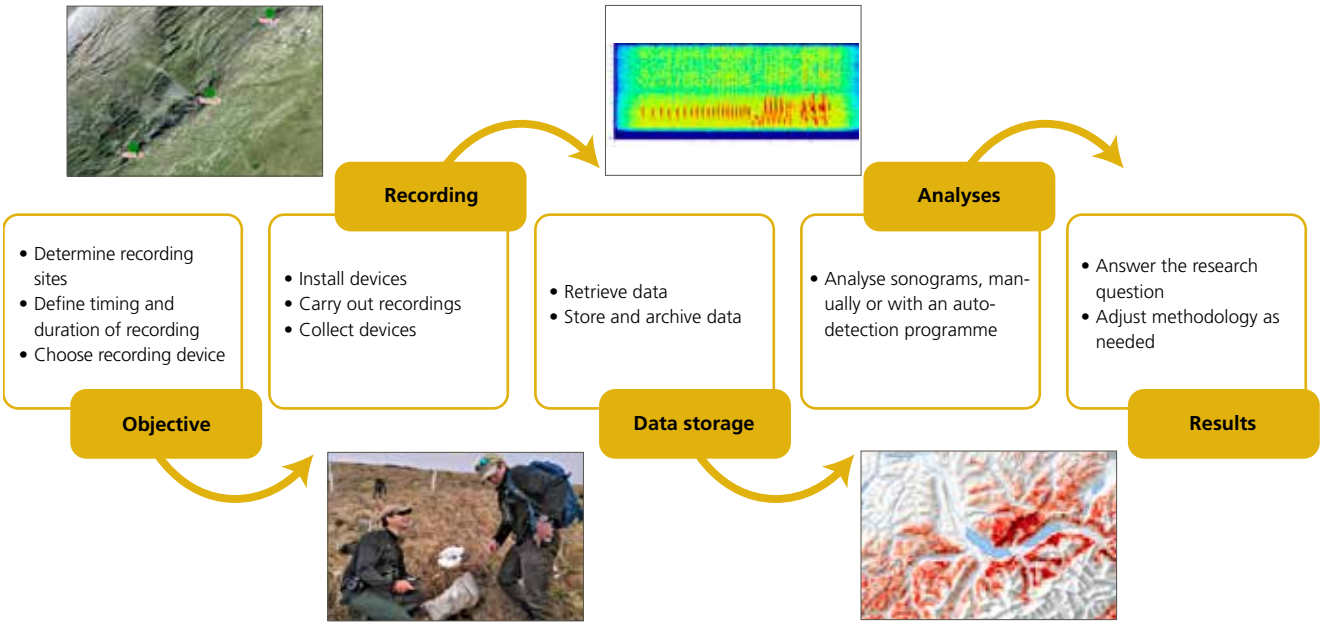
Bioacoustics in bird monitoring

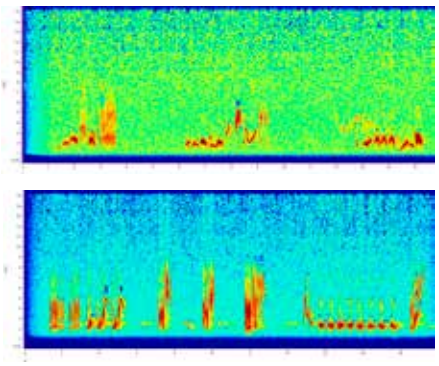
Have you ever taken part in owl monitoring? If you have, you know that it can be quite a challenge. Surveys need to be conducted at night and, in the case of some species, in winter and in mountainous terrain. You spend a lot of time in the cold, waiting. Maybe at some point, the species you are looking for will start to call. Maybe you won't hear a thing. There is now an alternative to this method: acoustic recording devices.

Unthought-of possibilities

Bioacoustic monitoring is the monitoring of wild animals using sound recorders. Since user-friendly devices at affordable prices have become available, this method has spread both in the field of science and among hobby ornithologists. The sound recorders are set up in the field to record vocalisations following a predefined schedule (e.g. one hour before until one hour after sunrise every day). The recordings are then analysed at the office on the computer. Deploying acoustic recorders is a promising approach for species that are difficult to detect, either because they are nocturnal or elusive or because they live in remote areas (e.g. owls, rails and grouse). Bioacoustic monitoring allows us to investigate a species' presence, vocalisations and even behaviour.



A bioacoustic monitoring project involves several steps. Audio data collected in the field can be visualised andanalysed as sonograms on screen. Alternatively, machine-learning algorithms may be employed. Analysing the collected audio data often requires more time and effort than the field work itself.



Sonograms of Eurasian Blackbird (top) and Song Trush (bottom) songs. You can listen to these sound tracks in the species portraits on vogelwarte.ch (the QR codes link to the portraits).

Further information

xeno-canto.org contains a large collection of bird songs, including the sonograms.
You can find software for visualising audio files as sonograms at *audacityteam.org* or *ravensoundsoftware.com/raven-lite-downloads*

Species like Eurasian Pygmy-owl are very hard to survey using field methods. Handy recording devices allow us to monitor birds while keeping disturbance to a minimum and increases the chances of actually detecting a species that is present.

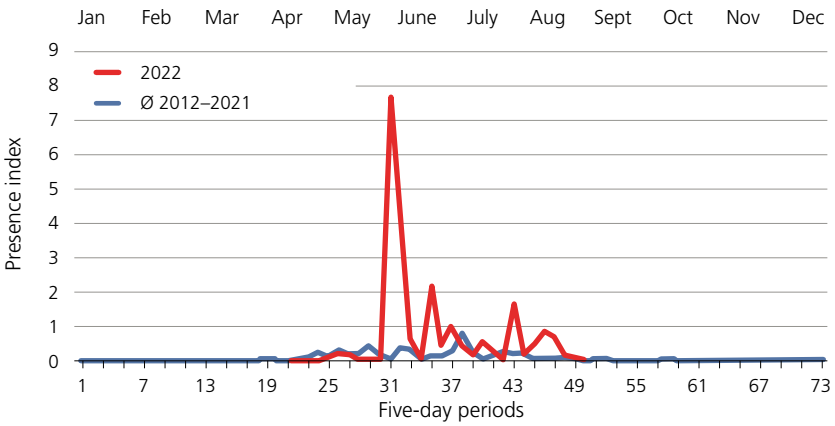
Sandwich Terns mainly overwinter off the coast of West Africa or in the Mediterranean region. Only few birds pass through Switzerland.

Exceptional passage of terns

The Common Tern is the only member of the tern family that regularly breeds in Switzerland. Breeding habitat is lacking for any other species of tern. They are, however, regular visitors to our waterbodies in spring and summer. In 2022 some terns showed up in much greater numbers than usual.

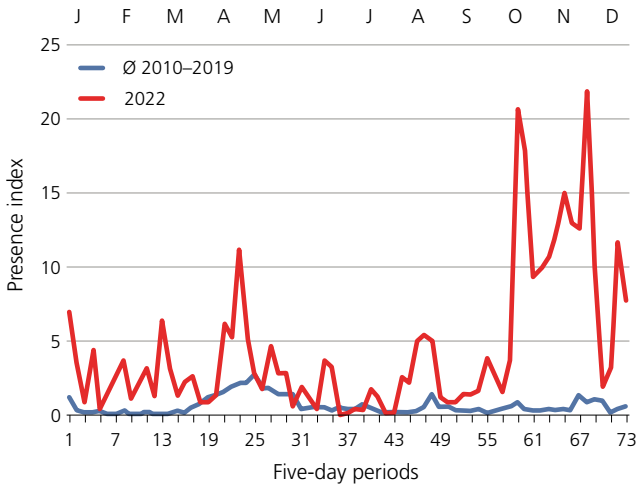
The spring passage of White-winged Tern, for instance, which fluctuates greatly from one year to the next, was the heaviest since records began in 1990. The terns were seen on large and small lakes. The largest flock of 19 birds was recorded in early May in the Fanel BE nature reserve on Lake Neuchâtel. Common Gull-billed Terns, although they appeared in smaller numbers, were also at a record high. Counts of Caspian Terns were the third-highest since 1990.

Even more impressive was the appearance of Sandwich Terns. This species keeps close to the seacoast and is rarely seen inland. Between April and September, Sandwich Terns are regular but rare visitors to Switzerland. In 2022, however, the presence index was four times the average of the previous 10 years. Following some initial sightings at the beginning of May, the species was seen in 15 sites on the Central Plateau between June and September. In most cases, the sightings involved individuals or groups of fewer than 10 birds. On 4 June, however, a flock of 30 birds was recorded near Préverenges VD, a number unprecedented in Switzerland. Three of these birds had been ringed as nestlings on the North or Baltic Sea coast between 2017 and 2020. This gives us information about the bird's origin and confirms that the birds seen in Switzerland are for the most part adults. The influx could be linked to the bird flu epidemic that swept through several Sandwich Tern breeding colonies between the UK and Germany in 2022. As a result, reproductive success was low and adult birds left the colonies early in large numbers. Western European populations with their core ranges in the Netherlands and the UK had seen a slight increase over the past years, but the overall European trend is uncertain. Time will tell how this



Although strongly associated with seacoasts, individual Sandwich Terns occasionally summer in Switzerland. In the summer of 2022, the presence of the species was well above average. Around 50 years ago, Sandwich Terns were observed courting and nest-building in Switzerland.

An unprecedented influx brought dozens of Cattle Egrets to the valleys of Ticino in winter 2021–2022.



Cattle Egret records followed a completely different pattern in 2022 compared with the 2010–2019 average. Prior to 2020 the birds were mainly seen during spring migration, while the 2022 occurrence pattern more closely resembles that of a wintering bird.

outbreak of bird flu impacted populations of Sandwich Terns across Europe.

Cattle Egret numbers explode

In the course of its global and European expansion, the Cattle Egret has become a more frequent visitor to Switzerland in recent years. Following the first Swiss record in 1974, sightings remained rare up to the first larger influx in 1992. Since then, the number of observations has steadily increased, ever more rapidly so since 2021. Until the turn of the millennium, the species was mainly recorded in Switzerland in spring. Summer sightings were smaller in number and winter records were very rare. This pattern remained largely unchanged until 2019, even though some years saw slightly higher records in autumn and occasionally in early winter. In 2020–2022 however, there were yearly spring and summer influxes, followed by an even higher influx in autumn and winter. In 2022, winter records exceeded spring counts for the first time. Global warming presumably makes it easier for this temperature-sensitive species to push north, especially since increasing aridity is driving Cattle Egrets out of their core range on the Iberian Peninsula. The rise of winter sightings in Ticino has been aided by mild winters with little snow, but is likely also a direct result of the exploding breeding population in northern Italy's Po Valley.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
J	0	0	0	1	1	0	0	2	1	1	1	0	1	0	6	0	2	1	1	1	1	5	47
F	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	1	2	1	0	1	0	2	35
M	0	1	1	0	0	1	2	0	2	2	1	0	1	1	0	1	2	2	7	1	1	3	36
A	2	1	1	1	2	7	1	1	12	2	1	3	8	1	2	2	9	7	4	12	14	15	37
M	2	2	1	2	1	8	2	2	5	6	2	1	8	3	2	2	7	8	4	19	9	14	12
J	1	1	7	0	0	1	1	2	2	2	3	1	1	1	2	3	6	11	3	5	25	17	20
J	1	1	1	0	0	1	1	1	1	1	0	1	2	1	2	1	1	2	2	7	14	21	21
A	5	2	1	1	0	20	1	0	1	2	1	1	1	0	3	2	9	0	0	11	7	20	32
S	1	1	1	1	1	2	2	1	1	1	1	2	2	0	1	2	1	7	0	1	2	53	6
O	8	1	1	1	4	23	22	1	12	2	9	1	1	1	1	2	1	3	1	1	1	9	24
N	3	1	1	0	2	2	2	0	5	0	2	0	0	12	0	1	1	1	1	0	9	5	21
D	1	1	1	0	0	0	2	0	0	14	0	2	0	10	0	1	2	2	2	2	9	80	37

Maximum size of Cattle Egret groups recorded per month in 2000–2022. The peak of 23 birds, reached during the first large influx in autumn 2005, was not surpassed until June 2020. Since autumn 2021, counts have reached a level previously unseen in Switzerland.

Record numbers of vultures

As typical soaring birds, Griffon Vultures depend on thermals.

In the Alps, to the west of the line leading from the Stockhorn range to Val d'Illiez, dozens of Griffon Vultures can regularly be observed, sometimes as many as 50 or more. Since 2000, these specialised soaring birds have been seen daily during the summer months, with numbers increasing since 2012 and again since 2018. Most of the birds come from reintroduction projects in southern France (Southern Alps, Grands Causses). But ring findings also indicate that some individuals find their way here from Spain, Portugal and Croatia. The reintroduction projects that began in France in 1981 have been very successful. Once extinct except for one colony in the Pyrenees, the French breeding population numbered around 3000 pairs in 2021. The birds seen in the Swiss Alps are mainly youngsters from this population. The excursions seem to pay off. An estimated 300 000 livestock populate the alpine pastures during the summer months; added to these are large populations of ungulates. Where there are so many animals, there are plenty of losses, and the vultures can help themselves to carrion.

Despite the rise in observations and the longer stays extending into autumn, it is unlikely that Griffon Vultures will start breeding in Switzerland anytime soon. In the southern European breeding grounds, egg-laying begins early, between December and March. Thermals and food are scarce in the Alps in winter, and the conditions therefore unfavourable for a specialist soaring bird. Only if Griffon Vultures were to regularly stay in Switzerland all year round would breeding become a possibility.

Unusual eastward advance

Following a steady rise in Griffon Vulture sightings until 2020, there were significantly fewer observations in 2021. From mid-June 2022, however, it became apparent that more Griffon Vultures than ever before had made their way to the Swiss Alps. For the first time, Griffon Vultures were seen

Griffon Vulture

	2008			2010			2012			2014			2016			2018			2020			2022	
J	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1								
F	0	0	0	0	0	0	0	0	1	1	0	0	2	2	1								
M	2	0	7	0	1	0	0	1	0	0	1	0	2	1	1								
A	8	2	3	4	7	14	1	12	3	17	24	3	15	3	20								
M	12	33	58	115	73	68	108	47	135	123	105	58	655	236	243								
J	71	89	177	171	286	174	221	585	195	1173	1302	1202	3211	1361	2236								
J	9	117	48	167	428	373	309	1398	778	1833	5114	4603	5975	4017	6464								
A	1	13	5	127	66	49	46	280	306	616	2128	2686	3515	2924	6527								
S	0	3	8	12	1	6	4	19	13	10	679	1535	2382	2222	2669								
O	3	0	2	6	0	7	1	4	2	1	134	294	143	254	370								
N	0	0	0	0	4	0	0	0	1	0	0	6	0	1	32								
D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3								

Cumulative daily totals of Griffon Vultures recorded in 2008–2022 per month. The numbers have multiplied, and stays increasingly extend into autumn.

Cinereous Vulture

	2008			2010			2012			2014			2016			2018			2020			2022	
J	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
M	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0								
A	1	0	0	2	0	0	0	1	0	0	3	0	0	1	0								
M	0	11	0	3	0	0	0	0	6	3	0	2	4	2	7								
J	0	1	1	3	0	1	1	1	5	2	16	5	11	5	19								
J	0	1	0	0	2	0	3	0	4	5	18	25	38	13	69								
A	0	3	0	0	0	0	0	0	0	0	20	56	58	42	111								
S	0	0	0	0	0	0	0	0	0	0	12	61	29	17	55								
O	0	0	0	0	0	0	0	0	0	0	8	13	0	0	8								
N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1								
D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1								

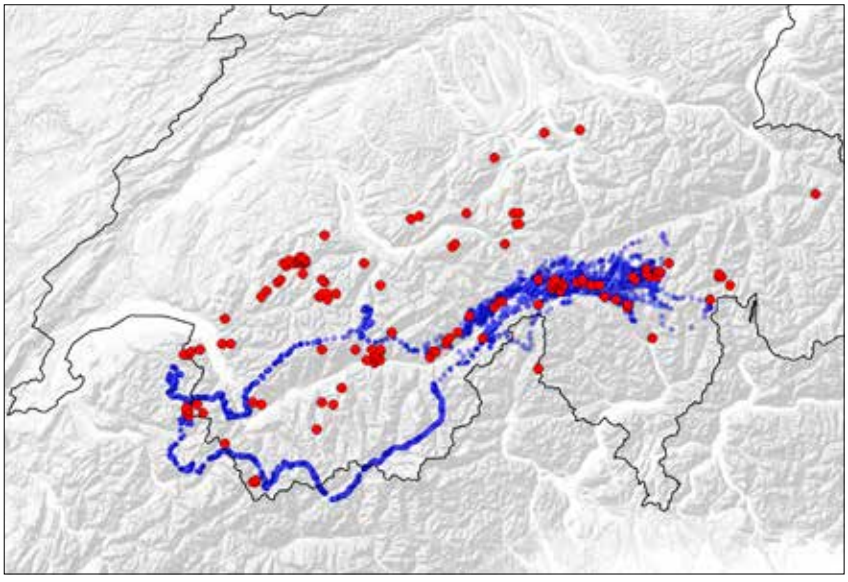
Cumulative daily totals of Cinereous Vultures recorded in 2008–2022 per month. The species has been seen more regularly in Switzerland since 2018. As with Griffon Vulture, stays are extending later into the year.

in larger numbers and for longer periods in the Alps of Ticino, Uri, Glarus and Schwyz as well as in northern Graubünden. This heavy influx presumably had multiple causes. The dry and hot weather generated strong thermal columns for several days, creating ideal travel conditions for these soaring birds from the southwest. At the same time, there were relatively few heavy thunderstorms in the Western Alps, which may have meant fewer livestock deaths from lighting and thus a reduced food supply for vultures. This could have prompted the Griffon Vultures to venture further east in search of food. Finally, reproductive success in the French colonies was below average in 2022. Many adult birds therefore left the breeding sites and ranged widely, some of them reaching Switzerland.

So far, Cinereous Vultures in Switzerland are usually seen singly or in twos.

Cinereous Vulture becomes a regular visitor

With all eyes on Griffon Vulture, Cinereous Vulture has also made an entrance in Switzerland. The species was reintroduced to three sites in southern France from 1992 onwards. The development was less dynamic than for the griffon vulture, but by 2022 there were 49 breeding pairs in France. Cinereous Vultures have been spotted in Switzerland every year since 2002, and sightings became more regular from 2018 onwards. Cinereous Vulture observations in the Swiss Alps intensified in 2022, mainly from mid-July to mid-September. Ticino was the site of an unusual visit from a tagged Cinereous Vulture seen circling above Lago Maggiore between 1 and 11 December – a winter first. The same bird had made a lengthy stay in Switzerland during the summer. The forays into Switzerland do not always pass off well. In early November 2022, the remains of a bird that had fledged in the Verdon region in 2020 were found above Lungern OW, cause of death unclear. Four birds had been found severely weakened or dead in previous years, including one that had fallen victim to electrocution and one whose crop was bulging with plastic waste. The examples illustrate that these large birds of prey are exposed to threats in Switzerland as well.



GPS track of a Cinereous Vulture visiting the Swiss Alps between June and September 2022 (blue), and records of Cinereous Vulture observations in 2022 (red).

Further information
www.vogelwarte.ch/src

Soaring birds can be observed in their tens of thousands at the Défilé de l'Écluse every autumn. They often take advantage of upward air currents along the Jura mountain chain (seen on the left).

Défilé de l'Écluse – a magnificent spectacle

Its exceptional topographical location is what makes this spot one of a kind. Jura, Alps and Lake Geneva form a huge funnel with the narrow end located south of Geneva and demarcated by Mont Salève, Mont Vuache and the Jura mountain chain. Here, near Chevrier F, just before the Rhône cuts through the Jura, birds on autumn passage in a mainly southwesterly direction converge in large numbers. Raptors, storks and pigeons journey through this place in larger numbers than anywhere else in central Europe. 30 000–50 000 birds of prey pass through every autumn; in autumn 2021, numbers exceeded 60 000. So it is no wonder that this spot gets special attention from ornithologists. In 1983 the large migrating birds were surveyed during the entire autumn season for the first time. Counts have been carried out annually since 1993. It is a formidable task, as the season here is a long one: Black Kite and White Stork migration begins early, in mid-July. But it will be the end of November before the main mass of Eurasian Buzzards have passed through and migration activity comes to an end. To ensure permanent surveillance on all good migration days, two professional ornithologists are employed every year. These are assisted, especially on weekends, by volunteers from in and around Geneva belonging to the Groupe Ornithologique du Bassin Genevois.

Franco-Swiss cooperation

The counts are organised by the Délégation territoriale Haut-Savoie of the Ligue pour la protection des oiseaux (LPO) Auvergne – Rhône – Alpes. Because the counts were at risk of being discontinued due to lack of funds, the Swiss Ornithological Institute stepped into the breach a few years ago. Since then, the institute has funded the major part of the surveys. It is important that these counts continue. The long-term data series provides an excellent overview of the course and volume of the autumn passage of large birds in central Europe. As migration is influenced by meteorological conditions, the numbers can fluctuate widely from one year to the next. Long-term data series allow us to distinguish fluctuations from more long-term trends and to correctly interpret the results.

Gliders put on a show

Smaller birds of prey like falcons, hawks and harriers that travel by flapping flight can traverse mountain ranges or Lake Geneva at any point without difficulty. While these flapping birds are seen in significant numbers at Défilé de l'Écluse, they are underrepresented overall. Birds that rely on making a large part of the journey by soaring and gliding are much more heavily influenced by topography. And so Red and Black Kites, Eurasian Buzzards, European Honey-buzzards, and White and

	2016	2017	2018	2019	2020	2021	2022
Common Swift	15265	50639	16488	17928	6398	22867	26466
Common Woodpigeon	24159	89948	59171	19872	23321	76933	18890
Common Crane	301	405	1652	1301	380	214	388
Black Stork	121	201	121	115	77	118	90
White Stork	1020	2947	1937	3353	3377	4390	4399
Great Cormorant	5729	18605	11959	19908	10298	15817	22859
European Honey-buzzard	1391	3392	5172	1677	4997	4318	4482
Osprey	80	162	65	90	93	98	89
Eurasian Sparrowhawk	1274	1305	1094	1084	580	1238	795
Western Marsh-harrier	328	707	395	466	326	544	416
Red Kite	11127	10786	9018	12574	11983	17976	15301
Black Kite	7625	14201	9322	8481	6653	16415	5031
Eurasian Buzzard	19365	17549	11063	13241	8456	18930	10690
Common Kestrel	365	1034	264	585	452	753	429
European Bee-eater	271	524	601	822	643	746	483
Total raptors	**41692**	**49289**	**36540**	**38433**	**33806**	**60535**	**37513**
Total birds	305373	553637	329842	314873	160874	378413	247872
Survey duration (h)	976	1181	1122	1556	1315	1244	1316

Results of 2016–2022 counts for selected species or species groups.

References

Birot-Colomb, X., C. Giacomo, M. Maire & J.-P. Matérac (2019): Évolution annuelle (1993–2017) de la migration postnuptiale des rapaces au défilé de l'Écluse (Haute-Savoie et Ain, France). Nos Oiseaux 66: 101–126.

Birot-Colomb, X., C. Giacomo, M. Maire & J.-P. Matérac (2020): Évolution annuelle (1993–2019) de la migration postnuptiale au défilé de l'Écluse (Haute-Savoie et Ain, France) II. Pigeons, Grue cendrée, Ciconiiformes, Grand Cormoran, Guêpier d'Europe, corvidés, alouettes et irruptions d'espèces forestières. Nos Oiseaux 67: 221–245.

Black Storks hone in on the opening that leads out of the Central Plateau in their thousands. In the case of Red Kite, with about 18000 individuals counted in 2021, around a quarter of the world's population passes through this point. Cranes using the new flyway Hungary – Vienna – south Germany – Swiss Central Plateau to make their way to Camargue and the Iberian Peninsula also travel through this spot in ever larger numbers. The passage of European Bee-eater has been noteworthy as well in recent years, reflecting the species' increase in central Europe. Common Woodpigeons, in contrast, are less numerous than they used to be. The species has increasingly become resident, and consequently the massive flocks we once saw have shrunk. But even if Woodpigeons reach only a fraction of their former mass, this migration hotspot still holds the promise of unforgettable experiences for birders.

An estimated quarter of the world's Red Kite population passes through Défilé de l'Écluse every autumn.

Common Snipes overwinter in several wetlands in Switzerland every year.

Highest temperatures, lowest counts

At 422 000 individuals in January 2023, the number of waterbirds in Switzerland (including the German and French parts of Lake Constance and Lake Geneva) was at its lowest since 1970. In November approximately 389 000 individuals were counted, which is an all-time low since the start of the counts in November 1991.

Mild winters are becoming the norm

Across Europe, the cold season 2022/23 was milder than the long-term average. In northern Europe especially temperatures were above-average (it was the warmest October on record, and the fifth-warmest November), prompting many waterbirds to spend the winter further north. Winter in Switzerland was very mild as well.

Population counts were below average in November in particular. Several species reached new lows, including Tufted Duck and Common Pochard with 39 000 and 59 000 individuals instead of the average 100 000 and 80 000, respectively. Although diving ducks continued to arrive in Switzerland into January (when 80 000 Tufted Ducks and 64 000 Common Pochards were counted), the downward trend of the last 25 years persists.

In many other common species, counts are in line with the trends of recent years. At 34 000, the January count of Mallard reached a new low, continuing the decline of the past years. Black-headed Gull (43 000 individuals) and Common Coot (83 000 individuals) numbers are similar to those of recent years.

Numbers of northern species collapse

The mild winter affected the numbers of some of the rarer species. For example, no northern marine ducks like Long-tailed Duck, Common Scoter or Velvet Scoter were seen in November 2022. Smews were absent as well. Although we have seen a positive trend in Common Shelduck in recent years, only a single individual was counted in 2022. Mew Gull numbers were unusually low as well: only 49 individuals were recorded in Switzerland in November 2022. That figure rose to 1100 in the January count, but this, too, is a new all-time low. Despite the absence of many northern species, some of the volunteers were rewarded with exciting discoveries. A Bar-tailed Godwit spent the whole winter at Lake Geneva. And a Black-legged Kittiwake arrived for a long stay in the region of Les Grangettes VD. Finally, as in the previous year, a Great Skua could be observed at Lakes Neuchâtel and Biel into November.

Record highs for Northern Pintail

But numbers were not this low for all species. Northern Pintail reached a new high in November 2022 with 2700 individuals. Both in the Ermatinger Becken (Lake Constance) and at Lake Neuchâtel, counts were unusually high in November 2022. Northern Pintails were attracted by extensive shallow water zones due to low water levels.

Observations of Mew Gulls were lower than ever in winter 2022/23.

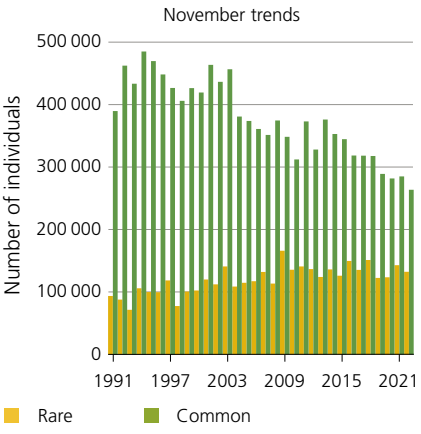
Even in early February, Lake Sils in Upper Engadine had not frozen over.

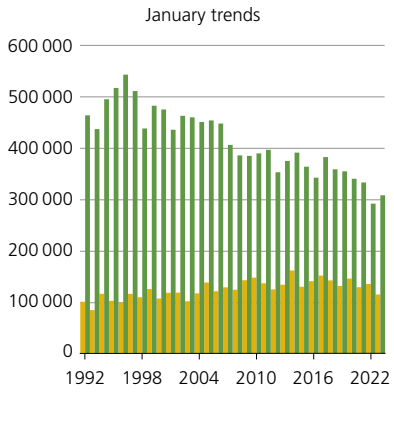
Species sensitive to frozen ground and icy shores benefited from the mild temperatures. A case in point was Common Moorhen, with record highs of about 1300 individuals in both November and January. Cold winters can increase mortality and decimate the populations of this partial migrant. Common Snipe was also well represented. At about 250 individuals, the November count roughly corresponded to the average of the past 10 years. In January, 417 Common Snipes were counted, surpassing the previous 2021 record by more than 100.

Increase in non-native species

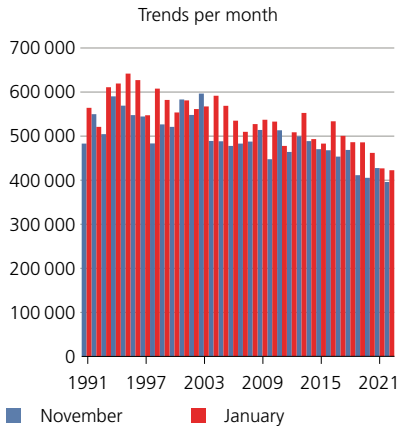
The Egyptian Goose population continues to grow. With 185 birds, a new November high was recorded, while the January count, at 194 individuals, was the second highest. This non-native species is expected to continue its rise in the years to come, as we are seeing strong increases e.g. in Germany and it continues to spread to new breeding sites in Switzerland, too. Greylag Goose also presents an unbroken upward trend.

Further information
www.vogelwarte.ch/state/winter





Trends for the five most common species (Tufted Duck, Common Pochard, Common Coot, Black-headed Gull, Mallard) and all other species, in November (left) and January (right). Column height corresponds to the cumulative counts. While the five most common species have markedly declined in number, the sum of all the remaining species shows a moderately positive trend until the early 2010s and has remained stable since then.



Trend of total counts (Switzerland including German and French parts of Lake Constance and Lake Geneva) in November and in January. Counts tend to be lower in November, but the trends for both months are similar.

Waterbirds like this Yellow-legged Gull like to feed on new arrivals such as the Spinycheek Crayfish, a North American species.

Sub-surface dynamics

In winter, Swiss waterbodies host hundreds of thousands of waterbirds. The declining overall numbers can primarily be explained by milder winters in northern Europe. But local factors affect the population dynamics of wintering birds as well. Among other influences, the number of individuals and the species composition depend on the food available in the waters. All Swiss lakes and rivers are shaped to a great extent by human activities, and this in turn affects the food webs. Such changes lie concealed below the water's surface and are easily missed, and yet they are central to understanding the trends in waterbird numbers.

Eutrophication

In the 1970s the phosphorus concentration in Swiss waterbodies was at its peak. Algae bloomed in the nutrient-enriched waters, triggering an ecological chain reaction that resulted in the original vegetation disappearing from many lakes. As water quality has slowly improved since the 1980s, many of these aquatic plants have gradually returned. Today, stoneworts and pondweed thrive once more. As aquatic plants recovered, the number of herbivorous winter visitors rapidly increased, especially throughout the 1990s. The wintering population of Red-crested Pochard, for example, which like to feed on stoneworts, grew from a few hundred individuals in the 1980s to over 26 000 in November 2022.

Newcomers complement the food supply

New non-native species continue to be introduced to Swiss lakes and rivers. Humans are active participants in this process through boat transport, the linking up of waterways or intentional release. Among the most prominent invasive species are plants like Canadian Waterweed, invertebrates such as crustaceans and mussels, and fish such as Three-spined Stickleback. Several of these species serve as food for wintering birds. Loons and large gulls are regularly observed feeding on Spinycheek Crayfish, up to 10 cm large crustaceans originally from North America. Another example is the close temporal correlation between the rise in Black-necked Grebe numbers on certain lakes and the arrival of opossum shrimp in those lakes. But while some introduced species are unproblematic and are integrated into the food web, others have the potential to upend whole ecosystems.

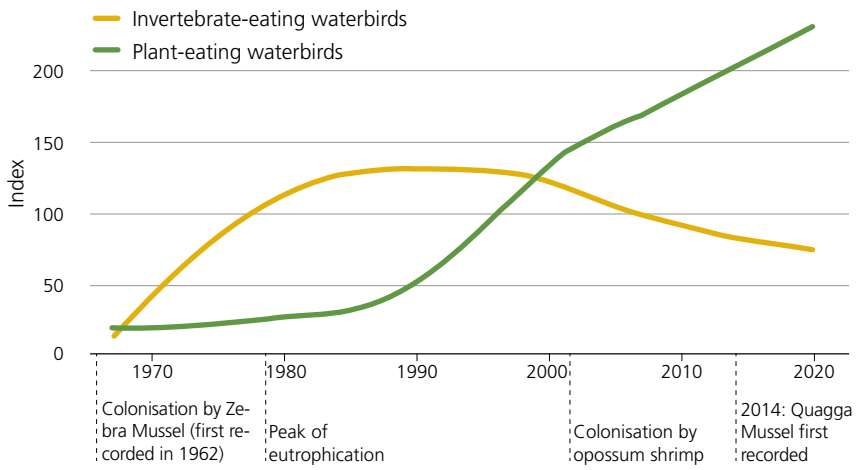
Uncertain future

One of the last century's most momentous invasions was the Zebra Mussel's

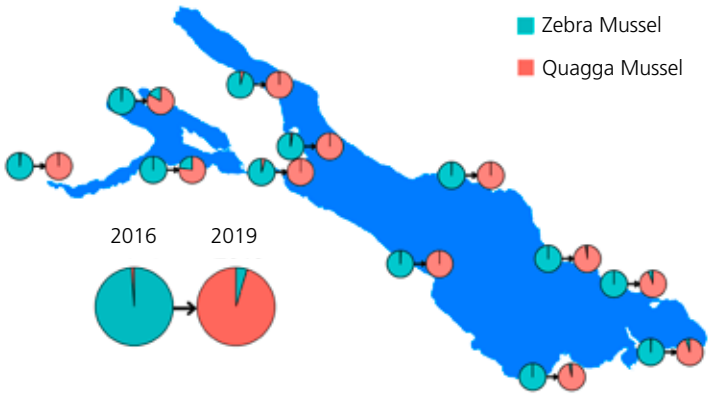
colonisation of the pre-Alpine lakes. Present in masses in shallow water zones, they provided many wintering birds with an abundant source of food and help explain the increase in many species in the second half of the 20th century (e. g. Tufted Duck, Common Pochard, Common Goldeneye and Common Coot).

The first detection of Quagga Mussels in the Rhine in Basel in 2014 heralded the next major upheaval. As a recently published study by the international research project SeeWandel shows, Quagga Mussels are now spreading rapidly throughout Switzerland. In the space of four years (2016–2019), they have almost completely displaced Zebra Mussels in Lake Constance. The species also inhabits Lake Geneva and the lakes at the Jura edge, but has not yet been detected in central Switzerland.

Unlike Zebra Mussels, Quagga Mussels can occupy deep water (up to 240 m) and are not reliant on hard substrate. They can thus colonise lakes in much greater numbers and better evade predation by waterbirds. At the same time, Quagga Mussels have fewer edible soft-tissue parts compared to Zebra Mussels of similar size, making them a less valuable food source for birds. It is still too early to estimate how the ecological conditions in our waterbodies and wintering birds will be affected. But the experience of the Great Lakes in North America, colonised by Quagga Mussels more than 20 years ago, suggests that the ecosystems on our lake bottoms may be in for some serious changes.



Changes below the water surface shape the trends of wintering bird numbers: when the Zebra Mussel colonised the large pre-Alpine lakes, the number of invertebrate-eating waterbirds (Tufted Duck, Common Goldeneye etc.) greatly increased (yellow line). By contrast, plant- eating species (Red-crested Pochard, Gadwall etc.; green line) increased in line with the reduction in nutrient loading.



Rapid spread: in just four years, Quagga Mussels almost completely displaced Zebra Mussels in Lake Constance. Source: adapted from Haltiner et al. (2022).

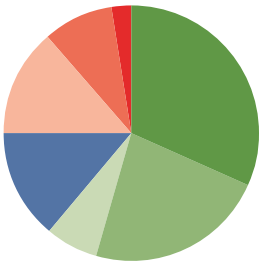
Like the closely related Zebra Mussel, the Quagga Mussel originally comes from the Black Sea region and is considered one of the most successful invasive species in Europe and North America.

Wintering waterbirds in Switzerland

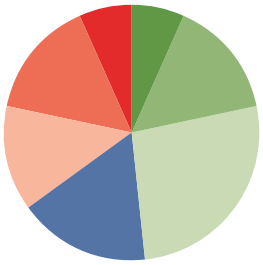
Current population size and population trend for waterbirds wintering in Switzerland (including the German and French parts of Lake Constance and Lake Geneva) for the entire survey period (1967–2023) and for the last 20 years (2004–2023). Trends are based on January counts. Trends shown as +++ or −−− signify a change by more than a factor of 5, while ++ or −− marks a change between a factor of 2 and 5 and + or – a change by less than a factor of 2. The symbol • means that no statistically significant change was detected. This is the case for populations that are actually stable but also for those that fluctuate heavily. For species with very small populations (never exceeding 50 individuals) the trends are given in brackets.

Species	November Count 2022	January Count 2023	Trend 1967–2023	Trend 2004–2023
Whooper Swan	76	785	+++	++
Tundra Swan	5	18		(++)
Mute Swan	7813	7117	+	+
Greylag Goose	1854	1879	+++	++
Gr. White-fronted Goose	0	0	++	−−−
Bean Goose	0	3	−−−	−−−
Barnacle Goose	4	6		(-)
Canada Goose	4	4		(−−)
Ruddy Shelduck	797	743		+++
Egyptian Goose	185	194		+++
Common Shelduck	1	40	+++	+
Mallard	35687	34277	–	–
Garganey	2	0	(•)	(−−−)
Common Teal	9183	8653	+	+
Northern Pintail	2172	1113	+++	++
Eurasian Wigeon	2512	4013	+++	++
Mandarin Duck	94	63		–
Gadwall	9664	8966	+++	+
Northern Shoveler	854	626	+++	•
Red-crested Pochard	26216	18426	+++	+
Common Pochard	59483	63994	++	–
Tufted Duck	38630	82524	++	–
Ferruginous Duck	55	57	+++	++
Greater Scaup	11	20	−−	−−−
Common Goldeneye	513	3810	−−	−−
Long-tailed Duck	0	1	(•)	(−−)
Common Eider	27	35	–	−−
Common Scoter	0	1	(−−)	(•)
Velvet Scoter	0	95	++	+
Smew	0	11	−−	−−
Goosander	5034	5816	++	+

Species	November Count 2022	January Count 2023	Trend 1967–2023	Trend 2004–2023
Red-breasted Merganser	31	73	++	•
Little Grebe	2952	2940	–	•
Horned Grebe	2	13	(++)	(++)
Black-necked Grebe	2674	4139	++	++
Great Crested Grebe	29463	25843	+	•
Red-necked Grebe	4	7	•	−−
Common Moorhen	1298	1272		+
Common Coot	90108	83956	–	–
Red-throated Loon	0	5	(+++)	(•)
Arctic Loon	86	46	+++	+
Common Loon	0	0	(•)	(−−)
Grey Heron	2046	1929	++	+
Great White Egret	356	475		+++
Eurasian Bittern	7	17		(•)
Great Cormorant	9018	6335	+++	•
Eurasian Curlew	1200	1416		+
Common Sandpiper	80	66		+
Common Snipe	246	417		++
Mew Gull	49	1111	–	−−
European Herring Gull	4	5		(−−)
Yellow-legged Gull	5133	3256		+
Caspian Gull	37	50		
Lesser Black-backed Gull	15	11	(•)	(-)
Great Black-backed Gull	1	2	(++)	(•)
unident. large gull	1360	884		
Mediterranean Gull	9	4	(+++)	(+++)
Black-headed Gull	39578	43214	–	–
Little Gull	0	10	(+++)	(•)
Common Kingfisher	718	323		+
White-throated Dipper	871	782		+
Grey Wagtail	896	528		+



Trend 1967–2023
(43 species)

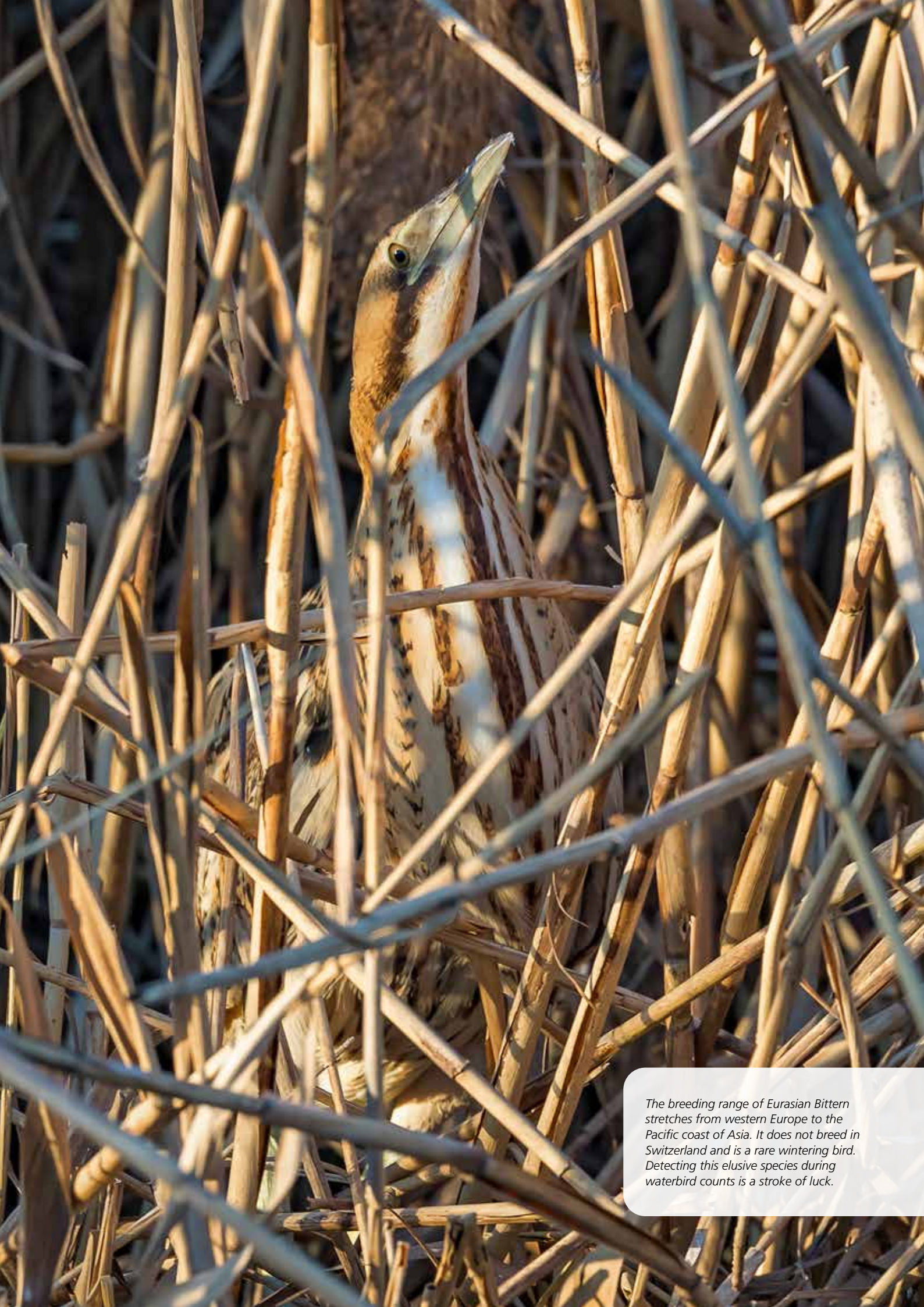


Trend 2004–2023
(60 species)

+++ increase > factor of 5
++ increase between factor of 2 and factor of 5
\+ increase < factor of 2
• not significant or fluctuating
– decline < factor of 2
−− decline between factor of 2 and factor of 5
−−− decline > factor of 5

The wintering numbers of many species are increasing. However, the proportion of species with increasing trends is greater over the entire period (since 1967) than over the past 20 years.

Further information
www.vogelwarte.ch/state/winter

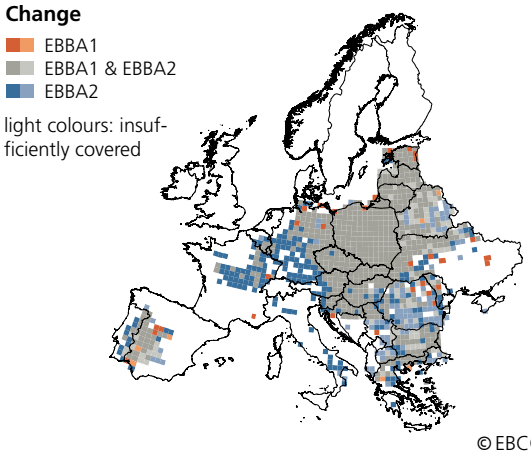


The breeding range of Eurasian Bittern stretches from western Europe to the Pacific coast of Asia. It does not breed in Switzerland and is a rare wintering bird. Detecting this elusive species during waterbird counts is a stroke of luck.

The Common Crane has been extending its breeding range southwestward again since the 1960s. In 1995, Cranes were recorded breeding in France (Lorraine) once more, and have bred in Bavaria since 2002 and in Baden-Württemberg since 2016. Breeding has not yet occurred in Switzerland.

Europe is becoming wilder

Central Europe is not the first place that comes to mind when thinking of wilderness. Even in near-natural landscapes like the Alps, human influence is omnipresent. Not least because many of the species we associate with wilderness have disappeared from large parts of the continent. But Europe is becoming wilder. Not only beaver, wolf and bear are making a comeback, but several bird species have been regaining ground after suffering dramatic losses in the past centuries. In the report «Wildlife Comeback» recently published by the Rewilding Europe organisation, 25 European bird species were analysed to investigate the causes of the growing populations.



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Comparing results from the first and second European breeding bird atlases (EBBA 1 & 2) shows that Switzerland is a blank spot on the Black Stork's distribution map, despite the strong expansion in central Europe since the 1980s (blue squares). Whether the species will colonise Switzerland in the near future depends on whether it finds sufficiently large and undisturbed areas of forest.

Effective measures

In all 25 species included in the «Wildlife Comeback» report, legal action was listed as an important factor for successful recovery (e.g. the Bern Convention or the EU Birds Directive). The Great White Egret, for example, profited from shooting bans, expanding its European range fivefold between the 1980s and the 2010s. Often, such measures have positive effects that go beyond the target species: Eurasian Bittern indirectly benefited from hunting bans on other species (e.g. Grey Heron), which reduced disturbance and accidental kills. Other effective legal measures include bans on egg collecting and on using poisoned bait to control bird and mammal populations.

But legal protection can only aid recovery and expansion if the necessary habitats exist. It comes as no surprise, therefore, that habitat protection and habitat management rank second and third in the list of key success factors. Protecting and restoring wetlands contributed to the substantial range gains of species like Eurasian Bittern (+24 %), Eurasian Spoonbill (+61 %) and Black-winged Stilt (+67 %) from the 1980s to the 2010s. Further important reasons for a species' successful return include, among others, reintroduction projects and awareness-raising campaigns that heighten acceptance of and consideration for these returning species.

Obstacles to wilderness

But there are also factors that work against these positive trends. Top of the list are agricultural practices, followed by the effects of transport and energy infrastructure, human interventions and disturbance as well as unintentional consequences of hunting and fishing (e.g. lead poisoning). The chances for expansion or recovery depend mainly on the number of concurrent threats.

Rewilding

Disrupted or damaged ecosystems can be restored through active «rewilding». The main goal of rewilding projects is to reinitiate ecological processes and thereby restore the related ecological functions. In these «wild» ecosystems, many ecological niches can emerge. They also provide the necessary conditions for food specialists (e.g. Bearded Vulture) and large raptors (e.g. Golden Eagle) to survive. Measures range from reducing interventions to the targeted introduction of species that perform key ecological functions. Large ungulates, for instance, help to preserve open landscapes. In the end, we humans benefit from intact ecosystems as well, as they safeguard nutrient cycles and sequester CO_2 as well as having economic benefits (e.g. tourism).

Wild animals at Switzerland's borders

In the course of their European expansion, many species have approached our own borders – Black Stork, Common Crane and Osprey breed just a few kilometres away. Whether these species manage to take the leap, or whether Switzerland will remain a blank spot on their distribution map, also depends on whether they find sufficiently large near-natural landscapes here where they can breed without disturbance.

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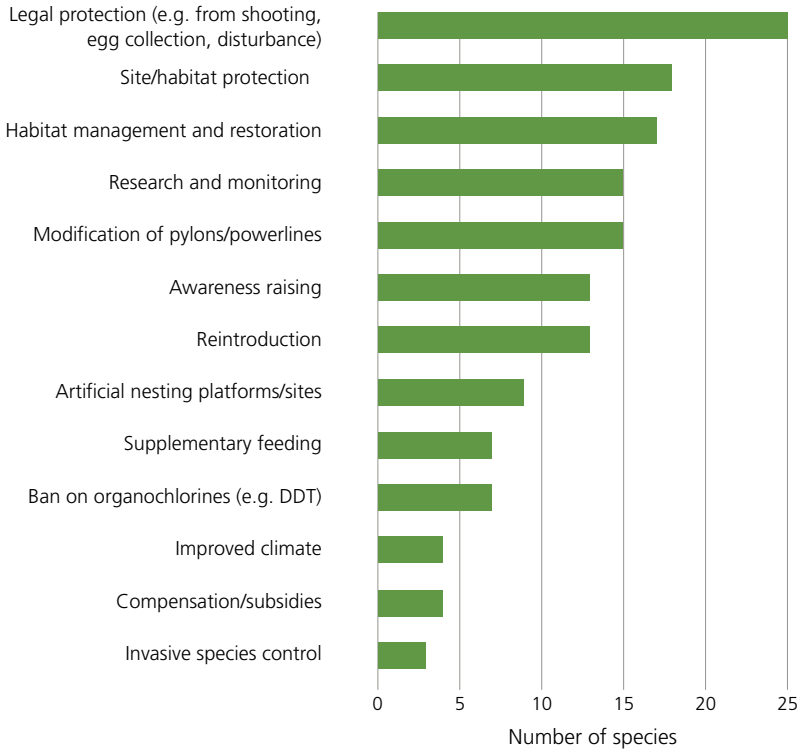

Measures contributing to the recovery of 25 selected European bird species. Example of how to interpret the chart: all 25 species were able to benefit from legal protection, while nesting aids are listed as a success factor for only nine species. Source: adapted from Ledger et al. (2022).

Thank you for many years of dedicated work!

This report is based mainly on countless observations, territory mapping surveys, special surveys and counts undertaken by thousands of ornithologists. These committed birdwatchers are out and about in every season, often in the face of inclement weather. Many of them devote much of their leisure time to their hobby. We are extremely grateful to all our volunteers. It is a pleasure to work with so many motivated and dedicated people!

We would also like to thank our local, regional, national and international partner organisations, most especially for their collaboration in breeding bird surveys and waterbird counts. A huge thank you to the photographers for their fantastic images. And finally, we thank our collaborators at Biolovision S.à.r.l. for the valuable work they put into ornitho.ch.

Group pictures from the meetings of the Swiss Ornithological Institute's volunteer collaborators, in Sursee (top) and Yverdon (bottom).

The specialist knowledge of ornithologists often stems from great passion and decades of hard work. The resulting data series help us to understand nature and explain the changes we see. This is exemplified by the book «55 Jahre Wasservogelzählung am Bodensee» (German only), which was published by the Ornithologische Arbeitsgemeinschaft Bodensee and the Ala a few years back and contains an immense wealth of knowledge. Harald Jacoby, Hanns Werner, Gerhard Knözsch and Walter Gabathuler participated in the counts every winter throughout (and beyond) those years.*
** Can be purchased under www.vogelwarte.ch/de/shop/fachpublikationen/55-jahre-wasservogelzaehlung-am-bodensee.*

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