

Gravel pits – refuges for displaced species

Gravel pits add to the diversity of agricultural landscapes and serve as pioneer habitats for birds. Due to the absence or loss of their natural habitats, Collared Sand Martin and Little Ringed Plover have become closely associated with these artificial environments, which are now also under threat.

Gravel pits emerged between the two world wars, when demand for concrete and construction material for roads increased, and reached the peak of their activity in the 1960s and 1970s⁶. They essentially expose a top layer of fine soil and a gravel layer beneath that is in contact with the fluctuating water table.



Bertrand Pose

The combination of bare gravel surfaces and open water creates a suitable alternative habitat for the Little Ringed Plover, despite the presence of construction machinery.



Bernard Lugin

Gravel pit with open water and a sand bank accommodating a colony of Collared Sand Martins. Above it lies a steep slope with rough vegetation for pioneer species such as Common Stonechat or Common Whitethroat.

Havens of biodiversity

Many birds, amphibians, dragonflies, crickets and plants lost large expanses of alluvial and marsh habitats in the course of large-scale land-improvement schemes that were realised from the mid-19th to the mid-20th century. The artificial habitats created by gravel extraction were therefore of critical importance for these species. Machinery periodically digs up the ground and prevents the surfaces from being taken over by vegetation. The upper slopes made of gravel-free soil are left undisturbed. Within a few years, areas of rough land, shrubs and hedges with bushes or trees develop that add to the structural diversity and ecological value of the landscape on an area of several hectares. The contrast to the surrounding expanse of uniform farmland transforms gravel pits into havens for wildlife.

Significance for birds

These havens not only serve as stopover sites of regional importance for various migrants (especially waders)⁴ but also offer alternative habitats for threatened breeding birds to raise their young. Because periodically flooded gravel banks have disappeared from our rivers, gravel pits now support one third of the breeding sites of the Little Ringed Plover³. The Collared Sand Martin breeds almost entirely in these alternative sites, because steep sandy cliffs no longer form on rivers that have lost their natural dynamics due to river engineering works. Several gravel pits even serve as breeding sites for the European Bee-eater, still rare in Switzerland, but spreading since it first bred here in 1991^{AtCH2}, or for the Common Kingfisher. Depending on the region and on local conditions, the species spectrum may include shrubland birds of open landscapes, such as Common Stonechat, Common Whitethroat, Melodious Warbler, Red-backed Shrike or Common Linnet. For want of better alternatives, gravel pits have become substitute habitats for the pioneer species of floodplains and farmland.

Threats and conservation measures

Security is not part of the service that these retreats offer their guests. Firstly, excavation takes place year-round, and secondly, the heightened safety regulations introduced in the 1990s and increased economic pressure result in shorter concessions and earlier restoration of the original landscape. Without deliberate arrangements with the extraction companies and close monitoring on site, broods of Little Ringed Plover, Collared Sand Martin or European Bee-eater are at huge risk of being destroyed by machinery or the advancing edge of the pit. Negotiations with pit operators often pave the way for the protection or even creation of sand walls for Collared Sand Martin¹. Little Ringed Plover nests are harder to protect because they are almost invisible in the gravel and are strongly disturbed by mining operations. Even if losses

- Collared Sand Martins
- Little Ringed Plovers
- Gravel pits



Only few of the many gravel pits (yellow) in Switzerland attract Little Ringed Plovers (black) or Collared Sand Martins (green). Of these two species, the Collared Sand Martin is most heavily dependent on gravel pits. The Little Ringed Plover also breeds in other habitats. Source: swisstopo.

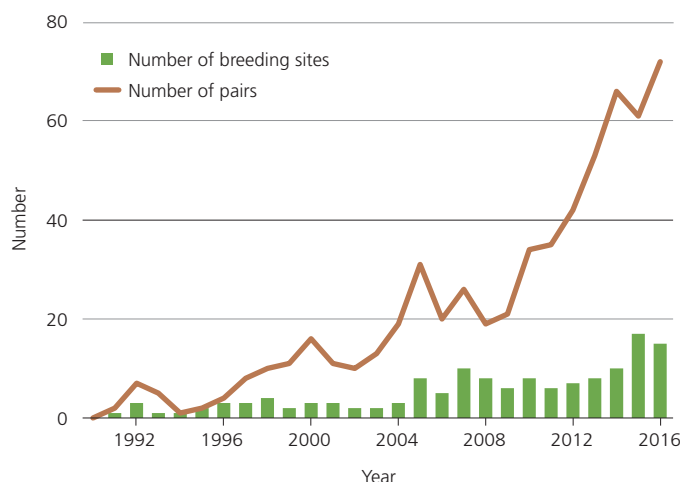
can be prevented by establishing protection zones and informing the workers, the broods often fall prey to predators, especially on flat gravel surfaces. For these reasons, the breeding success of Little Ringed Plovers in gravel pits is probably low.

What does the future hold for these threatened refuges?

Conditions do not necessarily improve for birds when extraction ends. Gravel pits used to be abandoned, becoming overgrown and losing their value as habitat for pioneer species. Some gravel pits, however, continued to be maintained to preserve biodiversity or were designated as nature reserves. Today, they are systematically «restored» and returned to agricultural or silvicultural use. The pits are filled in and quickly lose their appeal. In the 1950s, there were about 2000 active gravel pits below 900 m in Switzerland; in 2016, that number had dropped to fewer than 500², at high cost to the Collared Sand Martin in particular.

The protection of species that depend on gravel pits, mainly the Collared Sand Martin, to a lesser extent the Little Ringed Plover, presents new challenges. Gravel pits that accommodate these species should not be refilled, or at most partially, making sure that enough suitable habitat remains. Further, continued maintenance that is geared towards the species' ecological requirements should be guaranteed. Finally, additional measures need to be put in place to reduce the dependence of these threatened species on gravel pits. Measures could involve customised breeding sites for the Collared Sand Martin, such as sand piles out of suitable material^{1, 5}, or river restoration projects, which would also benefit other threatened species.

Bertrand Posse



Change in the number of breeding sites (columns) and breeding pairs (lines) for the European Bee-eater in Switzerland from 1990 to 2016.

¹ Bachmann et al. (2008a–b); ² Fachverband der Schweizerischen Kies- und Betonindustrie/Association suisse de l'industrie des graviers et du béton/Associazione Svizzera dell'industria degli Inerti e del Calcestruzzo, pers. comm.; ³ Rnjakovic (2014); ⁴ Schmid et al. (1992a–b); ⁵ Schmit (2016); ⁶ Sticher (1984a–b)