

Circle of Life

A new way to support
Europe's scavengers



Rewilding
Europe



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NATURE



Rewilding Europe, founded in 2011, is an initiative that seeks to inspire a broad popular movement to shape a new, wilder version of Europe. Rewilding Europe is about making Europe a wilder place, with much more space for wildlife, wilderness and natural processes, bringing back the variety of life for us all to enjoy and exploring new ways for people to earn a fair living from the wild.

www.rewildingeurope.com



ARK Nature, established in 1989, is a nature conservation organisation that has been pioneering in rewilding nature for over 25 years. It is one of the initiating partners of Rewilding Europe. ARK Nature is specialised in bottom-up restoration of natural processes, linked to economic and social development of the regions in which rewilding takes place, both in the Netherlands and in the rest of Europe. Since 2008, ARK Nature works with several partners on the Circle of Life (Dood doet Leven) in the Netherlands and Belgium, for the return of large animal carcasses and scavengers in nature.

www.ark.eu

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An essential element of wild nature



FRANS SCHEPERS
Managing Director,
Rewilding Europe

This brochure discusses subjects that are naturally repellent to many people: carcasses, dead animals, road kills and putrid meat. Yet for scavenging species, the availability of these things is key to their survival. The role of carcasses in wild nature is frequently overlooked, but they are an essential component of numerous fully functional food chains.

It is only recently that the conservation movement had to fight for more dead wood in our forests. Now it is widely accepted by many management bodies that healthy, natural forests need large amounts of such wood, in the form of both standing and fallen trees. We now know that dead and rotting trees are a key component in the lifecycle of myriad forest species, from woodpeckers and bats through to beetles and fungi.

If making the argument for more dead wood in our forests is still a challenge, then pressing the case for leaving carcasses in nature is even more difficult. One of the core elements of rewilding entails the restoration of functional landscapes, where natural processes and ecological dynamics thrive. Such processes may be abiotic, as in river flows, or biotic, such as those that exist throughout the ecological web in food chains. Increasing the availability of carcasses can help to restore biotic processes and create more diverse and dynamic habitats.

By adopting the Circle of Life approach, as outlined in this brochure, Rewilding Europe and ARK Nature want to throw a spotlight on the role of dead animals and wildlife in nature. Our focus is on larger mammals in particular; the establishment of healthy and diverse populations of such species creates a prey base for carnivores, who in turn provide food for scavengers. In addition, carcasses from road kills and hunted wildlife can also be used to support scavenging species.

This Circle of Life brochure details a number of practical steps that rewilding initiatives across Europe can take to support scavenger populations, as well as important background information. At Rewilding Europe and ARK Nature we are committed to the restoration of scavenger populations in the areas where we work. We warmly encourage other initiatives to join us, and will provide support wherever possible.



ESTHER BLOM
Deputy Director,
ARK Nature

*In Africa, lion kills help to sustain healthy vulture populations.
In Europe, wolf kills should do the same.*



As a vulture's head disappears into a carcass, a beech marten bares its teeth at a red fox intent on taking a bite of the same carrion. A closer look reveals a diverse cleaning crew of beetles and flies working diligently to process what is left of the large mammal. This typical scavenging scene should be a common sight across much of Europe.

The role of scavengers in nature often brings to mind life on the African savannah. But scavengers are equally at home in Europe, where they process that final, valuable link in the food chain – the carcasses of large herbivores.

But on our continent today such carcasses are a rare commodity. Wilderness has become arable land, populations of wild grazers are often managed at low densities, and legislation demands the immediate removal of dead livestock. As a result, much of the biological "waste" has disappeared from the European ecosystem and is no longer part of the natural cycle of life.

Through adoption of the Circle of Life approach, large carcasses will retake their place in nature, allowing Europe's numerous scavengers to once again eat their fill. This brochure provides a practical overview of the possibilities for such an approach, addressing relevant stakeholders such as those managing nature, fauna and roads. The background information presented here is also intended to inform policymakers, as well as other parties interested in expanding their knowledge about this fascinating and often overlooked link in the food chain.



The past

A few thousand years ago, large populations of wild horses, aurochs, European bison, elk, roe deer and red deer roamed our continent. Every year countless numbers of these large herbivores would die – from old age, food scarcity, illness, attacks by large predators and natural disaster. An army of scavengers, from insects, bacteria and fungi through to small mammals, large mammals and raptors such as vultures and eagles, would naturally clean up their carcasses.

....and present

Over the past two thousand years, large areas of Europe have been converted into agricultural land. Many of the continent's important wild grazers, such as the auroch and wild horse, have completely disappeared from the European landscape. In many areas these herbivores have been replaced by sheep and cows - kept for slaughter, these animals are not part of the natural food chain. When such livestock dies naturally, removal and destruction is compulsory by law.

The naturally occurring herbivores that remain in our landscape today - such as roe deer, red deer, fallow deer and wild boar - should, in principle, still be part of the natural cycle of life and death, their carcasses left in the wild to sustain scavengers. But they rarely are.

Across Europe, substantial number of adult herbivores are shot, every year, as a result of population management and poaching. This, in turn, leads to a lack of large predators which would otherwise ensure a ready supply of carcasses. As a result, in areas where animals such as the wolf, brown bear or lynx are present, their densities are far below the optimum level. Carcasses from road kills may occasionally be left out in nature, but are usually either destroyed or end up on the dinner table.

Occupying a middle ground between fully wild animals and domestic livestock, and increasingly roaming Europe's natural habitats, are herds of semi-wild horses and cattle. While their numbers have grown substantially over the last 25 years, these large grazers generally have no "wild status". They are included in agricultural legislation, which means their carcasses must also be removed from nature.

In summation, the supply of carrion originating from the death of large (wild and semi-domestic) grazers in European landscapes is now very limited compared to historic levels. Restoration of the food chain and revival of scavenger populations will require an abundant and widespread natural supply of carcasses. Circle of Life will work towards this goal.

Poisoning of scavengers

Over the course of the last few centuries, persecution (through hunting and particularly poisoning) has taken its toll on populations of scavenger species across Europe. More recently, legal protection, habitat restoration and species-specific restoration measures has led to a gradual recovery of many of these species.

Unfortunately, unintentional lead poisoning (see text box on page 24) and the use of veterinary drugs has also had a serious impact on scavenger populations. In the 1990s, for example, the treatment of domestic livestock with Diclofenac, an anti-inflammatory and analgesic drug, led to a dramatic decline (99%) in the vulture populations of South Asia. It took many years before Diclofenac was identified as the cause of this decline.



In 2010, thanks to efforts by Birdlife International, the sale of Diclofenac was eventually banned across the South Asia region. But in Europe, this drug is still on the market (for example in Spain and Italy) and exported to other countries. Birdlife International is now calling for a total global ban on Diclofenac, as safer alternatives (such as Meloxicam) are readily available.



The added value of large carcasses

Why is Circle of Life striving for a greater supply of large animal carcasses in nature? What are the positive impacts of such carrion?

Herbivore carcasses are miniature ecosystems that supply large amounts of minerals, energy, water and materials over relatively long timeframes. This is something that smaller carcasses cannot do. The heavy bones of large carcasses can provide lime-deficient soils with minerals for decades.

In winter, a large carcass may nourish predators for weeks, as they become accustomed to eating carrion. For inexperienced predators in particular, carrion is a welcome energy source. It is also a concentrated food supply for raptors during the migration season, and for bears and badgers emerging from their winter rest period. Carcasses allow animals and birds to build up their body weight. Young ravens, for example, grow fast; a carcass can supply them with large amounts of food over a relatively short space of time.

A large carcass in spring or summer also constitutes a huge food resource for insects, which

in their developmental stage may be largely dependent on carrion. An extensive community of arthropods, comprising myriad species and thousands of individual creatures, can typically be seen feasting on a carcass. Insects are attracted to carrion from miles around, to reproduce either within, on, or underneath it. In turn, these insects and their larvae are a valuable food source for predatory insects, birds, mammals, reptiles and amphibians.

Specialist scavengers, such as the four species of European vultures and red and black kites, and seasonal scavengers, such as raven and white-tailed eagles, are also largely dependent on herbivore carcasses. As are species that specialise in decomposing bones, hooves and fur.

Following decomposition, a large carcass leaves an open area of fertile soil surrounded by vegetation. Pioneer plant species can thereby benefit from the favourable circumstances created for germination, while cold-blooded creatures often use these sunny spots to warm themselves.

Impact on soil and vegetation

The nutrient cycle may be a key natural process, but the role of large carcasses within it has so far been largely overlooked. During their lifetime, grazers "hoover up" scarce nutrients, while their death suddenly releases them. As such, large herbivore carcasses provide local concentrations of nutrients, such as proteins and fats, and minerals such as calcium, phosphorus, potassium, sodium and magnesium.

The bones of herbivore carcasses gradually become scattered throughout the landscape, mostly by predators such as foxes, jackals and wolves, but also by wild boars. Parts of these bones are eaten by various bird species, such as the red kite and bearded vulture (the latter is a specialist at this.) The heavy bones of larger ungulates, which release their chemical constituents more slowly, can act as an important source of minerals in mineral-deficient regions for many years, and are a special biotope for mosses and fungi. There is even a particular fly species, commonly known as the bone skipper (*Thyreophora cynophila*), that feeds on the marrow in carcass bones (after these bones

have been cracked open by predators). This fly species, once considered extinct, was rediscovered in Spain in 2009.

In many of Europe's sandy landscapes the natural nutrient balance has been disturbed. This is a result of many decades of logging, combined with high levels of nitrogen deposition. In contrast to riverine areas, which undergo regular flooding, the minerals in such soils are scarcely replenished.

Over the centuries, poor soils from which trees have been logged and large ungulates removed (both wild and domestic) have been especially affected by nutrient depletion. With the migratory routes of large herbivores blocked by fences, roads and other types of infrastructure, this depletion has been accentuated by the diminished natural transportation of nutrients from mineral-rich valleys to higher sandy soils. Restoring free-roaming herds of grazers, with their trails of manure and carcasses, would therefore contribute to the restoration of the natural nutrient cycle on a landscape-wide scale.



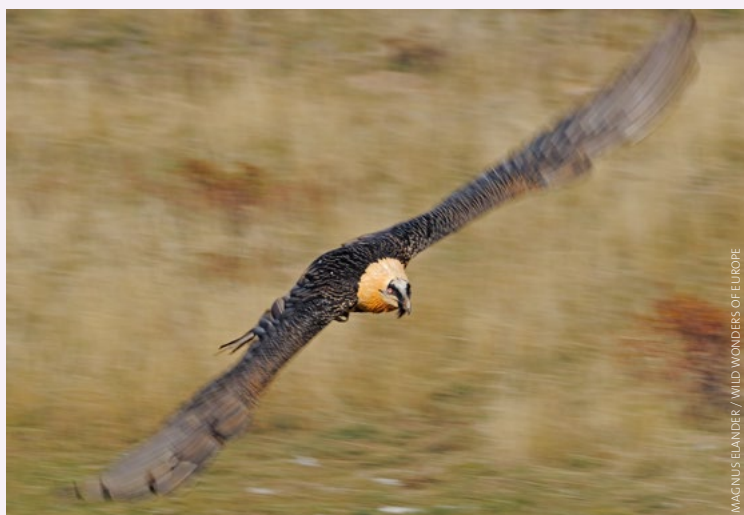
Bone skipper fly.



Vultures in Europe

Two centuries ago, Egyptian vultures, bearded vultures, black vultures and griffon vultures were among the most common breeding bird species in central and southern Europe. During the Middle Ages, in the region known today as southern Germany, griffon vultures were still a frequent sight, with a breeding area stretching all the way up to the Middle Rhine and Moselle. As recently as 150 years ago, they would build their nests in the Swabian Jura. Archaeological finds show that in the days of the Roman Empire, black vultures (which nest in trees) could be found as far north as present day Belgium, Germany and the Netherlands.

These vultures subsequently disappeared from most European countries (Portugal, France, Italy, Austria, Poland, Slovakia and Romania). At their lowest point, in the 1960s, there were only 2,000 pairs of griffon vultures and 200 pairs of black vultures left in Spain. Thanks to reintroductions and species protection, vulture populations are now thankfully recovering.



Bearded vulture.



Griffon vulture and black vulture.

In 2013, between 27,000 and 28,000 breeding pairs of griffon vultures were counted within Europe. The largest numbers were found in Spain, where the population increased from 8,064 breeding pairs in 1989 to 22,455 in 1999. In 2008, the griffon vulture population was estimated at around 25,000 breeding pairs.

The European population of black vultures is also on the rise. In 2012, 2,068 breeding pairs were counted in Spain. The species was reintroduced in France, as early as in 1992, in the Grands Causses (Massif Central). A total of 53 birds were released over the 1992–2004 period. This led to the establishment of 11 breeding pairs, and by 2013 this had increased to at least 20 pairs. From 2004 onwards, this success has been followed up by the reintroduction of 34 birds in the French Alps. Since 2009, for the first time in 150 years, this has resulted in a breeding pair. Vultures, when searching for food, are easily able to cover hundreds of kilometres, which means that large areas of north-western Europe are once more within their reach.

The increase in vulture sightings in the Low Countries is remarkable, with all four species spotted since 1993. These mostly involve groups of griffon vultures, which are now using southerly winds to roam northwards on a yearly basis. Most of these birds end up returning to their breeding grounds in the south.

In June 2007, the number of roaming griffon vultures peaked in Belgium, Germany and the Netherlands, with 200, 100 and 110–130 birds seen respectively. This was presumably the result of the closure of over 90% of Spanish vulture feeding locations – traditional carcass dumping sites known as “muladares”. The implementation of EU Regulation 1774/2002, a result of the BSE crisis, had a far-reaching impact on the European populations of vultures, eagles and kites. International pressure has since resulted in more relaxed regulation, which has seen the return of such muladares.

Vultures can be considered a key indicator species – wherever these impressive scavengers appear on the scene, circumstances will also be favourable for many other, less demanding species.



How many would be enough?

Although more is needed for Europe's community of scavengers to recover completely, nature will make efficient use of each and every carcass. As the amount of naturally occurring carrion in European landscapes is usually very low, any additional contribution is significant, and even the use of road kills can make a difference.

Examples from Dutch nature

The stable roe deer population of the Dutch province of Limburg numbers roughly 4,200 animals. Every year around 400 are killed as a result of traffic collisions, and between 1,500 and 1,800 are culled and removed from nature.

Every year around 2,300 roe deer are also born. This is 100 more than the maximum total number of culled animals and road kills (2,200), and 400 more than the minimum (1,900). In conclusion,

every year between 100 and 400 roe deer die from natural causes, presumably mostly young calves. The 400 road kills experienced by the population therefore represent a significant addition to the supply of carrion.

Herds of wild horses and cattle roam the natural habitat of the Gelderse Poort, along the Dutch-German border. In 2014, this herd consisted of around 180 animals. The 30% annual increase in the population of the herd is removed, in the form of live sales or as wild meat.

Every year, around 15 adult horses and cattle with an average weight of 300 kilogrammes are found dead. If those carcasses could be left in situ, this would drastically increase the supply of carrion. Current regulations, however, stipulate that landowners are obliged to remove the carcasses and submit them for destruction.



KARSTEN REINHARTS / ARK NATURE

Restoration attempts

Since the 1960s, nature conservation organisations have been trying to improve the structural supply of large carcasses in nature across Europe. Using various methods, their objectives have been to restore everything from single species (such as the bearded vulture, black vulture, griffon vulture and raven) to entire ecosystems.

Such methods have included, amongst others:

- Placing hunted animals or road kills, in collaboration with wildlife managers or hunters, back into the wild.
- Leaving all hunted animals in situ within an area.
- The natural process of animal death and decomposition being allowed to run its course, as far as possible, without any human intervention.

Early stage experiments

Supplementary feeding stations

Across the world, the availability of wild ungulate carcasses has decreased as a result of domestication and the agricultural use of animals. Scavengers, such as vultures, have therefore become dependent on the carcasses of domesticated animals. But stricter veterinary regulations mean this food source has become increasingly unreliable.

Since the 1970s, so-called supplementary feeding stations have been set up in southern Europe and Africa to ensure an adequate supply of carrion. These stations contribute to the survival of many vulture populations, and have been shown to be important in the reintroduction of vultures (for example in the Grands Causses, French Alps and Pyrenees).

As a result of the large aggregations of raptors, however, such feeding stations also can have a negative impact. The most dominant individual animals and/or species frequently monopolise the food source, chasing away less competitive scavengers. The predictability of the supply and type of carrion can also reduce the diversity of scavenging bird species and disrupts interspecific facilitation (for example, the activity of small scavengers increasing the chances of carcasses being detected by larger vultures). Feeding stations may also risk unintended poisoning as a result of trace veterinary drugs remaining in carcasses (in those animals that have been euthanized or medically treated). In a way, such "vulture restaurants" interfere with nature – they cannot completely replace natural, randomly available carrion that would support a far more diverse range of species than just the larger scavengers.

In an ideal world, scavengers are entirely supported by natural prey and carcasses. A perfect example is the reintroduction of the bearded vulture in the Alps, which started 20 years ago. At the beginning, birds had to be fed artificially. But with the simultaneous growth of Alpine ibex and Alpine chamois populations, the bearded vulture population here (currently some 20 breeding pairs) is now almost completely sustained by the naturally occurring carcasses of these ungulates.

Similarly, research has shown that in the Eastern Rhodope Mountains, on the Greek-Bulgarian border, the increasing griffon vulture population is sustained significantly (ca 60% of the time) by the carcasses of wolf kills. Restoring food chains in this area is a flagship project of Rewilding Europe, supported by the European Commission (LIFE Vultures).

Circle of Life pilot areas

In a growing number of European countries, efforts have been made by conservation organisations and initiatives to increase the volume of carcasses in support of scavenging communities.

In the Netherlands, Belgium and Germany pilot-activities were developed under the Circle of Life programme. In these three countries, over the last six years, as many as 95 species of birds and mammals have been seen to benefit from the presence of carcasses. In addition to rare species such as ravens, red and black kites, white-tailed eagles, griffon vultures, wild cats and wolves (the last currently only in Germany), these include the more ubiquitous common buzzard, European polecat, fox and beech marten.



Primarily a scavenger, the red kite mostly eats carrion.



Remains of a domestic cow calf eaten by a Marsican brown bear.



Cameratrap image showing a fox eating European bison.

Scavengers





Progressive insight

Many lessons have already been learned from Circle of Life pilot projects and studies. For example, we now know that it is important to vary the location of carrion made available within a certain area, rather than always providing it at the same spot. This was well illustrated in the late 1990s by experiences with a raven population on the Dutch Veluwe. Breeding results were poor, despite the fact that an adequate supply of carrion was provided at the same location. Investigation showed that a group of young loitering raven were monopolising the feeding locations, meaning there was not enough carrion left to sustain breeding pairs.

Similar scenes have been witnessed at so-called vulture restaurants in southern Europe, where young vultures have been pushed aside by adults.

Another lesson that has been learned is that a peak in the supply of carrion should coincide with the natural peak in mortality among large grazers, which is towards the end of winter. This period overlaps with the reproductive season of many scavengers.

Experiences have also shown that whenever animals are shot or killed and their carcasses left in nature, the bullets used to kill them should be lead-free, in order to prevent the lead poisoning of scavengers.





GERT ELBERTSEN

Small-scale scavenging

A large carcass offers refuge and nourishment to over a thousand species of insects, spiders, harvestmen, springtails, isopods, centipedes, mites and worms. The insects include around 750 beetle species, 150 fly species, and an unknown number of species of butterflies, grasshoppers, ants and wasps.

Only some of the 750 species of beetles are exclusively dependent on carrion; those are the strictly carrion-eating scavengers (the carrion beetle family), the bone specialists (the *Trogidae* family), and the feather, hide and fur specialists (the *Nitidulidae* family of sap beetles). Certain species of predator beetles also specialise in carcasses.

Other beetles have an opportunistic relationship with the remains of large ungulates; if a carcass is available, they will take advantage of it. This includes various species of dung beetles, who feed on dung and compost as well as carrion. There are also the rove beetles (and their larvae), which are attracted by the rich supply of maggots, fly pupae, mites and flesh typically present in large herbivore carcasses.



The *Nicrophorus vespillo* is a burying beetle that breeds on carcasses.



Carrion flies have an active role in the decomposition process.

BART BEEKERS / ARK NATURE

BOB LUIJKS / NATUURPORTRAIT



Rewilding Europe

In some European countries, such as Spain, France and Bulgaria, carcasses are left at strategic locations for the purpose of promoting the recovery of vulture populations. The Rewilding Europe initiative (www.rewildingeurope.com) is now exploring new and additional possibilities for developing ecologically functional landscapes, where natural processes can thrive.

Millions of hectares of abandoned agricultural land, particularly in southern and eastern Europe, provide new opportunities for such development. It is here that spectacular wild nature is not only free to develop, but can also form the basis for new rural economies. The aim is to let nature run its course as much as possible in these areas, without any outside interference. As large grazers repopulate the land, so large predators and scavengers will follow. In this way, natural food chains can be restored, with the beneficial impacts of such restoration impacting wild nature on a far wider scale.



Abandoned farmland in Castelo Rodrigo, Portugal.



Wild-living herd of Konik horses in the Rhodope mountains, Bulgaria.



Domestic cow faces an Italian wolf feeding on horse carcass in Abruzzo, Central Apennines, Italy.

Experiencing nature

One of the main objectives of Circle of Life is to involve the general public in attempts to restore Europe's community of scavengers. In the Netherlands, this is done with the use of local information billboards, leaflets, a website (www.dooddoetleven.nl), a YouTube channel (www.youtube.com/dooddoetleven) showing footage of camera traps, and nature excursions.

The level of interest in these media and activities is always very high. For example, when a film was posted online about a griffon vulture on the Sint Pietersberg plateau near Maastricht, it was viewed by 30,000 people in the first week. Most people consider carrion and vultures to be an inherent part of nature. Information about the subject is appreciated, they say, as they are not accustomed to the nearby presence of large carcasses. For people who are interested, there are many possibilities to observe the process of decay. Photographers can use camouflage huts or bird hides to photograph scavengers.



Circle of Life billboard in The Netherlands.



Bear watching hide in Finland.





ELIWA DUINDAAN / ARK NATURE

The Nordic countries have had positive experiences with the use of wildlife watching hides to observe brown bears and wolverines. In eastern Europe, there are good examples of such hides being used for photographing wolves and brown bears. Countries in southern Europe and Bulgaria have achieved great success by combining vulture feeding stations with wildlife watching. In this way, vultures can contribute significantly to a new wildlife economy (such as at Faia Brava in Portugal, the Arda Valley in Bulgaria, Dadia Forest in Greece and Rémuzat in the French Alps). As early as 1995, the annual revenue from local vulture-based tourism in the Grand Causses was estimated at 600,000 euros. Over 20 years later, it is significantly more.

Rewilding Europe has developed a practical guide (www.rewildingeurope.com/wildlife-watching-hides/) describing various species and the most suitable professional wildlife watching hides for observing them. It outlines various case studies, and provides useful information on various factors such as hide ownership and whether or not to use bait.

Remarkable behaviour

Camera traps near carcasses have recorded some remarkable scavenger behaviour: raven collecting the fur of roe deer to build their nests; an aggressive beech marten trying to chase away a fox; little owls pecking at maggots; woodpeckers hammering on bones to pry off flesh; a wild cat tearing at the carcass of a roe deer in an attempt to move it; and raven calling out to lure a white-tailed eagle into tearing open a carcass with its sharp beak, then chasing it away again so that they themselves can eat. In addition, many unexpected visitors have been seen to arrive at carrion, such as various species of butterflies, attracted by the large supply of minerals.





The next steps

A practical guide to further restoring scavenger populations

Circle of Life is striving for an increase in the number of carcasses of large animal species left in nature. Legislation can be complicated, but may offer possibilities. This brochure lists those possibilities for nature, wildlife and road management organisations, all of whom can play an effective role in revitalising scavenger communities by making the carcasses of large animal species available to scavengers, wherever possible. In doing so, deliberation and collaboration between the various parties involved are of vital importance.

Effective management, from the Circle of Life perspective, sometimes means doing nothing – leaving carcasses where they are instead of

removing them, thereby providing food for the numerous scavenger species that currently face a dearth of carrion. Every additional contribution counts, in this respect. And it is important that wild animal species, such as roe deer, red deer, wild boar and European bison, become part of the natural cycle of life and death as soon as possible, because this is already permitted under current legislation.

Circle of Life has considered the possible risks of leaving carcasses out in nature with respect to both public and animal health. While these risks have proven to be negligible, monitoring remains necessary. For more information, see page 26.

How can conservation organisations contribute?

There are a number of ways that conservation organisations can benefit scavengers by leaving large carcasses in nature. A number of these combine very well with the operation of wildlife watching or bird hides (see page 20 on experiencing nature).

1. Certain agreements can be made with road and wildlife management organisations to increase the supply of carrion in natural areas by including road kills.
2. If wildlife management agencies or units are contracted to manage fauna, this contract can directly take account of the interests of scavengers.
3. If conservation organisations are responsible for wildlife population control, all or some of the culled animals can be left for scavengers to benefit from.
4. Central zones within large natural areas can be designated so as to allow the decomposition of wild animal carcasses.
5. In locations where human-scavenger conflict may occur, diverting those scavengers may be a local solution (see text box about distracting predators). For example, raptors can be diverted away from wind farms, or large predators from reindeer calving areas.
6. In certain natural areas, where area managers are unable to turn over the carcasses of wild horses and cattle to be destroyed, exceptions can be approved by supervisory authorities. In collaboration with such authorities, clear guidelines should be established for situations where these exceptions would be permitted. For example:
 - a. Carcasses that are in an advanced stage of decomposition are allowed to be left where they are (as moving them would spread remains over the surrounding terrain);
 - b. Carcasses lying in inaccessible locations are allowed to be left where they are (as they cannot not be removed in one piece);
 - c. Carcasses are allowed to be left in locations where the equipment needed to remove them would damage vulnerable species (such as nesting rare birds or rare plant species);
7. EU Regulation no. 142/2011, Art. 14.2 allows for the deposition of livestock carcasses, under controlled conditions, at wildlife feeding stations, for the benefit of protected European species such as kites, white-tailed eagles and vultures. This practice has already been implemented in eight European member states. Article 14.3 allows “natural feeding” of such



Rock pigeon freshly killed and partly eaten by peregrine falcon.

Distracting predators

A commonly held belief is that placing carcasses in nature will attract facultative scavengers, such as foxes or crows. These “pest species” may, in turn, drive away ground-nesting birds. While this would seem a logical assumption, it is not borne out by observations in the field.

At the Natura 2000 area of Krauchenwieser Baggerseen, in south-west Germany, conservationists placed carcasses, mainly large fish from the lake, within the habitat of a mixed bird colony. The colony, in the past, had suffered large losses due to crows. Crows were indeed attracted to the dead fish, but their subsequent behaviour was surprising. Firstly, they were no longer interested in the eggs or nestlings of the bird colony. Secondly, they did not eat the fish itself, but carefully picked maggots from the fish. They preferred the constant and secure food source provided by the fish carcasses over the bird colony.

Something similar was done to protect the last German great bustards from predation by white-tailed eagles. In this situation, one species of high conservation priority was preying on an even more endangered species. The solution was to distract the eagles by setting up “eagle restaurants” supplied with various types of road kill. It wasn’t only the eagles and large bustards that were found to benefit from this approach, but many other species, such as red kites and great grey shrikes.

Such an approach could be helpful in areas where wolves attack livestock. Instead of complaining about them killing our livestock, why not supply them with road kill carcasses in times of need?

Carcasses could also be used to distract raptors away from wind farms. Placed at strategic locations, a constant supply of carrion would prevent raptors – all of whom are scavengers, to a certain degree – from being injured by turbines.

protected species, in certain areas and under specific conditions, by leaving wild horse and cattle carcasses in situ after their death (i.e. without collecting them or using feeding stations). Such areas are designated in consultation with supervisory authorities.

8. In some natural areas, horses and cattle are not given the status of “domestic” animals. In the Netherlands, for example, the Oostvaardersplassen and Veluwezoom are such areas. This means that the obligatory destruction of their carcasses (through EU Regulation 1069/2009) is not necessary. Animals from these areas are not allowed to enter the food industry, and can therefore remain in nature after their death. The opportunities presented by the exemptive status of these semi-wild herbivores could be leveraged more often.

How can wildlife management contribute?

In many nature reserves, populations of large animals are controlled by hunting. To this end, conservation organisations usually enter into contracts with wildlife management units or

hunting associations. The hunted animals are mostly intended for human consumption, but there are also opportunities to meet some of the needs of scavengers.

9. As conservation organisations argue for large carcasses to be left in nature, so wildlife managers and hunters can also make a contribution. For example, it could be stipulated that the intestines of culled animals remain uncovered – as opposed to being buried or hidden underneath tree branches - to serve as carrion for scavengers.
10. A contract with a conservation organisation may stipulate the exclusive use of lead-free bullets. This would ensure that the animal remains (e.g. the intestines) are free of lead, protecting scavengers from poisoning.
11. Wildlife management and conservation organisations may enter into agreements whereby hunted animal carcasses that are unsuitable for human consumption are left in nature.
12. Wildlife management and conservation organisations may enter into agreements whereby road kills are deposited at designated locations in natural areas.



Preventing lead poisoning

Across Europe, lead-based bullets are still widely used in the hunting of animals for population control. This may, in turn, lead to lead poisoning in scavengers. In Germany, between 1993 and 2000, as many as one quarter of the more than 300 white-tailed eagles found dead were found to have died from lead poisoning. In the state of Brandenburg, the percentage was even higher, with 34.5% of birds killed by lead poisoning (this is about 255 white-tailed eagles in the years 1990-2012). Lead poisoning was also found to have killed other scavenging raptors, such as golden eagles, red kites and common buzzards.

Within the body of a culled animal, a lead bullet leaves a 40-centimetre wide cloud of lead fragments around the entry wound. Scavengers typically have strong stomachs, in which food is retained for long periods of time. This means they can digest rotting carrion without getting sick. But the disadvantage of such a strong stomach is that relatively large amounts of lead can accumulate in the body. An absorption of just a few milligrams of lead can result in fatal damage to the nervous system (impacting sight and muscle coordination).

In several German states, the previously high rate of animal and bird mortality as a result of lead poisoning has meant the use of lead-free ammunition has become mandatory. However, in many European countries this is still not the case. European legislation on this is now urgently required.



13. Wildlife management organisations take account of the interests of scavengers when drafting regional or local wildlife management plans. This could include, for example, better coordination between hunting periods and the seasons in which scavengers have the greatest need for carrion.
14. Regional wildlife management plans may also stipulate the exclusive use of lead-free ammunition. Rewilding Europe and ARK Nature call for (inter)national legislation on the mandatory use of such lead-free ammunition, as is currently the case in certain regions in Germany.
15. Regional authorities and wildlife management organisations could formulate a road kill policy or regulation, stipulating that road kills are returned to nature. This obviously excludes domestic pets, such as dogs and cats.
16. The transportation of legally protected animal species (Habitat Directive; Bern Convention and national regulations) – dead or alive – requires an official exemption (situation 2017). Wildlife management and conservation organisations could enter into agreements, in this regard, with the appropriate authorities.
17. Carcasses could be deposited within nature reserves at locations designated by the conservation organisation, ensuring adequate spatial distribution. It is undesirable and unnatural for carcasses to always be left at the same location. It may lead to dominant individual animals or birds taking possession of such a location (and of the carrion regularly deposited there), chasing fellow birds and animals away, or to dominant species driving away other species.

How could road management authorities contribute?

Wild animals killed by vehicles – so-called road kills – are a valuable source of carrion. In many European regions, road kills are simply destroyed. This is unfortunate, as it involves unnecessary costs and represents a significant waste of a valuable natural resource.



European wolf in Finland.



Dead horse at a vulture feeding station in Spain.



Wild boar.

Large carcasses and health concerns

Are large carcasses and their rotting flesh a threat to our health? Do they pass on diseases to livestock? This concerns many people. Understandably so, because we are no longer accustomed to the sight of decomposing animals. The answer is a reassuring no - veterinarian studies have demonstrated that the risk of diseases being transmitted in this way is negligible. What many people do not realise is that scavengers actually clean up germs, thereby preventing diseases from spreading.

In the 1970s there was much discussion about whether to remove dead wood from forests, as it was thought that it may spread diseases to living trees. Today, we know that dead wood is an inherent part of a healthy forest and not a danger to other trees.

It is the same with carcasses. Diseases do not grow on carcasses by themselves. There is the possibility, however, of a dead animal having been the carrier of a disease when it was still alive, and this disease can then be spread to others via the carcass. Other situations that require extra attention are carcasses that are in water, where botulism may develop during hot weather, and carcasses in those parts of Europe where anthrax occurs in nature. For the purpose of public health and safety, therefore, many European countries monitor wild and semi-wild ungulates for the occurrence of dangerous diseases.

Keeping check

It goes without saying that it is very important to continually monitor the health of animals in the wild. In addition, domestic livestock should also be monitored; wild ungulates can become infected with diseases that emerge within the agricultural sector, and vice versa.

In 2009, the European Wildlife Disease Association (EDWA) started a health surveillance programme. One of its goals is to promote the methodical harmonisation of wildlife health surveillance in European countries. As of June 2016, the EDWA counted 27 European countries as members, each exchanging information on wildlife diseases and their management.

On a national level, wild boars are regularly checked for diseases. In the Netherlands, for example, they have been examined for foot-and-mouth disease, Aujeszky's disease, swine vesicular disease and trichinosis since 1997. Monitoring has shown that boars are free of all so-called infectious diseases to

which prevention and control requirements apply, and that these diseases cannot be transmitted via their carcasses. Only when wildlife management organisations have cause for concern, the 20,000 roe deer that are being hunted each year are also checked for diseases. For other ungulates, the risks are considered negligible.

Since 2000, the Netherlands has also monitored animal diseases in horses and cattle living in the wild. Results from these monitoring projects also show that carcasses, in the current situation, do not pose any risks to either animal or human health. Should circumstances change, policy could be redirected, or the policy of leaving carcasses out in nature could temporarily be amended for certain species. The member states of the EU have strategies in place that provide for such eventualities.

Wise precautions

The greater the number of carcasses being deposited in nature, the greater the chances of people encountering them. It is always advisable not to touch such carcasses, even though the risk of becoming infected with a contagious disease is negligible for humans. Circle of Life advises information billboards be placed in natural areas, warning the public not to touch carcasses and to keep dogs on a leash. Should dogs inadvertently come close to or even eat from a carcass, there is no cause for concern, as canines have strong digestive systems. Some dogs like to roll in carrion, which for their owners could be another reason to keep them on a leash.



Scavengers: nature's clean-up crew

Scavengers are important cleaners. Wild boars will eat the carcasses of fish and aquatic birds that have been infected with botulism; the boars themselves have a high resistance to the botulism toxin. Vultures and raptors will eat the flesh of mammals infected with diseases to which other mammals are susceptible, such as classical swine fever. The scavengers' powerful gastric acid efficiently decomposes harmful bacteria and viruses. Smaller scavengers also provide this type of cleaning service for the ecosystem, as they feed in large numbers and work very efficiently.

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- Spectacular footage of scavengers on the YouTube channel of Circle of Life: www.youtube.com/dooddoetleven
- The websites of www.dooddoetleven.nl and www.ark.eu/circleoflife provide numerous articles, large amounts of background information, drawings and FAQs (in Dutch) about nature and the death of wild animals.





Rewilding Europe and ARK Nature are committed to the restoration of scavenger populations in the areas where we work.

This Circle of Life brochure details a number of practical steps that rewilding initiatives across Europe can take to support scavenger populations, as well as important background information. By adopting the Circle of Life approach, Rewilding Europe and ARK Nature want to throw a spotlight on the role of dead animals and wildlife in nature.

We warmly encourage other initiatives to join us, and will provide support wherever possible.

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