

Summary symposium **Rewilding with large herbivores: challenges and opportunities for science and practice** 26 August 2016

Venue: Netherlands Institute of Ecology (NIOO-KNAW), organized together with the NecoV (Netherlands Flemish Organisation for Ecology)

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Rewilding with large herbivores is increasingly being practiced in nature areas. In The Netherlands it started with the Oostvaardersplassen in the 80's where Konik horses, Heck cattle and Red deer were free to roam without controlling their population sizes, whereas simultaneously Scottish highland cattle entered the Netherlands in the Veluwezoom area as a grazer that could be used for nature management and was better suited to year round outdoor conditions. Since then the practice of using large herbivores in nature areas has strongly diversified, both in terms of the type of management of the herbivore populations, the species of herbivores used and the aims of introducing the large herbivores. In this symposium the current knowledge of large herbivores in a nature management context and developments therein was presented by both scientists and practitioners with particular attention to the open questions and challenges in the field of rewilding and large herbivore management and ecology.

The talks illustrated the wide variety of sites and habitats in which large herbivores can now be found in nature areas in The Netherlands, as well as the variety in large herbivore species themselves and the variety of reasons why they are introduced. Large herbivores are used as a management tool to maintain or promote certain vegetation types and structures and the corresponding fauna, as wild animals that belong in ecosystems and are interesting to see for the public and as a means to bring back native large herbivores currently lacking from our ecosystems. Currently the whole continuum from strictly managed to as unmanaged as the law permits is represented. Similarly, rewilding can be seen as a continuum instead of a black and white contrast between grazing management versus rewilding with large grazers. Whereas grazing management is often focused on preserving certain species, habitat types or species diversity, rewilding is oriented towards stimulating natural processes and thus is a form of open-ended management where there are no targets of certain species or habitat types to be met. This has evoked concerns of loss of habitat types and desired species or a general decline of biodiversity in some parties both from nature conservation practice and the scientific world. It is clear that at the moment data are largely lacking that could answer this question as in particular the scientific literature is strongly dominated by opinion papers and essays, but not those providing data on consequences of rewilding. From the Oostvaardersplassen there is recent data that plant species richness is higher in the grazed areas than in established exclosures, whereas for insects there are shifts in the community composition as some like more open and others more closed vegetation, but no general trend in their overall diversity. Hence spatial heterogeneity in vegetation structure seems optimal for including most diversity, a pattern well known to appear at intermediate herbivore densities.

Another open question is the role of predators. In ecosystems with large predators it has been clearly demonstrated that these induce major changes in particular in the habitat use of large herbivores and their resulting impact on the vegetation as well as in the population levels of their prey. However, predation pressure naturally varies strongly in time and space, hence the (temporal) absence of predators is not by definition unnatural. In most Dutch areas with large herbivores

populations are managed, also in rewilding areas, hence the herbivore densities in many rewilding areas are much lower than in the Oostvaardersplassen, the first image that in particular the public has when thinking of rewilding with large herbivores. The presentations on rewilding also demonstrated that rewilding is much more than introducing herbivores, but involves preparing areas to allow more natural processes such as water level dynamics, before introducing large herbivores. The interplay between abiotic dynamics, including water, fire in other ecosystems, but also biotic factors as insect outbreaks, and the large herbivores in shaping the landscape structure and plant and animal communities is another open question. In rewilding practice there is furthermore a strong socio-economic side to rewilding as humans are actively involved by creating and promoting local opportunities for instance in eco-tourism. Similarly, there is a lot of interaction with the public around sites with large herbivores where people think there are too many herbivores, illustrating that interaction with the public is unavoidable and essential around sites with large herbivores. In part this relates to the shifting baseline concept, where at present-day we are not used to the presence of large animals, especially not at high densities, anymore.

From rewilding sites both practically and scientifically interesting aspects can be learned and the symposium made clear that there are still many outstanding questions that could be collectively answered. Apart from the ones already mentioned, these include the restoration of large gradients, where large herbivores can migrate from (river) floodplains to higher sandy areas and how this will affect the large herbivores ecology and their impact on the landscape. New tools such as geo-tracking of the animals and the use of camera traps are very useful in this context. With the appearance of mixed species groups of large herbivores the question about the role of herbivore diversity in their interactions among each other, but also in their resulting impact on the habitat, becomes relevant. Furthermore, the wider selection of possible herbivores to introduce yields questions on which herbivores to use in which environments and for what targets in managed sites. The introduction of long-lost herbivores such as bison offers unparalleled opportunities to study the ecology of these animals, which are currently only known as refugee species. Similarly, rewilding sites are often novel ecosystems in our currently urbanized world, which create habitat for species that have been absent from The Netherlands for a long time or for species that could be refugee species even within The Netherlands.

In summary, the symposium provided an overview of the state-of-the-art of using large herbivores in nature management, rewilding in practice and the science of large herbivores and their impacts. Many open questions were identified which can be addressed in future projects.