



Does it have (four) legs?

The Dutch Experience of Nature Development

- The shifting sands of National Park Drents-Friese Wold
- Predator free in Oostvaardersplassen
- Return of the gray wolf to Yellowstone

Dr Mark Fisher March 2011

The Wildland Research Institute



Where would you expect to find this landscape?



Inland sand dunes - the provinces of Drenthe and Friesland

Friesland



Drenthe



National Park Drents-Friese Wold

History of the shifting sands at Drenthe

Early human presence led to deforestation, turning it into heathland. The heathlands were overgrazed so intensively that plants stopped growing there, causing the shifting sands to be blown about.

By 1850 the shifting sands were so large that they turned into a serious threat for villages and fields. The first small-scale forestations were made to stop the sands from shifting.

About 120 years ago, the State Forestry Service started large scale reforestation, planting three kinds of conifers, with the main purposes of fixing the dunes, stopping wind erosion and for the production of timber



National Park Drents-Friese Wold

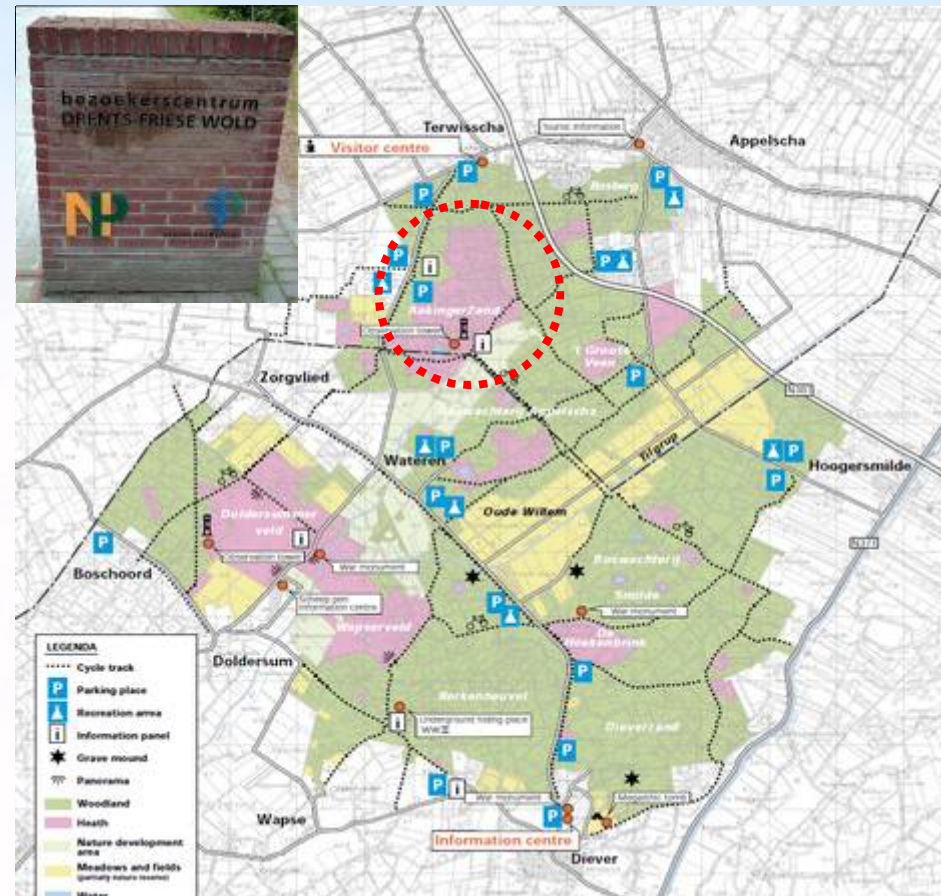
6150ha of forest, heathland, shifting sands and river valley grassland - a national park in 2000

4,150ha is state-owned by *Staatsbosbeheer* (National Forest Service)

1,600ha by Foundations and a Nature Society
400ha by a number of private landowners



the Vledder Aa stream restored to its old course



Drift Sand Expansion



Loss of sand?

From 1990 onwards, "severe management measures" led to about 175ha of forest being cleared, followed by clearing of regenerated scrub.

Grazing with over 100 sheep and cattle was instituted to prevent regrowth and maintain the sands in an open, shifting condition

'guided natural system' – nature development areas

"The Drents-Friese Wold has been chosen to become a national park with the aims of intensifying nature management and nature development.... This development should be based on an almost complete restoration of the function of the hydrological system and integral management in which large grazing animals from then on determine the structure of the landscape"

Management- and development plan Drents-Friese Wold

"There are many different types of cattle in the park, like Scottish highlanders, Salers, Limousins and blonde Aquitaines. All these breeds are extremely suited for grazing heathlands and open forests" - Big Grazers, Nationaal Park Drents-Friese Wold

"Shepherd Catrinus Homan leads his flock over the Doldersummerveld and Wapserveld heathland. He takes the sheep to the areas where they are most needed" - Herd of sheep, Nationaal Park Drents-Friese Wold





STOP

**the clearcuts in our
National Parks!**

-founding in 2005 of Action
Group "Woudreus"

- 7000 signatures, MP's, local
+ national newspapers

Our Story - Stichting de Woudreus (Giant Forest Foundation)

"These sand dunes formed several centuries ago due to excessive topsoil removal and felling of trees to reclaim arable land. An ecological disaster of unprecedented proportions"

"70% of the trees in the Drenthe-Friese Wold, according to the redevelopers, are exotic and will, if the plans go ahead, be disappearing"

"Large machines with brute force pushing down trees, snapped trunks half remain standing, paths and roads are rutted and muddy pools changed"

"A survey shows 52% of Dutch people prefer forest. 18% prefer rivers and lakes. Dunes and sand with 14% coming in third place"

"PAST is a very elastic concept" " NATURE IS NOT A ZOO"

"Should this beautiful scenery in our national parks be demolished to make way for Landscape Change due to the hobby of a small group of biologists and ecologists, who have great influence on the policy of the Ministry of Agriculture, Nature and Food Quality?"



Back to the primordial nature

“Since the early eighties, large herbivores are increasingly being released into nature. This is a practical management measure to counteract scrub encroachment. The "natural" is legitimized with reference to the past. This is based on the view of Frans Vera, employee in the State Forestry Service, that the prehistoric 'forest' from the time of the first farmers, had the character of parkland at the hands of large numbers of wild herbivores, including deer, cattle and horses. Horses were, however, virtually disappeared shortly after the last ice age, quickly followed by scarce aurochs, and pollen diagrams give no reason to assume much openness. That would not be so bad, if land managers (SBB, NM) had not gone a step further trying to develop experimental 'new self-nature' in which domestic animals have to 'de-domesticated'. This is accompanied by dramatic winter mortality and major public indignation. We are faced with the abuse of prehistory as a reference for an ecological experiment, with a bioethical problem as a result, and with completely autonomous operating major environmental organizations that have little underlying social criticism. Whose "nature" is it anyway? Only the biologists? And what exactly is nature in the Netherlands?”

Prof. dr .L .J. Louwe Kooijmans, Cleveringa Lecture 26 November 2010

Oostvaardersplassen

“Large grazers
Typical of the area are the large herbivores: red deer, Heck cattle and Konik horses live in a natural way in wild herds. They play a key role in the natural dynamics.”

About 6,000ha of undeveloped polder
1983 release of Heck cattle - 406
1984 release of Konik horses – 1,171
1986 designation as a State Natural Monument
1992 release of deer – 2,172

State Forest Service www.staatsbosbeheer.nl/Natuurgebieden/Oostvaardersplassen.aspx



Wetland - marshland

“Almost half of the northwest European population of greylag geese use it as a rough grazing area. It is a breeding ground for spoonbills and home to a large cormorant colony, including the large and little egret and bittern are there for. The area is rich in raptors, sea eagle has bred there since 2006, and is home to many species of ducks, grassland birds and reed dwellers”



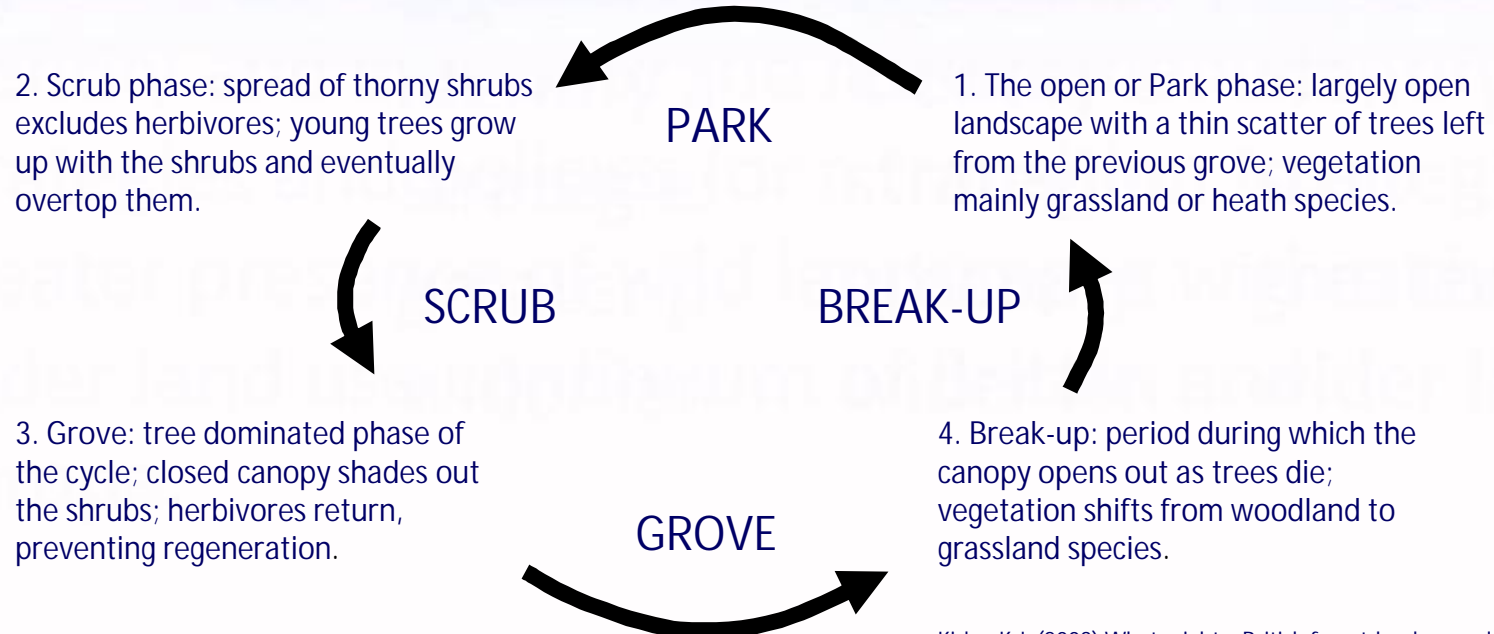
Nature development – to what?



The VERA Hypothesis

NO permanent closed-canopy woodland or regeneration at existing woodland site
Large herbivores created open conditions, and drove the forest regeneration cycle.
Herds of aurochs, bison and wild horses grazed large, open areas that eventually went through scrub and woodland phases before breaking down to form open areas again.

Frans Vera (2000) *Grazing ecology and Forest History*, CABI, Wallingford



Kirby, K.J. (2003) What might a British forest-landscape driven by large herbivores look like? English Nature Research Report No 530

NO support for Vera Hypothesis in the literature

"The available pollen data reported here forces the rejection of Vera's hypothesis"

Mitchell, F.J.G. (2005) How open were European primeval forests? Hypothesis testing using palaeoecological data. *J. Ecol.* 93, 168–177

"The absence of any crucial pollen-analytical evidence [8, 18] to support the idea of open-canopy primeval forest as envisaged by Vera [5] has important implications for forest management policies that assume the wood-pasture hypothesis is appropriate and valid for natural European lowland forests"

Birks, H. John B (2005) Mind the gap: how open were European primeval forests?. *Trends in ecology & evolution* 20, 154-156

"Pollen data from pre-Neolithic levels in Wales support a high-forest model of vegetation structure as proposed by Peterken (1996) and Mitchell (2005). Large sites which reflect regional vegetation indicate the region was predominantly closed woodland at around 6000 cal. yr BC, and there is little evidence to support a wood-pasture model (sensu Vera, 2000)"

Fyfe, R. (2007) The importance of local-scale openness within regions dominated by closed woodland. *Journal of Quaternary Science* 22(6) 571–578

"The contribution of this study to the current debate on the role of large herbivores in determining the structure of northwestern European woodlands (Vera 2000, Svenning 2002, Mitchell 2005) is to suggest that in Britain the aurochs may not have been a prime determinant of the structure of the more upland woodlands"

Hall, SJG (2008) A comparative analysis of the habitat of the extinct aurochs and other prehistoric mammals in Britain. *Ecography* 31, 187-190

"the extent of landscape openness as suggested by the Vera hypothesis is too high. Natural (river plains, wetlands, poor soils) and disturbance-induced (floods, windthrow, fire) small openings in closed beech forests were more likely to have produced the observed pollen assemblage at Lobsigensee 6000 years ago"

Soepboer and Lotter (2009) Estimating past vegetation openness using pollen-vegetation relationships: A modelling approach. *Review of Palaeobotany and Palynology* 153: 102–107

"The evidence about more recent (ca. 500–1900 A.D.) periods in Grazing Ecology and Forest History does not support the Vera Hypothesis. The most important general problem is that the material Vera presented appears to be irrelevant to the hypothesis. While it is certainly true that medieval and early modern written sources often describe woodland with more open vegetation than today's closed forests, this says very little about Mesolithic conditions"

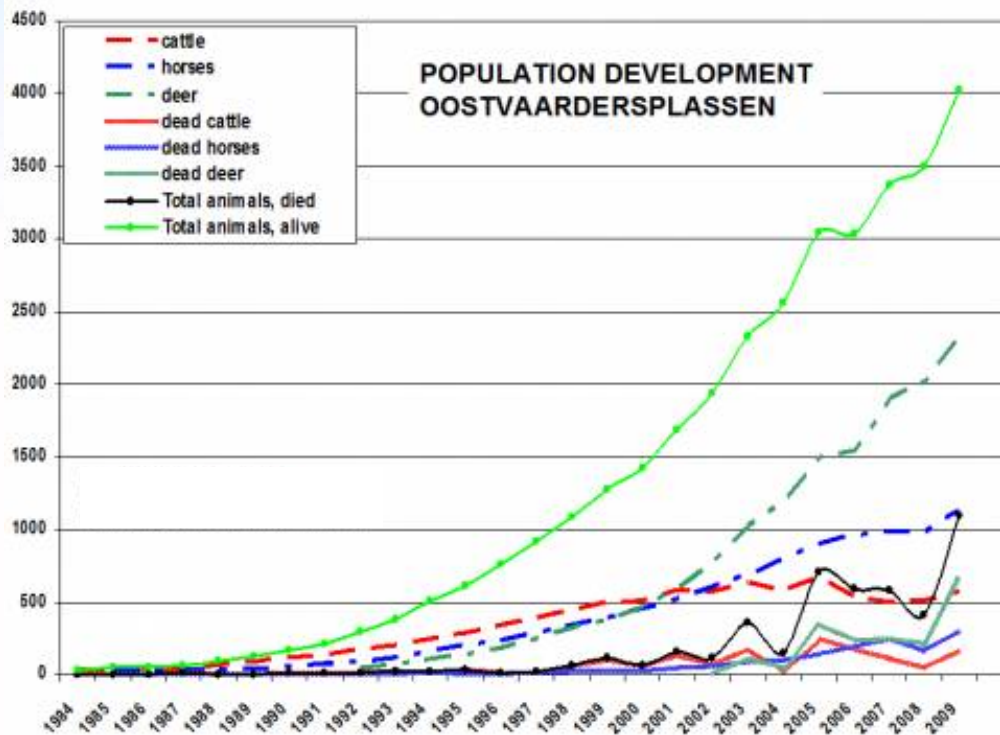
Szabo, P. (2009) Open woodland in Europe in the Mesolithic and in the Middle Ages: Can there be a connection? *Forest Ecology and Management* 257 (2009) 2327–2330

"the open areas evident within the records were not driven by the activities of grazing animals, that herbivore density does not control natural forest structure, effectively nullifying the crux of the Vera hypothesis"

Whitehouse and Smith (2010). How fragmented was the British Holocene wildwood? Perspectives on the "Vera" grazing debate from the fossil beetle record, *Quaternary Science Reviews* 29: 539–553

The rise in herbivore pressure

“The Oostvaardersplassen, for example, contains none of its lost predators, such as bears or wolves, yet other reintroduction experiments have shown that they can alter the entire ecosystem”
 Emma Marris (2009) Reflecting the past, Nature 462:30-32



Deer – 2,172

Konik horses – 1,171

Heck cattle - 406

Populations as of January 2010

The natural herbivory

The odds are stacked against woodland development in nature development because livestock feed differently to native herbivores

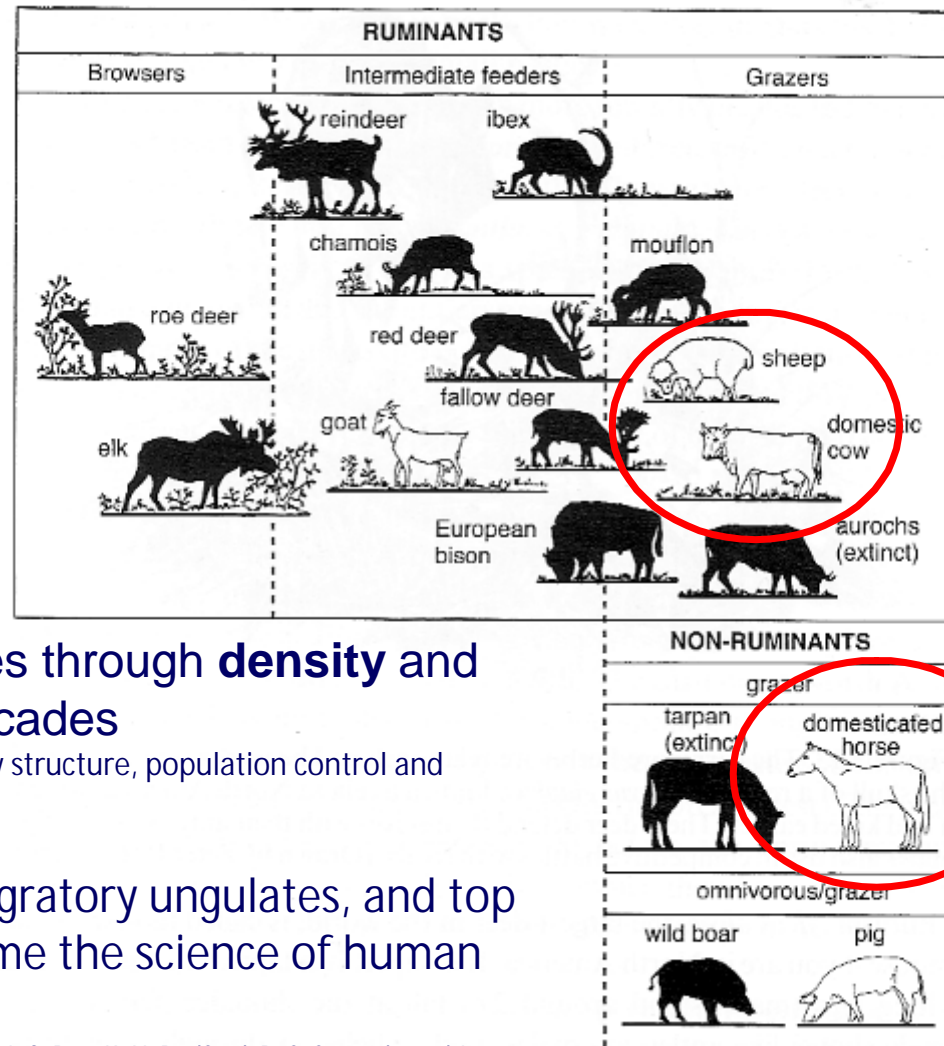
"green world hypothesis"

Predators control herbivore pressures through **density** and **behaviourally** mediated trophic cascades

Hairston, N.G., Smith, F.E., Slobodkin, L.B. 1960. Community structure, population control and competition. American Naturalist 94, 421-425

"In the absence of mega-herbivores, migratory ungulates, and top predators, ecology will by default become the science of human artefacts"

Terborg, J. 2005. The Green World Hypothesis Revisited. Pages 82-99 in J. C. Ray, K. H. Redford, R. S. Steneck, and J. Berger, editors. Large Carnivores: and the Conservation of Biodiversity. Island Press, Washington DC



Lamar Valley in Yellowstone NP





Lamar River

Buffalo in the Lamar Valley



Herbivores



Elk





Moose



Carnivores



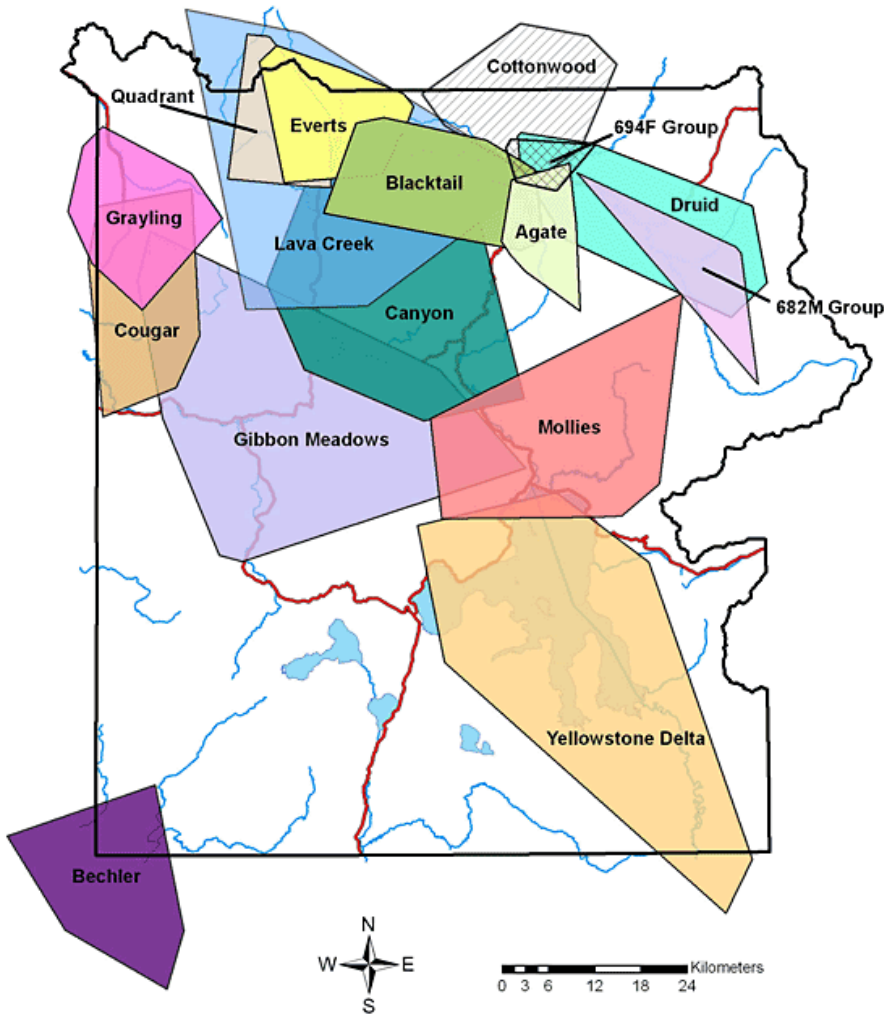
Return of the wolf to Yellowstone



Wolves in US killed off by 1930. Since then, a few returned over the border from Canada and formed packs in Montana.

In 1995/96, over 60 gray wolves brought in from Canada and released in Yellowstone NP and Idaho. Now about 1,650 wolves with about 100 living in Yellowstone.

2009 Yellowstone Wolf Pack Territories



At the end of 2009, at least 96-98 wolves in 14 packs (6 breeding pairs), 1 non-pack grouping, and 2 loners

365 wolf kills include:

- 302 elk (83%)
- 19 bison (5%)
- 17 deer (2%)
- 1 moose (<1%)
- 4 pronghorn (<1%)
- 1 bighorn sheep (<1%)
- 1 Canada goose (<1%)
- 1 bald eagle (<1%)
- 3 coyotes (<1%)
- 2 red foxes (<1%),

Gray wolf



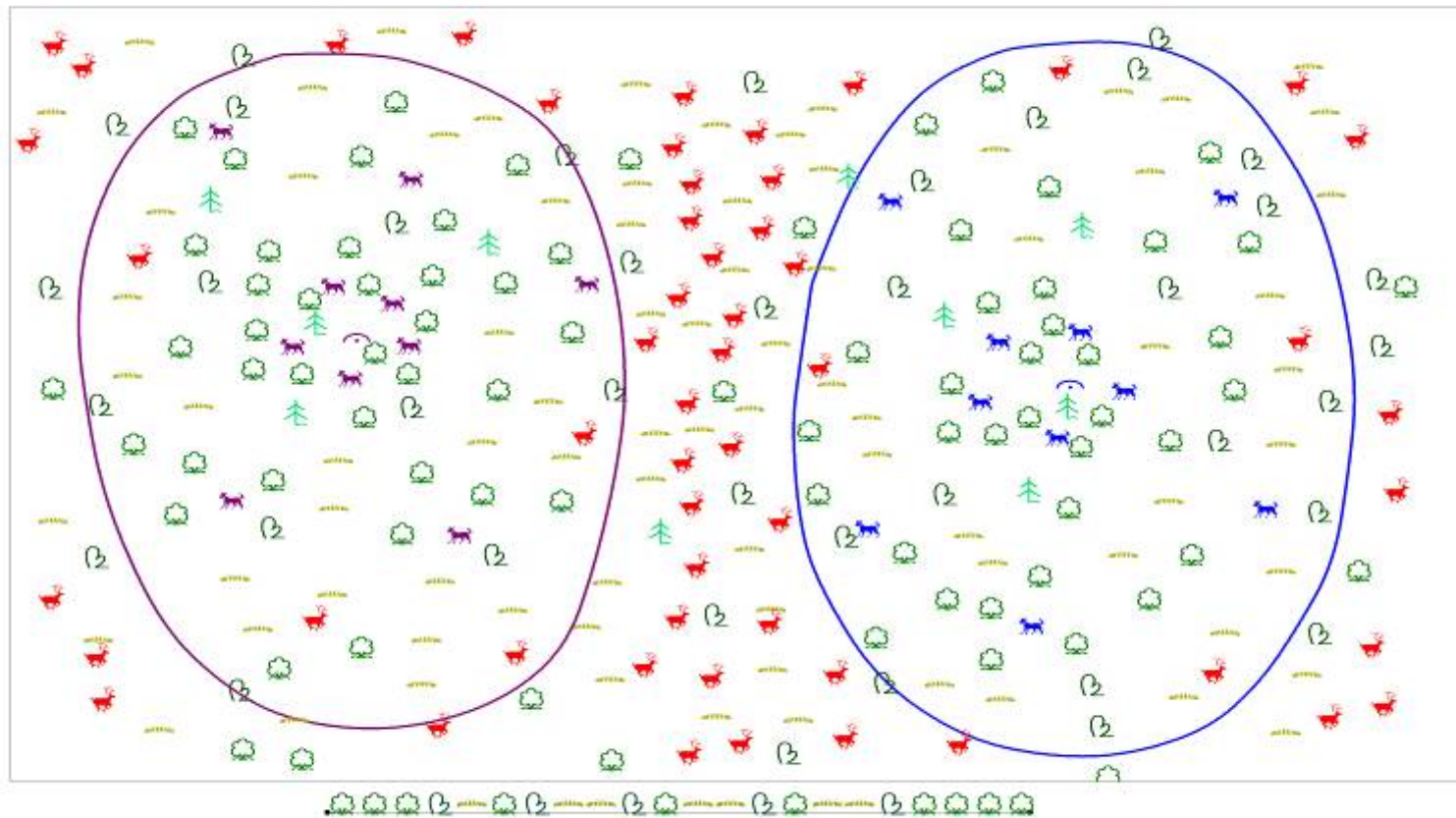
The Wildland Research Institute



WRI



Wolves make woodland in a landscape of fear



National Geographic March 2010

Before & After Wolves

Restoring wolves to Yellowstone after a 70-year absence as a top predator—especially of elk—set off a cascade of changes that is restoring the park's habitat as well.

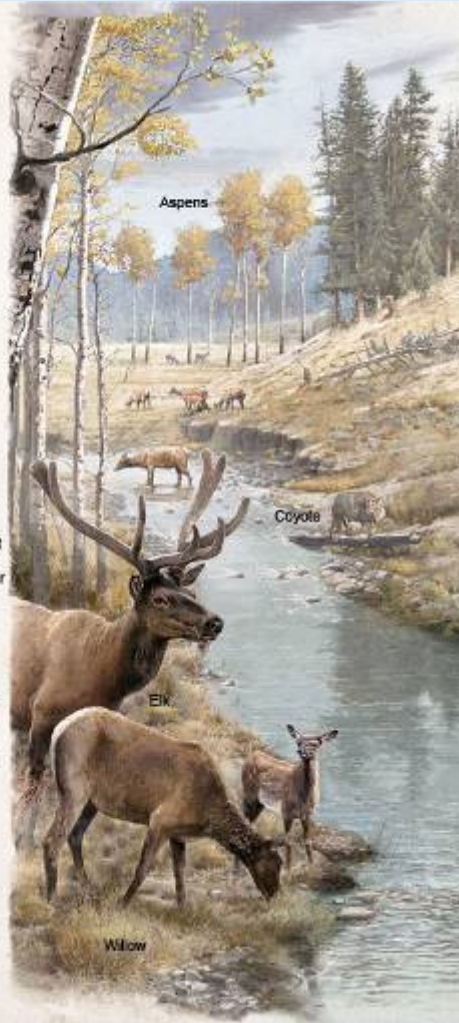
YELLOWSTONE WITHOUT WOLVES 1926-1995

ELK overbrowsed the stream side willows, cottonwoods, and shrubs that prevent erosion. Birds lost nesting space. Habitat for fish and other aquatic species declined as waters became broader and shallower and, without shade from streamside vegetation, warmer.

ASPEN trees in Yellowstone's northern valleys, where elk winter, were seldom able to reach full height. Elk ate nearly all the new sprouts.

COYOTE numbers climbed. Though they often kill elk calves, they prey mainly on small mammals like ground squirrels and voles, reducing the food available for foxes, badgers, and raptors.

ART BY FERNANDO G. BASTIEN, NO DRAPP; ANAHEA HOBBS, NO DRAPP; SOURCES: ROBERT L. BISHOP AND WILLIAM J. REIPLE, OREGON STATE UNIVERSITY; DOUGLAS W. SMITH, YELLOWSTONE NATIONAL PARK



YELLOWSTONE WITH WOLVES 1995-PRESENT

ELK population has been halved. Severe winters early in the reintroduction and drought contributed to the decline. A healthy fear of wolves also keeps elk from lingering at streamside, where it can be harder to escape attack.

ASPENS The number of new sprouts eaten by elk has dropped dramatically. New groves in some areas now reach 10 to 15 feet tall.

COYOTES Wolf predation has reduced their numbers. Fewer coyote attacks may be a factor in the resurgence of the park's pronghorn.

WILLOWS, cottonwoods, and other riparian vegetation have begun to stabilize stream banks, helping restore natural water flow. Overhanging branches again shade the water and welcome birds.

BEAVER colonies in north Yellowstone have risen from one to 12, now that some stream banks are lush with vegetation, especially willows (a key beaver food). Beaver dams create ponds and marshes, supporting fish, amphibians, birds, small mammals, and a rich insect population to feed them.

CARRION Wolves don't cover their kill, so they've boosted the food supply for scavengers, notably bald and golden eagles, coyotes, ravens, magpies, and bears.



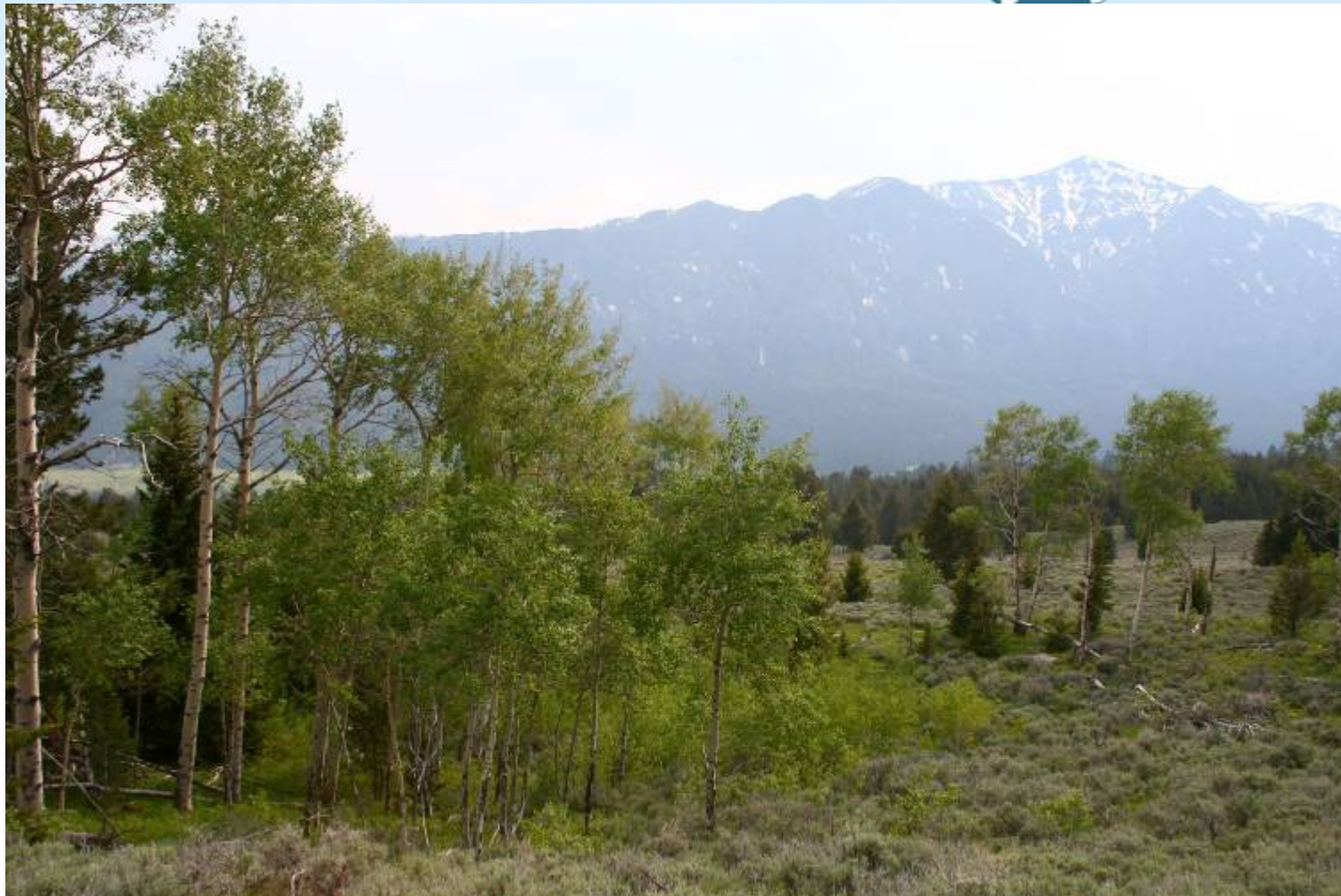
Willow flats

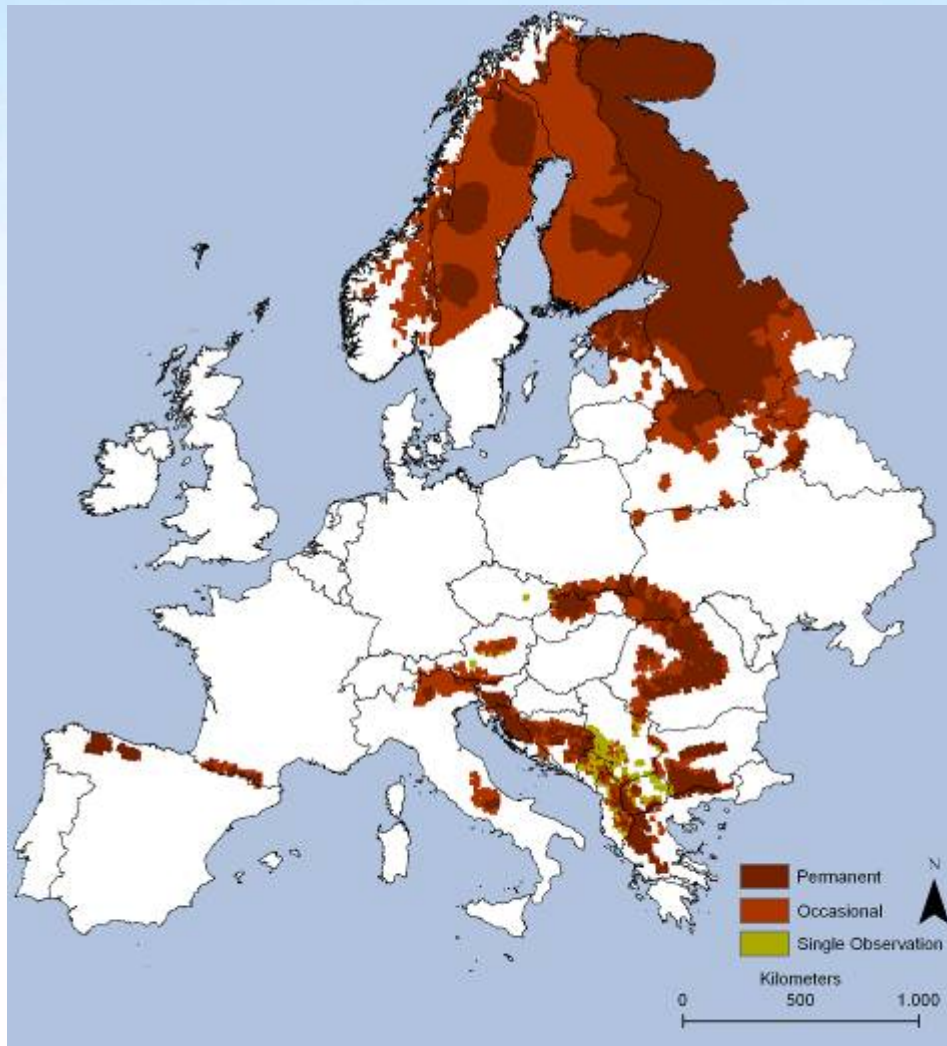


Willow flats



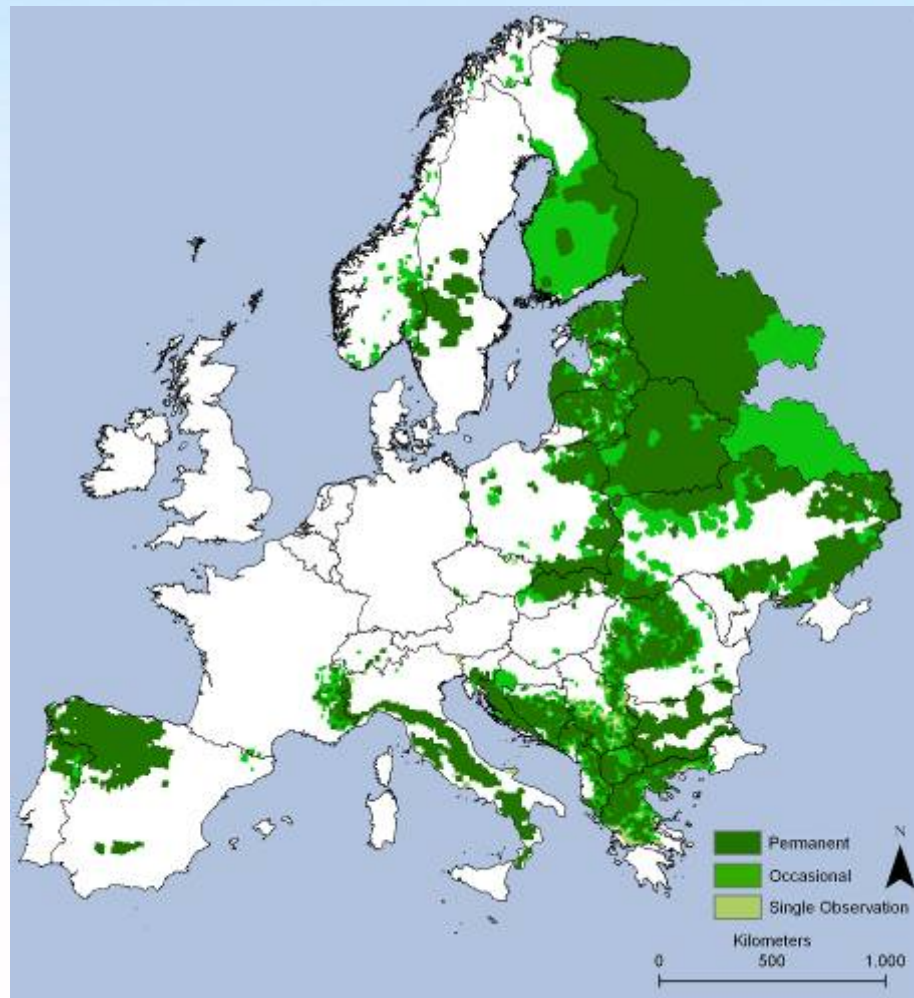
Regrowth of aspen





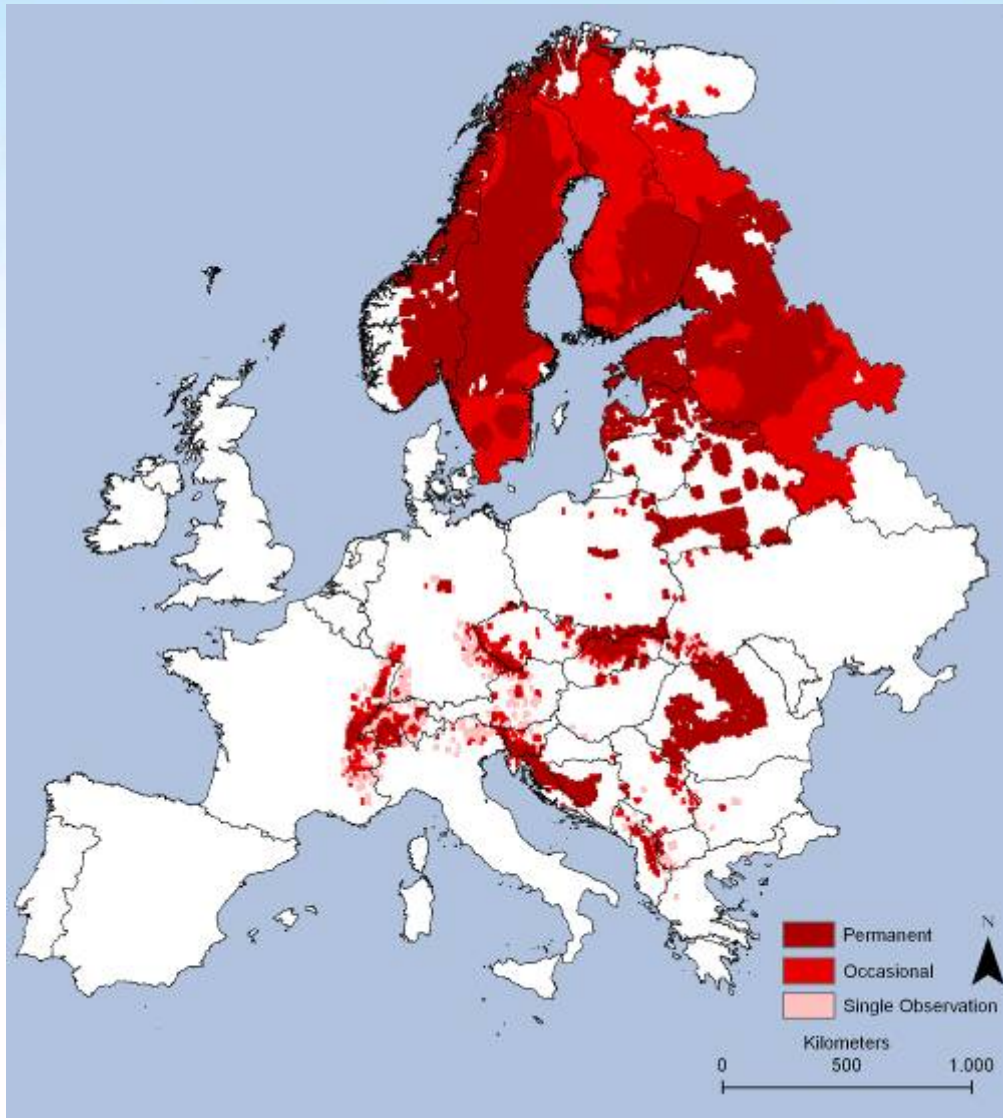
Bear in Europe





Wolf in Europe





Lynx in Europe

