



# GRASSLAND AND SAVANNAH ECOSYSTEMS

An urgent need for conservation and sustainable management

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# Preface

As we navigate the impacts of COVID-19 over the coming months and years, we must recognise the importance of our relationship with nature, and the far-reaching consequences that it can have on our planet. The pandemic has exposed both the fragility of our food system, with risks of increased food insecurity, and the importance of resilient and sustainable food systems as part of physical and environmental health. It is evident that our current consumption and overexploitation of the natural world poses threats to the health of people and our planet. As we begin to build our way of living for the next normal, we have a once in a 100-year opportunity to redesign the way we coexist with nature, and deliver a New Deal for Nature and People – starting with our food system.

While there is wide awareness of the need to protect ecosystems such as forests, oceans, coral reefs and polar caps, the importance of grasslands and savannahs, and therefore the need to conserve them, is often ignored. They are in deep trouble – we've already converted more than half of all major grasslands and savannahs, and they continue to face one of the highest and fastest rates of conversion, driven by unsustainable agricultural expansion. Though grasslands and savannahs are generally far from news headlines, they are extremely important for our food system, local economies and the health of our planet overall.

Most of our food comes from grasslands and savannahs and they provide livelihoods for many people, including indigenous communities, who cultivate the lands they call their homes. Grasslands and savannahs provide vital ecosystem services: mitigating climate change, acting as water sources, and providing a home to thousands of species of flora and fauna, many of which are found only in small areas. Protecting them is critical to tackling biodiversity loss and climate change, but it must be done in a way which also contributes to improving food security and maintaining livelihoods and local cultures.

This paper highlights just some of the ways in which this can be done, a suite of specific practices that can be actioned immediately. Implementing impactful strategies that benefit nature and people will require the cooperation of farmers, buyers, governments, financiers and others – but these case studies show it is possible and it is now time to scale our solutions.

This paper is an important moment in our goal to rehabilitate grasslands and savannahs by advocating for the inclusion of these biomes in global conservation and climate agendas and leading on-ground interventions to protect and restore the land. The impacts of COVID-19 reinforce the urgency with which we must act to redesign our food system for the next normal and change our relationship with nature. We must seize this moment, strengthening how we collaborate across sectors and geographies. We look forward to working with our partners in the public and private sector to achieve a greener future for our grasslands and savannahs, and ultimately, for us and our planet.

**João Campari**

Global Food Practice Leader

WWF International

# Introduction

Grasslands and savannahs are critically important ecosystems, rich in biodiversity. They have multiple ecosystem services including huge carbon stocks, and contain unique historical and cultural values. They are crucial for human development. Yet they have often been undervalued, their conservation and protection virtually ignored, and both their ecological and socio-cultural values have suffered in consequence.

**Grasslands and savannahs are critically important ecosystems**

Grasslands and savannahs cover some 26–40 per cent of the planet's total land, representing 80 per cent of the world's agricultural and livestock area (Suttie et al. 2005). Most are used as rangeland, providing feed for livestock used in meat and dairy production. In many places, such as the Northern Great Plains (United States), the Pantanal (Brazil and Paraguay), the Pampas and Campos (Uruguay and Argentina), the Llanos (Colombia), the Maasai Mara (East Africa), the Great Steppe (Mongolia and China), and the Himalaya and Trans-Himalaya region (China, Bhutan, India, Nepal and Pakistan), extensive livestock grazing provides livelihoods for millions of rural and indigenous people. In Africa, where savannahs comprise over 50 per cent of the continent, people depend on them for water, food, medicine, timber and grass for construction, fuelwood and charcoal, with a total annual value exceeding \$9 billion (Ryan et al., 2016). They also provide opportunities for recreation and tourism, supporting local economies, particularly where they are home to charismatic species.

## The problem

Grasslands and savannahs are facing some of the fastest and highest rates of conversion and degradation of any biome, resulting in significant biodiversity loss, carbon emissions, and negative impacts on freshwater systems, along with erosion of local and traditional cultures (Nelson, 2006, O'Mara, 2012, Van der Walt et al., 2015). Although many human activities contribute to this problem, unsustainable agricultural production is the main driver. Moreover, only 8 per cent of the area of these biomes is protected. A lack of awareness of their value contributes to their vulnerability and has resulted in limited action on the global conservation agenda.

Biodiversity and ecosystem services in grasslands and savannahs are degrading faster than ever before in human history (Ridder 2007, Conant 2010). These ecosystems are at the centre of socio-economic conflicts in areas with extensive rural poverty and where people and

economies are highly dependent on natural resources. They are critical for mitigating climate change, preserving freshwater resources, and providing habitats for some of the planet's last large wildlife herds and other endemic and threatened species, ensuring food security, supporting livelihoods, and maintaining the cultural identity of millions of rural and indigenous people.

In South America, savannah ecosystems cover 269 million ha (Rippstein et al. 2001). Most (76 per cent) belong to the Cerrado of Brazil, but about 11 per cent (28 million ha) form the Venezuelan Llanos and 6 per cent (16–17 million ha) the Llanos Orientales of Colombia (Blydenstein, 1967; Rippstein et al., 2001). These last areas are seen as a single ecoregion, the Llanos of the Orinoquia. The remaining 7 per cent is a mosaic of flooded grasslands, savannahs, and tropical forests forming the Pantanal, the world's largest wetland, stretching across Bolivia, Brazil, and Paraguay (Swarts 2000). This wetland is part of a larger dry plain of around 100 million ha, known as the Gran Chaco. The Gran Chaco Americano is increasingly used for livestock grazing and raising crops, with the conversion of natural vegetation accelerating. Further south on the continent, South American grasslands extend through Argentina, Uruguay, Paraguay and parts of Brazil, occupying 82 million ha of pampas and campos.

**Only 8 per cent  
of grassland and  
savannah biomes  
are protected**

These grasslands and wetlands play a crucial role in sustainability, with high social, cultural, economic and environmental values (Bengtsson et al., 2019). Beyond providing habitats for plants and animals that are adapted to the unique hydrologic regimes and soil conditions (Pollock et al. 1998, Mitsch et al. 2014), they provide important ecosystem services, including climate regulation and water purification (Maltby and Acreman 2011, O'Mara 2012, Mitsch et al. 2015). Local communities and indigenous peoples preserve ancient cultural values, embodied in their knowledge about nature conservation and the sustainability of traditional subsistence systems (Ishwaran and Clüsener-Godt 2007, Salcedo and Barrera 2019).

Humans have formed symbiotic relationships with these biomes and are intrinsically linked to them as part of their cultural identities. Grasslands and savannahs are home to some of the last remaining nomadic cultures (such as East Africa's Maasai people), and host sites where important spiritual and cultural rituals and ceremonies are held. These cultures retain unique knowledge about the sustainable use and management of their ecosystems, including fire, grazing and seasonal transhumance, which are essential for successful development, restoration and conservation strategies.

**Globally,  
half of all major  
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savannahs  
have been lost**

Widely overlooked is the essential role of grasslands and savannahs in climate change mitigation, particularly in terms of global carbon storage and sequestration. They represent between 20 and 34 per cent of the global stock of carbon in terrestrial ecosystems (150–200 tons of carbon/hectare). Grasslands and savannahs store at least three times more carbon than tropical rainforests. Because of their deep root systems and because they are more resilient to droughts and fires, grassland and savannah systems store carbon more reliably than other vegetation types (Dass et al., 2018).

Globally, half of all major grasslands and savannahs have been lost, and conversion continues at a rapid pace. The biggest driver is agricultural production, which is converting native ecosystems for food and fuel crops, clearing land for livestock and creating new tree plantations. Two of the biggest conversion fronts are in Brazil's Cerrado and North America's Great Plains, which are losing about 2 million hectares per year combined. Future conversion could be triggered by new transportation and energy infrastructure in the sub-Saharan savannahs and Miombo forests, and the World Bank has proposed large-scale expansion of commercial agriculture into savannahs to provide economic development and alleviate poverty for growing African populations. Climate change will push conversion into new areas where longer growing seasons make crop production possible. Further, prominent deforestation-free efforts actively promote the leakage of agricultural expansion towards grasslands and savannahs. For example, large-scale leakage is believed to have occurred into the Cerrado as a result of the Amazon Soy Moratorium (Miranda et al., 2019).

Many of the grasslands and savannahs that remain are degraded due to unsustainable grazing and agricultural practices, the introduction of non-native species and inappropriate fire management. This makes them even more vulnerable and unable to provide the goods and services that communities depend on.

Grasslands and savannahs have become increasingly fragmented, interrupting wildlife corridors, undermining pastoralist traditions and, in some cases, disrupting freshwater flow, due to fencing practices and infrastructure for agriculture as well as energy development such as oil and gas or wind power.

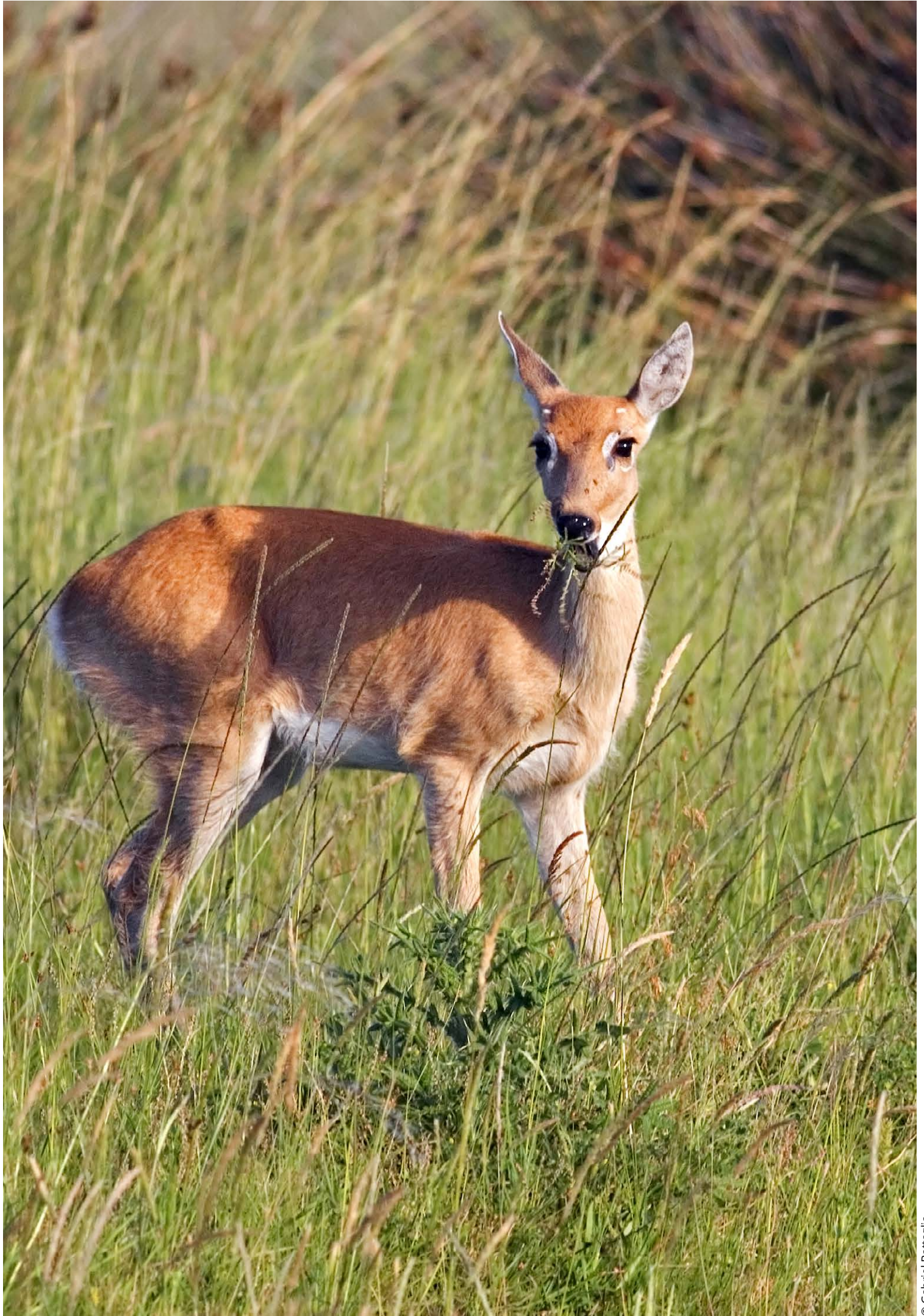
The following report draws together information from around the world on the current status of some key grasslands and savannahs, describes how WWF is working to conserve these regions and introduces a new strategy to halt and reverse the losses summarised above.



## Introduction to case studies

The following short case studies present information from WWF colleagues working in grassland and savannah ecosystems. Although making no attempt to be a complete global survey, the case studies present an overview of conservation issues in some of the world's most important, and in some cases most threatened, grassland and savannah ecosystems. The aim of the case studies and more generally of this publication is to:

- » **Raise the profile of grassland conservation** within the wider conservation community, and a publicity drive aimed particularly toward the conservation community, relevant conventions and industry bodies
- » **Provide an overview** of status, trends, threats and opportunities in key grassland habitats, initially through a series of invited presentations at a conference in 2019, which have now been written up to form this overview report
- » **Provide input to a series of international processes** that influence grassland conservation, including a resolution to the World Conservation Congress (which, if successful is binding on IUCN and its members); input to the post-2020 targets discussion in the Convention on Biological Diversity (CBD); input to the Land Degradation Neutrality work of the UN Convention to Combat Desertification (UNCCD) and links to carbon management within the UN Framework Convention on Climate Change (UNFCCC)





# Pampas, Humid Chaco, Espinal and Campos and Malezales Ecoregions Argentina

## Grassland and savannah ecosystems of Argentina

The four main grassland and savannah ecoregions of Argentina – (i) Pampas, (ii) Humid Chaco, (iii) Espinal and (iv) Campos and Malezales – cover 88 million ha, which represents 32 per cent of the country’s most humid and arable lands. Though these ecosystems host a unique biodiversity and deliver a wide range of ecosystem services, they are among the most threatened and unprotected regions in Argentina.

The Pampas covers about 60 per cent of the grassland area with a remarkable biodiversity including about a hundred land mammals, such as the iconic pampas deer (*Ozotoceros bezoarticus*) and at least 26 species of birds threatened with extinction, including brown-and-yellow marsh bird (*Pseudoleistes virescens*), marsh seedeater, (*Sporophila palustris*), ochre-breasted pipit (*Anthus nattereri*) and upland goose (*Chloephaga picta*).

The Espinal, characterised by grasslands and forests and referred to as the “forested pampas”, harbours many Pampas species which are now affected by hunting and habitat transformation. Much of the Espinal is located in lands with a high level of agricultural and urban development and its surface has been greatly converted for decades.

The Campos and Malezales (*Mesopotamian savannah*) ecoregion covers an undulating plain with different types of grasslands. The vegetation is formed in the north by pastures and grasslands composed of diverse communities of herbs with typical species of the Gran Chaco and Atlantic Forest ecoregions, including many species now locally extinct, including big cats like the puma (*Puma concolor*) and jaguar (*Panthera onca*). However, maned wolves (*Chrysocyon brachyurus*), pampas and marsh

deer (*Blastocerus dichotomus*) can still be found. Birds are abundant, including greater rhea (*Rhea americana*), tinamous, yellow thrush and ochre-breasted pipit.

The Humid Chaco ecoregion is located in north-eastern Argentina, the middle of Paraguay and small areas in south-western Brazil. The region slopes gently towards the east and overlooks areas of depressions. A mosaic of strips of high, well-drained land dominates the countryside, with forests along the river courses alternating with interfluves at the base of the creeks and gorges that feed the rivers. These strips feature natural pastures, grasslands and savannahs. Xerophilous forests are mixed with palm savannahs; lower areas are subject to flooding. In the open native grasslands of the Chaco, the maned wolf, the greater rhea, and the Chacoan guanaco (*Lama guanicoe*) can still be found.

## Drivers of change

The main drivers of change in the Argentinian grasslands and savannahs are:

- » The expansion of the agricultural frontier for intensive livestock and monoculture crops, including afforestation with exotic species
- » Ongoing establishment of forest plantations (like pine and eucalyptus)
- » Degradation and desertification due to overgrazing, clearing of trees and other unsustainable management practices
- » Native grasslands, habitat for endemic birds, being replaced by planted, exotic grasses for forage or being destroyed by the use of glyphosate herbicide. In the northeast of Argentina, some tall grass species, like *Espartillo amargo*, have been replaced by humans for over a century and have mostly vanished.
- » Urbanisation and infrastructure, including canalisation and drainage of wetlands
- » Birds of tall grasslands being threatened by the loss of habitat and changes in vegetation structure due to overgrazing

In the Chaco, commercial exploitation and decline of plant species threatens to permanently change the vegetative structure of the ecoregion along with associated animal species. The caños were the first areas occupied by humans and livestock, leading to conversion and degradation, impacting wildlife like the maned wolf, greater rhea and Chacoan guanaco. The jaguar, which once roamed the grasslands, is confined to forest relicts and under threat from both deforestation and human-

wildlife conflict. Other emblematic species include the giant armadillo (*Priodontes maximus*), which suffers from high mortality rates due to road accidents and hunting, mainly due to conflicts with dogs, and the strange-tailed tyrant (*Alectrurus risora*), a bird typical of high grasses.

In the Espinal, the palm forests of Yatay have already been replaced by agriculture and forest plantations. The main threat for the grasslands of Campos and Malezales is the conversion to pine and eucalyptus forestry.

Table 1 illustrates the dramatic difference between the very small coverage of protected areas in these regions and the large proportion of land that has already been converted.

**Table 1: Extent of protected and converted land in grassland and savannah ecoregions of Argentina**

Ecoregion	% protected	% converted	Land use
Humid chaco	2.42	13	Livestock
Campos and Malezales	0.006	21	Livestock/forestry
Espinal	0.26	47	Agriculture/forestry/livestock
Pampas	1.05	78	Agriculture/livestock

## Conservation responses from Fundación Vida Silvestre

Fundación Vida Silvestre Argentina (FVS), an affiliate of WWF, has been working since 1977 for the conservation of grasslands and associated biodiversity, beginning with a strong focus on the preservation of pampas deer and its habitat. This long-term work has proven that the sustainable management of native grasslands and savannahs offers unique potential to unite biodiversity conservation and sustainable production, e.g. with sustainable cattle ranching. Knowledge exists about best management practices to conserve these biomes while contributing to livelihoods and food security. The creation of more protected natural areas and the promotion of sustainable management of livestock are the main challenges facing these ecoregions. As over 90 per cent of the land in Argentina is in private hands, it is difficult to create state protected areas. In 2002, Fundación Vida Silvestre Argentina, with the participation of more than a hundred specialists, identified Areas of Valuable Grasslands (AVPs) that were still conserved in the Pampas and Campos ecoregions of Argentina, Uruguay and southern Brazil (Bilenca and Miñarro, 2004).

FVS has ample experience working with private landowners who want to produce and conserve. The conservation responses cover:

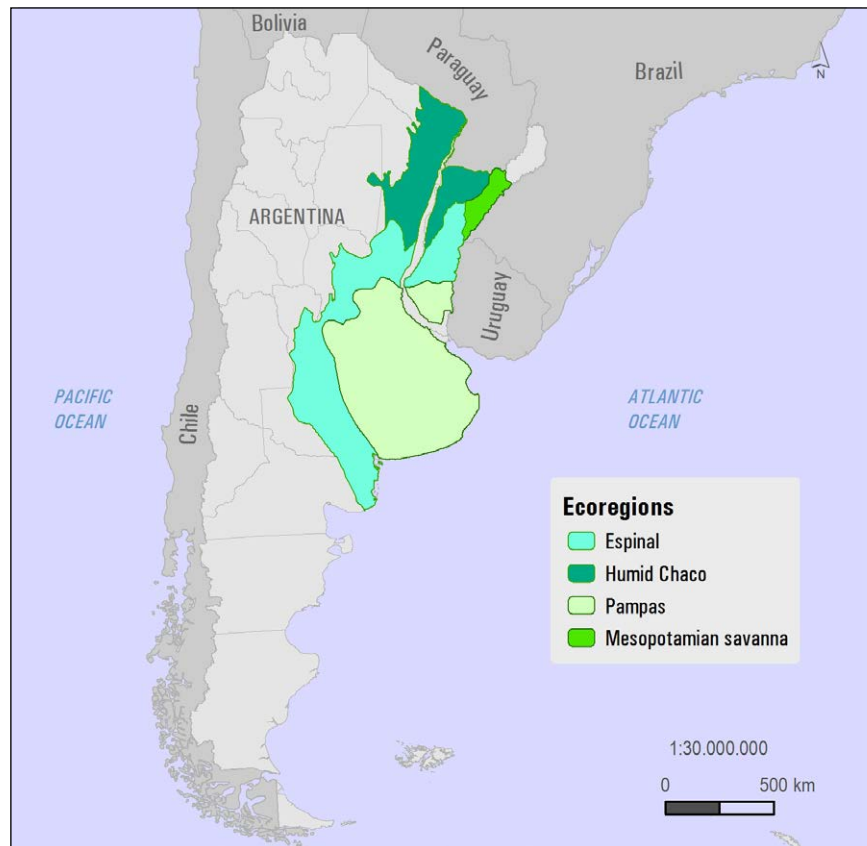
- » Extension kits for sustainable livestock practices in the Pampas, Campos and Chaco
- » Training for thousands of producers, students and professionals in better management practices
- » A network of private reserves implementing best practices
- » Creation of protected areas in public and private lands (including Ramsar sites and other protection categories, where sustainable use is allowed)
- » Economic incentives for farmers that conserve grasslands jointly with local and national governments, including a certification for “Grasslands Beef”, which is sold in Carrefour supermarkets

Our goal is: By 2030, at least 3,500,000 ha of the remaining grassland and savannah ecosystems of the ecoregions maintain their cover relative to 2020 in good health and resilience – ensuring the provision of key ecosystem services for society and the recovery of its biodiversity.

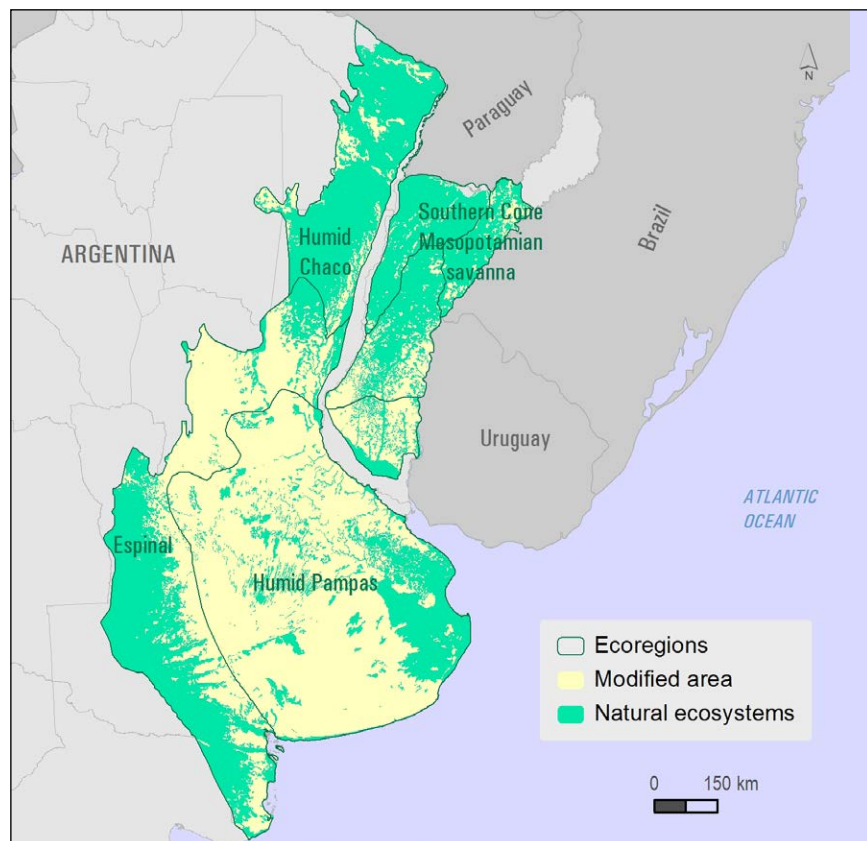
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**Map 1:**  
**Grassland and savannah**  
**ecoregions of**  
**Argentina**



**Map 2:**  
**Natural and converted**  
**grassland and savannah of**  
**Argentina**









# Cerrado Brazil

## The grassland and savannah ecosystem

The Cerrado is the world's most biologically diverse savannah and the second-largest vegetation formation in South America, covering around 200 million ha in Brazil. It covers one-fourth of Brazil's land area and small parts of Bolivia and Paraguay. Stretching across the central region of Brazil, the Cerrado is connected to other vital biomes: the Amazon, to the north; Caatinga to the northeast; Pantanal, to the southwest; and Atlantic Forest, to the southeast.

In the heart of Brazil, a range of grasslands, savannahs, palm swamps and forest habitats make up the Cerrado, one of the world's richest and most endangered areas of biodiversity. This biodiversity hotspot is home to 5 per cent of all the species on the planet, harbouring over 12,000 species of plants, in which one third are found exclusively in the biome.

The Cerrado is home to surprisingly beautiful, exotic landscapes and cultures. Most of its biomass is underground. The trees' root systems are typically deep, acting like a giant sponge that absorbs and stores rainwater, which is distributed throughout the entire year to millions of springs. It is considered the "cradle of Brazilian waters" as it provides around 40 per cent of Brazil's freshwater. Also, its vegetation is a vitally important carbon stock, storing about 13.7 billion tonnes of carbon, two-thirds of which is underground. Additionally, it is home for hundreds of traditional and indigenous peoples, whose livelihoods are remarkably related to biodiversity and use of the biome resources.

However, the Cerrado is under threat and is rapidly disappearing, with only limited areas of this natural heritage under protection. In recent decades, half of its vegetation has been deforested and converted into pasturelands and agricultural activities.

## Drivers of change in the Cerrado

The main drivers of change in the region are:

- » The expansion of the agricultural frontier for livestock and mono-culture crops – especially soy and cattle production
- » Land-use change for land speculation
- » Unsustainable land use – 30 per cent of Cerrado’s pasturelands are badly degraded and underperforming, so that land that could be sustainably cultivated is wasted while new areas of native vegetation are cleared
- » Poor law enforcement (including land grabbing, illegal deforestation, lack of compliance with the Forest Code etc.)

## Conservation responses from WWF

The knowledge built up from decades of studies and field experience in the Brazilian Cerrado is enough to affirm that it is possible to conserve the Cerrado’s biodiversity and waters, to produce sufficient agricultural products without converting new areas, and to support the lifestyle of communities that make sustainable use of its resources.

WWF along with other partners is part of the *Cerrado Initiative*, an extensive programme of actions to consolidate a positive and sustainable future for the biome with national and international cooperation. Our main goal is to align conservation, business and social development to achieve a conversion-free landscape by 2030.

We use an interdisciplinary landscape conservation approach, relying on governance, markets and financial interventions that will lead to our five transformational strategies: 1) halt conversion; 2) restore natural vegetation to increase connectivity and ecosystem services; 3) rehabilitate degraded pasture areas for sustainable and better land use; 4) increase and effectively manage protected areas; and 5) ensure sustainable use of biodiversity by engaging traditional communities. All interventions build on years of successful WWF projects and act on a sense of urgency supported by a strong global momentum to protect the Cerrado. The programme works in multiple ways.

### **By engaging markets:**

Reduction in deforestation levels from 1 million to 600 thousand hectares yearly in the last five years, despite projections that conversion rates would rise due to increasing demand from China and the results of two good crop years. Central to this achievement were:

- » The GTC (Cerrado Working Group), established in 2017, representing more than 90 percent of the soy sector (traders) and key civil society organisations that agreed to work towards zero conversion of the biome as soon as possible
- » The Cerrado Manifesto (September 2017) was signed by 60 Brazilian organisations, calling on the global market to stop buying soy and beef from recently converted areas of the Cerrado
- » In response to the Cerrado Manifesto +140, global companies (including 40+ investors) signed the Statement of Support (SOS) to the Manifesto
- » The China Meat Association and 64 leading meat companies signed the Sustainable Meat Declaration (2017), consisting of an explicit pledge to avoid deforestation and the conversion of natural habitats in their livestock production and feed value chains

### **By shifting finance:**

Examples of key changes in which WWF played a major role are:

- » The ABC (Low Carbon Agriculture) Programme, which increased the value per contract (i.e. the amount the producer can borrow from the bank for any single loan) from R\$2.2 million to R\$5 million with a reduction of the interest rate.
- » LDC (soy trader) committed to providing long-term loans for farmers aiming to rehabilitate degraded pasture. Total funds were for 10 million hectares for the first phase (Feb 2019).
- » The Cerrado Funding for Soy Farmers (US \$15M) was launched in 2019 by three companies of the SoS Manifesto (Tesco, Nutreco and Grieg Seafood). The fund was designed to conserve native vegetation in the Cerrado by providing financial incentives to farmers to produce soy without conversion.

### **By advocacy and public policy engagement:**

- » The #ampliaveadeiros campaign collected more than 7,000 signatures and secured participation of relevant stakeholders for expansion of the Veadeiros protected area. The protected area increased from 65,000 hectares to 240,000 hectares in 2017.
- » Lobbying activities were instrumental in avoiding the downsizing of two protected areas in the Cerrado (Brasília National Park, Brasília National Forest in 2018, and Bodoquena National Park in 2019).
- » WWF Brazil's lobbying activities contributed to Congress rejecting Executive Order 867. This Provisional Measure could have structurally changed the Brazilian Forest Code, preventing more than five million hectares of degraded land from being restored.

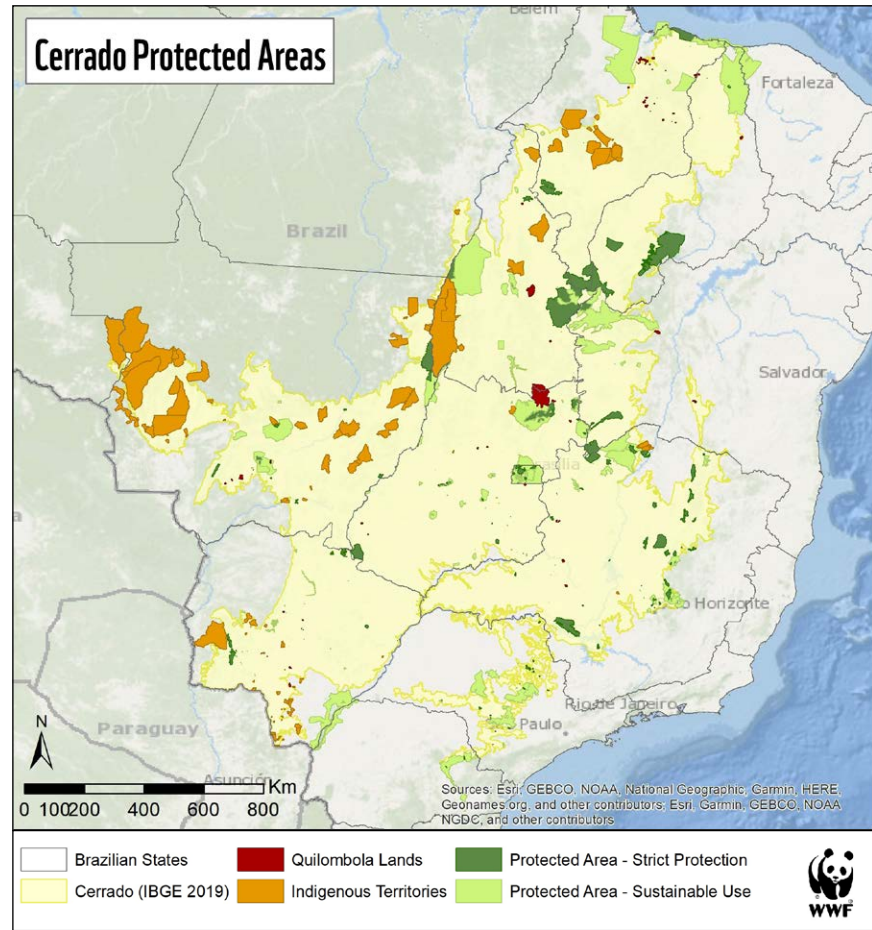
### **By building community support:**

- » The Sertões Project, running since 2010, is using a protect-manage-restore approach in the most prominent protected area mosaic in the Cerrado. One of the project strategies is improving livelihoods by promoting sustainable production, focusing on the collection of non-timber forest products, while at the same time helping to enhance participatory conservation planning. More than 350 cooperative members were directly involved through training provided in business management. The project generated +US\$ 200,000 through the commercialization of collected fruits and nuts. Additionally, new domestic and international market opportunities for Cerrado products were created through a partnership with the regional cooperative centre (Central do Cerrado).

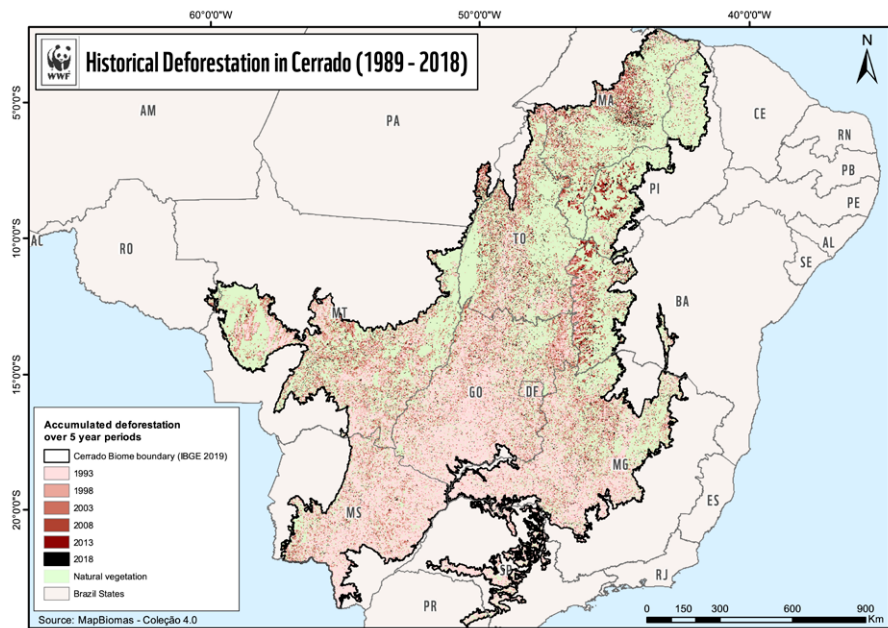
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**Map 3: Cerrado protected areas**



**Map 4: Historical deforestation in the Cerrado 1989–2018**







# Orinoco Region Colombia

## The grassland and savannah ecosystem

The Orinoco Basin stretches across Colombia and Venezuela. About 37 per cent of the Basin is in Colombia, covering almost 35 million ha or 22 per cent of the country, with 42 per cent of this savannah. The ecosystems of the Colombian Orinoquia are highly diverse, extending from the high Andes (Paramo, high Andean forests) through the eastern slopes of the eastern range of the Andes (Andean foothills or Piedemont) to the tropical savannahs (high plains and seasonally inundated/flooded savannahs) and, to the south, transition forest to the Amazon forest biome.

The Colombian Orinoquia is home of 4,899 plant species recorded to date, 250 mammals, 1,300 birds, 119 reptiles and amphibians and around a thousand fish species. Iconic species include the jaguar, puma, pink dolphin (*Inia geoffrensis*), grey dolphin (*Sotalia fluviatilis*), striped catfish (*Pseudoplatystoma orinoquense*), pavon (*Cichla orinocensis*), *Metynnis* spp. of fish and electric fish. Of the Orinoquia's species, 35 per cent are endemic to the region. The region is additionally characterised by its wealth of water resources and wetlands that represent 34 per cent of the country's total wetland area. It is also part of the Orinoco macro basin, considered the third largest river system in the world. The region exhibits high vulnerability to climate change. The Orinoco supports important ecosystem services, based mainly around water and carbon sequestration and storage. The area has a rich human cultural diversity. Despite the high levels of biodiversity, the Orinoco is the least represented of Colombia's regions in the protected area network, with only 4 per cent currently protected.

## Drivers of change

The Orinoquia is under serious threat because of the expansion and intensification of agroindustry, as well as extractive activities related to oil. Promoting significant rural development in the region based on agroindustry is considered a key strategy within the government's agenda, particularly in the context of post-conflict development.

Concerns have arisen in relation to the imminent risk of large-scale ecosystem transformation, biodiversity/ecosystem services loss and a significant increase in GHG emissions.

The main drivers of change in the region are:

- » Extractive activities
- » Unsustainable land-use change
- » The expansion of the agricultural frontier
- » Climate change
- » Loss of biodiversity and ecosystem services

The agricultural frontier is expanding fast and so far there have been few efforts to conserve natural habitats. Due to anthropic and extractive interventions, by 2012 the transformation of the region already reached



15.5 per cent, resulting in a drastic decrease of natural flooded savannahs from 11,401 km<sup>2</sup> to 9283 km<sup>2</sup> (18.5 per cent). These severe changes have negative impacts on the biological and cultural diversity in the Orinoco, including the loss of habitat due to the expansion of extractive interventions, intensive agriculture, water and soil contamination, the introduction of non-native species and the growing threat of climate change.

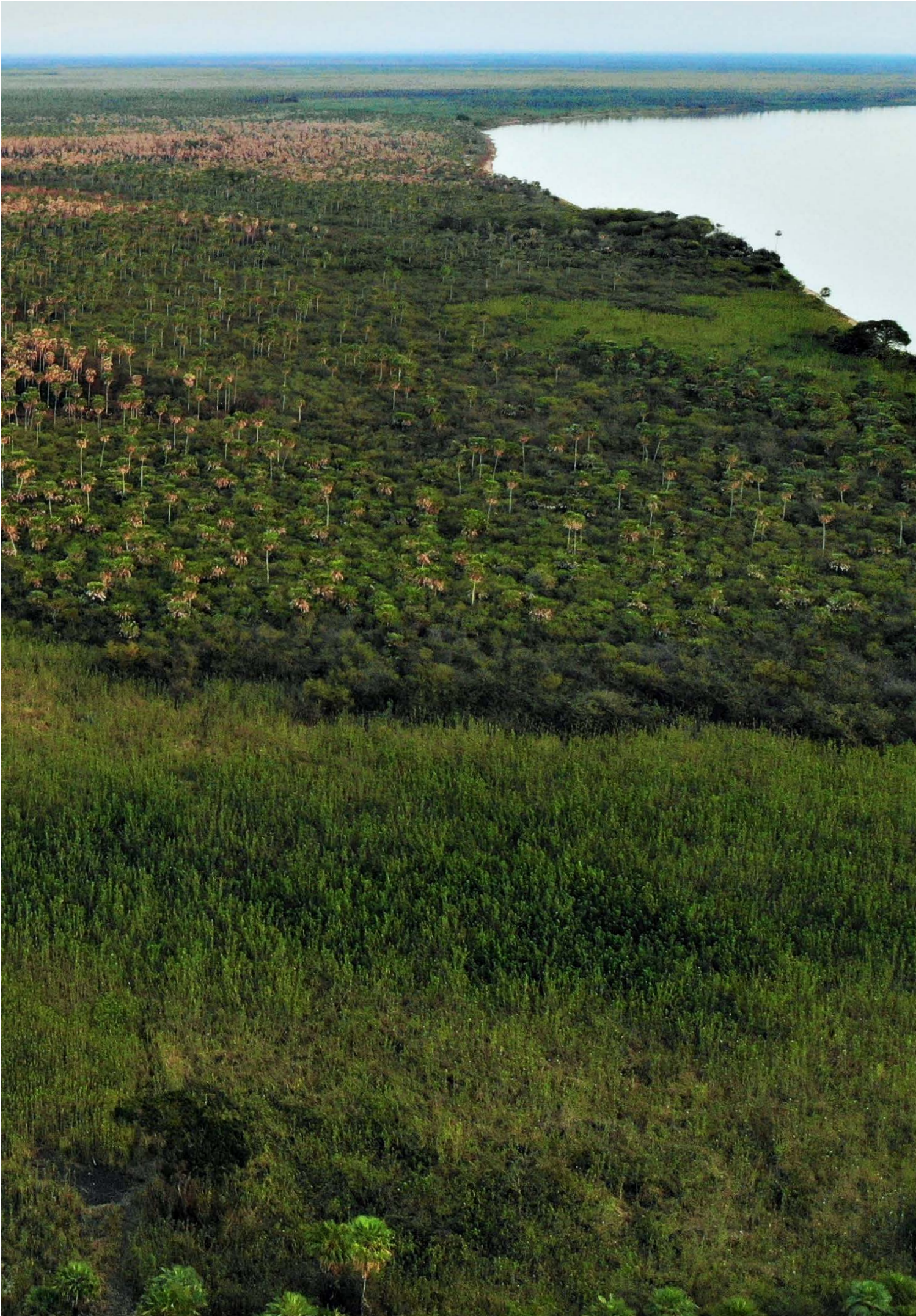
## Conservation responses from WWF

WWF Colombia aims to contribute to the country's path towards sustainable, climate-smart, low-carbon, inclusive and equitable socio-economic development. Three strategic lines of action have been adapted for use in the Orinoquia:

1. "A space for nature" that promotes the conservation of biodiversity and ecosystem services of the region by providing support to decision-makers for the inclusion of issues related to the climate, biodiversity and ecosystem services into land-use planning, promoting the declaration of new protected areas and enhancing the management of the existing protected area systems, engaging with productive sectors, identifying and designing low carbon and conservation-production best management practices, promoting deforestation and conversion free value-supply chains, along with the conservation of forest, grasslands and fresh water ecosystems.









# Pantanal

## Brazil, Bolivia, and Paraguay

### The grassland and savannah ecosystem

The Pantanal is a mosaic of flooded grasslands, savannahs, and tropical forests. It is the world's largest wetland with 17.9 million ha stretching across Brazil (78 per cent), Bolivia (18 per cent) and Paraguay (4 per cent). This wetland area is part of a larger dry plain of around 100 million ha, known as the Gran Chaco. This ecosystem supports significant biodiversity with more than 3,500 plant, 159 mammal, 565 bird, 325 fish, 98 reptile and 53 amphibian species along with countless invertebrates and micro-organisms. It has the largest density of jaguars and is home to abundant populations of giant otter (*Pteronura brasiliensis*), marsh deer, pampas deer and hyacinth macaw (*Anodorhynchus hyacinthinus*). These grasslands and wetlands play a crucial role in sustainability, with social-cultural, economic and environmental values. Beyond providing habitat for plants and animals that are adapted to the unique hydrologic regimes and soil conditions, they provide important ecosystem services, including climate regulation, flood control, soil fertilisation and water purification. Local communities and indigenous people are the cement of a complex social tissue, guarding traditional knowledge and cultural values in line with ecosystem conservation.

There are six Ramsar sites in the Pantanal, four in Brazil, one in Bolivia and one in Paraguay. The Brazilian Pantanal is also recognised as a UNESCO World Heritage site and part of it is a UNESCO Biosphere Reserve. Some 4.6 per cent of the Pantanal is protected in Brazil, with higher levels of protection in Bolivia, leading to around 7 per cent currently protected for the whole region.

## Drivers of change

The main drivers of change in the Pantanal are:

- » Livestock grazing and raising crops, with the conversion of natural vegetation accelerating
- » Land-use changes in upstream areas and headwaters (e.g., Brazilian Cerrado, Bolivian Chaco), in Brazil only 1 per cent of the headwaters are protected and 55 per cent of the natural vegetation cover has already been lost
- » Large infrastructure projects and small dams, with about 115 dams in the headwaters, disrupting river flow and seasonal water patterns
- » Climate change (Guyra Paraguay, 2017; WWF Brasil, 2018)

## Conservation responses from WWF

WWF fosters land-use management and zoning for savannahs and grasslands, maintaining carbon, biodiversity and water regimes and allowing sustainable agricultural production. In partnership with farmers' associations, research institutions and governments, WWF has promoted:

- » Good practice programmes with over 173,214 hectares
- » Good practice programmes in 95 farms
- » Training for 596 people
- » Creation of financial incentives for sustainable use in the Mato Grosso do Sul state in Brazil

These outcomes are the result of a range of goals including:

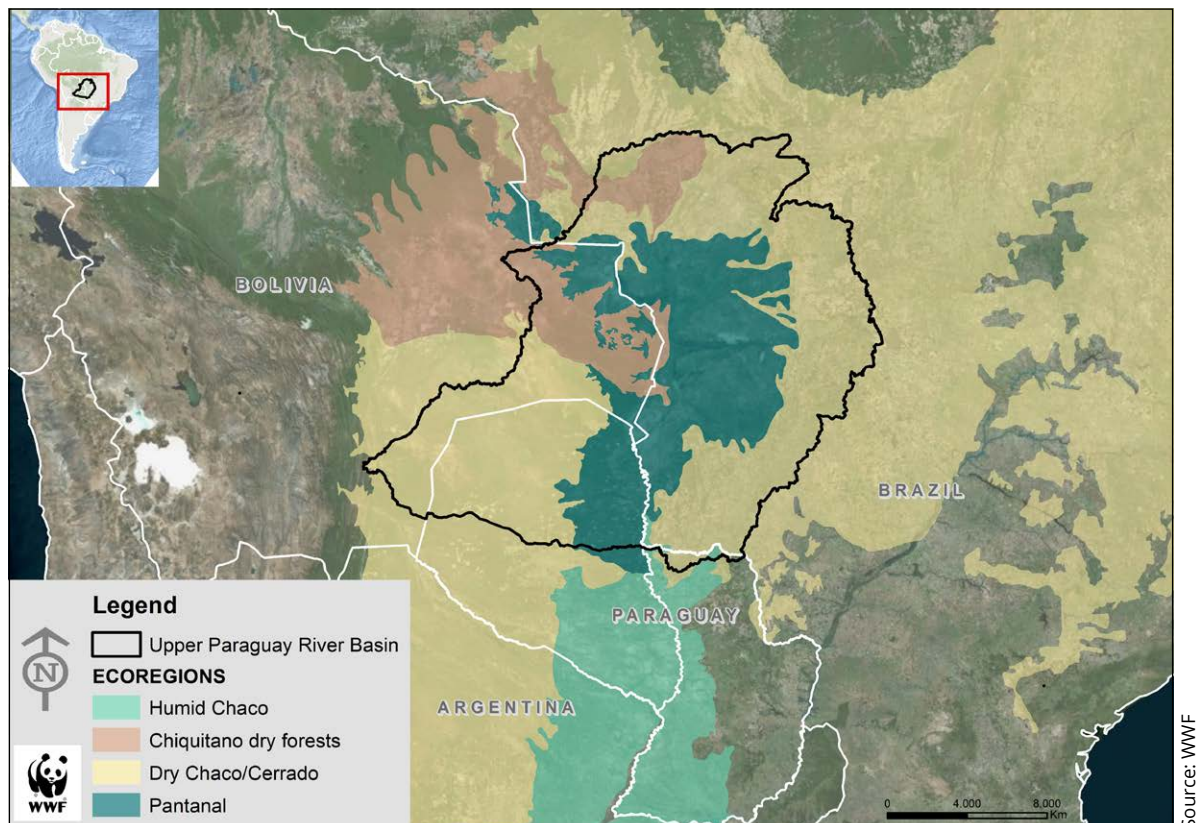
- » Promoting an integral vision in relation to changes in land use and its impact on hydro-biological dynamics
- » Promoting sustainable cattle ranching as a conservation and development opportunity for the Pantanal
- » Identifying the impacts and risks associated with climate change for the region, developing and implementing adaptation strategies
- » Fostering corporate social and environmental responsibility, engaging with the production and financial sectors to develop and implement criteria for social and environmental responsibility
- » Promoting connected systems of protected areas within the three countries, along with Ramsar sites, biosphere reserves, and wildlife corridors—and developing greater capacity to manage the Pantanal's natural resources through sustainable conservation, financing, and environmental and local governance practices

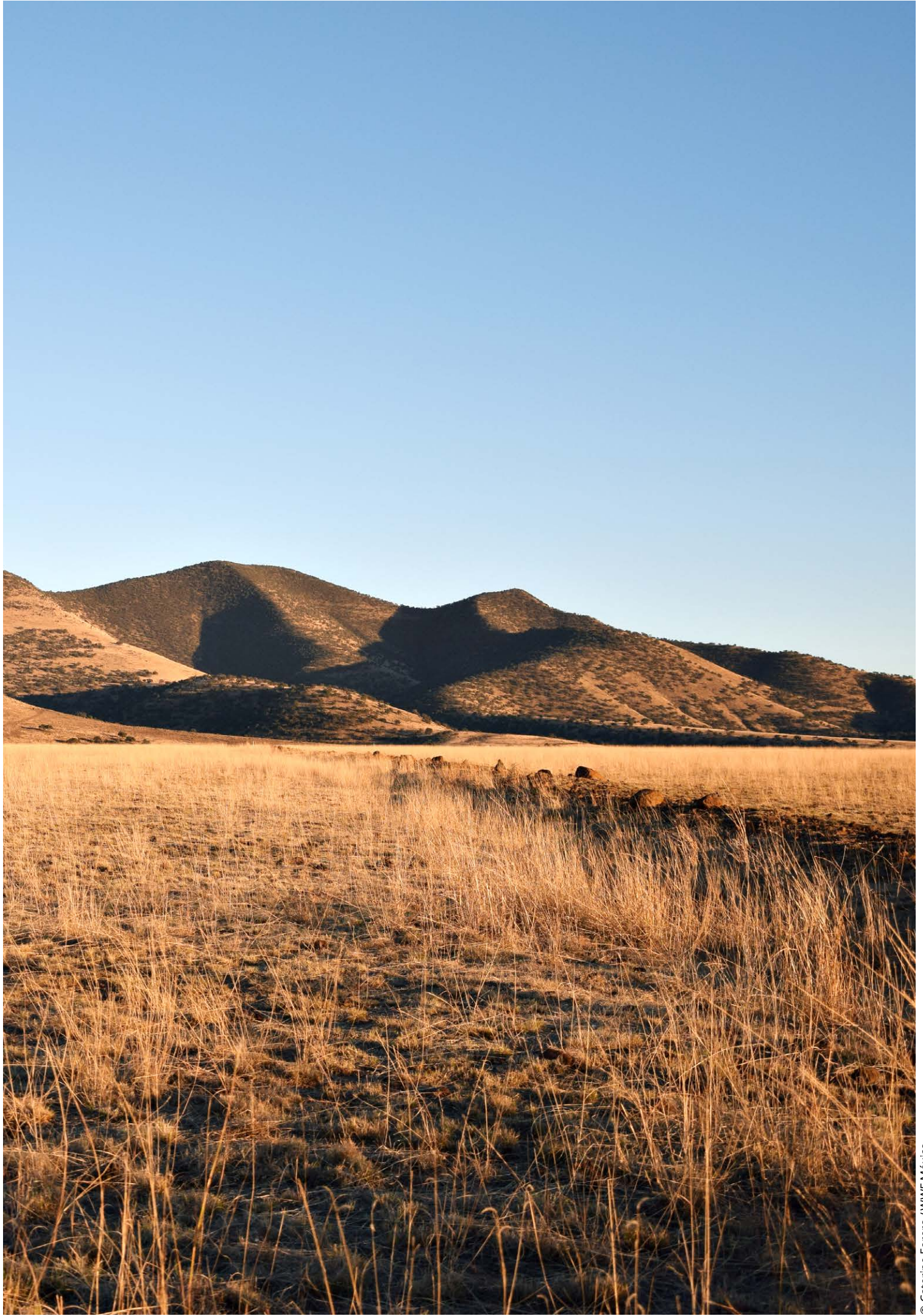
In 2018, during the 8th World Water Forum, Brazil, Bolivia and Paraguay signed the *Tri-national Declaration for the Conservation and Sustainable Development of the Pantanal*, taking commitments with the conservation and sustainable development of the region. This process was supported and facilitated by WWF.

### Contact

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**Map 6: The Pantanal ecoregion**







# Chihuahuan Desert

## Mexico

### The grassland and savannah ecosystem

The Chihuahuan Desert is the largest desert in North America and the second most diverse worldwide. It is a territory shared by Mexico and the United States that extends along 63 million ha and is bounded by the two largest mountain systems in Mexico: the Sierra Madre Oriental and Occidental. 75 per cent of this ecoregion is located in Mexico.

It is the only ecoregion classified by both its terrestrial and aquatic importance. Its lakes, springs, rivers and streams house a wide variety of freshwater species. Because of its climatic conditions and low rainfall, water is a crucial resource here.

The Rio Grande, fed by the Pecos and Conchos rivers, along with many smaller rivers, is the heart of the only major river system in the ecoregion. In Coahuila, there is a large wetland area, Cuatrociénegas, where pools fed by abundant sources of groundwater support freshwater fish and invertebrates found nowhere else on Earth.

There are several vegetation types in the ecoregion, including scrublands, woodlands, cacti and agave communities and grasslands. 350 of the world's 1,500 known species of cacti live in the Chihuahuan Desert. The rich native diversity of this region includes 333 species of birds, 23 species of fish and 76 species of reptiles and amphibians and more than 130 species of mammals.

Currently, the grasslands cover 15 to 20 per cent of the ecoregion. However, the original extent is unclear, considering the transformation processes that these ecosystems have undergone in the last 150 years. Historical records show that in the mid-1800s the native grasslands were almost free of shrubs, but today grasslands are a continuous mosaic of grasses and shrubs, including species of side-oats grama (*Bouteloua curtipendula*), black grama (*Bouteloua eriopoda*), creosote bush (*Larrea tridentata*), mesquite (*Prosopis glandulosa*) and acacia (*Acacia* spp.). The presence of shrub species is an indicator of grassland degradation and some estimates suggest that 25 to 50 per cent of scrublands may have once been grasslands (Dinerstein et al. 2000).

Despite this, grasslands still maintain representative mammal species such as the pronghorn (*Antilocapra americana*), the black-tailed prairie dog (*Cynomys ludovicianus*) and the mule deer (*Odocoileus hemionus*). Also, these grasslands are key for migratory bird species; for example, 27 of 33 grassland-obligate bird species that breed in the western Great Plains of North America spend the winter in the Chihuahuan Desert (Pool et al. 2014).

The importance of Chihuahuan Desert Grasslands goes beyond biodiversity. Grasslands provide key ecosystem services, such as forage, groundwater recharge and soil carbon storage, which contribute to human well-being in rural and urban communities and sustain economic activities such as cattle ranching and agriculture.

There are 18 federal natural protected areas in the Chihuahuan Desert, partially or fully included in the whole ecoregion. Natural and secondary grasslands are only present in 10 of these protected areas (see map below). Grasslands cover around 6 per cent (374,543 hectares) of the total surface of these protected areas (6,233,986 hectares) (Table 2).

**Table 2:**  
**Grassland area in the federal natural protected areas in the Chihuahuan Desert.**

FEDERAL PROTECTED AREA	PROTECTED AREA CATEGORY	TOTAL PA SURFACE (ha)	GRASSLANDS AREA (ha)	% OF GRASSLAND AREA
Cañón de Santa Elena	Fauna and flora protection area	277,250.82	9,437.02	3.4%
C.A.D.N.R. 004 Don Martín	Natural resources protection area	1,509,958.27	53,791.48	3.6%
C.A.D.N.R. 043 Estado de Nayarit	Natural resources protection area	2,307,137.15	5,170.71	0.2%
Janos	Biosphere reserve	529,088.44	215,157.05	40.7%
Maderas del Carmen	Fauna and flora protection area	207,141.39	29,727.82	14.4%
RB Mapimí	Biosphere reserve	339,787.22	28,980.83	8.5%
Ocampo	Fauna and flora protection area	343,366.16	6,556.77	1.9%
Tutuaca	Fauna and flora protection area	435,086.26	2,020.17	0.5%
Cuatrociénegas	Fauna and flora protection area	83,609.85	19,607.44	23.5%
Bavispe	Fauna and flora protection area	201,560.66	4,094.00	2.0%
<b>TOTAL AREA</b>		<b>6,233,986.24</b>	<b>374,543.30</b>	<b>6.0%</b>

Note that only a small portion (<10%) of the C.A.D.N.R. 043 Estado de Nayarit and Tutuaca PAs is located inside the Chihuahuan Desert Ecoregion. They are included in the list above since they still have important natural or secondary grassland patches. Data source: Instituto Nacional de Estadística Geografía (INEGI). Uso del Suelo y Vegetación. Escala 1:250 000. Serie VI. Capa Unión. 2016.



## Drivers of change

The main drivers of change in these grasslands include agricultural conversion, overgrazing and unsustainable livestock practices, overexploitation of water sources and invasive species. Other drivers include the suppression of natural fire regimes and climate change.

- » **Agricultural conversion:** land-use change from grasslands to croplands is a primary driver of degradation. For example, estimates for the Valles Centrales of Chihuahua (a grassland priority conservation area), show that the area of croplands expanded by 69,240 hectares from 2006 to 2011, resulting in the loss of 19,505 ha of grassland and 49,929 ha of mixed grass/shrubland (Pool et al. 2014).
- » **Overgrazing:** historically, Chihuahuan Desert grasslands have been used for cattle ranching, but unsustainable practices have led to overgrazing and desertification. The overgrazing is a serious threat to grasslands because it changes grass-species composition and structure, removing perennial and native grasses and replacing them with shrublands (Kerley and Whitford 2000). This degradation has several environmental and socio-economic impacts, which include biodiversity loss, soil erosion and reduction in forage production for cattle ranching activities.
- » **Overexploitation of water sources:** water is always a scarce resource in the Chihuahuan Desert but the increasing pressure of agricultural pumping, cattle ranching expansion and urban development is leading to the overexploitation of surface and underground water, and consequently, to grassland loss. In some areas of the Chihuahuan Desert, illegal wells and centre-pivot irrigation systems that use groundwater have resulted in overexploitation of aquifers and further conversion of grassland areas to agricultural fields (Pool et al. 2014).
- » **Invasive and exotic species:** the introduction of exotic grass species to increase forage production for cattle ranching has been a common practice in the Chihuahuan Desert. This is the case of buffel grass (*Cenchrus ciliaris*), a native grass of Asia and Africa, which was introduced in Mexico in the 1940s and has been invading natural grasslands ever since. As with buffel grass, there are several other exotic grass species that have been used to replace native species such as blue grass (*Bouteloua gracilis*). On the other hand, even native species like mesquite (*Prosopis glandulosa*) are a threat to

grasslands. As mentioned above and due to overgrazing practices, shrub species are increasing their dominance over grasslands, leading to degradation and desertification.

## Conservation responses from WWF

WWF has been involved in Chihuahuan Desert grasslands conservation since the 1990s. Activities include:

- » Generation of technical information about the Chihuahuan Desert grasslands and the development of conservation strategies. The results of these planning efforts include the *Action Plan for Grasslands Conservation in the State of Chihuahua* (2008) and the *Master Plan of the Regional Alliance for the conservation of the Chihuahuan Desert Grasslands* (2012)
- » Reactivation of the Mexican Roundtable for Sustainable Livestock in 2018
- » WWF has supported key partners\*\* in the region working with ranchers and local communities to conserve and sustainably use grasslands. Results include:
  1. More than 100,000 hectares of grasslands under protection through conservation agreements with the land owners
  2. Protection and monitoring of endangered grassland species (black-tailed prairie dog colonies in Sonora and Chihuahua, pronghorn and grassland birds)
  3. 235,000 hectares used for cattle ranching implementing ecosystem-based adaptation, reducing the vulnerability of ranchers to climate change
  4. More than 700 hectares under restoration through planting native grasses, removing shrubs and grazing exclusions

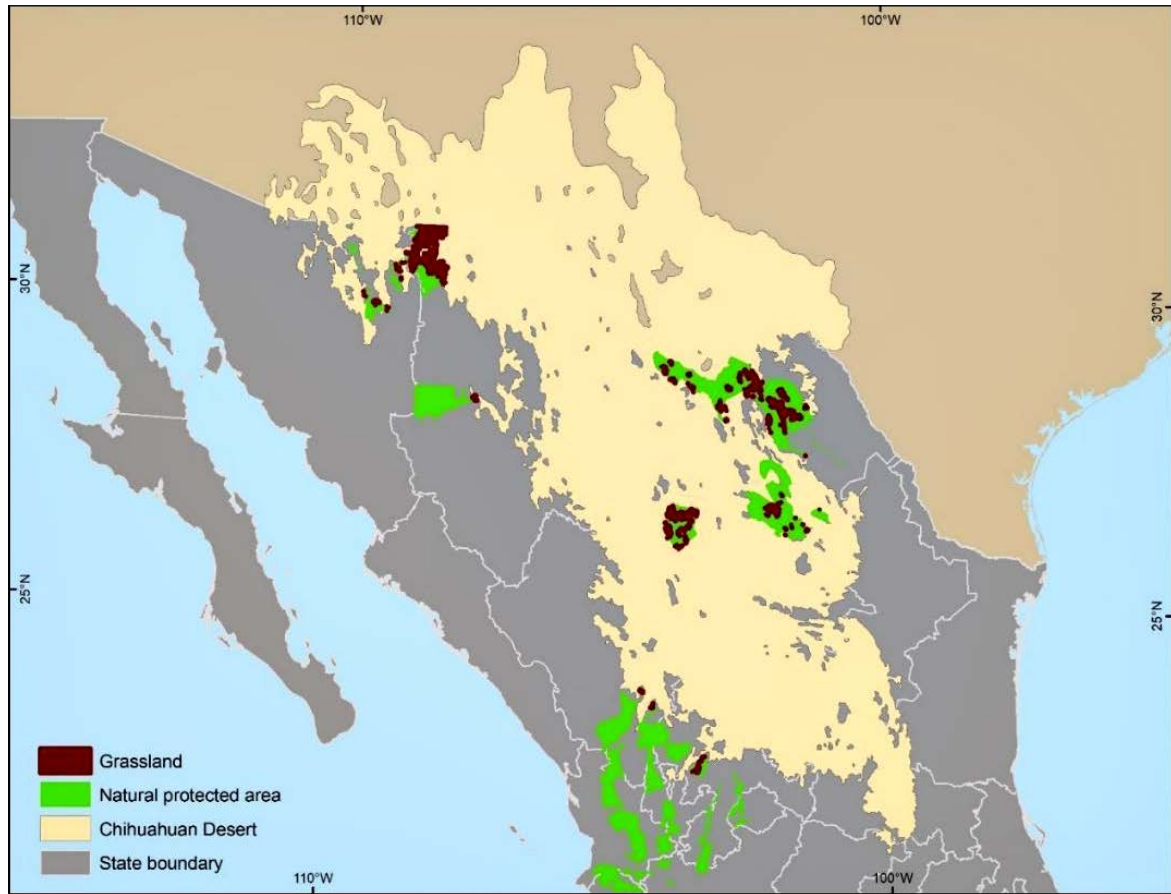
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\* Key partners include: Instituto de Ecología of the National Autonomous University of Mexico, the Autonomous University of Nuevo Leon, Profauna A.C., Naturalia A.C., and CEFADDEBAS A.C.

**Map 7: Protected areas in the Chihuahuan Desert**







# Northern Great Plains United States of America and Canada

## The grassland and savannah ecosystem

The Northern Great Plains (NGP) of North America occupy a central portion of the United States and Canada and comprise one of the last remaining intact temperate grasslands in the world. It spans more than 180 million acres (74 million hectares) and encompass five US states and two Canadian provinces. Remarkably, given the vast resources they provide, the undulating plains upon which spectacular numbers of wildlife once roamed still represent one of the best conservation opportunities in the world. The Northern Great Plains ecoregion, which comprises approximately 25 per cent of the total area of the Great Plains of North America, remains about 70 per cent intact, thanks in part to its harsh climate, which has made agricultural expansion relatively difficult until the most recent decades (Map 8). In fact, the NGP still supports 1,595 species of plants, which provide habitat for 300 species of birds, 95 species of mammals and 28 species of reptiles. The Missouri and South Saskatchewan Rivers, in addition to smaller prairie streams and riparian and wetlands, provide habitat for 13 species of amphibians and 121 species of fish. The region is sparsely populated, supporting about 1.6 million people (1 person/46 ha).

The matrix of land ownership types across the ecoregion creates unique challenges and opportunities for conservation efforts. The majority of the ecoregion – 77 per cent – is privately owned, followed by federal and state/provincial-owned lands at 14 per cent, and tribally owned lands at almost 9 per cent. Private landowners within the ecoregion are primarily farmers and ranchers, but also include non-resident and recreational investors and other small landholders. Federal lands include national parks, national grasslands, national forests, national wildlife refuges, national monuments and Bureau of Land Management lands. In addition, 14 American Indian Reservations are located within the ecoregional boundary in Montana, South Dakota and North Dakota, and eight First Nations Reserves are located in Alberta and Saskatchewan.

A little more than 2 per cent the region's millions of hectares is protected in national parks and wildlife reserves (IUCN I-IV), and about 15 per cent is in protected areas with sustainable use (IUCN V-VI) where activities such as oil and gas development can be undertaken.

## Drivers of change in the Northern Great Plains

- » Conversion of intact grasslands to cropland is the largest threat to the NGP ecoregion. Over the last five years, the region has lost an average of 675,000 ac/year (273,000 ha/yr) to cropland agriculture. Wheat, corn and soy are the three most prevalent crops planted on newly converted land. WWF created the Plowprint Report to track and raise awareness of conversion [www.plowprint.org](http://www.plowprint.org).
- » Oil and gas development is also a major threat to the region. Technological advances in oil and gas extraction, namely hydraulic fracturing and horizontal drilling, have enabled industry to tap into resources that were once too difficult and expensive to access.
- » Wind energy, coal production, invasive species, climate change, diseases, fragmentation and dams also impact the species and systems of the Northern Great Plains.
- » US policies, specifically federal crop insurance and price support programmes, incentivise grassland conversion.
- » Many landowners consider bison and black-footed ferrets as direct and indirect threats to the health of their livestock and livelihoods, thus limiting where they can be restored at meaningful scales. Many Native Nations consider these animals to be culturally significant and welcome their return.

## Conservation responses from WWF

WWF envisions a future where thriving prairies and an abundance of wildlife contribute to the economic and cultural sustainability of the people who live in the Northern Great Plains. We have been working here since 2002, protecting the grasslands, building strong partnerships with ranching communities and Native Nations and restoring wildlife.

**We have two overarching goals by 2030:** (1) to eliminate grassland conversion in the NGP; (2) to ensure that populations of the most ecologically, economically, and culturally important species are restored and thriving in the wild.

WWF is catalyzing change over a large productive landscape to avoid loss of habitat and protect iconic species. We create enabling conditions through policy and market incentives and engage communities to ensure that these incentives result in conservation on the ground. Maintaining a matrix of intact, well-managed grasslands across the ecoregion will enable species – and communities – to adapt to climate change by providing habitat for species to move in response to random events, as well as to change their distribution and abundance on a decadal time scale.

» **Resilient communities.** Increasing the financial resiliency of ranching operations will increase the likelihood that grasslands remain intact and continue to provide wildlife habitat and other critical ecosystem services. WWF's *Sustainable Ranching Initiative* works with landowners, industry groups, NGOs, corporations, and government agencies to conserve grasslands at scale by generating a better working environment. We do this by improving the resilience of ranching communities, developing market forces that reward sustainable beef production and understanding the benefits and impacts of beef production on the ecosystems of the NGP.



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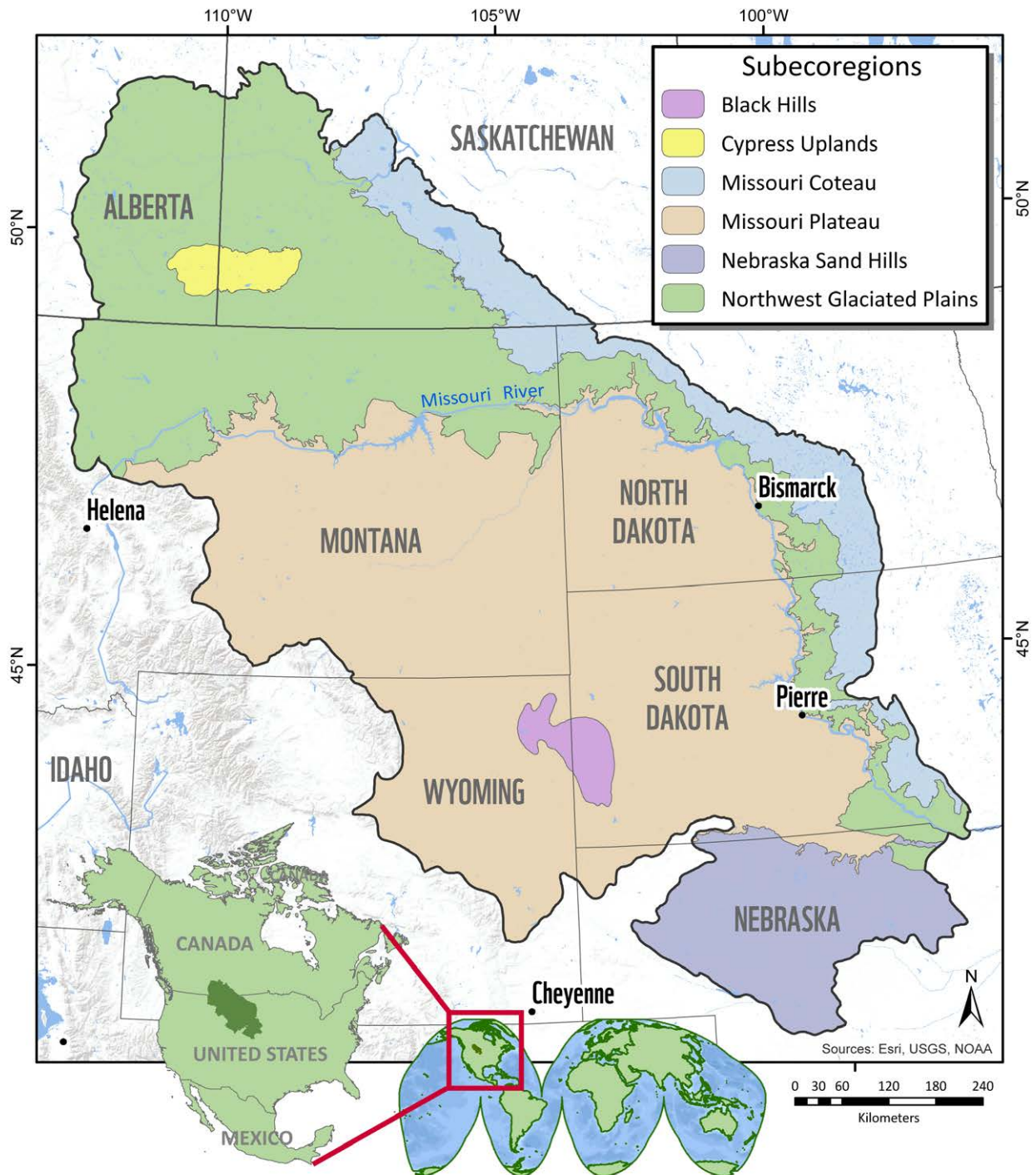
- » **Financial and policy incentives.** We engage policymakers to influence government programmes and grassland protection via policy. We engage input suppliers, financial institutions and other value chain stakeholders to increase the availability of market-based incentives for grassland conservation that benefit NGP communities.
  
- » **Wildlife restoration.** WWF works with communities, agencies, NGOs and Native Nations to restore self-sustaining populations of bison and black-footed ferrets on tribal and public lands. We work with Native Nations and national parks to expand habitat available to bison and ferrets. We build a strong constituency for bison conservation among Native Nations, building capacity to manage herds, improve governance, deliver and sustain tribal bison programmes. We work with a coalition of Native Nations to generate sustainable financing for greater wildlife management and conservation on tribal lands. We pursue innovative technologies to protect ferrets at reintroduction sites and target investments to achieve measurable increases in populations.

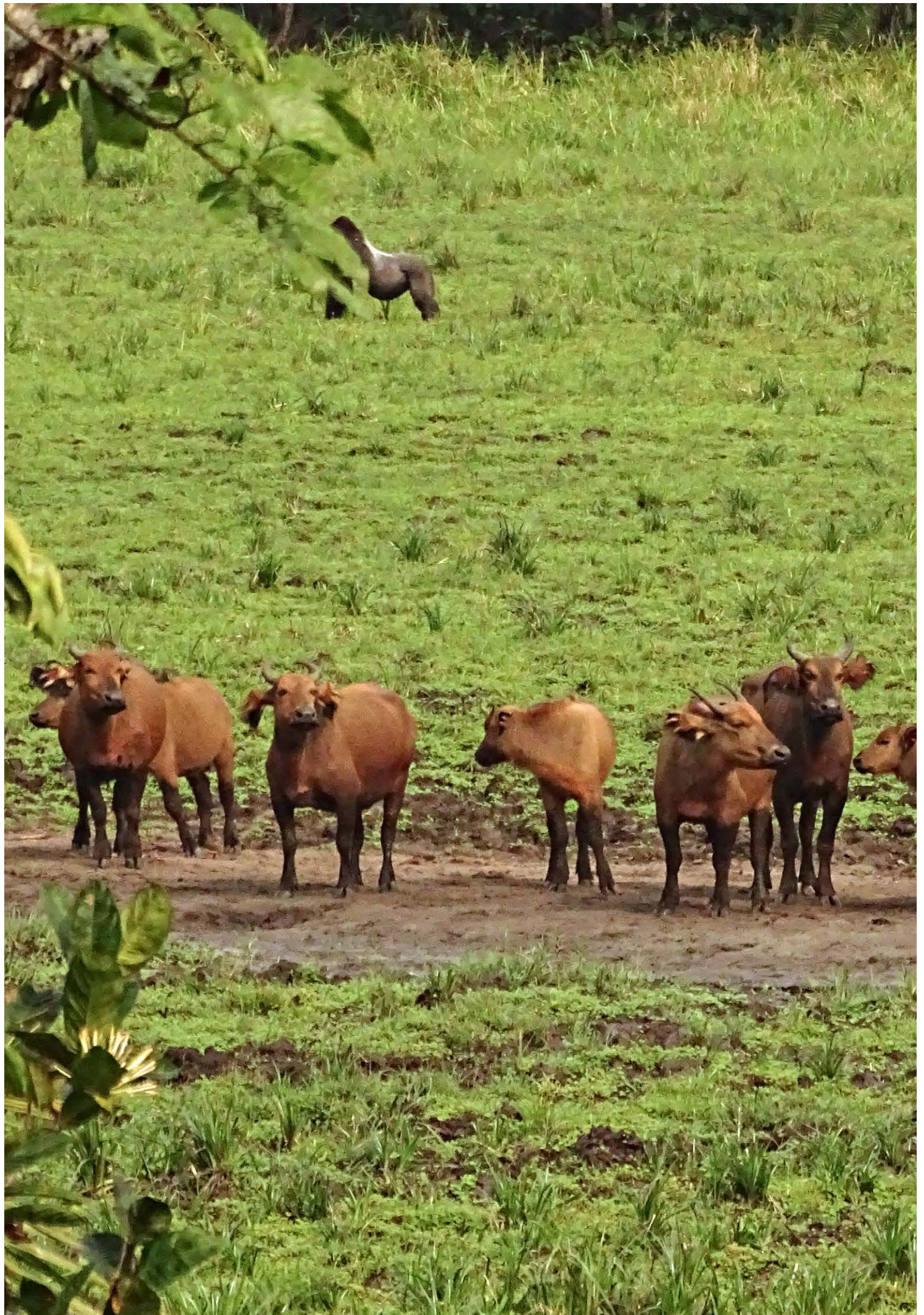
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**Map 8: Ecoregions in the Northern Great Plains**







# Congo Basin

## Central Africa

### The grassland and savannah ecosystem

At the northern and southern ends of the Congo Basin, dense forest gives way to savannah, although the boundaries between the two are constantly shifting. These ecosystems are caused by climate fluctuations over the last 10 million years, the impact of elephants toppling trees preventing re-growth by saplings and providing fuel for fires and human interventions; the savannah here is at least partly a cultural landscape. Three types are recognised: (i) savannah with forest blocks; (ii) savannah with gallery forest (i.e. forest along waterways); and (iii) forest with enclosed savannah. The Southern Congolian forest-savannah mosaic is a focus for WWF in the region and extends over parts of the Democratic Republic of Congo and Angola. The region is an important habitat for many species including the bongo (*Tragelaphus eurycerus*), defassa waterbuck (*Ellipsiprymnus defassa*) and roan antelope (*Hippotragus equinus*), all of which have been heavily impacted by hunting.

### Drivers of change

Agricultural practices in general (both large- and small-scale), and oil palm, rubber and cocoa expansion in particular, are the major drivers of change in the region, and it has been calculated that an additional 4 million ha will be needed to meet future regional palm oil demand by 2035. Considering that the Congo basin is a high forest cover (HCF) ecoregion (green heart of Africa), new plantations are increasingly focused on savannah and degraded forest areas, in part to take the pressure off natural forests, even within WWF's own strategy. Hunting and consumption of bush meat is also a major threat to many species. Additionally, population growth, urban and infrastructure development and extractive industries (mining, gas and oil) all impact the region, causing soil erosion, conversion of natural ecosystems and water pollution. Human-wildlife conflicts between elephants and subsistence farmers threaten elephant populations and impact negatively on food security.

## Conservation responses from WWF

The WWF Oil Palm Strategy focuses on: (i) encouraging the replanting of old plantations and (ii) rehabilitation of aging or inactive/abandoned plantations rather than clearing new high conservation value (HCV) forest lands for development of oil palm plantations; and (iii) encouraging Roundtable on Sustainable Palm Oil (RSPO) certification of plantations to ensure best practices. However, the establishment of palm oil plantations on savannah is also being promoted as a solution to address clearance of High Conservation Value forests. This “solution” is recognised as challenging and the WWF global grasslands and savannah initiative (GGSI) has a goal of both deforestation and more general conversion-free production. Lack of data and of clear and accurate maps hampers conservation responses, and providing this information is a priority for establishing appropriate protection measures.

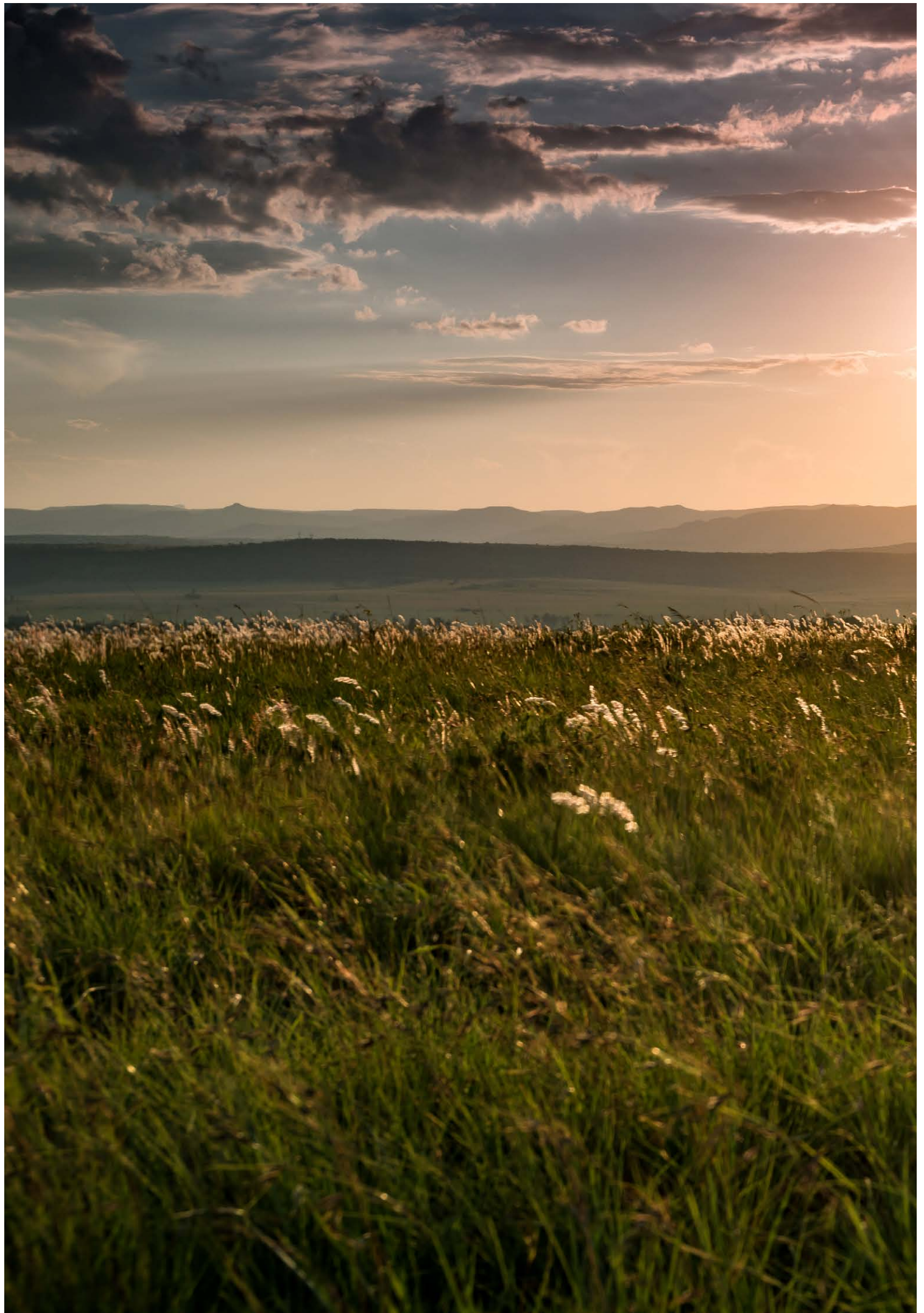
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**Map 9: Protected areas of the Congo Basin**



Source: WWF





# Guardians of the grasslands

## South Africa

### The grassland and savannah ecosystem

The grassland biome is located in the higher central plateau, covering parts of the Kwa-Zulu Natal, Mpumalanga, Free State and Eastern Cape provinces, ranging from sea level to 2,850 metres, but tends to be commonest at higher elevations. Grasslands cover just over 29 per cent of South Africa's surface area and have high levels of biodiversity, particularly among plants. Savannah is the largest vegetation type in the country, occurring over 46 per cent of the area and being most prominent in the lowveld and Kalahari regions. The grassland and tree mix is maintained by a combination of geographic and climatic conditions with fire and grazing/browsing being important factors. Key animal species include black (*Diceros bicornis*) and white (*Ceratotherium simum*) rhinos and elephant (*Loxodonta africana*).

### Drivers of change

Despite the presence of some large national parks, provincial nature reserves and private/communal protected areas, many grassland and savannah habitats remain under-protected; for example, half of savannah vegetation types in the country have less than 5 per cent coverage in protected areas and grasslands even less so. Pressures include conversion to crops (particularly maize, some soy and vegetables, tree plantations and in savannahs also some fruit farms), overgrazing leading to degradation, impacts of urbanisation, competing interests from extractives, poor fire management, climate change pressures and in some places invasion by non-native woody shrub species.

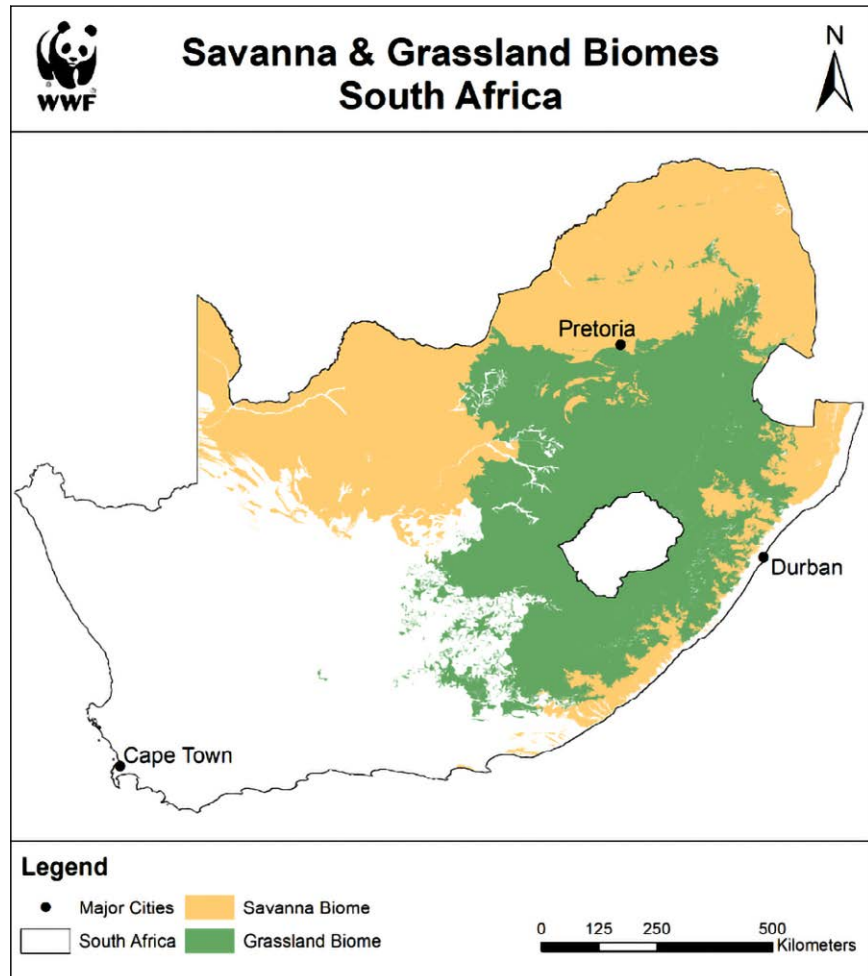
## Conservation responses from WWF

WWF favours approaches that move from pure conservation to ones that help communities to address sustainable social development, gradually changing the way that communities and government departments view conservation. The 300-strong Mgundeni community owns 1,472 hectares, which they successfully claimed in 1999. Mgundeni's traditional leader, iNkosi Mabaso approached Ezemvelo KZN Wildlife in 1999, wanting to protect land from unsustainable activities. By 2003, WWF was working with the community to introduce plans for biodiversity stewardship and social development; a new way of working for the organisation. The iNkosi (an indigenous/traditional word translating to "Chief") signed a communal biodiversity stewardship agreement in 2009, committing to conserve 124 ha and co-creating a management plan with Ezemvelo KZN Wildlife (the provincial conservation authority). In 2018 the area was expanded to a 455-ha protected environment, which represents a significant portion of their land. One of the strongest contributors to success was the establishment of an advisory forum consisting of community members, NGOs and government departments who meet monthly to discuss community needs and aspirations. WWF has supported implementation of a sustainable cattle farming initiative, developed grazing plans and provided training in bull and pregnancy testing as well as help in accessing grant funding for vaccination and supplementary feeding. Other capacity building initiatives include invasive weed control and fire control training. While farming responsibly and protecting biodiversity, Mgundeni have successfully transitioned from subsistence to semi-commercial cattle farming, selling 150 cattle for the first time in 2018.

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**Map 10: Savannah and grassland biomes of South Africa**







# Restoration in Jilin province China

## The grassland and savannah ecosystem

Natural grasslands encompass 393 million ha of the country, comprising the single largest national area of grassland, some 12 per cent of the global total. Grassland covers 40.9 per cent of China's land surface, making it 2.91 times larger than farmland and 1.89 times larger than forest. Distribution is uneven, however, with 80 per cent in the north and only 20 per cent in the south. Grassland is divided between five regions: northeast grassland, Mengning gan, Xingjiang, Qinghai-Tibet and South of China grassland. Four main types are recognised: typical steppe, desert steppe, meadow steppe and Alpine steppe. Much of the grassland is in dry areas with low productivity and made up of fragile ecosystems that are susceptible to degradation. The World Bank reports that almost 3 million ha have been affected by desertification and up to a quarter of China's surface area is already covered by deserts. Furthermore, over 90 per cent of grassland is degraded to some degree, with the area increasing every year. Since 2000, grassland restoration projects have been carried out in 13 provinces, including restoring farmland to grasslands, approaches to controlling sandstorms and providing subsidies for ecological protection. However, the problems facing grasslands are still recognised as being severe.

In early 2019, major grassland protection policies were introduced by the National Forestry and Grassland Administration, identifying various categories of grassland with different management prescriptions. "Contracted grassland" covers 0.287 billion ha, delimited basic grassland covers 0.233 billion ha, and grassland with protection and restoration grazing comprises 0.159 billion ha, accounting for 73, 59 and 40 per cent of total grassland area in China. These areas are the foundation for drawing the Ecological Red Line, China's new conservation policy, for grassland ecology.

## Drivers of change in China

Degradation is widespread, driven by a variety of factors, of which overgrazing is generally believed to be the most important. The main underlying drivers identified are lack of awareness and poor understanding of

sustainable management, both among the farming community and those managing livestock. Climate change is also contributing to degradation; recent research suggests that climate change may be marginally more important than human activities in overall grassland degradation. Grazing bans have been introduced by the government in some places, although they are reported to have had only limited success. The *Grain for Green* project, initiated in 1999, has been successful in restoring farmland and land in mountain areas; by 2010 it was reported to have restored 15 million ha of farmland and 17 million ha of barren mountain land, although much of this “restoration” was to monoculture tree plantations.

## Conservation responses from WWF

WWF is involved in some field programmes and also in policy advocacy.

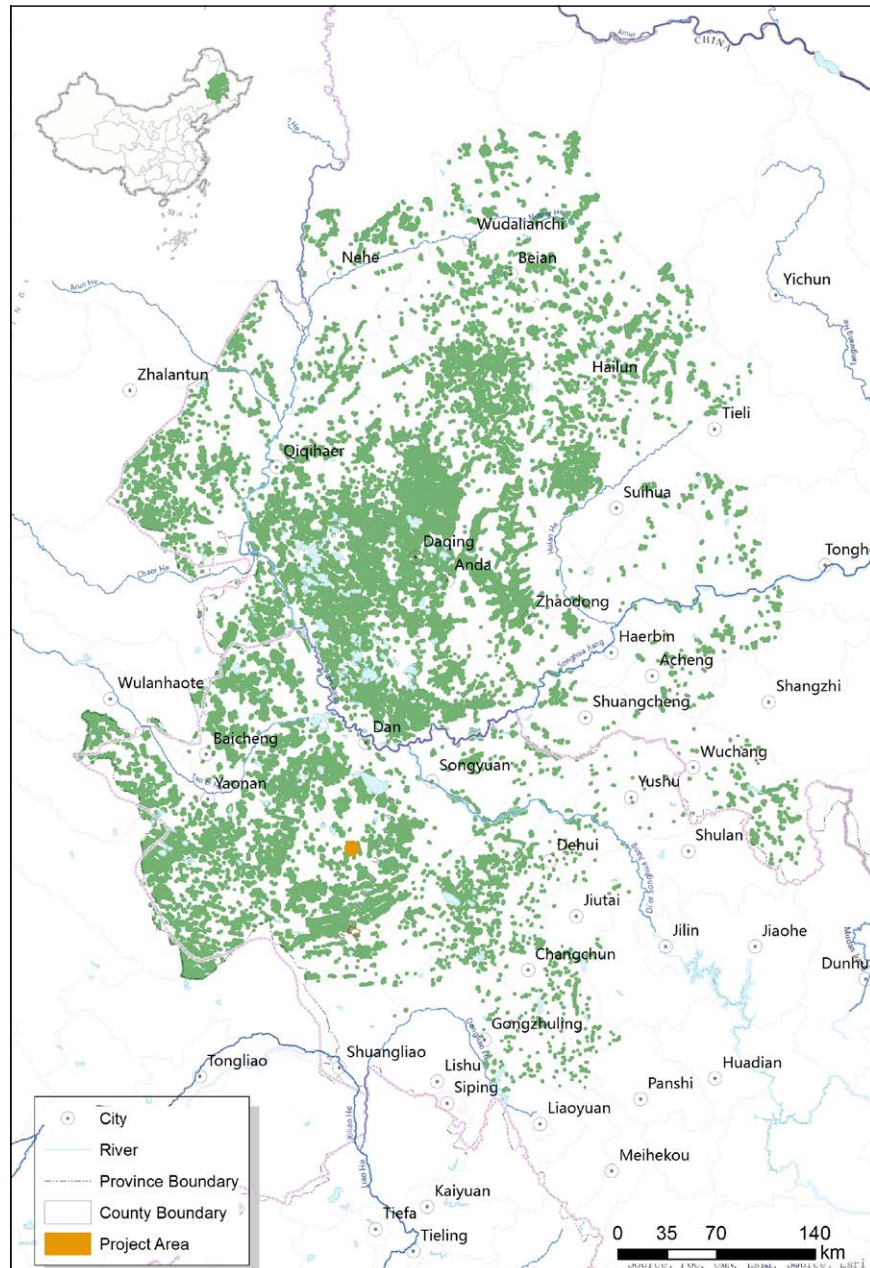
- » The grassland in the western Jilin province is part of the Horqin grassland covering a total area of 2.84 million ha, being meadow steppe dominated by *Aneurotepidimu chinense*, a rhizomatous grass. Much has already undergone severe degradation. WWF is working in Qian’an County in the west of the province, experimenting with the restoration of severely degraded grassland, for example on an 11.26-ha site in Fuzi village, to trial methods for larger scale application.
- » At national level, WWF is calculating natural capital value of the grassland ecosystem and contributing to environmental education about the importance of grasslands. And together with the science research agency, WWF is working to develop guidelines and criteria for grassland evaluation.
- » At provincial level, WWF is collaborating with authorities to develop an action plan, drawing on the lessons learned in restoration pilot projects.
- » At regional level, WWF is cooperating with partners to investigate typical degraded grassland and explore ecological restoration methods on the Songnen Plain; this project is ongoing, and restoration appears to be progressing well in the absence of grazing. Here the main grass species is *Leymus chinensis*, a good forage crop for cattle and sheep; *Elymus daharicus* is also being restored. The great bustard (*Otis tarda*) is a focus species, and still declining in China despite a hunting ban; its population is therefore an important indicator species of grassland restoration and management. A key challenge for the restoration project is ensuring economic benefits for local communities and bringing them in as active partners in the restoration.

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Map 11: Grassland distribution in China



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# Boundless steppe Kazakhstan

## The grassland and savannah ecosystem

The grasslands of Kazakhstan are really boundless: steppes and semi-deserts occupy more than 1.1 million km<sup>2</sup>, which is more than the territory of Germany and France together, around 40 per cent of the territory of the country. Various types of highly productive biomes with different forms of dominant species of natural vegetation are included in this ecosystem: rich forb – feather grass steppes with *Stipa korshinskyi*, fescue, sagebrush, forb-feather grass complexes, *Helictotrichon*, tufted bunch grass, perennial saltwort communities, meadow vegetation in the river valleys, etc. About 40 per cent of this area had been ploughed by the end of the 1950s–1960s; the rest was used for domestic livestock grazing (primarily sheep). An important part was kept intact, being used by the native saiga antelope (*Saiga tatarica*) population. Since 1990 the area of cropland has seriously decreased, as well as the grazing pressure both from livestock and wild ungulates, leading to a recovery of natural steppe complexes. In total, by the end of 2013 protected areas (IUCN categories I and II) in the Kazakhstan steppe covered 2,745,998 ha and further expansion is planned by 2030.

## Drivers of change

Tilling of huge areas of wild lands, unsustainable agriculture and the absence of crop rotation lead to serious soil degradation in the steppe zone of Kazakhstan. Simultaneously, overgrazing was an important driver of natural grassland degradation. Since 1990, livestock numbers have decreased dozens of times, along with a decline in arable lands. The process of natural ecosystem restoration started spontaneously on abandoned lands and was especially successful in the case of mosaic biotopes. Recent drivers of change in large natural grassland areas are principally climate change, desertification caused by lack of humidity and wind erosion. Local overgrazing is again a driver, as livestock numbers are increasing, but distant pasture animal husbandry has not been revived, and major grazing pressure occurs only in the surroundings of villages. Important drivers identified are a lack of awareness

and poor understanding of sustainable management, both amongst the farming community and those managing livestock. Restoration of populations of wild ungulates, e.g. initially the saiga, does not contribute to degradation, but instead is an important factor preventing accumulation of dry vegetation and the threat of fires. Infrastructure development (linear structures, such as roads, pipelines, fences dividing new types of private lands; oil and gas extraction) all fracture the connectivity of ecosystems and cause locally important pollution.

## Conservation responses from WWF

WWF concentrated initially on the conservation of the most intact unique northern forest steppes and, as a result, the system of protected areas was seriously developed in northern Kazakhstan. The first natural World Heritage nomination in Central Asia, “Saryarka-steppe and Lakes of Northern Kazakhstan”, was prepared and submitted to UNESCO in 2003, and finally nominated in 2008, totalling 450,344 ha. It comprises two clusters; Naursum State Nature Reserve, its sanctuaries and buffer zones (supported by WWF) and Korgalzhn State Nature Reserve (supported by NABU).

In the process of designing the Central Asian ECONET (2003–2006), a network of strict protected areas, ecological corridors and buffer zones for the entire region was developed and approved by all relevant national and regional authorities. ECONET as a whole includes about 40 per cent of the territory of the region – e.g., around 40 per cent of the territory of the steppe zone is suggested for strict protection and/or sustainable use, and this is approved by Kazakhstan authorities and included in protected area development plans and economic national sustainable development plans.

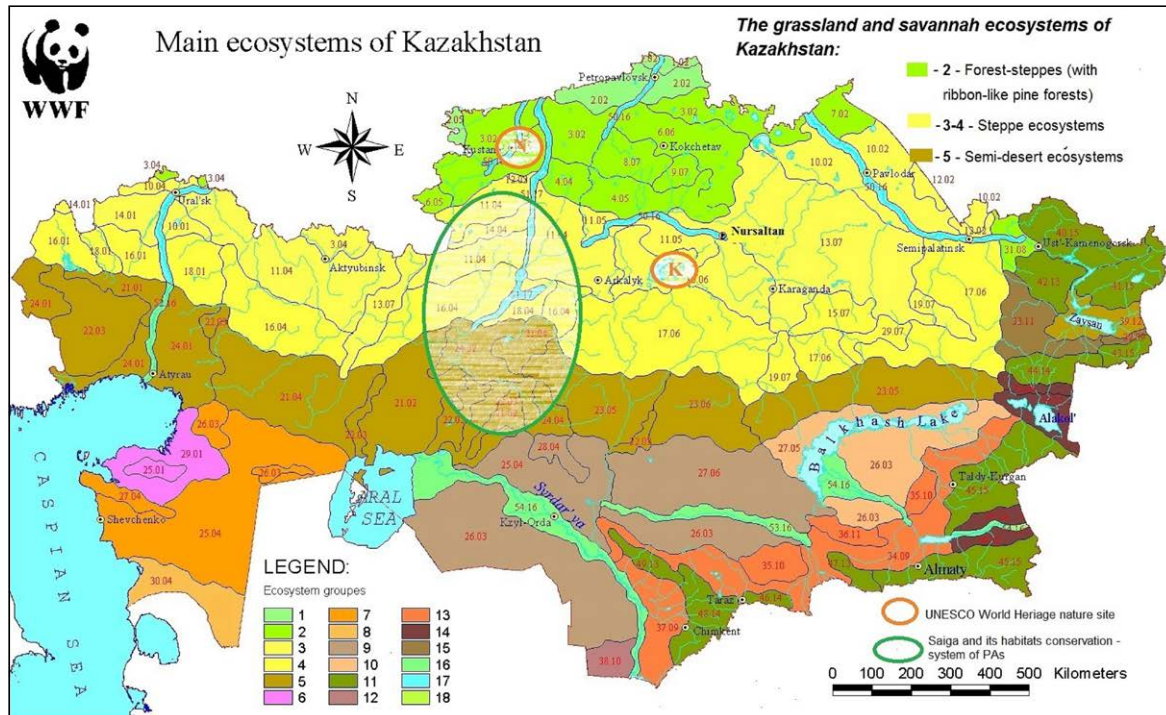
One of the ECONET clusters – the Altyn-Dala network of protected areas, comprising the major Betpakdala saiga population habitats – was further developed by WWF and later handed over for implementation to ACBK. As a result, 489,766 ha of grasslands are already under strict protection.

In the following years, WWF concentrated on some aspects of saiga conservation. The species has experienced several serious declines over the last few years, including a major die-off in the spring of 2015, and remains critically endangered

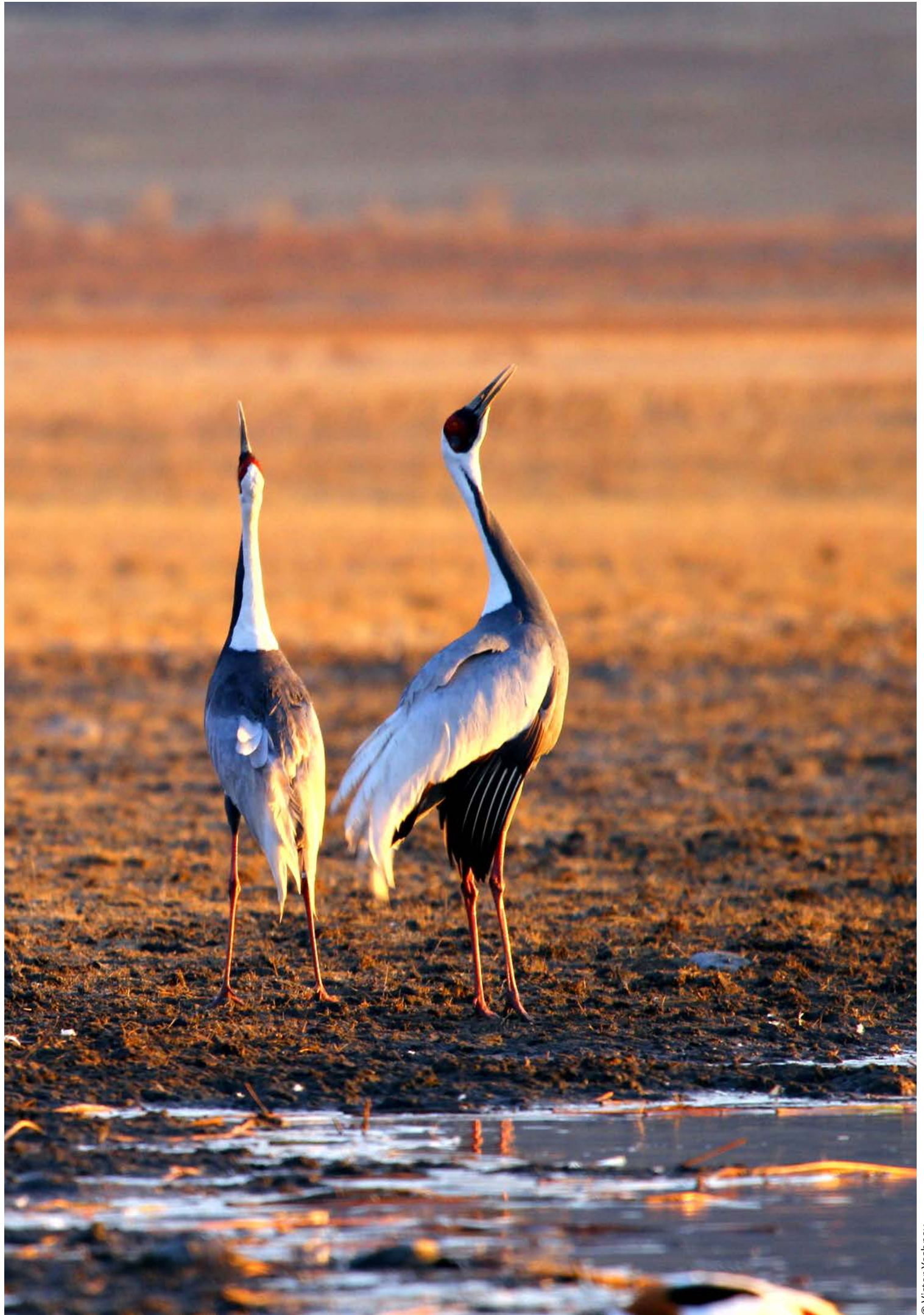


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Map 12: Main ecosystems in Kazakhstan



"ECONET Central Asia" 2006





# Daurian steppe

## Mongolia, Russia and China

### The grassland and savannah ecosystem

The Eurasian steppe stretches from Hungary and Romania, through central Asia and into Manchuria in China. The Daurian Steppe Ecoregion includes the Dauria International Protected Area established by three countries – Mongolia, Russia and China – the largest protected steppe in Eurasia. In Mongolia, the steppe covers 86.4 million ha, 55.4 per cent of the country. Much is used for agriculture, which contributes 11 per cent to GDP. There are six types distinguished: alpine meadow, high mountain steppe, meadow steppe, dry and moderately dry steppe and desert steppe; all highly threatened in at least parts of their area. Only 9.8 per cent of the steppe is protected in Mongolia, although there is a target of 30 per cent protection by 2025. Three quarters of the country is undergoing some level of degradation, with 22 per cent heavily or severely degraded.

The area of Daurian steppes possesses high biodiversity for steppe. Wetlands support globally significant breeding populations of many endangered birds, including the red-crowned (*Grus japonensis*) and white-naped (*G. vipio*) cranes, swan goose (*Anser cygnoides*), great bustard (*Otis tarda*) and relict gull (*Larus relictus*). Several million waterbirds pass through the wetlands in spring and autumn via the East Asian-Australasian Flyway. More than 16,000 Mongolian gazelles (*Procapra gutturosa*) inhabit the Dauria Nature Reserve in Russia and its adjacent areas. The gazelle is mainly restricted to Mongolia with outlier populations in Russia and China; its annual migration is one of the last large-scale migrations in the northern hemisphere. It is declining throughout its range, was extirpated in western Mongolia and reintroduced in 1984; and the current population is estimated at 3–3.8 million. The Asian great bustard (*Otis tarda dybowskii*) is rapidly declining, with a population estimated at 1,500–2,200 individuals, with about 1,100 in Mongolia. The Mongolian saiga (*Saiga borealis mongolica*) has undergone major population fluctuations in Mongolia due to harsh winters, goat plague and poaching and is a priority species for WWF.

## Drivers of change

The Daurian steppe is characterised by extensive agriculture: pastures, hayfields and arable lands. About 30 per cent of the steppe territories in Russia are ploughed and about 50 per cent of the territory of steppe and of meadow plots in the forest-steppe. In Mongolia, about 2 per cent of the steppe and 10 per cent of the steppe and meadow plots in the forest-steppe are arable. In Mongolia, the main drivers of change are a rapid increase in the number of livestock, leading to overgrazing (particularly as encouragement to cease nomadic practices means that livestock are concentrated), poaching, use of fire in management, and climate change, with increased temperatures projected to have major impacts. However, pasture degradation is usually seen only in the immediate vicinity of villages. Planned infrastructure, including new railways, could interfere with migration patterns of several species such as the goitered (*Gazella subgutturosa*) and Mongolian gazelle, although legislation has been introduced in an attempt to make such developments wildlife friendly. Agriculture is the second largest emitter of greenhouse gases, responsible for 48.5 per cent of the total. CO<sub>2</sub> emissions are highly sensitive to grazing pressure and sustainable management, particularly of meadow steppe, could create a major carbon sink. By 2000, pastures in Russia had in contrast largely recovered from historical overgrazing. Spring fires have a significant impact on these ecosystems: about 30 per cent of the steppe and wetlands in Russia and 15 per cent in Mongolia burn annually. The ecology of Dauria is also strongly influenced by climate fluctuations.

## Conservation responses from WWF

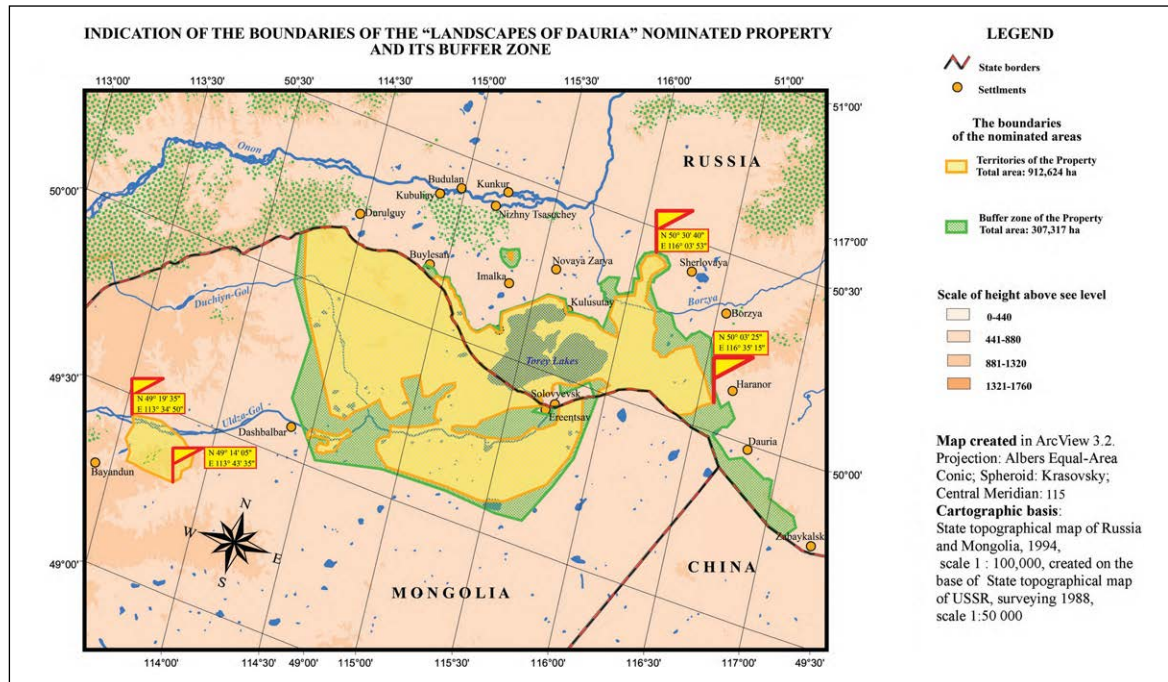
WWF has been continuously working to support the establishment and development of the protected area network, conducting conservation and research activities, and ensuring free migrations of the Mongolian gazelle between Russia and Mongolia. In 2017, the Landscapes of Dauria achieved UNESCO World Heritage status; WWF-Russia supported this process. The Dauria International Protected Area annually signs a work plan and implements joint activities for the study and conservation of biodiversity. These events are supported by WWF in Russia, Mongolia and China. WWF together with Dauria International Protected Area and the NGO Rivers without Boundaries Coalition are implementing the *Going Dry* pilot project, aimed at harmonising transboundary river protection and management in river basins of Dauria. This project is run under the auspices of the UNECE Water Convention.

In Mongolia, WWF is advocating the elimination of tax exemption for cattle ranchers, which has caused the sudden and unsustainable explosion in livestock numbers. Replacement of nomadic grazing with settled agriculture has often proved unsustainable on the thin soil of the region and this also requires major changes in policy.

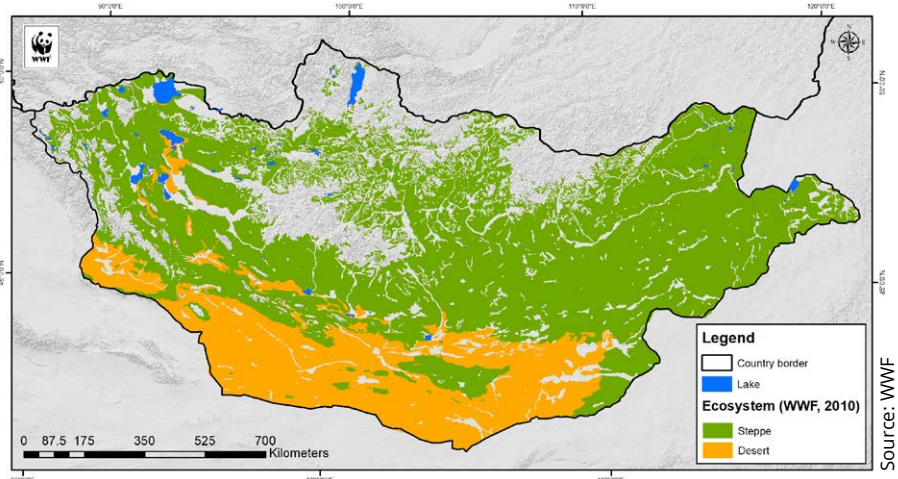
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**Map 13: Landscapes of Dauria Map**



**Map 14: Steppe habitat in Mongolia**







# Managing grassland in the Terai Arc Nepal

## The grassland and savannah ecosystem

Grassland covers roughly 1.7 million hectares of Nepal, about 11.5 per cent of the country. It is found in four physiographic regions throughout the country: in the lowlands, the mid hills, high mountains and the Himalayas, each with very different species and associated wildlife. The lowland Terai grassland in particular is considered one of the world's most productive ecosystems and is known to host a large range of rare and endangered species, including greater one-horned rhinoceros (*Rhinoceros unicornis*), Asian elephant (*Elephas maximum indicus*), tiger (*Panthera tigris*), hog deer (*Cervus porcinus*), swamp deer (*Cervus unicolor*), wild water buffalo (*Bubalus bubalis*) and bengal florican (*Houbaropsis bengalensis*). These grasslands have over 50 recorded grass species making this a unique ecosystem. These grasslands are a result of floods, fires and riverine erosion that continually change grassland types and its extent. However, the short open grasslands are maintained both naturally as well as by anthropogenic disturbances.

Presently, only 4 per cent of the grassland habitats are in protected areas within lowland areas of Nepal. Further, these grasslands are threatened by invasion of woody perennials, invasive alien species such as *Chromola odorata*, *Lantana camara*, *Mikania micrantha* and *Parthenium hysterophorus*.

## Drivers of change

The main drivers of change are not only overgrazing (outside the protected areas system), wildfire and large-scale infrastructure, but also natural succession as forests return to grassland areas. Other causes of degradation include excessive use of chemical fertiliser, shifting cultivation patterns in the uplands without proper terracing and repeated grazing beyond the carrying capacity of the ecosystem. Heavy grazing pressure in mountain areas also causes soil compaction, reduced infiltration capacity, increased run-off, increased soil erosion and reduced overall productivity of the land.

## Conservation responses from WWF

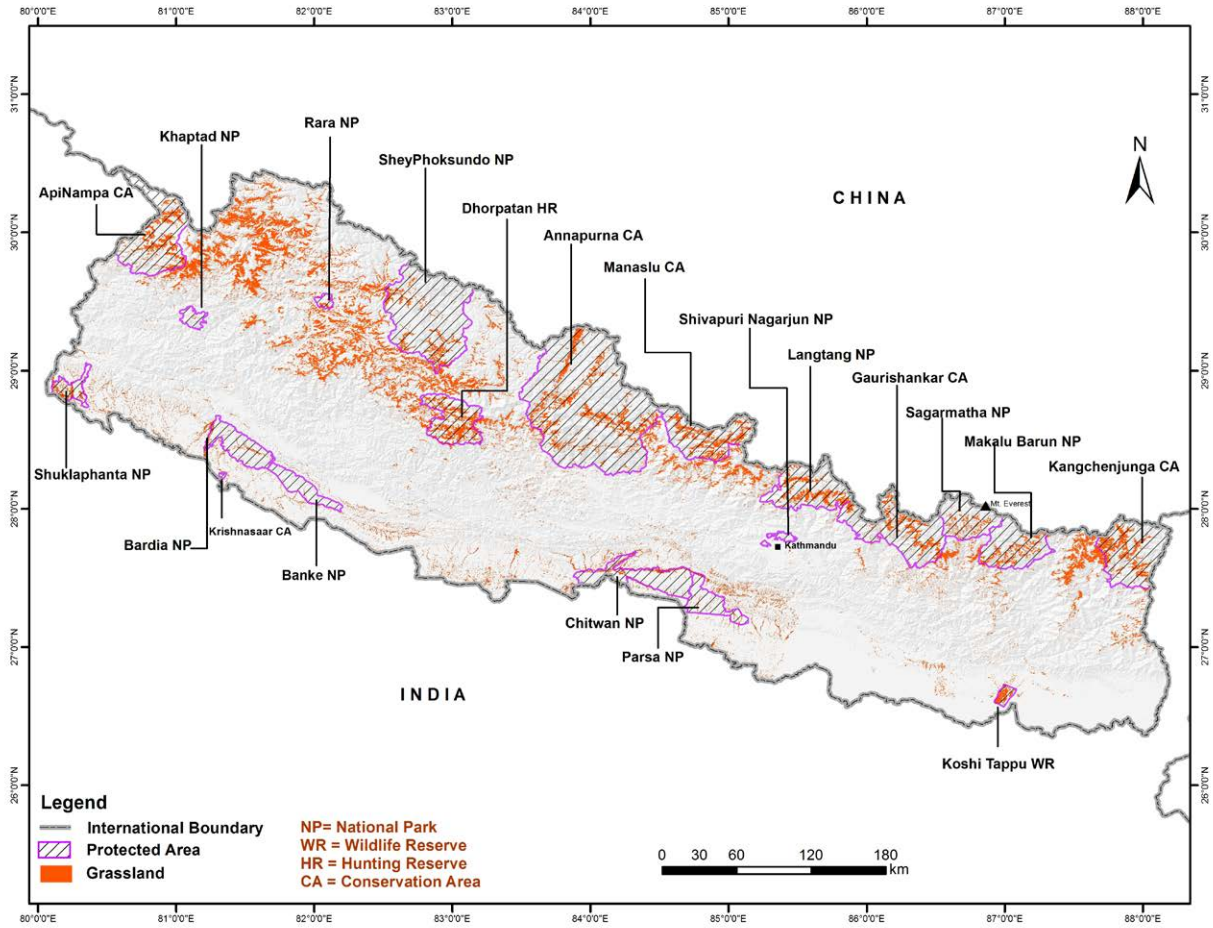
WWF focuses on managing critical grassland from a wildlife conservation perspective, providing support to arrest grassland succession by removing young trees and invasive species and maintaining short swards to increase productivity. WWF also supports the government of Nepal to prepare species-specific conservation action plans that focus on grassland habitats. Protected areas and the community forest practice controlled burning of grassland patches to increase the amount of young, succulent vegetation most favoured by ungulates. Additionally, regulation of annual grass cutting (*“khar khadai”* in local dialect) within national parks provides thatch for the local communities and also benefits herbivores by retaining short grasslands. WWF Nepal is helping the government develop a framework and standards for habitat management in lowland Terai, which will guide the future of grassland management in Nepal Terai.

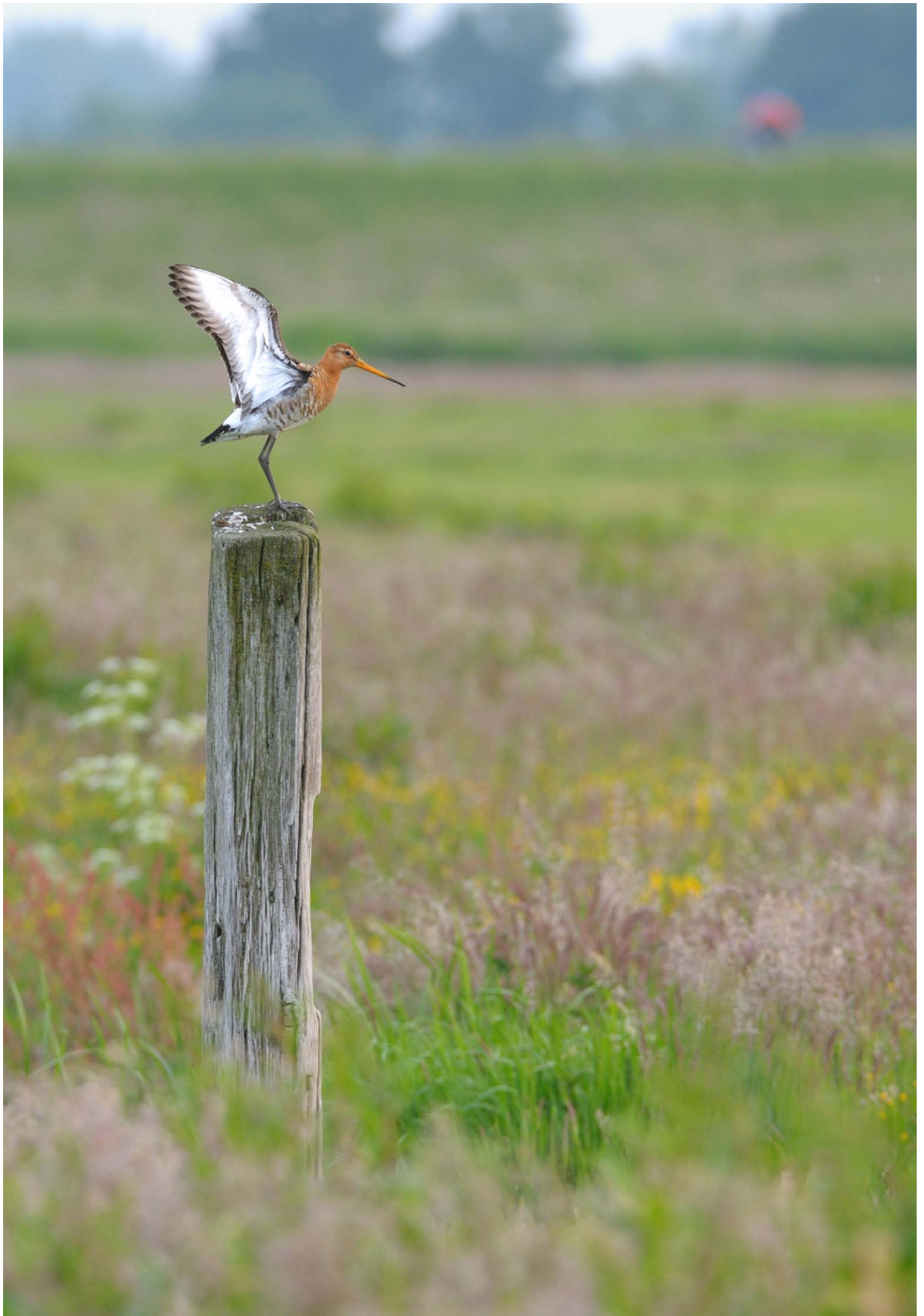
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**Map 15: Grassland distribution in Nepal**







# Biodiversity monitoring on dairy farms The Netherlands

## The grassland and savannah ecosystem

Grasslands in the Netherlands cover about 1.13 million ha, of which only 0.15 million ha (13 per cent) is within protected nature areas (CBS et al., 2020a). The remaining 0.98 million ha (87 per cent), covering about one third of the country is used for agricultural production; to graze livestock and produce hay (CBS et al., 2020b). The agricultural grasslands, dispersed across the entire country, are predominantly used by the dairy sector, which is consequently the largest land user in the Netherlands. The sector includes over 17,000 dairy farms, which together house a total of 1.58 million dairy cows – predominantly Holstein Friesian. Dairy grasslands are primarily “improved” pastures, sown with high-protein rye grass and heavily fertilised and managed, rather than the diverse, herb-rich grasslands that would naturally develop on poorer and less disturbed soils. The intensive grassland management for dairy production puts a lot of pressure on biodiversity, both on grasslands (and other biomes) in agricultural and nature areas, as well as in production areas of imported animal feeds. Wildlife populations in the Dutch agricultural landscape have declined in abundance by 50 per cent since 1990 (WWF-Netherlands 2020). Characteristic grassland wildlife groups such as butterflies and meadow birds are increasingly threatened including the national bird, the black-tailed godwit (*Limosa limosa*).

## Drivers of change

The Netherlands has one of the highest human population densities in the world, meaning that the pressure for space has seen intensive agriculture thrive. The intensification of the country’s dairy sector in particular has resulted in a system famed for its production efficiency. However, this intensification has come at a huge cost for nature and the environment. Vast monocultures of high-protein grass leave little room for biodiversity on the agricultural grasslands. Excess manure,

fertiliser, antibiotics and pesticides pollute the environment and nitrogen deposition has led to the degradation of natural areas. Through the import of feed such as soy, the country's environmental footprint extends far beyond its borders. This system is not only running up against its ecological limits, but also starting to make ever less sense from a socio-economic perspective, as farmers are highly dependent on European Union subsidies for their income.

## Conservation responses from WWF

WWF NL works with businesses, farmers' organisations, financiers, government bodies and researchers on the development of an alternative agricultural model that produces food in balance with nature. To achieve the desired system change, several lock-ins need to be addressed that keep the current system in place. They include a dominant business model that focuses on short term gains with narrow margins and bulk production at low cost, a policy environment and agricultural subsidy scheme that incentivises intensification and a research focus on increasing efficiency and improved production.

WWF NL has joined forces with dairy giant FrieslandCampina and agricultural financier Rabobank to break some of the barriers and find ways to reconcile the environmental (biodiversity restoration), economic (good income and future prospects for farmers) and social (sector's license to produce milk) objectives of stakeholders in the dairy landscape. The aim of this collaboration is to develop a new business model that turns protection and recovery of biodiversity from a cost item into a source of income.

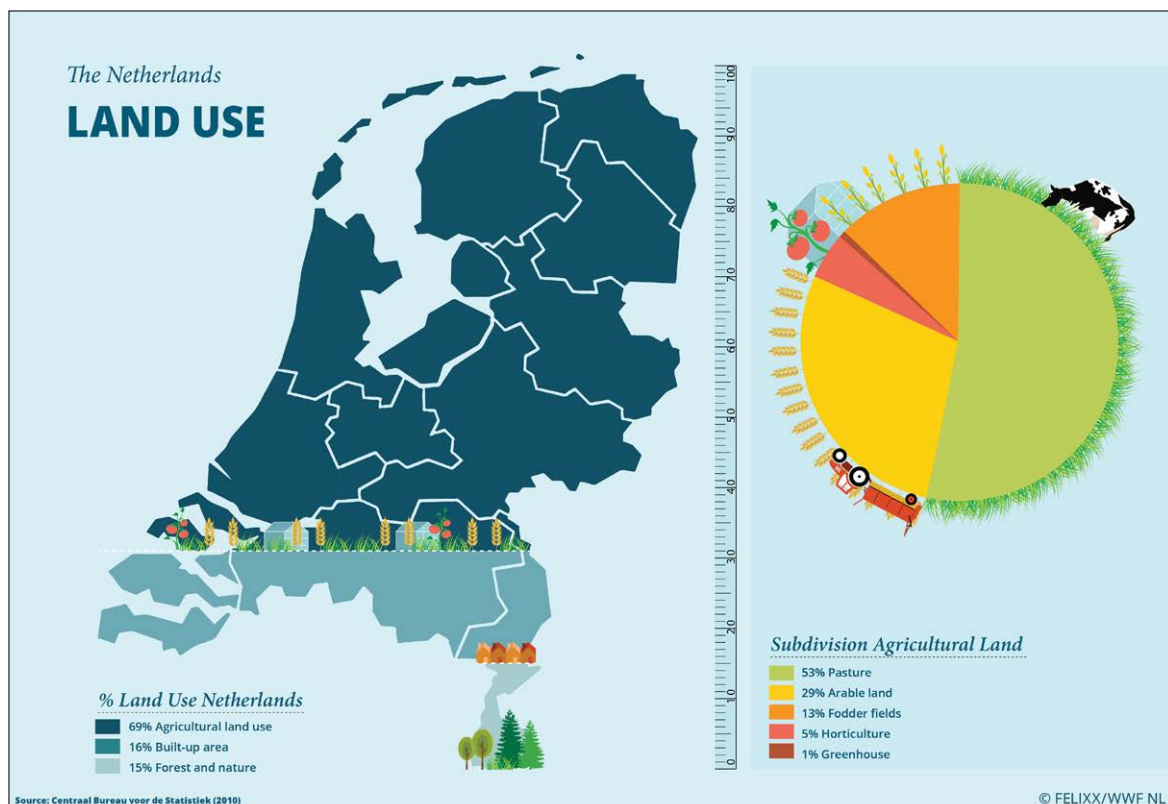
The collaboration has resulted in the 'Biodiversity Monitor for Dairy Farming', a tool to measure farmers' biodiversity-based performance on and around the farm, using an integrated set of Key Performance Indicators (KPIs). Rather than measuring the resulting biodiversity impact itself, the KPIs measure biodiversity-based performance within a farmer's sphere of influence. They include, for instance, nitrogen soil surplus, the percentage of herb-rich grassland and the percentage of feed protein produced on farm (circularity). As such, KPIs provide insight into the farmers' contributions to favourable conditions for biodiversity, both on dairy farms and their immediate environment, as well as on nature reserves throughout the Netherlands and biodiversity outside the Netherlands. For each KPI, optimum and threshold values are determined to stimulate continuous improvement towards the desired biodiversity impact at the landscape scale, rather than at the farm level (Laarhoven et al., 2018).

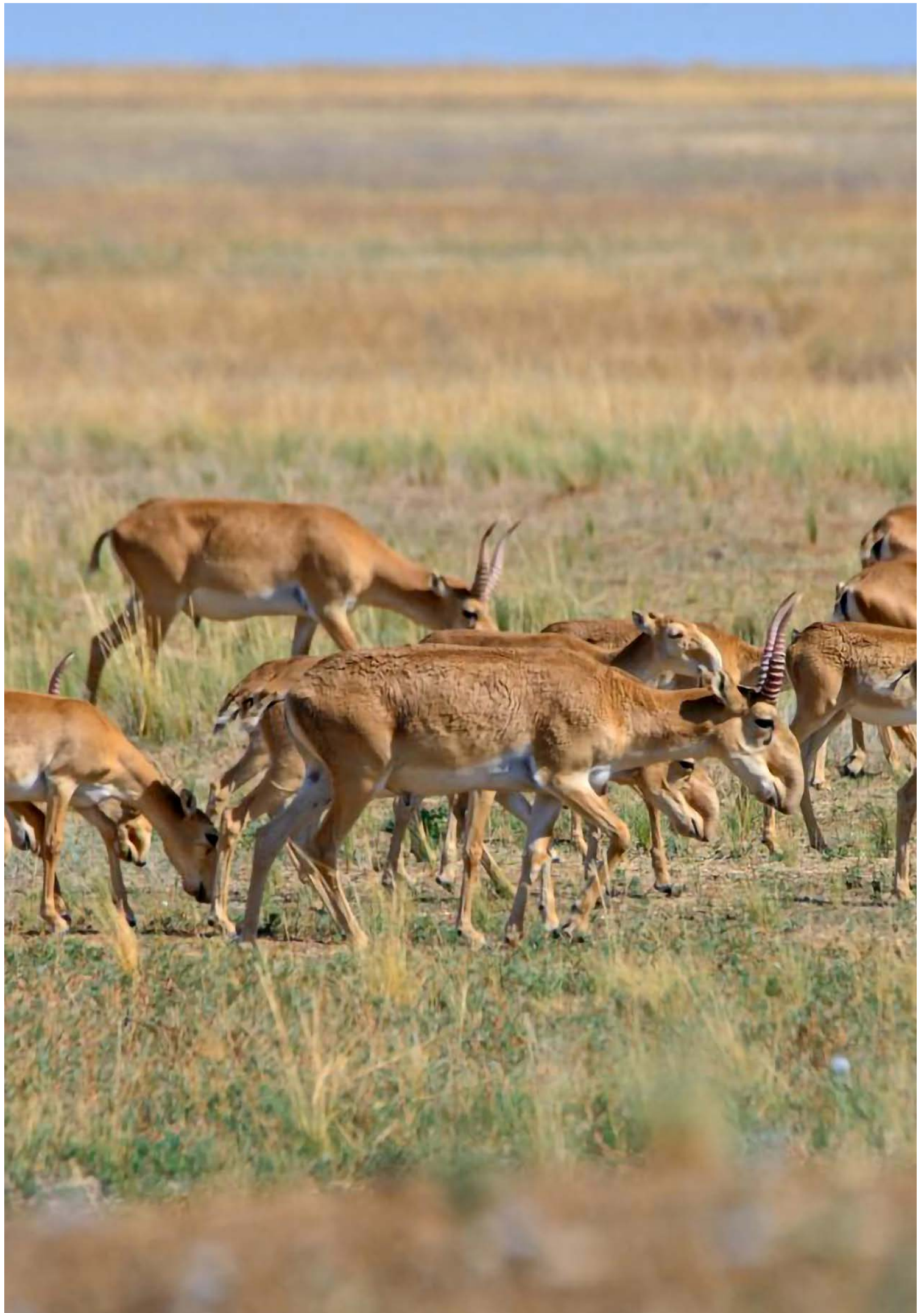
Widespread adoption of this standardised monitoring tool allows farmers to receive multiple benefits from different stakeholders for their biodiversity performance. This accumulation of benefits will make investments in biodiversity more rewarding for farmers. FrieslandCampina has already adopted the KPIs in their milk price reward scheme and Rabobank is conducting several pilot projects to differentiate interest loans based on the KPI performance of farmers. These are important steps in the alignment of efforts towards the common goal of landscape scale biodiversity recovery and sustainable grassland farming.

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**Map 16: Land use in the Netherlands**







# Last habitat of saiga in Europe

## The Russian Federation

### Grassland and savannah ecosystem

The Pre-Caspian steppe is a subdivision of the vast Pontian steppe, which covers the true steppes of Eastern Europe. It comprises lowland herb-rich grass steppes, herb-grass steppes, grass steppes, and desert steppes. Today, only 3–5 per cent remains in a natural or near-natural state, with only 0.2 per cent protected in two main protected areas – Chernye Zemli Biosphere Reserve (Republic of Kalmykia) and Stepnoi Sanctuary (Astrakhan Region) with a total of 203,700 hectares. Grazing lands cover 61.8 per cent of the Republic of Kalmykia and Astrakhan Region. The saiga antelope (*Saiga tatarica*) is the main wildlife species of concern, but there are also wetlands that provide important habitat for various species of cranes.

### Drivers of change

The entire region has been affected by desertification from overgrazing and climate change. Remote sensing studies of the region show the extent of desertification ranging between 60 and 70 per cent in the past three decades. The Black Lands (Chernye Zemli) of Kalmykia represent one of the largest foci of desertification in Europe. More than 20 per cent of the Pre-Caspian steppe is now degraded to windblown sand. This has resulted in intensive soil erosion and drastically lower agricultural production. As a result, pasture productivity has fallen by 40–60 per cent.

Due to overgrazing and climate change, steppe plant diversity is declining. Typical species-rich plant communities have been replaced by graminaceous vegetation, which increases the chances that grassland fires will occur.

## Conservation responses from WWF

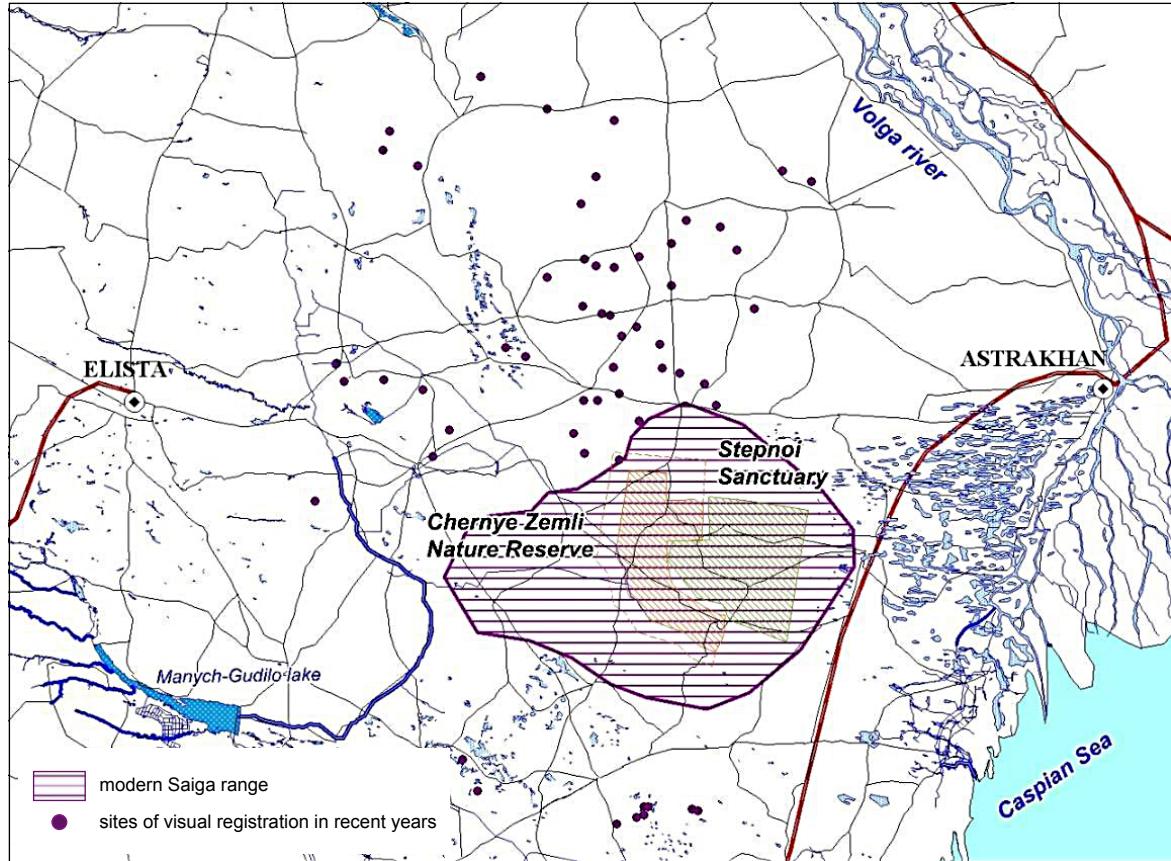
WWF Russia is implementing a five-year project on saiga antelope conservation since 2018. This population is the only migratory ungulate of Europe, and its numbers have shrunk dramatically from 800,000 to 5,150 in the last 60 years due to poaching and habitat degradation. The project consists of anti-poaching measures and improving adaptation capacity of the saiga to climate change (e.g., in 2018 WWF Russia repaired three artesian wells in the Stepnoi Sanctuary to maintain the saiga population in harsh summer conditions). Another planned initiative on native pasture ecosystem restoration still needs funding to be launched.

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**Map 17: Protected areas of the Pre-Caspian steppe**







# Cattle and conservation

## Australia

### The grassland and savannah ecosystem

Australia contains tropical, subtropical and temperate grassland and savannah ecoregions. Land classified for livestock grazing covers over half (54 per cent) of the total land area of Australia (over 400 million ha), although some of these areas are desert and have low or zero stocking rates. Of 185 million ha of grasslands classified among the Major Vegetation Subgroups, some 4.4 million ha have been cleared, with temperate and blue grass communities undergoing the greatest losses. Around a quarter (23.8 per cent) is currently protected. Although ecosystems have changed dramatically since European settlement, particularly with respect to the introduction of non-native and invasive species (over 1,200 species have been introduced), much of the tropical and subtropical area is still predominantly under native vegetation. Temperate grasslands, on the other hand, have been highly modified for cropping and livestock, in response to greater availability of water. Eleven Australian grasslands are listed among the country's threatened ecological communities, with various temperate grasslands in Victoria, New South Wales, Queensland, Tasmania, etc. listed as critically endangered. Degradation does occur, although often linked primarily with seasonal or occasional events such as drought

### Drivers of change

Drivers of change in the northern large natural grassland areas are principally overgrazing and climate change, although neither of these have been fully measured. More intense droughts and more frequent and intense fires will both likely change aspects of grassland and savannah ecosystems in the future. Additionally, pressure for livestock grazing land in the humid tropics of Queensland is leading to major deforestation; so that new, usually planted, grasslands are being created. Among other things, this is leading to increased sedimentation, which is impacting the Great Barrier Reef. In temperate grasslands, conservation actions are aimed at protecting habitat for endangered animal species, including the native grasslands.

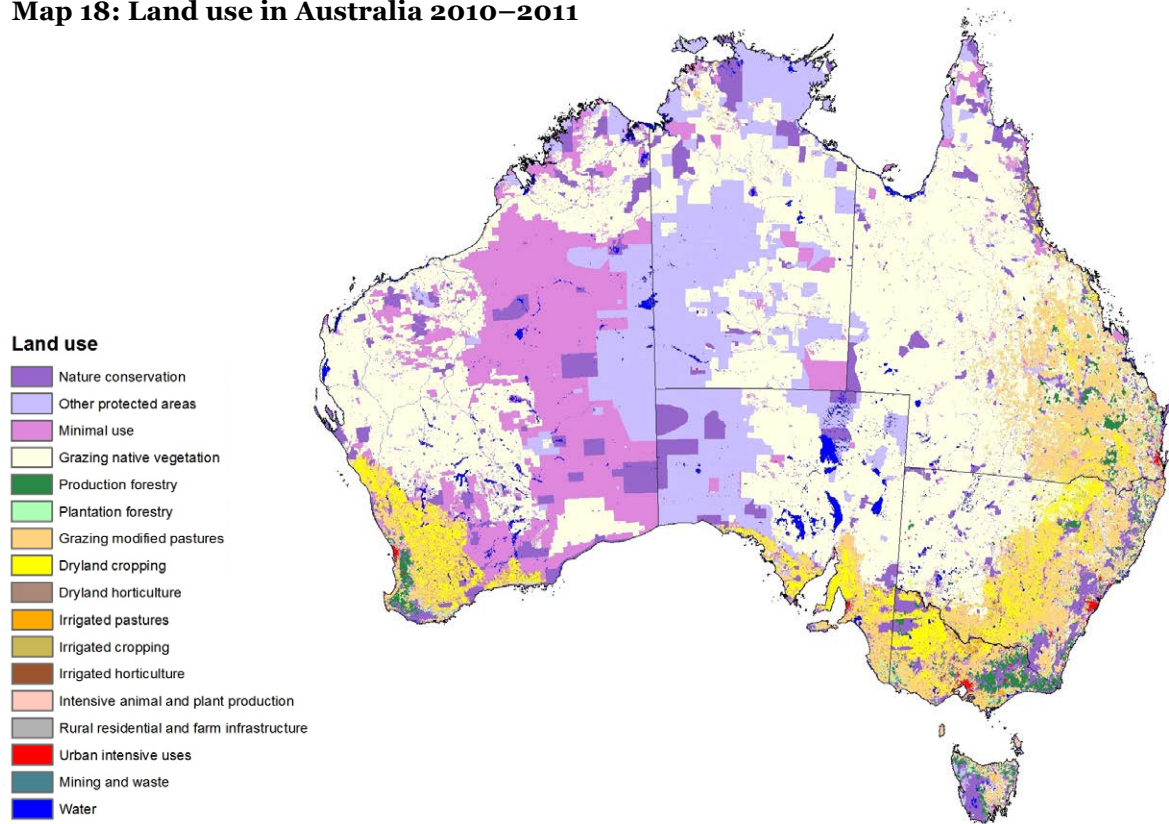
## Conservation responses from WWF

WWF's response focuses mainly on moving towards sustainable beef farming, using near-natural grasslands, rich in wildlife, maximising ecosystem health, including carbon sequestration and bringing strong social benefits. WWF envisions a global marketplace in which all beef is sustainable. By working with producers as well as companies and their supply chains to improve the sustainability of beef production, WWF is helping to ensure that consumers have choices for a safe, affordable and sustainable diet.

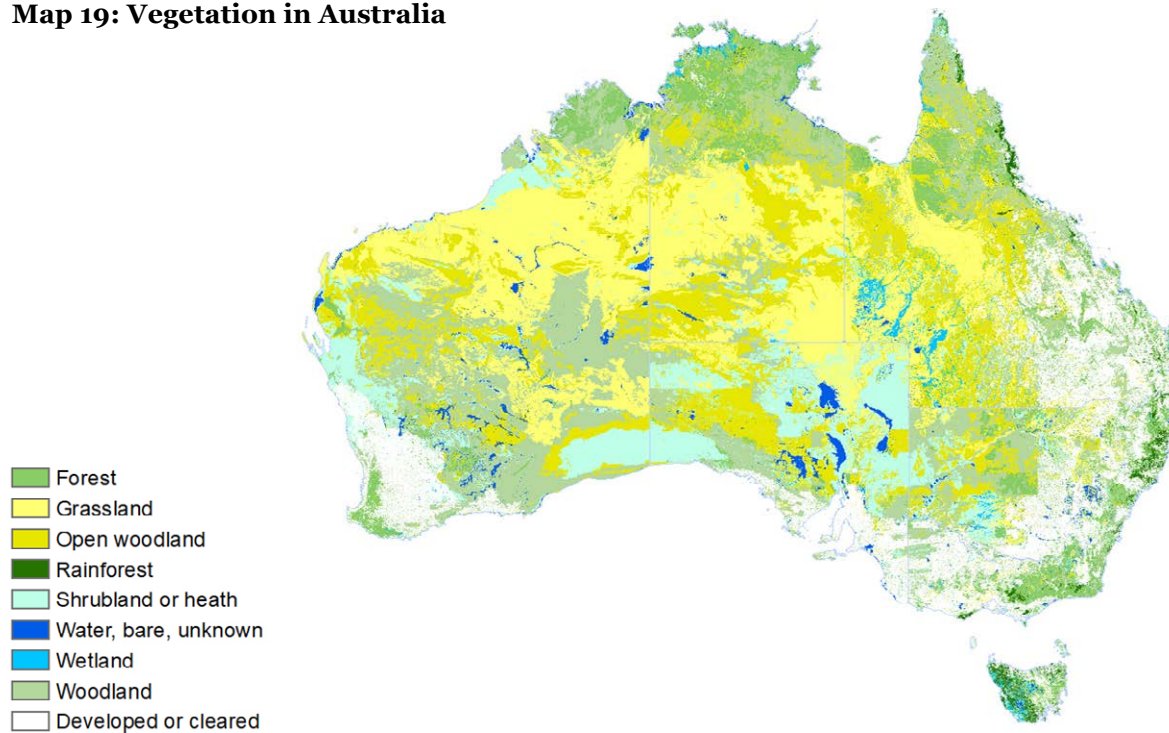
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**Map 18: Land use in Australia 2010–2011**



**Map 19: Vegetation in Australia**



# Conclusions

## The problem

Grasslands and savannahs are facing the fastest and largest rates of conversion and degradation of any biome, resulting in significant biodiversity loss, carbon emissions and impacts on freshwater systems. They are among the most endangered and threatened biomes of our time. In this report, we highlight the key lessons from WWF's engagement with grasslands and savannahs.

## Facts

The distribution, diversity and variety of grasslands and savannahs worldwide, from the savannahs of Brazil and Africa to the vast steppe of Central Asia, are what makes them unique and essential to the socio-ecological functionality of the planet.

- » Grassland ecosystems cover one quarter of all land on Earth and are adapted to the most extreme temperatures and seasons.
- » Grasslands and savannahs sustain more large animals than any other biomes and are home to the greatest gatherings of wildlife on Earth, such as the huge migrations over the Serengeti-Mara ecosystem in East Africa.
- » Most grasslands and savannahs have been extensively modified by humans, sometimes over millennia, yet many of these semi-natural ecosystems retain high nature values. They are among the oldest ecosystems of our planet.
- » There are socio-cultural values and identities rooted in grasslands and savannahs that are fundamental contributors to human evolution, well-being, history and development.
- » Grasslands and savannahs are vital for global food supply, contributing to agricultural, dairy and meat production.
- » Grasslands and savannahs are very important carbon stocks and should be at the frontline of the fight to mitigate climate change.

- » Grasslands face huge challenges: (i) conversion mainly to crops and tree plantations; (ii) impoverishment through replacement with non-native grasses and heavy fertiliser use; (iii) degradation due to overgrazing and pollution; and (iv) ecological impacts from climate change.
- » Impacts vary around the world, with conversion being the greatest threat in the tropics and parts of North America, and intensification being the most serious threat in Europe, whereas in some of Russia and Central Asia land abandonment is allowing a recovery of more natural ecosystems.
- » Responses must be tailored to the natural and social conditions of each grassland or savannah.
- » In some places, the main emphasis needs to be on conserving remaining natural or valuable semi-natural habitats through protected area systems or similar. In other ecosystems, the emphasis should be on improving management to reduce degradation and loss. A third group of grasslands and savannahs are already degraded to such an extent that restoration programmes are now the most urgent priority.

## Steps forward

- » Cooperative strategies are urgently needed to increase science-based (natural science, social sciences and humanities) knowledge of grasslands and savannahs worldwide; their status, ecology and trends and to identify priorities for conservation activities.
- » Advocacy is urgently needed to support grasslands and savannahs locally and globally: ensuring an adequate system of protected and conserved areas, improved management and, where necessary, developing and implementing large-scale restoration.
- » A rethink is needed regarding our diet, food choices, and sustainable practices for farming domestic herbivores, especially for meat and dairy, in light of the threats facing many grazing lands.
- » Global leaders also need to set ambitious targets to keep climate change within safe boundaries and provide a secure future for the next generations.





# A WWF Global Grasslands and Savannahs Initiative

**Our Vision:** a planet where grasslands and savannahs are effectively protected and managed to conserve nature, support climate goals, and sustain a thriving food system, thus improving the livelihoods of local communities and promoting socio-economic development.

**Our Goal:** to halt biodiversity loss and reduce greenhouse gas emissions from agricultural production and other threats in grasslands and savannahs, and to improve and restore the ecosystem services provided by these biomes to nature and people.

**Our actions:** The WWF Global Grassland and Savannah Initiative (GGSI) will aim to:

1. build a new global consensus for grasslands and savannahs, embedding them into the global conservation and climate agendas, and
2. deliver on-the-ground interventions in specific landscapes to protect, better manage, and restore these biomes, establishing models for wider replication.

The GGSI will raise the profile of these biomes by integrating them into the priorities of the *New Deal for Nature and People*, which aims to agree on decisive global action to halt biodiversity loss, and the *2021 Food Summit* convened by the FAO, IFAD and the World Food Programme.

## #1 > Elevate the profile of grasslands and savannahs to the highest level of international attention, ensuring they get the investments they deserve, through:

- A.** Launching a Global Coalition: For grasslands and savannahs with partners – from the public and private sectors and NGOs – developing consensus around the importance of these biomes. The coalition will set objectives, convene influencers and experts, advocate, and share information and best management practices; making the case for grasslands and savannahs conservation using the best available science, as well as testimonies from grassland-dependent communities.
- B.** Targeting the global conservation agenda: Starting with the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and Intergovernmental Panel on Climate Change (IPCC), along with peer-reviewed articles to explain the importance of grasslands and savannahs. Through the global coalition, integrate grasslands and savannahs into the targets of multilateral agencies and international constituencies addressing biodiversity, climate, and food: the UN Convention to Combat Desertification (UNCCD, Convention on Biological Diversity (CBD), UN Framework Convention on Climate Change (UNFCCC), Food and Agriculture Organization of the UN (FAO), Global Environmental Facility (GEF), World Economic Forum (WEF), sectoral roundtables, etc. Next, work with “champion” national governments to incorporate these biomes into conservation planning, Nationally Determined Contributions (NDCs), Sustainable Development Goals (SDGs) and post-2020 biodiversity targets.
- C.** Developing a global monitoring system for grasslands and savannahs: By 2022, ensuring that data on status and threats, conversion, biodiversity, and carbon storage are transparent and freely available. Our system will cover all relevant biomes globally, either enhancing an existing platform or launching a new one.
- D.** Securing private sector commitments: Working with companies to incorporate grasslands and savannahs into conversion-free commitments. The Accountability Framework provides guidance for implementing ethical supply chains in agriculture and forestry, with “zero conversion” of any natural ecosystem as a key criterion. The GGSI will promote such commitments to companies and corporate platforms and leverage the voluntary carbon market for investments in grasslands and savannahs in exchange for carbon credits.

- E.** Influencing funding toward grasslands and savannahs: Through the Global Coalition, targeting specific donors and investors – such as global climate funding mechanisms, foundations, institutional and private equity investors – to understand the value of grasslands and savannahs for climate, nature, and people and include them in their funding priorities, and in due diligence processes in order to avoid investment in development and afforestation projects which result in conversion, degradation or fragmentation.
- F.** Launching a Producer and Consumer Engagement Campaign: in 2022, with an aim to increase supply and demand for products that do not harm grasslands and savannahs and value their biodiversity.

## #2 > We will act urgently to deploy a suite of activities to protect grasslands and savannahs at the landscape scale.

In places where WWF works in these biomes (currently 23 countries on 6 continents), we will implement interventions that align with the “mitigation hierarchy”, which follows three key steps:

- A.** protect native vegetation by avoiding new conversions and by enhancing the area of public and private lands under effective protection
- B.** better manage working lands by sustainably enhancing agricultural productivity and minimising soil loss and degradation
- C.** restore degraded lands. Precise strategies and targets will be tailored to each region based on the local context, but will follow the protect-manage-restore approach at the landscape scale

### PROTECT/AVOID

- » Protect for permanence
- » Zero new conversion
- » Create and improve status of protected areas – public and private
- » Communities and economic uses

### MANAGE/REDUCE

- » Sustainable intensification (close yield gaps, reduce demand for new conversions)
- » Land use planning
- » Incentivize good conservation practices (PES, long-term contracts, government policy)

### RESTORE/REVERSE

- » Restore ecological function (for biodiversity, water, carbon and people)
- » Build capacity of farmers and local communities
- » Use business cases to help incentivize change

# Policy asks: Grassland and savannah

Additionally, WWF calls on many of the existing international processes to increase their consideration of grassland and savannah ecosystems, with the following issues identified.

## Convention on Biological Diversity

The omission of explicit mention of grassland and savannah in the Aichi targets and the lack of any mention in the zero draft of the post-2020 targets risks perverse results and leakage if governments shift development focus from forests to grasslands and savannahs in an unplanned manner. This could be addressed in the post-2020 targets by adding explicit reference to grassland and savannah. For example, to include explicit mention into targets, such as indicators for goal 1 in the zero draft (new text in **bold**):

- » Forest area as a proportion of total land area
- » Trends in forest extent and/or tree cover
- » Trends in primary forest extent
- » **Trends in extent of natural grassland and savannah**
- » Continuous global mangrove forest cover
- » Live coral cover
- » Species Habitat Index
- » Wetland Extent Trends Index
- » Biodiversity Habitat Index
- » Red List for Ecosystems

## UN Framework Convention on Climate Change

REDD+ focuses explicitly on forests as carbon stores, thus taking attention (and funding) away from carbon storage in other ecosystems (grassland and savannah, blue carbon, tundra, etc). There is urgent need for UNFCCC to give additional backing to the promotion of carbon-based Payment for Ecosystem Service Schemes aimed at other ecosystem-based carbon, through explicit mention at the next Conference of Parties and guidance to donors and others, including methodologies, about broadening the scope of carbon storage schemes to give greater emphasis beyond forests.

## UN Convention to Combat Desertification

The UNCCD Land Degradation Neutrality target provides important opportunities for grassland and savannah conservation, both through conservation and sustainable management. UNCCD could increase the conservation benefits of the LDN target by encouraging an explicit focus on using protected areas and other effective area-based conservation measures (OECMs) to maintain natural grassland and savannah that provides the highest levels of ecosystem services, including biodiversity. This could perhaps be achieved through a collaborative effort to identify high-value grassland and savannah areas (“hotspots”) around the world.

## Sustainable Development Goals

The SDGs are now set until 2030. But there is room in the reporting of progress on the SDGs to emphasise the key role played by grasslands and savannahs. For example, by encouraging that grassland and savannah conservation and management feature in national reports at least in relation to the following SDG targets:

- » **2.4** By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality
- » **13.1** Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
- » **15.3** By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

And in particular to ensure that grassland and savannah conservation is reported in the following target, even though these ecosystems are not explicitly mentioned by name:

- » **15.1** By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

# Governments

Grassland and savannahs have been under-emphasised in many national conservation plans. To gain momentum in protecting these important habitats, governments are encouraged to address the biome explicitly through (i) a gap analysis of grassland and savannah to determine where key ecosystems are habitats are not adequately represented in protected area systems; (ii) identification of how sustainable management, perhaps in OECMs, can provide effective conservation; and (iii) development and implementation of a strategy for conservation of remaining valuable grassland and savannah habitats. Governments also have a key role in funding and driving research and need to invest in creating and maintaining a sound body of information on status and trends of these ecosystems. Integrating an understanding of the social, economic and ecological importance of grasslands and savannahs into educational curricula is also a key need.

# Companies

Companies can help the grassland and savannah initiative by avoiding conversion or increasing management pressure on the most valuable grasslands, through application of the High Conservation Value methodology and similar exercises. Many have the opportunity to support more sustainable approaches through their purchasing policies and to support innovation and technologies for sustainable management and restoration.

# References

- Bengtsson, J., Bullock, J.M., Egoh, B., Everson, T., O'Connor, T. ... Lindborg, R. 2019. Grasslands – more important for ecosystem services than you might think. *Ecosphere* 10 (2): e02582.
- Bilenca, D and Miñarro, F. 2004. *Identificación de Áreas Valiosas de Pastizal (AVPs) en las Pampas y Campos de Argentina, Uruguay y sur de Brasil*. Fundación Vida Silvestre Argentina.
- Blydenstein, J. 1967. Tropical savanna vegetation of the Llanos of Colombia. *Ecology* 48 (1): 1–15.
- Dass, P., Houlton, B.Z., Wang, Y. and Warlind, D. 2018. Grasslands may be more reliable carbon sinks than forests in California. *Environmental Research Letters* 13: 074027.
- CBS, PBL, RIVM, WUR (2020a). *Index Natuur en Landschap (indicator 1544, versie 04 , 14 mei 2020)*. [www.clo.nl](http://www.clo.nl). Centraal Bureau voor de Statistiek (CBS), Den Haag; PBL Planbureau voor de Leefomgeving, Den Haag; RIVM Rijksinstituut voor Volksgezondheid en Milieu, Bilthoven; en Wageningen University and Research, Wageningen
- CBS, PBL, RIVM, WUR. 2020b. *Index Natuur en Landschap (indicator 1544, versie 04 , 14 mei 2020)*. [www.clo.nl](http://www.clo.nl). [Centraal Bureau voor de Statistiek (CBS), Den Haag; PBL Planbureau voor de Leefomgeving, Den Haag; RIVM Rijksinstituut voor Volksgezondheid en Milieu, Bilthoven; en Wageningen University and Research, Wageningen].
- Conant, Richard T. *Challenges and opportunities for carbon sequestration in grassland systems*. FAO, 2010.
- Dinerstein, E., Olson, D., Atchley, J., Loucks, C., Contreras-Balderas, S., Abell, R., Inigo, E., Enkerlin, E., Williams, C. and Castelleja, F. 2000. *Ecoregion-based conservation in the Chihuahuan Desert: A Biological assessment*. World Wildlife Fund, CONABIO, The Nature Conservancy, Pronatura Noreste and ITESM.
- Guyra Paraguay. 2017. *Informe de Deforestación Marzo 2017*. Guyra Paraguay, Asunción.
- Ishwaran, N., and Clüsener-Godt, M. 2007. Los sitios UNESCO en Iberoamérica para medio ambiente y cultura como escenarios del desarrollo sostenible. *Hacia una cultura de la conservación de la diversidad biológica, Zaragoza, SEA, Conabio, Conanp, Conacyt, Inecol, Unesco-MAB, Ministerio de Medio Ambiente-Gobierno de España*.
- Kerley, G. and Whitford, W.G. 2000. Impact of grazing and desertification in the Chihuahuan Desert: Plant communities, granivores and granivory. *American Midland Naturalist* 144 (1): 78-91.
- Laarhoven et al. 2018. Biodiversity monitor for the dairy farming sector. Available online: [http://biodiversiteitsmonitormelkveehouderij.nl/docs/Biodiversiteitsmonitor\\_engels.pdf](http://biodiversiteitsmonitormelkveehouderij.nl/docs/Biodiversiteitsmonitor_engels.pdf)
- Maltby, E., and Acreman, M.C. 2011. Ecosystem services of wetlands: pathfinder for a new paradigm. *Hydrological Sciences Journal* 56 (8): 1341–1359.
- Miranda, J., J. Börner, M. Kalkuhl, and B. Soares-Filho. 2011. Land speculation and conservation policy leakage in Brazil. *Environmental Research Letters* 14 (4): 045006.
- Mitsch, W.J., Bernal, B. and Hernandez, M.E. 2015. Ecosystem services of wetlands. *International Journal of Biodiversity Sciences: Ecosystem Services and Management* 1: 1–4.
- Mitsch, W.J., et al. 2014. Validation of the ecosystem services of created wetlands: two decades of plant succession, nutrient retention, and carbon sequestration in experimental riverine marshes. *Ecological engineering* 72: 11–24.



- Nelson, R. 2006. Regulating grassland degradation in China: shallow-rooted laws. *Asian-Pacific Law and Policy Journal* 7 (2): 385–417.
- Olson, D.M., Dinerstein, E., Wikramanayake, E.D., Burgess, N.D., Powell, G.V.N. et al. 2001. Terrestrial ecoregions of the World: A new map of life on Earth. *Bioscience* 51 (11): 933–938.
- O'Mara, F.P. 2012. The role of grasslands in food security and climate change. *Annals of Botany* 110 (6): 1263–1270.
- Pollock, M.M., Naiman, R.J. and Hanley, T.A. 1998. Plant species richness in riparian wetlands—a test of biodiversity theory. *Ecology* 79 (1): 94–105.
- Pool, D.B., Panjabi, A.O., Macias-Duarte, A. and Solhjem, D.M. 2014. Rapid expansion of croplands in Chihuahua, Mexico threatens declining North American grassland bird species. *Biological Conservation* 170: 274–281.
- Ridder, R.M. 2007. *Global forest resources assessment 2010: options and recommendations for a global remote sensing survey of forests*. FAO Forest Resources Assessment Programme Working Paper 141. FAO, Rome.
- Rippstein, G., Escobar, G. and Motta, F. (eds.) 2001. *Agroecología y biodiversidad de las sabanas en los Llanos Orientales de Colombia*. No. 322. Centro Internacional de Agricultura Tropical, Cali.
- Ryan, C.M., Pritchard, R., McNichol, I., Owen, M., Fisher, J.A. and Lehmann, C. 2016. Ecosystem services from southern African woodlands and their future under global change. *Philosophical Transactions of the Royal Society B: Biological Sciences* 371: 20150312.
- Salcedo, H.R. and Chaparro Barrera, A. 2019. Sobre los procesos de enseñanza-aprendizaje en el legado de los cantos de trabajo del llano, patrimonio cultural inmaterial de la Orinoquia. *Cultura, lenguaje y representación: revista de estudios culturales de la Universitat Jaume I* 21: 133–156.
- Suttie, J.M., Reynolds, S.G. and Batello, C. (eds.) 2005. *Grasslands of the World*. No. 34. Food and Agriculture Organization, Rome.
- Swarts, F.A. 2000. *The Pantanal of Brazil, Bolivia and Paraguay: Selected discourses on the world's largest remaining wetland system*. Paragon House, St. Paul, Minnesota.
- Van der Walt, L., Cilliers, S.S., Du Toit, M.J. and Kellner, K. 2015. Conservation of fragmented grasslands as part of the urban green infrastructure: how important are species diversity, functional diversity and landscape functionality? *Urban Ecosystems* 18 (1): 87–113.
- Volante, J.N. and Seghezze, L. 2018. Can't See the Forest for the Trees: Can declining deforestation trends in the Argentinian Chaco region be ascribed to efficient law enforcement? *Ecological Economics* 146: 408–413.
- WWF Brasil. 2018. *Ecological Risk Analysis of the Paraguay River Basin*. Brasilia.
- WWF-Netherlands. 2020. *Wereld Natuur Fonds (2020) Living Planet Report Nederland. Natuur en landbouw verbonden*. WWF. Zeist.



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