Biomes of Namibia

What is a biome?

- A biome is a broad ecological community of plants and animals within a specific region.
- Namibia has four different terrestrial biomes: desert, karoo, savanna and woodland, and two aquatic biomes: coastal/marine and wetlands.
- Regional climatic and topographic conditions such as rainfall, altitude, and rate of evaporation determine biomes.
- While one biome may be comprised of several different vegetation types, they share similar environments and ecological adaptations.
- Biomes are inter-dependent and interactive. They do not have definite borders, but transition zones along the edges of each biome.

What land uses are practiced in terrestrial biomes?

The four terrestrial biomes share many of the same land uses. As one moves from desert to karoo to savanna to woodland biome, certain activities, such as farming and agriculture, can be better supported by the biome. The land uses which are shared are as follows:

- Rangeland farming – communal and freehold and small- and largestock
- Agriculture – ranging from subsistence to commercial and some small scale irrigation
- Wildlife production – including trophy & sport hunting, cropping and sale
- Tourism & recreation – both in and outside of protected areas
- Mining and prospecting – both minerals and water resources
- Urban development and infrastructure
- Research and training

In the future the following uses will be important:

- Increased agriculture with improved irrigation methods and management
- Increased development and infrastructure
- Increased wildlife management and tourism

* *Many of these land uses also affect the aquatic biomes, and some uses are shared.*

Are the current uses of biomes sustainable?

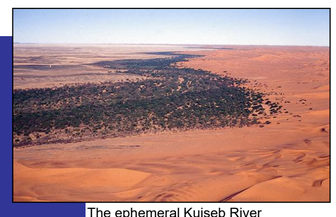
The majority of current and future land uses within all of Namibia's biomes are potentially sustainable. In order to become sustainable, proper planning, control and management practices must be implemented.

To promote sustainable management the correct policies and incentives need to be in place.

Wetlands

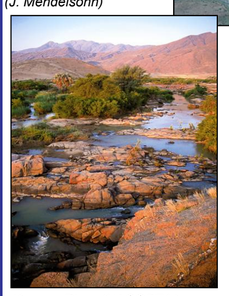
Characteristics

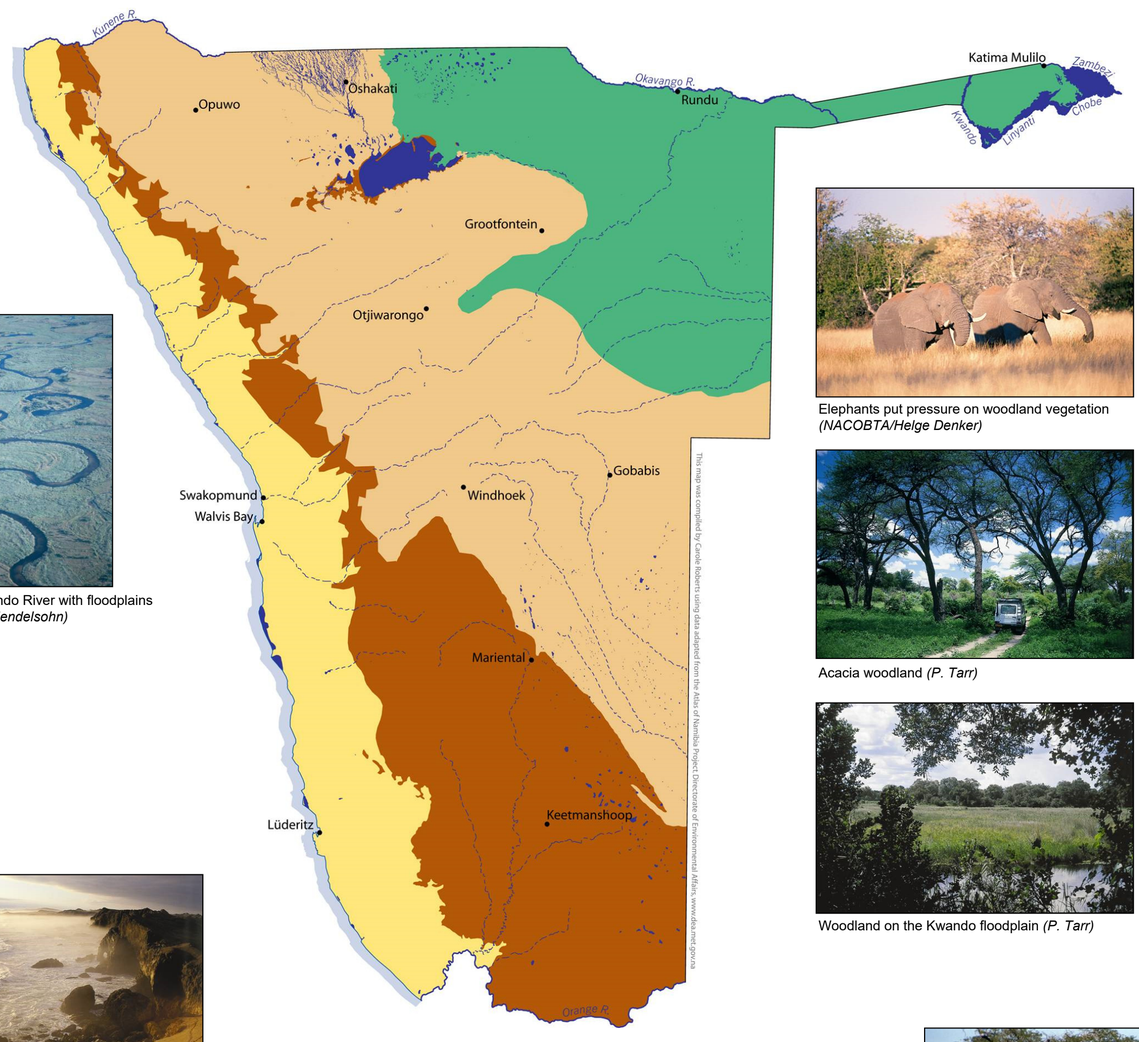
- Important sources of freshwater and vegetation
- Multiple habitats:
  - Perennial rivers – Kunene, Okavango, Zambezi, Kwando, Linyanti and Orange
  - Ephemeral rivers – Huab, Kuiseb, Ugab, etc.
  - Floodplains, e.g. along the Okavango and Zambezi Rivers
  - Ephemeral delta system, e.g. the Cuvelai Drainage System in the north-central regions
  - Pans, e.g. Etosha, being the largest, but many occurring in all four terrestrial biomes
  - Sinkholes, e.g. Otjikoto and Guinas lakes
  - Dams, e.g. Hardap and Von Bach dams
  - Swamps, e.g. Linyanti swamp
  - Marshes, e.g. at the confluence of the Okavango and Cuito Rivers
  - Vleis, e.g. Makuri pan
  - Springs, e.g. springs at Sesfontein
  - Estuaries – Kunene and Orange River mouths
- Typically highly productive systems
- Sensitive systems
- Important to the hydrology of an area (recharging of aquifers, etc.)
- Interact with all biomes (e.g. rivers, perennial or ephemeral rivers cut across terrestrial biomes)
- Pressured by water abstraction, over-exploitation, alien species and pollution
- Provides important resources to people, in addition to clean water, such as fish, reeds, lilllies, many fruiting and medicinal plants, etc.


The ephemeral Kuiseb River *(P. Tarr)*

Fishing on the Okavango *(J. Mendelsohn)*

Kwando River with floodplains *(J. Mendelsohn)*

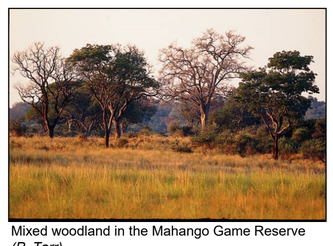

Kunene River *(NACOBTA/ Helge Denker)*



Elephants put pressure on woodland vegetation *(NACOBTA/Helge Denker)*

Acacia woodland *(P. Tarr)*

Woodland on the Kwando floodplain *(P. Tarr)*


Mixed woodland in the Mahango Game Reserve *(P. Tarr)*

Woodland

Characteristics:

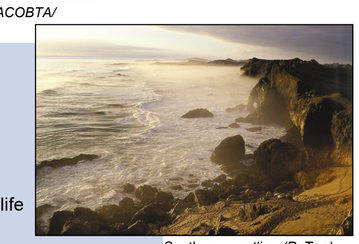
- Rainfall 450-700mm
- High species diversity, especially at interface with wetland biome
- Deciduous tree species are characteristic and include Zambezi teak (*Baikiaea plurijuga*), mopane (*Colophospermum mopane),* wild seringa *(Burkea africana)* as well as several *Acacia* species.
- High number of large mammals – 70% of Namibia's elephant population and the majority of buffalo and hippo populations
- Important to transboundary cooperation because ecosystems are shared and species move across national boundaries
- Deciduous woodlands tie up carbon, helping to combat global warming
- This biome is fire-dominated, but too much fire is damaging

Clearing in the Caprivi showing deforestation *(S. Bethune)*

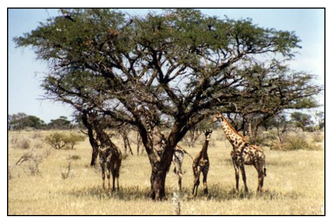
Coast/Marine

Characteristics:

- Cold current coastline – Benguela Current produces nutrient rich upwelling
- Highly productive system – supporting some of the highest concentrations of marine life in the world
- Multiple habitats
  - Littoral zone – from beach to low tide mark. Characterized by shallow water and large amount of light. Species include seaweeds, mussels, welks, limpets, rock lobsters, fish (including angling species) and breeding seal colonies.
  - Shelf zone – from low tide mark to end of continental shelf. Fish resources are concentrated here. Species include plankton, fish (e.g. pilchard, anchovy, hake), sea turtles, seabirds, seals, dolphins and whales.
  - Abyssal zone – from edge of continental shelf to deep ocean. Species include seabirds, whales, pelagic and deep sea fish.
  - Islands – islands off the coast provide safe breeding areas for nine different seabird species (e.g. penguins, gannets and cormorants) and one wader species.
  - Lagoons – Sandwich Harbor, Walvis Bay Lagoon
  - Estuaries – Kunene River mouth
- Pressured by over exploitation of fish resources, coastal diamond mining and pollution


Southern coastline *(P. Tarr)*

Sandwich Harbour *(P. Tarr)*

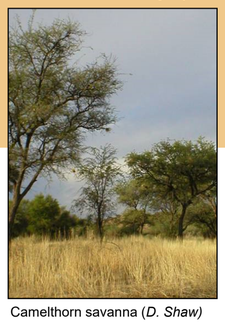

Giraffe browsing on *Acacia tortilis* *(D. Shaw)*

Kalahari savanna *(D.Shaw)*

Savanna

Characteristics:

- Rainfall 200-450mm
- Diversity of semi-arid savanna systems with eight vegetation types
- Savannas are dominated and characterized by *Acacia* species such as camelthorn (*Acacia erioloba)*, black thorn/swarthack (*Acacia melifera*) as well as mopane (*Colophospermum mopane)* in the north and northwest, shepard's tree (*Boscia albitrunca*) and a wide variety of grass species
- Dominant vegetation is fire-adapted
- This biome supports a high concentration of various species which are endemic to the region
- Supports large plains game of Africa – herd animals and predators
- Contains the headwaters and catchments of most ephemeral rivers in Namibia
- Due to variable climatic events and ephemerality, this biome is vulnerable to inappropriate management and over-use, resulting in degradation and loss of productive potential, also known as 'desertification'
- Bush encroachment in this biome is a significant environmental symptom of inappropriate management


Camelthorn savanna (*D. Shaw)*

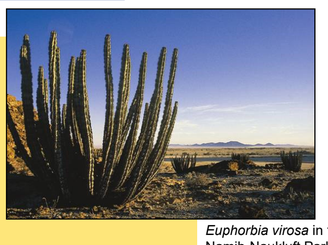
Land degradation from overgrazing is a threat to the savanna biome *(M. Muller)*

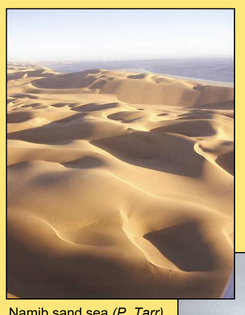
Desert

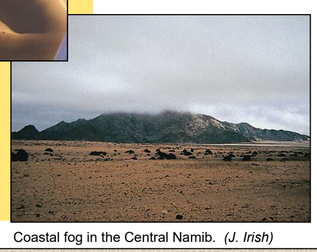
Characteristics:

- Low rainfall (less than 100mm) and lack of surface water
- Sparse vegetation – dominated by annuals, grasses (*Stipagrostis*) and dwarf shrubs
- Fragile soils
- Low primary production and low energy systems
- Large habitat diversity
  - Mountains, inselbergs
  - Gravel plains – North of the Kuiseb River
  - Sandy seas – South of the Kuiseb River
  - Succulent steppe – winter rainfall region
- This biome interacts with the coastal/marine biome, with coastal fog playing a vital role in supporting many plants and animals
- The ephemeral rivers, which cut across this biome, provide linear oases where large trees and water support many of the large mammals and other animals that are found in this unique desert
- Systems within this biome are extremely sensitive and fragile and prone to long-term degradation with long recovery periods

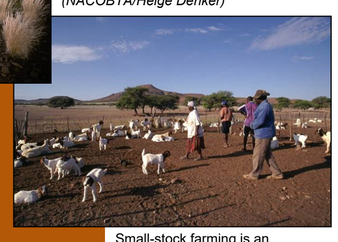
Gravel Plains near Cape Cross *(P. Tarr)*


Euphorbia virosa in the Namib-Naukluft Park *(P. Tarr)*


Namib sand sea *(P. Tarr)*


Coastal fog in the Central Namib. *(J. Irish)*

Karoo vegetation near Brukaros *(NACOBTA/Helge Denker)*


Small-stock farming is an important economic enterprise in arid areas. *(E. Parker)*

Karoo

Characteristics:

- Rainfall 100-200
- Vegetation is dominated by dwarf shrubs or 'Karoo bushes' such as three thorn Rhigozum (*Rhigozum trichotomum),* trumpet thorn *(Catophractes alexandri)* and *Eriocephalus* species and grass species (*Stipagrostis*)
- Harsh climate with large seasonal and daily temperature variations
- Lime-rich soils
- Less than 1% of this biome is conserved
- The fauna of this biome is species-poor, but in the 1800's it supported vast herds of springbok, which were reduced by hunting and fencing
- Sensitive to over-grazing and degradation which can lead to desertification

Fish River Canyon *(P. Tarr)*

Karoo vegetation in flower (D. *Shaw)*

What are the pressures on Namibia's biomes?

Many pressures and threats are shared by all of Namibia's biomes.

- Human population growth and poverty
- Unsustainable livestock production systems
- Growing demand for water
- The fragmentation of habitats and cutting off of nomadic and/or migratory patterns by human infrastructure (settlements, fencing, etc.)
- Degradation of key resources such as wetlands, sensitive vegetation and wilderness areas
- Unsustainable abstraction of resources (wildlife, veld-products, water, fish, etc.)
- Poorly planned urban development and infrastructure, including waste management
- Alien species

What can be done to reduce these pressures?

Several interventions and other actions can be taken to reduce the pressures on Namibia's biomes.

- Promote collaborative and integrated planning at all levels
- Secure additional land for conservation by state, private and communal management
- Create incentives for better land and natural resource management
- Promote enterprise and small business development
- Build awareness and capacity at all levels and on all issues

This poster was commissioned by the Namibia Nature Foundation and designed and compiled by Danica Shaw, Eco-Logic Environmental Management Consulting CC (061) 235460

TOTAL

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