

# Facts about Ingula's environment

8 000ha



area proclaimed  
as nature reserve

1 000ha



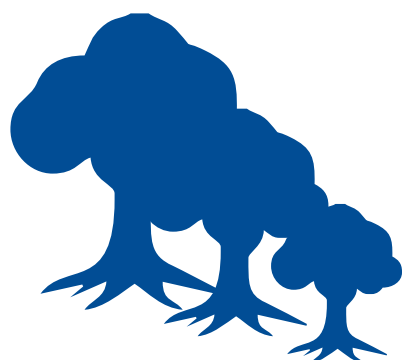
of wetland  
protected

three



critically endangered  
bird species

600+ha



of alien  
vegetation eradicated

110+km



of firebreaks  
prepared annually

100+km



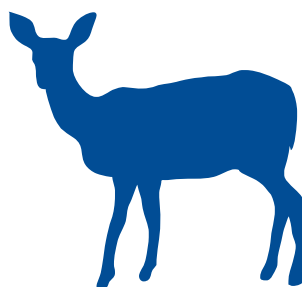
of historical erosion  
ditches under repair

320+



species of bird  
seen at Ingula

40+



species of mammal  
seen at Ingula

16+



species of reptile  
seen at Ingula

surveys



continuously  
done

three



endangered habitats

Ingula Pumped Storage Scheme

# Facts about Ingula's fossils

**255 million years**



age of **fossils** found  
at Ingula

**Pangea**



the name of the **super-continent**  
which included **Africa**

**95%**



of life on earth killed by the  
mass extinction at the end of the  
Permian period - called  
**'The Great Dying'**

**glossopteris**



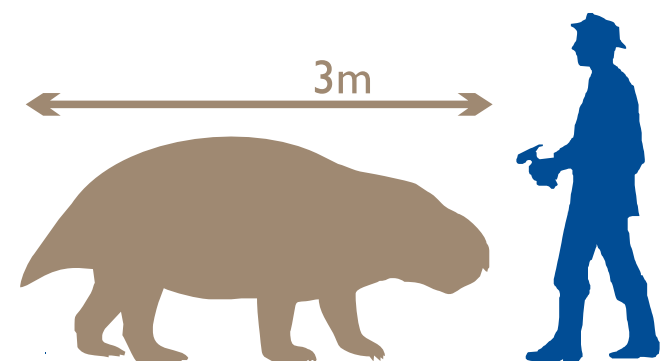
**fossilised leaves**  
were found in **large** quantities

**150+**



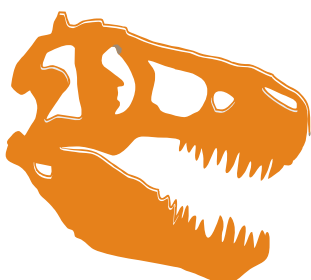
**vertebrate**  
fossils **recovered**

**dicynodon**



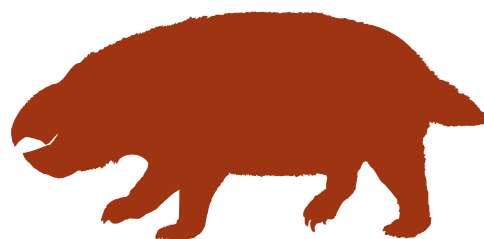
the type of **herbivores**  
discovered

**gorgonopsian**



the type of **carnivores**  
discovered

**dinanomodon**



the name of a possible  
**new species**  
of dicynodon found

**tree fossil**

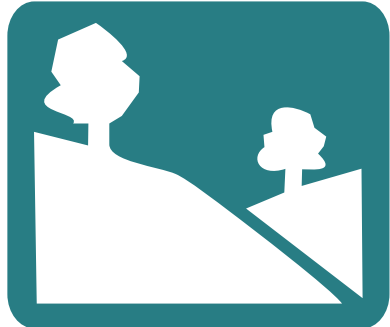


sections were found  
in **large** numbers

Ingula Pumped Storage Scheme

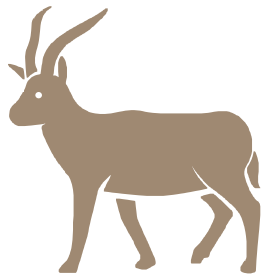
# Escarpment forests

320+ ha



of forests grow at altitudes of **800m up to 2100m** on **south-facing** ridges and in ravines where **moisture** is higher

17



**specialised** species **live** here - bushbuck is one such species

tallest

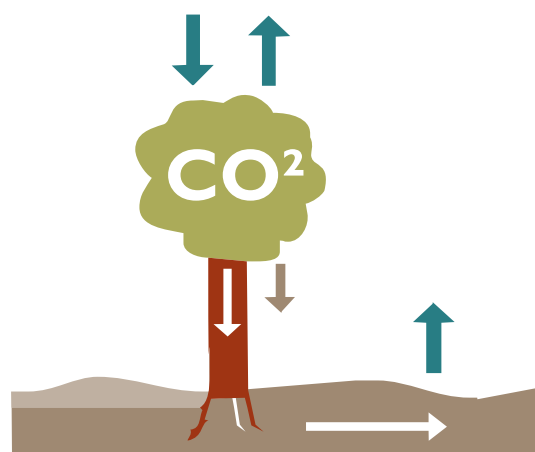


**indigenous** 'Real Yellowwood' trees grow at Ingula, up to **60m** tall

fire



**prevents** forests from **spreading** into **grassland** – limiting forests to moist, **fire-safe** habitats



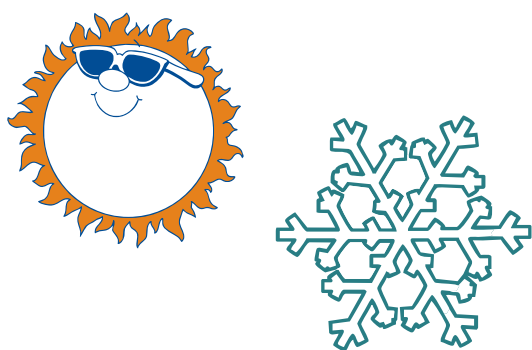
good at carbon **sequestration**

11 000



the number of **people** Ingula's forests provides **oxygen** for every year

habitat



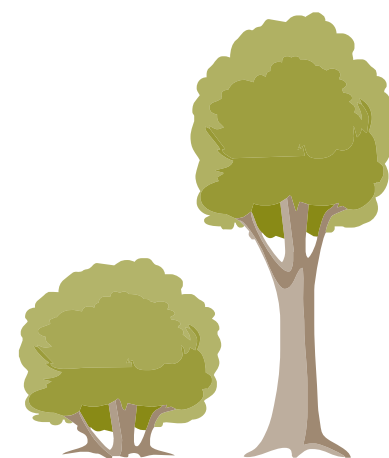
for altitudinal and seasonal **movement** of animals birds, and **refuge** during fires

water



is a **limiting** factor, restricting **trees** to kloofs and gullies

patches

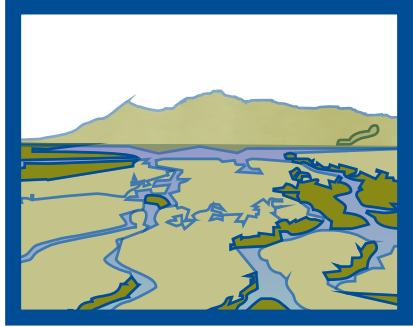


of forest are small to extensive, depending on **slope**, **geology** and **soils**

Ingula Pumped Storage Scheme

# Wetlands

1 000ha



of **high altitude** wetland,  
Wilge, Bedford and Chatsworth

37kg



of **CO<sup>2</sup>** is absorbed  
by every **hectare**,  
thus slowing the impact of  
**climate change**

four



**Olympic** swimming pools are  
absorbed by every **hectare**  
of wetland

habitat



for **specialised** plants  
adapted to **oxygen poor**  
conditions

2 Feb



**World Wetlands Day**  
is **celebrated** world-wide

draining



of wetlands for **agriculture**  
is a major **threat** to wetlands

home



of critically **endangered**  
bird species  
(White-winged Flufftail,  
Eurasian Bittern, Wattled Crane)

floods



are slowed down by wetlands  
**absorbing** water

filters

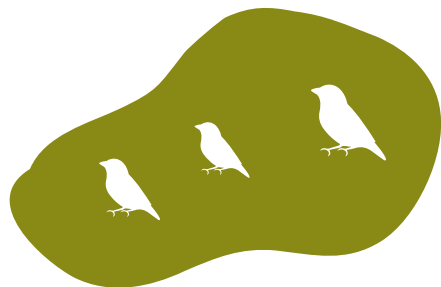


out **microbes** and  
excess nutrients added  
by **humans**

Ingula Pumped Storage Scheme

# Facts about Ingula's bird life

8 000ha



area proclaimed  
as nature reserve

three



endangered habitats  
**wetland, grassland** and  
**escarpment forest**

biodiversity



is very **high** at Ingula

IBA



status held by the  
Chatsworth and Bedford wetlands  
at Ingula's upper site  
(Important Birding and  
Biodiversity Area)

Partnership



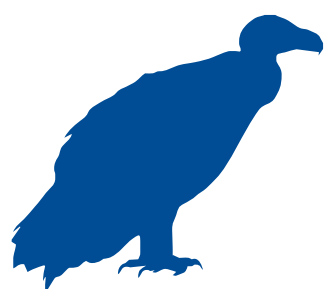
formed between Eskom  
**BirdLife South Africa** and  
**Middelpunt Wetland Trust**,  
since **2004**

320+



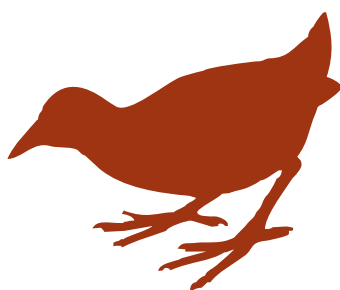
species of **bird**  
seen at Ingula

22



**threatened**  
species

three



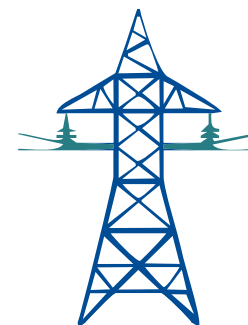
**critically** endangered species  
(Wattled Crane, Bearded Vulture and  
White-winged Flufftail)

surveys



continuously  
done to monitor  
species

mitigation



measures implemented  
to **minimise** the **impact**  
of power lines on birds

Ingula Pumped Storage Scheme



# Bedford Dam

## ‘Nature driven’

design of the dam due to the **sensitive environment**



5%

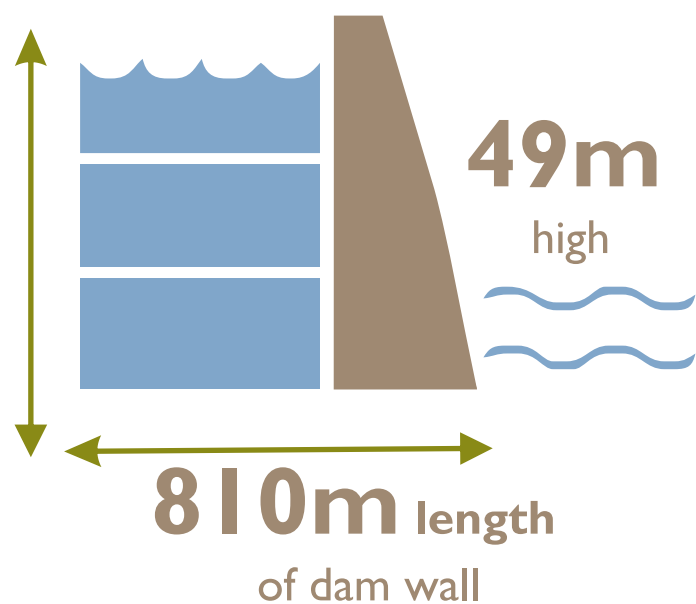


of **wetland** had to be **sacrificed** to build the dam

## Protection



of the wetland **downstream** of the dam wall by using an **innovative** design



## CFRD



concrete-faced rock-fill dam with a **22 million m<sup>3</sup>** capacity

11 km<sup>2</sup>



size of the **catchment** area of Bedford Spruit – the stream **feeding** the dam

36



soccer **fields** - the **surface** area when full (**255ha**)

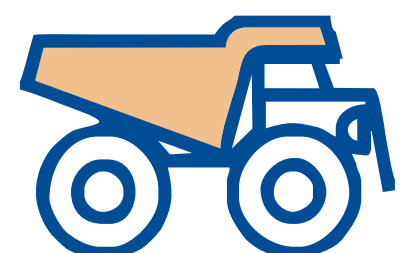


Winner



of CESA AON **Engineering Excellence** Awards in 2011 for **outlet** design

45 500

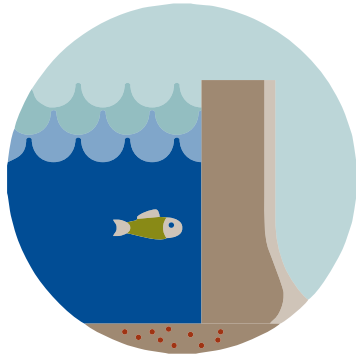


truck loads of **rock-fill**, (**1 050 000m<sup>3</sup>**) of sandstone, **quarried** from **inside** the dam basin

# Ingula Pumped Storage Scheme

# Bramhoek Dam

main



reservoir, on lower site with a **26,26** million m<sup>3</sup> capacity



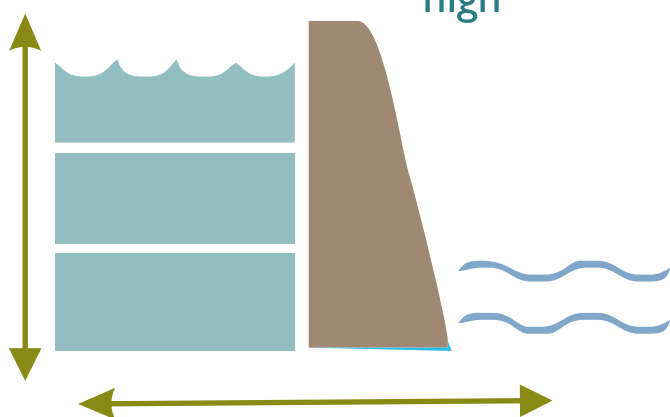
**year** - the time it took to **fill up**

**19**



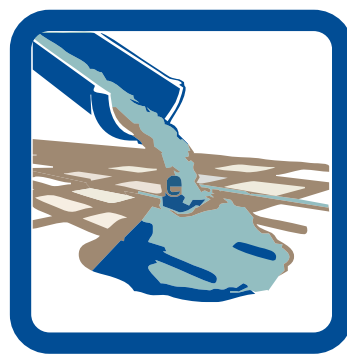
**million** cubic metres is used for generation called the '**live volume**'

**31,1m**  
high



**335m** length of dam wall

**81 800 m<sup>3</sup>**



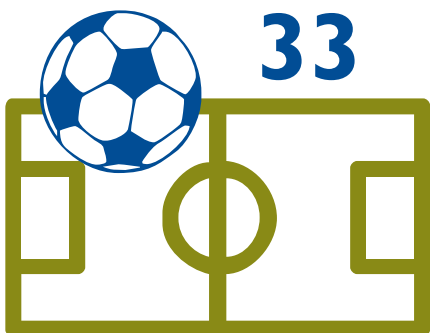
of **concrete** was used

**64km<sup>2</sup>**



size of the **catchment** area of Bramhoek Spruit – the stream **feeding** the dam

**33**



soccer **fields** - the **surface** area when full (**240ha**)



the **date** on which the river was **impounded**

**3 000**



**truck loads** of Roller Compacted Concrete (**RCC**) was used during **construction** (**67 000 m<sup>3</sup>**)

Ingula Pumped Storage Scheme

# Commitment to our community

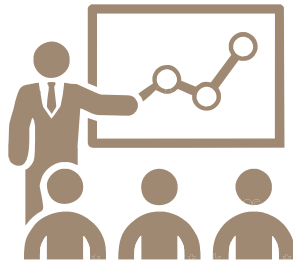


4500



people **employed** during construction

500



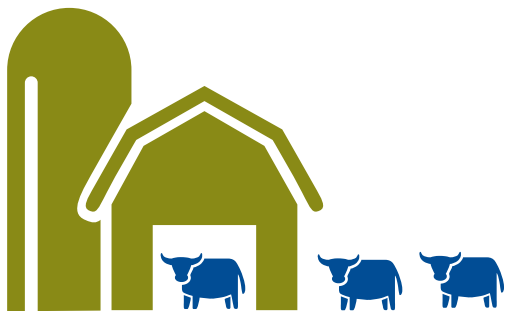
contractors trained through **Contractor Academy**

80%

of labour force **recruited** from **KwaZulu-Natal** and **FreeState**



five



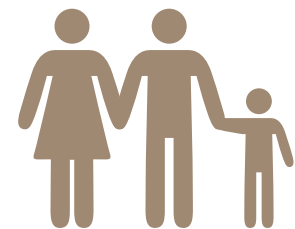
farms purchased for resettled families

eleven



new **homesteads** constructed for resettled **families**

4 000ha



of land **donated** to **resettled** families

5+



school buildings **renovate**

1 000+



bicycles donated to **school** children

Three



**computer** centres established in **rural** areas

## Ingula Pumped Storage Scheme



# Facts about Ingula

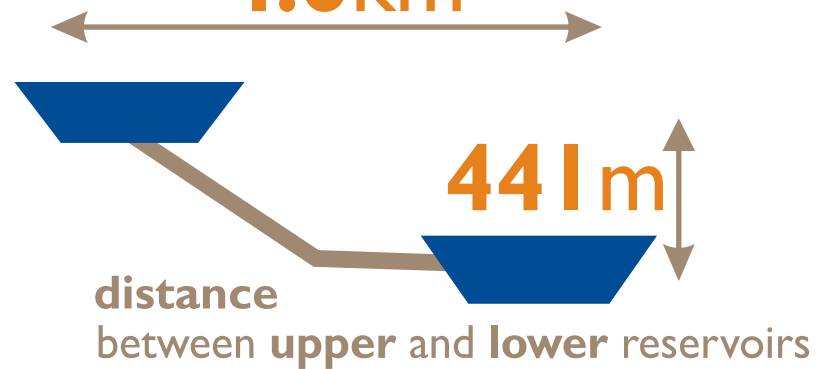


**1 332 MW**



is the **total** amount of electricity **produced** from **four** units each producing **333MW**

**4.6km**



**16 hours** of generation can be maintained

**116**



storeys, location of the **underground** power station

**15 000t**

of steel used in **steel linings**



**16km**

of **tunnels** constructed



**11 500 000m<sup>3</sup>**

rock **excavated** from tunnels, waterways and powerhouse complex



**8km**



of **waterways**

**largest**

man-made mudrock cavern in Africa with a length, width and height of **187m x 26m x 54m**



**10**

years, the time it took to **construct** Ingula, from **2006** to **2016**



**50** years expected operational **life**

## Ingula Pumped Storage Scheme