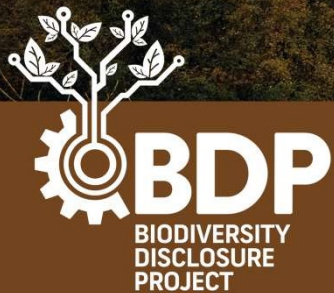




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Biodiversity and  
Business

[www.nbbnbdp.org](http://www.nbbnbdp.org)



# Corporate Biodiversity Accounting

**Dr. Gabi Teren & Luvuyo Kani, Biodiversity and  
Business, EWT**



# Tools and links between business and national targets

Introduction- Dr Gabi Teren, Programme Manager, NBBN.

- The EWT's National Biodiversity & Business Network (NBBN)

Biodiversity footprints and the Biological Diversity (BD) Protocol

- Mr Luvuyo Kani, GIS Specialist, NBBN
- The BD Protocol in Practice

The business case- Dr Gabi Teren

- For biodiversity accounting to enable meaningful target setting
- Opportunities to enable contributions from the private sector to national targets - stewardship
- 2 Warnings



# National Biodiversity & Business Network



**294** Companies

**4** Years



Biodiversity Disclosure Project



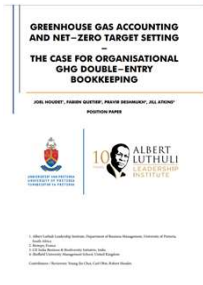
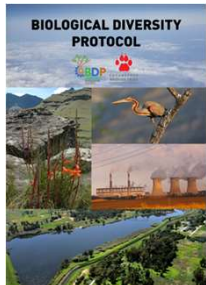
**40** Co-authors

**2** Years

Biological Diversity Protocol



Biodiversity Footprints



Thought Leadership



Network

Biodiversity  
Target Setting  
Training

**9** Modules

**5** languages

Capacity Building





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104/294

JSE listed companies and  
SOEs considered biodiversity  
as a material issue in 2021



# BIODIVERSITY PERFORMANCE RATINGS OF SOUTH AFRICAN COMPANIES

2021







		Acknowledgement	Disclosure	Commitment	Action	Opportunity
1	Spatial Planning	● ●	● ●	● ● ●	●	●
2	Restoration		●	●	●	
3	Conservation	●			●	
4	Species		●			
5	Wildlife Harvesting			● ●		
6	Invasive Species	● ●			● ●	
7	Pollution	● ●			● ●	●
8	Climate	●			●	● ● ●
9	Sustainable Use					
10	Agriculture & Forestry		●	● ● ● ●	●	
11	People	●		●	●	
12	Urban Areas					●
13	Access & Benefit Sharing					
14	Mainstreaming			●		
15	Business	● ●	● ● ● ●	● ●		●
16	Consumption	●		●	●	●
17	Biotechnology					
18	Subsidies					
19	Finance					●
20	Capacity Building	● ●				
21	Information	●				
22	Indigenous People	●				●
23	Gender					●



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# Biodiversity footprints and the Biological Diversity (BD) Protocol - Mr Luvuyo Kani, GIS Specialist, NBBN





# Biodiversity Footprint

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A biodiversity footprint refers to the total impact of an organization, project, region, service, or product on biodiversity (both positive and negative).



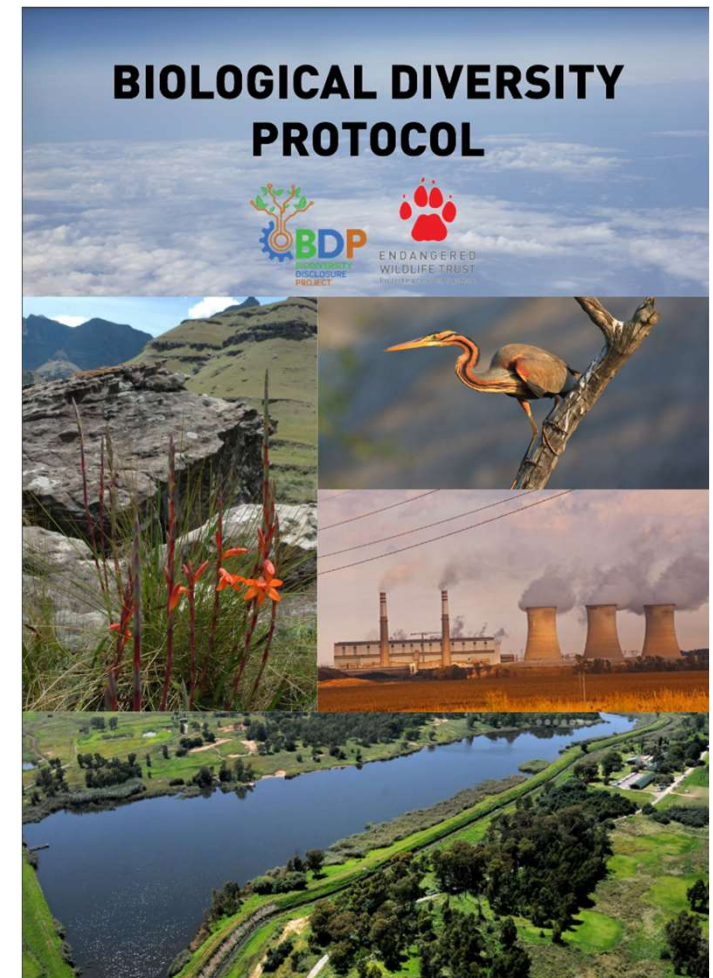


# Biological Diversity Protocol

- Increasing need for rigour in the sustainability space (i.e. providing evidence for claims).
- Corporate Natural Capital Accounting enables identifying, measuring, recording, summarizing, and reporting the (changes in the) state of nature.

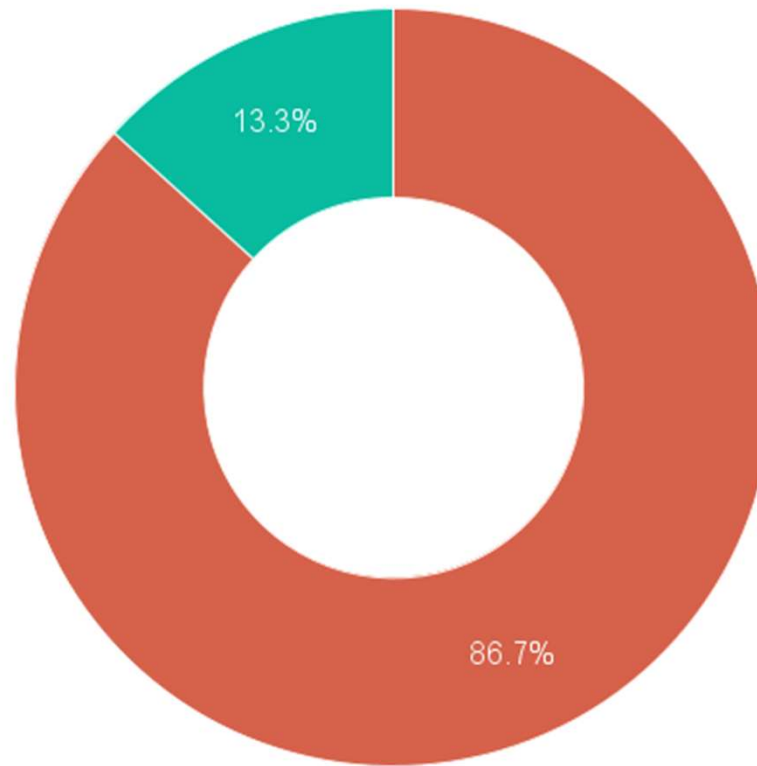
for each operation and ecosystem asset as part of the audit process to ascertain whether they meet their biodiversity targets.

- It enables **transparency, accountability**, and should be meaningful to management decision-making and corporate disclosure (audit trail).
- It produces Statements of both **Performance** (periodic changes) and **Position** (accumulated changes over time).
- Publicly available and globally recommended by





## Biodiversity Footprint at Acquisition



● Negative Footprint ● Positive Footprint



# BD Protocol Process





Set Assessment  
Boundaries

Develop Impact  
Inventory

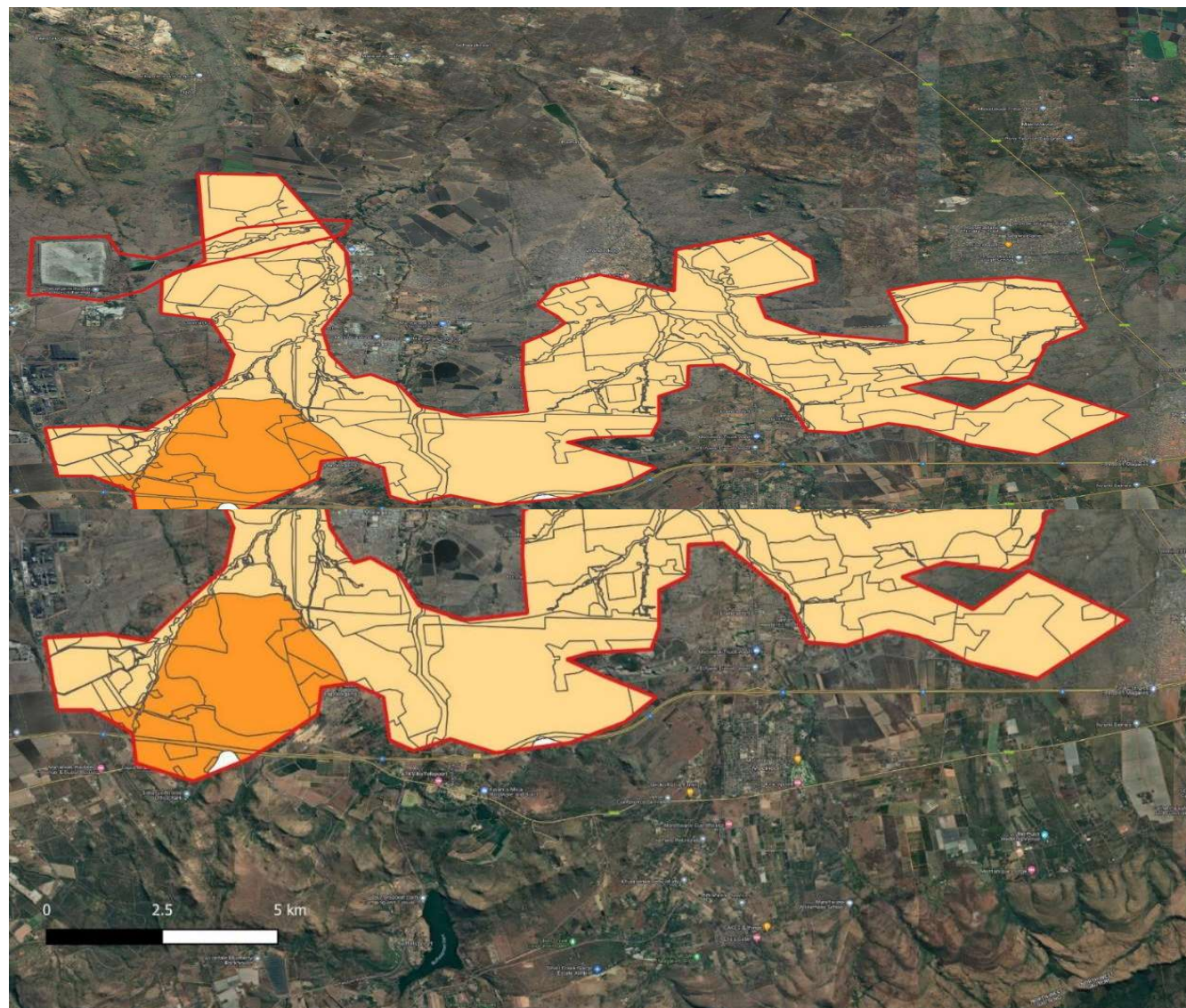
Assess Impacts

Measure Gains &  
Losses

Build Statements

Validate & Verify

Report & Manage



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 **Sibanye  
Stillwater**

-  Direct Operational Footprints
- Marikana BDP 2022 Ecosystem types
  -  Gold Reef Mountain Bushveld
  -  Marikana Thornveld
  -  Moot Plains Bushveld
  -  Norite Koppies Bushveld
-  Gold Reef Mountain Bushveld
-  Marikana Thornveld
-  Moot Plains Bushveld
-  Norite Koppies Bushveld

Map compiled by Dr Gabi Teren  
January 2023

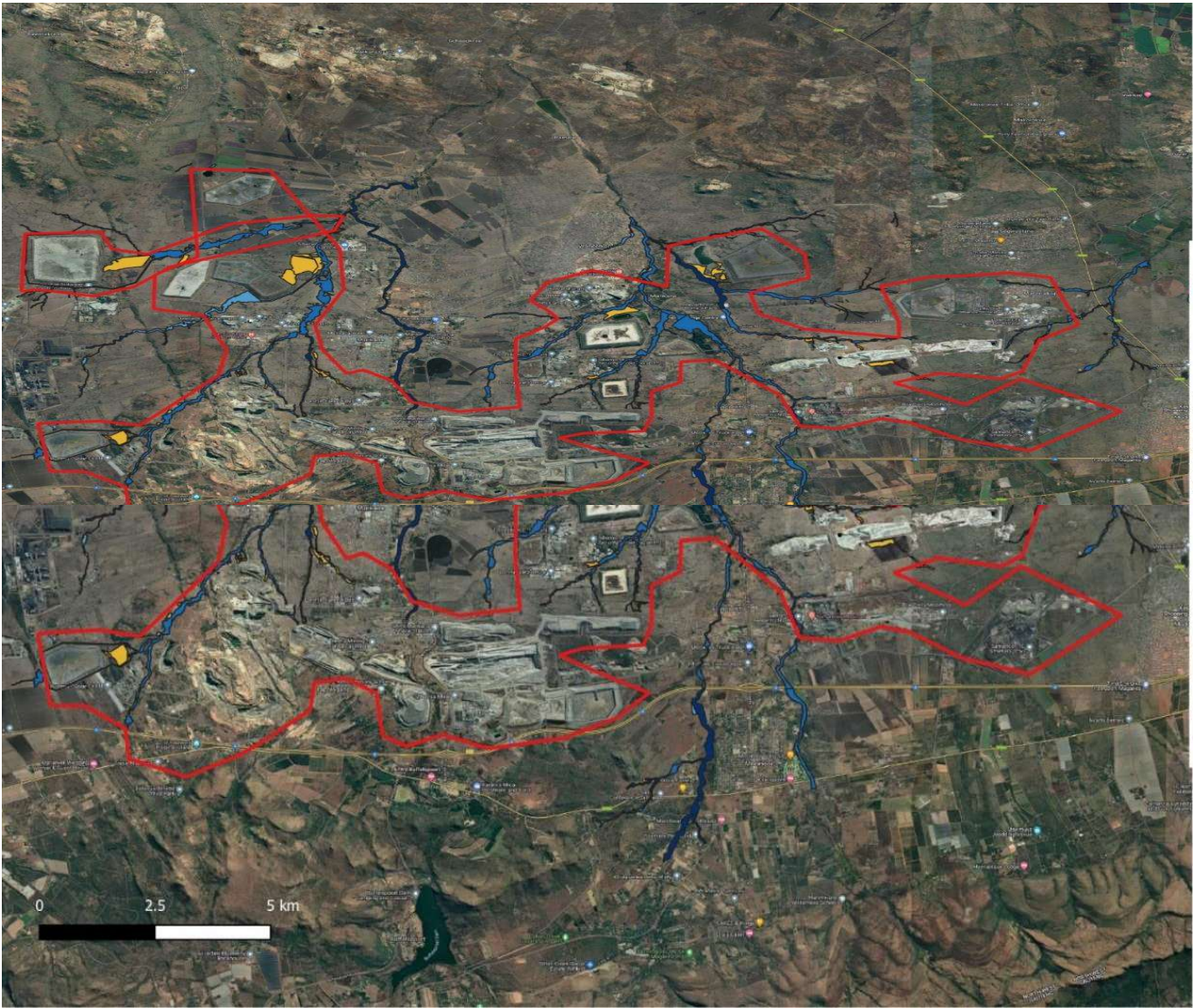
## Impact inventory:

- Includes all impacts on ecosystems
- Only impacts on material species, according to various criteria

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- Marikana
- Direct Operational Footprints
- 2023 new wetlands
- Wetland Watercourse Delineation PES scores
- C
  - D
  - E
  - Not Assessed
  - Artificial Wet Features Delineation
- Wetland Watercourse Delineation PES scores
- C
  - D
  - E
  - Not Assessed
  - Artificial Wet Features Delineation

Map compiled by Dr Gabi Teren  
January 2023



# State of Ecosystem Assets – Land Realm

## Condition scoring approach

Condition	Integrity	Land Use	Fragmentation / Connectivity	Ecological impacts
6	Reference State	Natural	No change in natural ecosystem structure, processes and biota have occurred (e.g. extinctions). Fully intact ecological functions across all scales (from genes, species, communities, ecosystems to landscapes).	
5	Very High	Natural	Very large (>100 ha) <b>intact</b> area for any conservation status of regional vegetation type. <b>High habitat connectivity</b> serving as functional ecological corridors, limited road network between intact habitat patches	<b>No or minimal current ecological impacts</b> (e.g. original species assemblages) with <b>no signs of major past disturbance</b> (e.g., ploughing).
4	High	Natural	Large (>20 ha but <100 ha) <b>intact</b> area for any conservation status of ecosystem type. <b>Good habitat connectivity</b> with potentially functional ecological corridors and a regularly used road network between intact habitat patches.	Only <b>minor current ecological impacts</b> (e.g. few livestock utilising area) with <b>no signs of major past disturbance</b> (e.g. ploughing) and <b>good rehabilitation potential</b> .
3	Medium	Semi-natural with signs of past disturbance	Medium (>5 ha but <20 ha) <b>semi-intact</b> area for any conservation status of ecosystem. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches.	Mostly minor current ecological impacts with <b>some major impacts</b> (e.g., established population of alien and invasive flora) and a <b>few signs of minor past disturbance</b> ; <b>moderate rehabilitation potential</b> .
2	Low	Transitional / Maintained	Small (>1 ha but <5 ha) area. <b>Almost no habitat connectivity</b> but migrations still possible across some transformed or degraded natural habitat; a very busy used road network surrounds the area.	<b>Several minor and major current ecological impacts. Low rehabilitation potential.</b>
1	Very Low	Transitional / Maintained	Very small (<1 ha) area. <b>No habitat connectivity</b> except for flying species or flora with wind-dispersed seeds.	<b>Several major current ecological impacts.</b>
0.05	None	Transformed living environment	<b>No habitat connectivity</b> except for flying species or flora with wind-dispersed seeds.	Monoculture agriculture / plantations
0	None	Transformed built environment	Completely transformed	Completely transformed e.g. mine, bare soil, buildings, road, quarry, etc.

Adapted from SANBI Functional Integrity Criteria 2020



# Biodiversity Footprint KPIs

## Ecosystems

- Corporates need to measure meeting their target
- Carbon offsets, credits, targets, disclosure all centered around shared, understood, integrated metric – CO<sub>2</sub> equivalent
- **Biodiversity Metric:** Ha equivalents (e.g. UN SEEA)
- NOT a universal unit – per ecosystem. More on measurement later.
- Each polygon per ecosystem has an assigned biodiversity state at a point in time

### ***Example:***

100 ha of a wetland ecosystem with a current condition of 2  
(pristine reference state is 6)

the **Total Biodiversity Footprint (TBF)** is 100 ha  
the **Positive Biodiversity Footprint (PBF)** =  $100 * 2 / 6 = 33.3$  ha  
equivalent (or 33.3% positive)  
the **Negative Biodiversity Footprint (NBF)** =  $100 - 33.3 = 67.7$  ha  
equivalent (or 67.7% negative)





Set Assessment  
Boundaries

Develop Impact  
Inventory

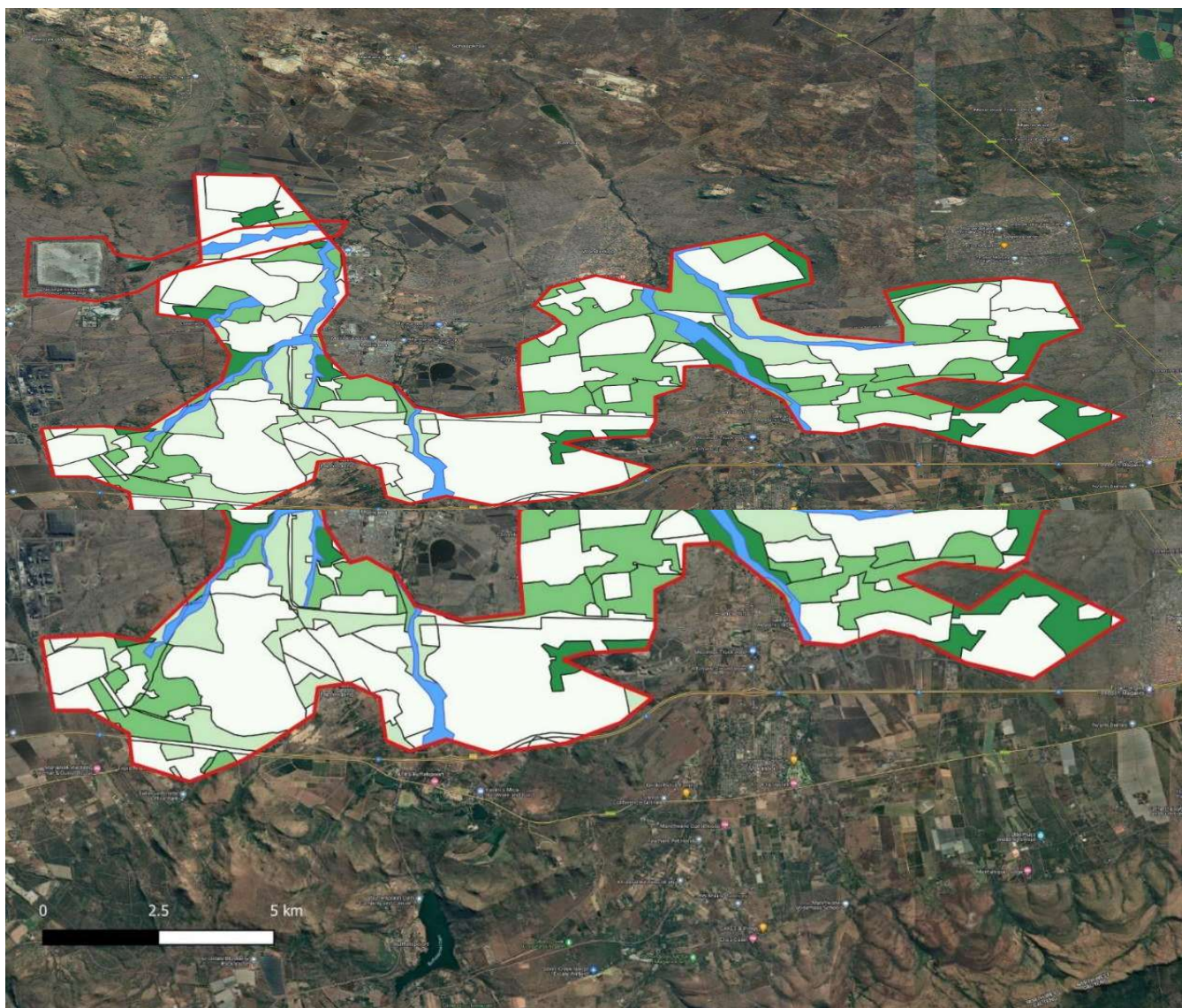
Assess Impacts

Measure Gains &  
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Validate & Verify

Report & Manage



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### Marikana

 Direct Operational  
Footprints

2021 Footprint as per  
the BD Protocol

2021 Wetland  
condition

 2.0


2021 Terrestrial  
condition

 0

 0.5


 the BD Protocol


2021 Wetland  
condition

 2.0

2021 Terrestrial  
condition

 0

 0.5

 1.0

 2.0

Map compiled by Dr Gabi  
Teren  
January 2023

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## 4. Measure gains and losses

Headline KPIS for impacts on ecosystems

- **Total Biodiversity Footprint** = sum of surface areas of ecosystems within impact inventory
- **Positive Biodiversity Footprint** = sum of surface areas adjusted for condition
- **Negative Biodiversity Footprint** = difference or gap between the Total Biodiversity Footprint (reference or pristine state of all surface areas) and the Positive Biodiversity Footprint (surface areas adjusted for condition)

- Example
- 100 ha of forests of condition 6 out of a maximum score of 10 (pristine or reference condition)
- **Total Biodiversity Footprint** = 100 Ha
- **Positive Biodiversity Footprint** =  $(6 * 100) / 10 = 60$  Ha eq.
- **Negative Biodiversity Footprint** = 100 ha eq. - 60 Ha eq. = 40 Ha eq.





## 4. Measure gains and losses

- **Does not need a** single metric for measuring biodiversity state is required for consolidation
- **Conversion tables** allow for different biodiversity state metrics to be translated into a **surface area adjusted for condition / integrity metric**: i.e. surface area equivalents

Ecosystem types	Area (ha)	Current condition score (2021)					Condition-adjusted surface area (Ha eq.) (Area (Ha) multiplied by A divided by B) (2021)
		Method	Current score (2021)	Reference state	A Converted score value (if needed)	B Reference state converted value (if needed)	
Vaal-Vet Sandy Grassland	273.95	NDVI	10%-40%	85%+	1	5	54.79
Vaal-Vet Sandy Grassland	256.88	NDVI	40%-55%	85%+	2	5	102.75
Western Free State Clay Grassland	180.57	NDVI	10%-40%	85%+	1	5	36.11
Western Free State Clay Grassland	224.74	NDVI	55%-70%	85%+	3	5	134.84
Highveld Alluvial	125.06	WET-Health	B	A	4	5	100.05
Highveld Alluvial	75.12	WET-Health	E	A	1	5	15.02
Vaal-Vet Sandy Grassland (riparian)	10.9	WET-Health	F	A	0	5	0
Vaal-Vet Sandy Grassland	1587.21	MSA	0.25	1	0.25	1	396.8
Vaal-Vet Sandy Grassland	290	MSA	0.5	1	0.5	1	145
Namaqualand Heuweltjie Strandveld	435.5	1 - 10 survey based	7	10	7	10	304.85
<b>Total</b>	<b>3468.93</b>					<b>Total (Ha eq.)</b>	<b>1290.23</b>



Set Assessment Boundaries	Develop Impact Inventory	Assess Impacts	Measure Gains & Losses	Build Statements	Validate & Verify	Report & Manage
---------------------------	--------------------------	----------------	------------------------	------------------	-------------------	-----------------

Journal entries	Accounting events	Account	Account category	Ecosystem Asset	Condition score	DR	CR
(a) Reference state							
1	Accounting for reference state of new ecosystem assets (boundary adjustments), which underpins their subsequent condition scoring	Ecosystem asset (Ha)	A (Statement of Biodiversity Position)	Marikana Thornveld	5	156.70	
				Gold Reef Mountain Bushveld	5	19.53	
				Moot Plains Bushveld Wetland	5	3.32	
				Norite Koppies Bushveld	5	0.84	
		Periodic gains (Ha eq.)	Y (Statement of Biodiversity Performance)	Marikana Thornveld	5		156.70
				Gold Reef Mountain Bushveld	5		19.53
				Moot Plains Bushveld Wetland	5		3.32
				Norite Koppies Bushveld	5		0.84
(b) At time of assessment							
2	Stock tacking of Marikana Thornveld assets, according to their condition scores (increase in asset sizes due to boundary adjustments)	Ecosystem asset (Ha)	A (Statement of Biodiversity Position)	Marikana Thornveld	0	41.84	
					0.5	16.30	
					1		206.77
					2	125.58	
					3	179.75	
3	Stock tacking of Gold Reef Mountain Bushveld assets, according to their condition scores (increase in asset sizes due to boundary adjustments)	Ecosystem asset (Ha)	A (Statement of Biodiversity Position)	Gold Reef Mountain Bushveld	5		156.70
					0		0.08
					1	19.61	
4	Stock tacking of Moot Plains Bushveld Wetland assets, according to their condition scores (increase in asset sizes due to boundary adjustments)	Ecosystem asset (Ha)	A (Statement of Biodiversity Position)	Moot Plains Bushveld Wetland	5		19.53
					2	3.32	
5	Stock tacking of Norite Koppies Bushveld assets, according to their condition scores (increase in asset sizes due to boundary adjustments)	Ecosystem asset (Ha)	A (Statement of Biodiversity Position)	Norite Koppies Bushveld	5		3.32
					2	0.84	
6	Recording condition-adjusted losses and gains associated to 2022 condition scores of Marikana Thornveld assets	Periodic losses (Ha eq.)	Z (Statement of Biodiversity Performance)	Marikana Thornveld	5	156.70	
		Accumulated negative Impacts (Ha eq.)	C (Statement of Biodiversity Position)	Marikana Thornveld	5		0.84
					0		41.84
					0.5		14.67
					1	165.42	
					2		75.35
		Periodic gains (Ha eq.)	Y (Statement of Biodiversity Performance)	Marikana Thornveld	3		71.90
			Z (Statement of Biodiversity Performance)	Marikana Thornveld	0.5		1.63
			Y (Statement of Biodiversity Performance)	Marikana Thornveld	1	41.35	
							50.23





## 4. Build your statements

Statement of Biodiversity Position  
(or Biodiversity Balance Sheet):

*Biodiversity assets or Total  
Biodiversity Footprint (A) =*

*accumulated positive impacts or  
Positive Biodiversity Footprint (B)*  
+

*accumulated negative impacts or  
Negative Biodiversity Footprint (C)*

or

$$A = B + C$$

Statement of Biodiversity  
Performance (or Biodiversity Net  
Impact statement):

*Net biodiversity impacts (X) =*

*periodic Positive Impacts / Gains  
(Y) -*

*periodic Negative Impacts / Losses*

or

$$X = Y - Z$$



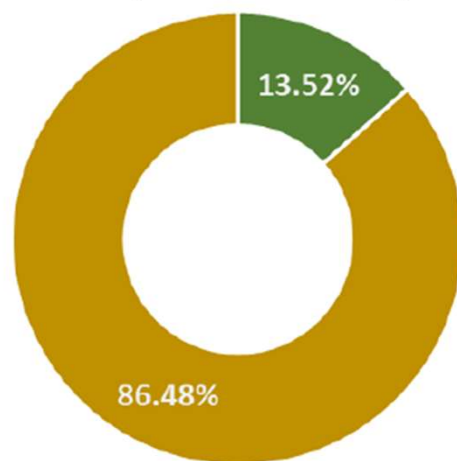
# Headline KPIs per operation, ecosystem and group level

	Total Biodiversity Footprint (TBF, in Ha)	Positive Biodiversity Footprint (PBF, in Ha eq.)	Negative Biodiversity Footprint (NBF, in Ha eq.)
Beatrix - Rietpan	1,463.34	302.52	1,160.83
Beatrix 123 shafts	2,789.31	216.56	2,572.75
Beatrix 4 Shaft	2,441.43	121.74	2,319.7
Blueridge	1,085.54	418.8	666.74
Burnstone	1,031.25	212.83	818.42
Driefontein - Abe Bailey Extension	881.18	250.02	631.16
Driefontein - North of Gatsrand	6,459.13	636.06	5,823.07
Driefontein - South of Gatsrand	1,922.53	456.92	1,465.61
Ezulwini	870.14	49.19	820.95
Kloof - Main, 4 & 7#	3,438.46	353.75	3,084.71
Kloof - 8#	331.31	13.62	317.69
Kloof - No 3 Shaft	32.4	0	32.4
Kloof - Libanon	493.12	19.91	473.21
Kloof - Venterspost	1,571.63	176.57	1,395.06
Kroondal	686.04	45.79	640.25
Marikana	11,472.55	1,181.35	10,291.19
Rand Uranium	5,952.38	292.15	5,660.23
RPM	5,262.91	438.42	4,824.5

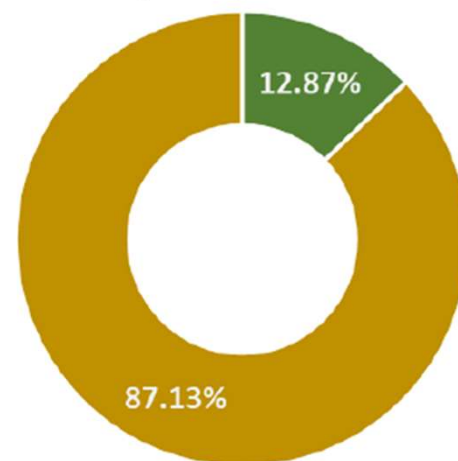


## Tracking changes to meet targets

Biodiversity Footprint at acquisition   Biodiversity Footprint at assesment



■ Positive Footprint  
■ Negative Footprint



■ Positive Footprint  
■ Negative Footprint



# The Business Case

Biodiversity stewardship for meeting targets

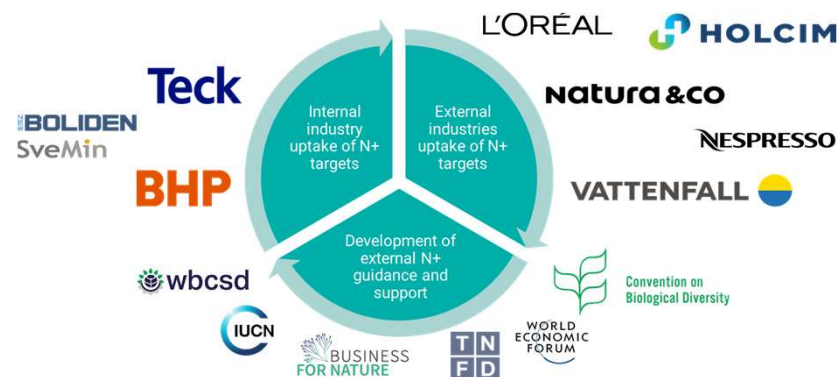
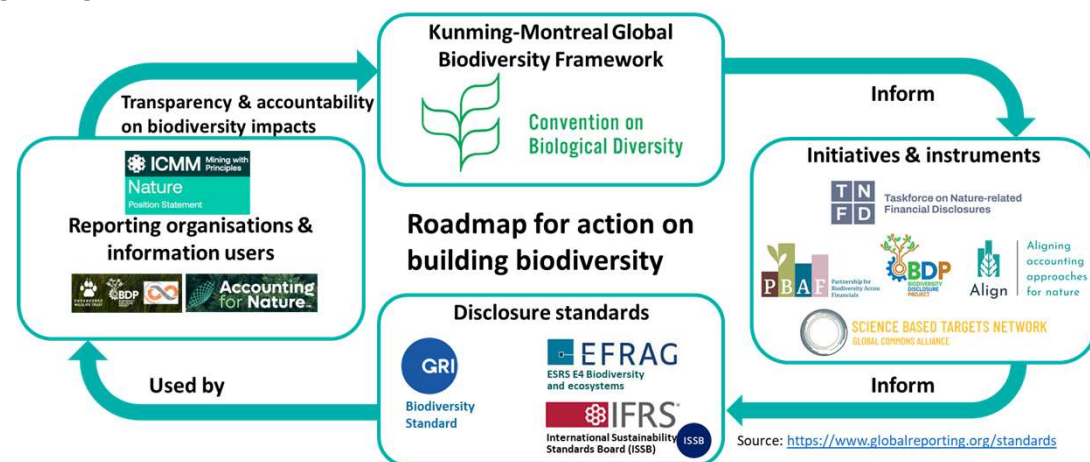




# Global action towards a nature positive future

## The need for action on nature – the business perspective

- Global nature assessments are increasingly comprehensive and robust
- Nature is in decline and the world is calling for action on nature positive outcomes
- Fast-paced development for drivers towards nature positive action is continuing (GRI Biodiversity Standard, Accounting for Nature Standard)
- There is a clear rise in the ambition and adoption of nature positive targets, both inside and outside of the mining industry



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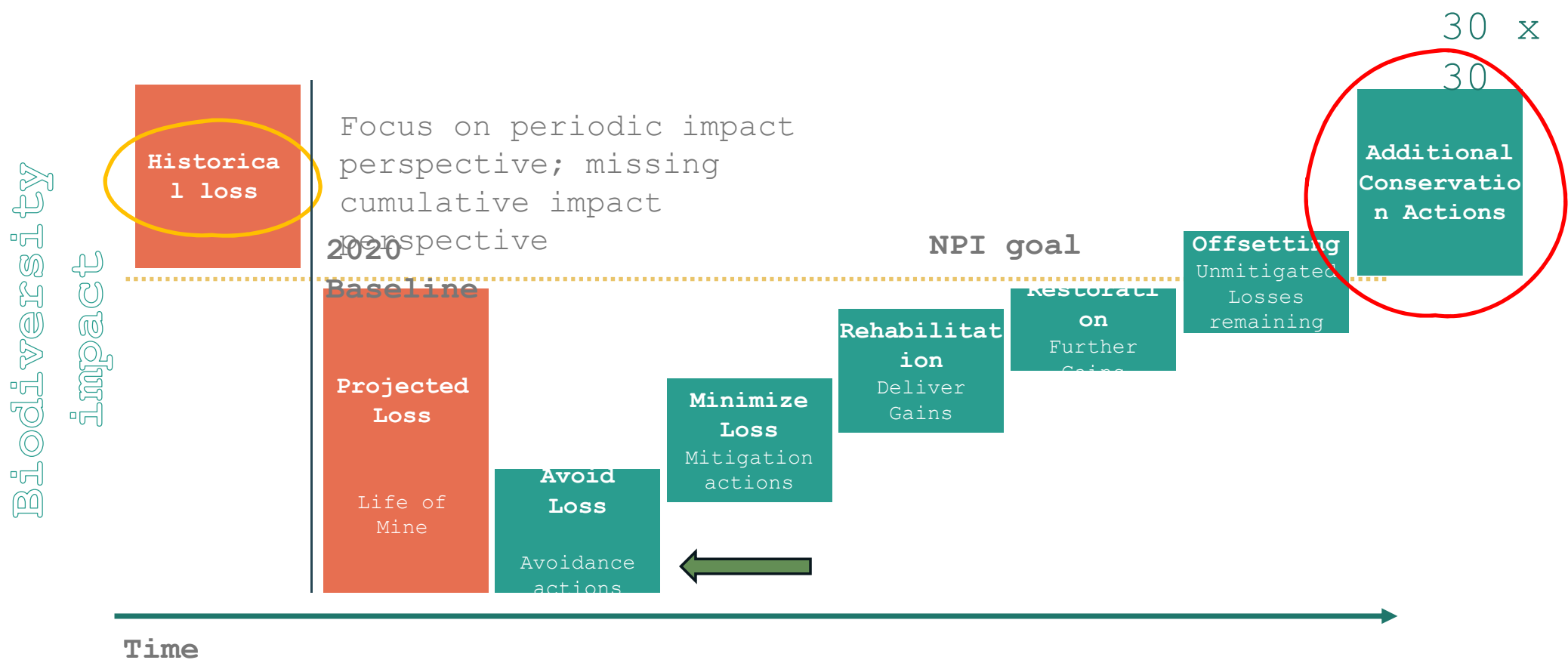
## Setting the scene

- Target 15 of the Global Biodiversity Framework requires companies to assess, disclose and reduce biodiversity-related risks and negative impacts and **increase positive impacts**
- Enhanced Biodiversity stewardship (including OECMs) and NPAES in South Africa is going to be critical for meeting **Target 3 (30x30)** and this needs resourcing
- Corporates supporting stewardship initiatives – can either be CSI (Voluntary for-good) OR **contribute to their own internal BD targets.**
- We have learned many lessons from working on corporate biodiversity targets and for over 2.5M Ha across the globe
- 2024-2025 will be the year of NATURE POSITIVE commitments- eg ICMM, IPICEA, TNFD
- The role of auditing will be increasingly important- need **verifiable, transparent, robust** accounting in meeting commitments and good BD data.
- We believe biodiversity should be recognised for its own **intrinsic value** (agnostic accounting) before valuation



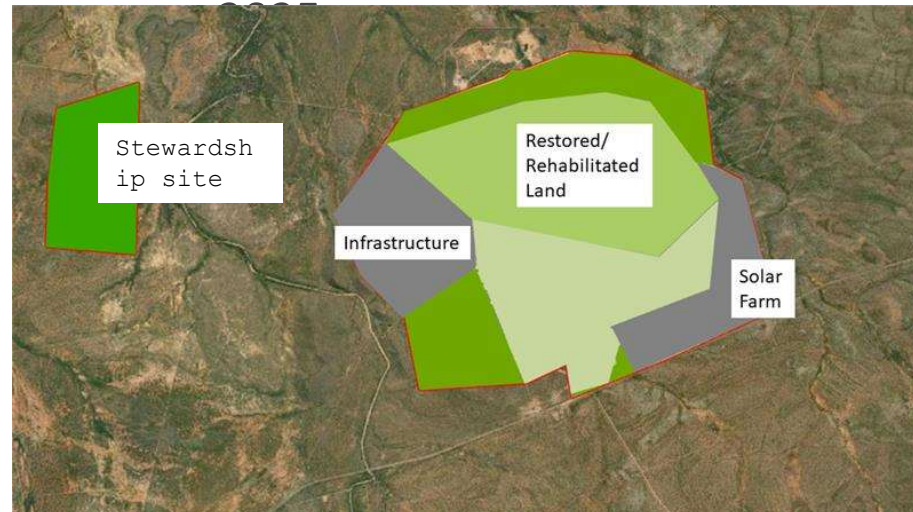


# Where do corporate targets of NPI, NNL fit in?



## Net Positive Impact 2025 progress scenario

- Fictitious Mine change from current to 2025
- Changes: one rehab area, one solar farm project transformation, purchase of 500 Ha stewardship site in good condition






# Net Positive Impact 2025 progress scenario with accounting

ASSETS (A ACCOUNTS)		Current (2023)		2025		2023-2025 net change
Ecosystem type		Condition score	Surface area (Ha)	Condition score	Surface area (Ha)	
Terrestrial	Musina Mopane Bushveld	0	1089.68	0	378.00	-711.68
Terrestrial	Musina Mopane Bushveld	1	112.95	1	368.00	255.05
Terrestrial	Musina Mopane Bushveld	2	158.80	2	540.00	381.20
Terrestrial	Musina Mopane Bushveld	3	117.11	3	192.00	74.89
Terrestrial	Musina Mopane Bushveld			4	250.00	250.00
Wetland	Musina Mopane Bushveld	3	2.13	2	2.13	0.00
Terrestrial	Limpopo Ridge Bushveld	0	903.85	0	250.00	-653.85
Terrestrial	Limpopo Ridge Bushveld	1	109.42	1	418.00	308.58
Terrestrial	Limpopo Ridge Bushveld	2	61.31	2	247.00	185.69
Terrestrial	Limpopo Ridge Bushveld	3	123.73	3	283.00	159.27
Terrestrial	Limpopo Ridge Bushveld			4	250.00	250.00
			2678.98		3178.13	499.15

New stewardship site  
NPI Not achieved  
New stewardship site

Totals	Current state (2023)		2025		2023-2025 net change
ASSETS (TOTAL BIODIVERSITY FC	2678.98	100.00%	3178.13	118.63%	499.15
ACCUMULATED POSITIVE IMPAC	231.92	8.66%	964.88	36.02%	732.96
ACCUMULATED NEGATIVE IMPA	2447.06	91.34%	2213.25	82.62%	-233.81

NPI achieved overall



# Win-win scenarios for conservation and corporation through corporate BD accounting

For corporates:

- They will weigh up the cost/benefits for: 1) not meeting targets, 2) risk screening for sites, 3) rehabilitation vs off-site areas, 4) long-term financial risk, 5) achieving value (payment for ES, tax incentives, etc.)
- To achieve targets from offsets, legal implications apply – and these differ per country and at a group level. They need to understand the intricacies.

For conservation:

- Need to ensure sustainable resources for post-declaration support
- Need to ensure large-landscape connectivity and apportionment of responsibility
- Need to prevent greenwashing





## Win-win scenarios: 2 warnings to heed

1. What does nature positive mean for NCA?
2. Good BD data for CNCA



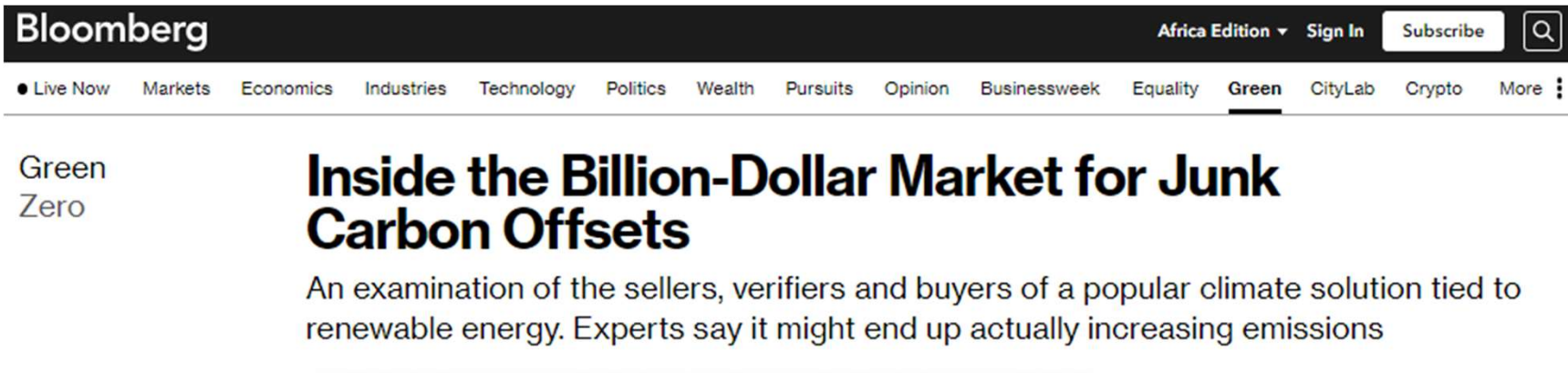
## Biodiversity Credits Rejected by ESG Body in New Guidelines

By Sheryl Tian Tong Lee

May 24, 2023 at 12:00 PM GMT+8

For global companies newly concerned about their impact on plants and animals, an influential standards-setting body has barred one of the easiest remedies: so-called biodiversity offsets, which allow firms to counterbalance their environmental impact in one place with conservation efforts elsewhere.

The Science Based Targets Network, a sibling organization to the emissions-focused Science Based Targets initiative, has released guidance for companies looking to establish "nature targets," or plans to reduce negative effects on the natural world.

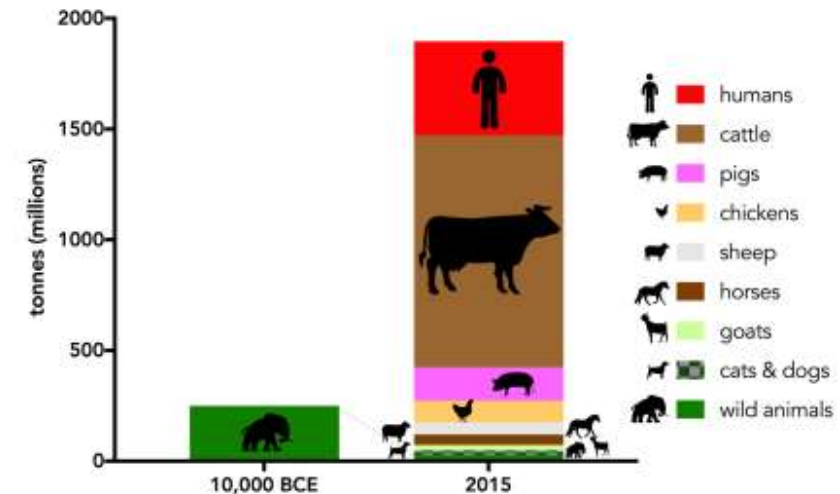
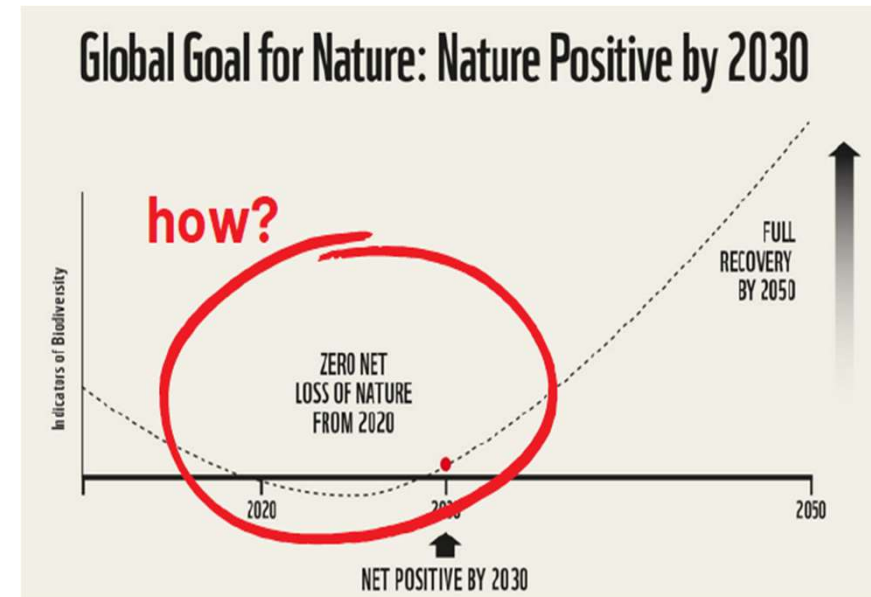


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# 1. Nature Positive and CNCA?

- It suggests all losses and gains are equivalent and can be aggregated, disregarding ecological equivalency principle
- It narrowly focuses on periodic changes from a 2020 baseline, disregarding accumulated human-induced losses
- Shifting baseline syndrome / what reference state for full recovery?



Paul Cherukha 2015



## Potential Solution:

Companies should have targets from both a periodic perspective and an accumulated one.

- A **periodic impact perspective** (Statement of Biodiversity Performance)
  - targets are based on expected NNL NPI changes in the state of individual biodiversity assets from a chosen baseline.
- From an **accumulated impact perspective** (Statement of Biodiversity Position),
  - E.g. 30% Positive Biodiversity Footprint ratio per biodiversity asset category and overall

## Key Principles

- Start from **ecosystem asset register** => net impact per asset category
- Use **mitigation hierarchy** (avoidance, minimisation, restoration, offset & voluntary conservation measures) to drive action plan, budgeting
- Focus on **threatened** and / or **(less well or un-protected ecosystems)**
- Organisational Boundary NB and legal ramifications for offsets/ voluntary contributions









Dataset Name	Biodiversity Intactness Index (BII)	Mean Species Abundance (MSA)	Ecosystem Integrity Index (EII)	Ecoregion Intactness Index (ERII)	Ecosystem Health Index (EHI)
Source link	<a href="#">Newbold et al (2016)</a> , <a href="#">Hill et al (2018)</a> , <a href="#">Philips et al (2021)</a> , <a href="#">Gassert et al (2022)</a>	<a href="#">Schipper et al (2020)</a>	<a href="#">Hill et al (2022)</a>	<a href="#">Beyer et al (2019)</a>	<a href="#">Rowland et al (2019)</a>
Date published (temporal range of data)	2021-22 (2005, 2017-2020)	2020 (2015)	2022 (2016-2021)	2019 (2009)	2019 (based on Red List assessment conducted)
Description	The population abundance of all major terrestrial taxonomic groups of animals and plants currently compared to that which would have occurred in the area before alteration by modern industrial society.	Biodiversity intactness represented as mean species abundance for plants, mammals and birds, and is a function of anthropogenic drivers.	The extent to which the composition, structure, and function of an ecosystem fall within their natural range of variation.	The ability of a habitat (both biotic and abiotic components) to support communities of species in an ecosystem.	Uses relative severity of change in ecosystem-specific variables and extent of the ecosystem affected to quantify transitions toward or away from ecosystem collapse.
Accessibility for ArcGIS data systems	Available as a raster layer	Available as a raster layer	Currently unavailable: requires own calculation based on component datasets	Available as a raster layer	Currently unavailable: requires own detailed calculation; depends on Ecosystem Red List assessments (typically at national scale)
Spatial scale	100m x 100m / 1km x 1km	300m x 300m	1km x 1km	1km x 1km	Ecosystem scale
Ecological equivalency	Equivalent to scale of Realm – Terrestrial	Equivalent to scale of Realm – Terrestrial	Equivalent to scale of Realm – Terrestrial	Equivalent to scale of Realm – Terrestrial	Ecosystem scale
Impact baseline	Modelled based on pressure-abundance relationships	Modelled based on pressure-abundance relationships	BII and Human Footprint Index (HFI) are modelled. Net Primary Productivity (approximate to the biomass of plants) is used as a broad proxy for ecosystem function	Models pressures only using the Human Footprint Index as a proxy for habitat quality	Measures impacts and risks (spatial and functional) referenced to the original ecosystem
Biodiversity component	Composition only	Composition only	Composition, structure, and function	Structure only	Potentially structure or composition and function

## 2. Good Biodiversity Data for CNCA:

- Best method per Ecosystem (not land-use)
- Both terrestrial and water realms
- Clear date of data acquisition to show changes from baseline
- It needs a scale relevant to a reference state (pristine) of that ecosystem.
- Spatial scale
- Best is ground-based, but this is expensive and we need to upskill Environmental Assessment Practitioners

We are working on producing a global remote-sensing CNCA-index based off verified data with accuracy assessment for complex systems





What is the path forward? Capacity building and building collaborations and partnerships and common, shared understanding

Thank You  
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