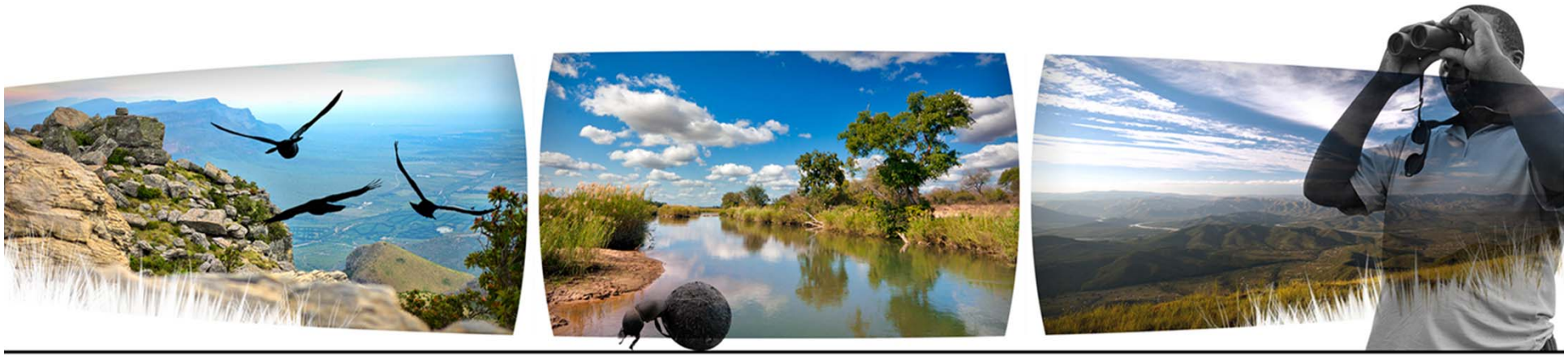
# Testing the IUCN Red List of Ecosystems methodology on South African datasets

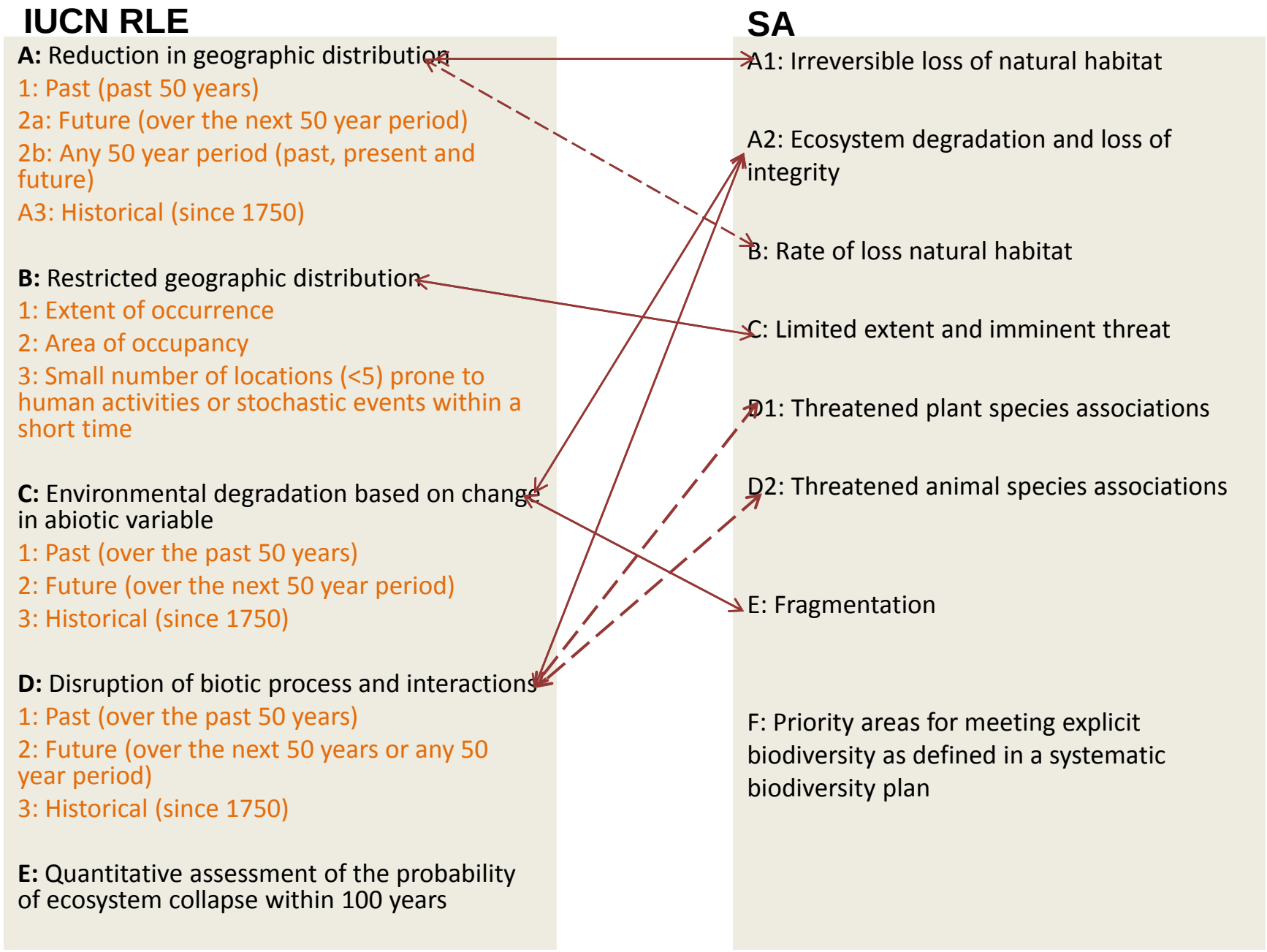
Maphale Matlala & Andrew Skowno
M.Matlala@sanbi.org.za



SANBI
Biodiversity for Life
South African National Biodiversity Institute

14th National Biodiversity Planning Forum
20–23 June 2017
Nombolo Mdhluli Conference Centre, Skukuza Camp, Kruger National Park

# Criteria linking



# Cont…

## IUCN RLE

**A:** Reduction in geographic distribution

1: Past (past 50 years)

2a: Future (over the next 50 year period)

2b: Any 50 year period (past, present and future)

A3: Historical (since 1750)

**B:** Restricted geographic distribution

1: Extent of occurrence

2: Area of occupancy

3: Small number of locations (<5) prone to human activities or stochastic events within a short time

**C:** Environmental degradation based on change in abiotic variable

1: Past (over the past 50 years)

2: Future (over the next 50 year period)

3: Historical (since 1750)

**D:** Disruption of biotic process and interactions

1: Past (over the past 50 years)

2: Future (over the next 50 years or any 50 year period)

3: Historical (since 1750)

**E:** Quantitative assessment of the probability of ecosystem collapse within 100 years

## SA

A1: Irreversible loss of natural habitat

A2: Ecosystem degradation and loss of integrity

B: Rate of loss natural habitat

C: Limited extent and imminent threat

D1: Threatened plant species associations

D2: Threatened animal species associations

E: Fragmentation

F: Priority areas for meeting explicit biodiversity as defined in a systematic biodiversity plan

# IUCN criteria vs SA criteria

## IUCN Red List of Ecosystems

A: Reduction in geographic distribution

Identifies ecosystems that are undergoing declines in area, most commonly due to threats resulting in ecosystem loss

| Sub-criterion | CR | EN | VU |
|---|---|---|---|
| **A1**: Past (over the past 50 years ) | ≥80% | ≥80% | ≥80% |
| **A2a**:Future (over the next 50 years) | ≥80% | ≥80% | ≥80% |
| A2b: Future (any 50 year period) | ≥80% | ≥80% | ≥80% |
| **A3** Historical (approximately since 1750) | ≥90% | ≥70% | ≥50% |

## SA Ecosystem threat status

A1: Irreversible loss of natural habitat

Identifies ecosystems that have undergone loss of natural habitat impacting on their structure, function and composition

| Criterion | CR | EN | VU |
|---|---|---|---|
| **A1** | Remaining natural habitat= biodiversity target | Remaining natural habitat= biodiversity target +15% | =60% |

**Similarities:**

- These criteria ecosystem types that have or are undergoing decline in the geographic distribution
- Both criteria uses quantitative thresholds and categories

**Differences:**

- Biodiversity thresholds
- Conservation target
- Times frame

# Cont…

## IUCN Red List of Ecosystems

B: Restricted geographic distribution

Identifies ecosystems with small distributions that are susceptible to spatially explicit threats and catastrophes

| Sub-criterion | CR | EN | VU |
|---|---|---|---|
| **B1**: EOO & decline in spatial extent | ≥2000 | ≥20 000 | ≥50 000 |
| B2: AOO & decline in spatial extent | ≥2 | ≥20 | ≥50 |
| **B3**: Small number of locations (<5) prone | | | VU |

## SA Ecosystem threat status

C: Limited extent and imminent threat

Identify small ecosystems or ecosystems with very little remaining natural habitat that could be destroyed by a few developments

| Criterion | CR | EN | VU |
|---|---|---|---|
| **C** | | =60% ecosystem significantly degraded | =40% ecosystem significantly degraded |

**Similarity:**
lists ecosystems with restricted distribution

**Differences:**
- IUCN uses EOO and AOO PLUS Evidence of decline to assess the risk of ecosystem collapse
- No threshold set for SA CR category

# Cont…

## IUCN Red List of Ecosystems

**D:** Disruption of biotic processes and interactions

| | | | | | |
|---|---|---|---|---|---|
| D1 | The past 50 years based on change in a biotic variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table: | Extent (%) | ≥ 80 | ≥ 50 | ≥ 30 |
| | | ≥ 80 | CR | EN | VU |
| | | ≥ 50 | EN | VU | |
| | | ≥ 30 | VU | | |
| D2 | D2a. The next 50 years, based on change in a biotic variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table; **OR** D2b. Any 50-year period including the past, present and future, based on change in a biotic variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table: | Extent (%) | ≥ 80 | ≥ 50 | ≥ 30 |
| | | ≥ 80 | CR | EN | VU |
| | | ≥ 50 | EN | VU | |
| | | ≥ 30 | VU | | |
| D3 | Since 1750 based on change in a biotic variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table: | Extent (%) | ≥ 90 | ≥ 70 | ≥ 50 |
| | | ≥ 90 | CR | EN | VU |
| | | ≥ 70 | EN | VU | |
| | | ≥ 50 | VU | | |

## SA Ecosystem threat status

**A2:** Ecosystem degradation and loss of integrity

Identifies ecosystems that are significantly degraded

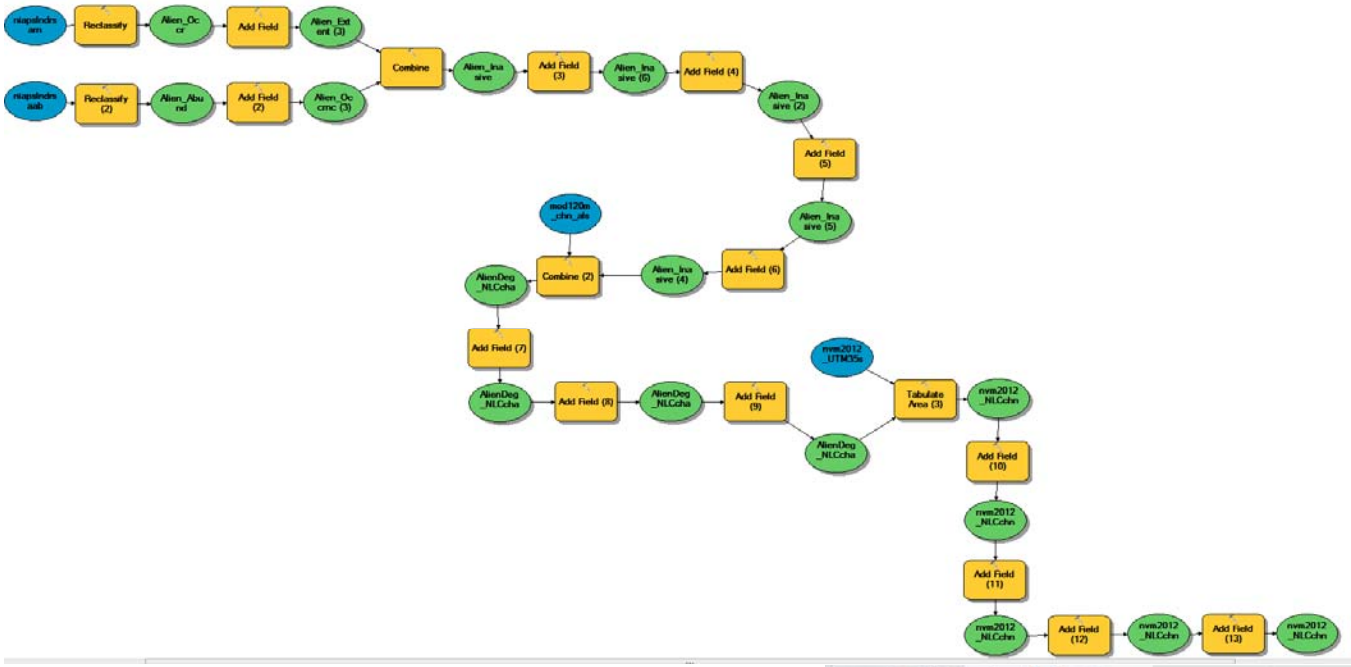
| Criterion | CR | EN | VU |
|---|---|---|---|
| A2 | | =60% | =20% |

**Similarity:**
Identifies ecosystems that are undergoing loss or disruption of key biotic processes

**Differences:**

- Uses the same thresholds and times frame as the IUCN criterion A
- criterion D assesses degradation based only on disruption of key biotic processes

# Tools to automate the assessment process



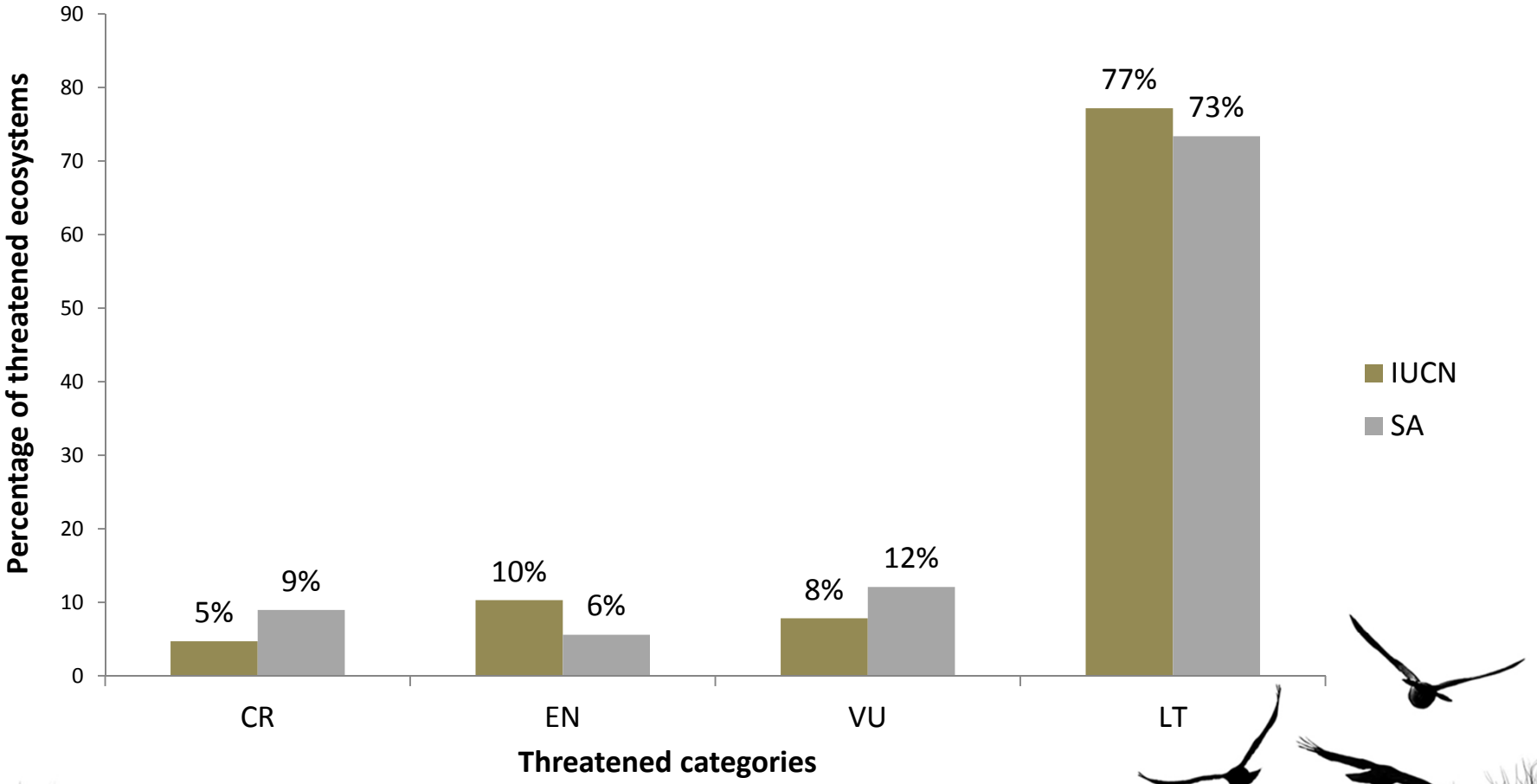

```
options(scipen = 999)
dat$PRD<-100*(1-(Area2013/Area1990)^(1/(2013-1990)))
PRD<-dat$PRD
#*****************************************************************************************************
#                                                                                    IUCN_subcriteria
#*****************************************************************************************************
#                                  A2a:  Estimate  ecosystem decline, 50 years into the future (Fu

dat$t1_A2a<-Area2013
t1_A2a<-dat$t1_A2a

dat$t2_A2a<-Area2013*(1-(PRD/100))^50
t2_A2a<-dat$t2_A2a

#percentagelost between 2013 and 2040
dat$A2a_PercLost<-round(((t1_A2a-t2_A2a)/t1_A2a)*100, 0)
A2a_PercLost<-dat$A2a_PercLost

#threat status (future declines)
dat$SubCrit_A2a<-ifelse(A2a_PercLost>=80, "CR",ifelse(A2a_PercLost>=50,"EN",ifelse(A2a_PercLost>
fretab_A2a<-table(dat$SubCrit_A2a)

#*****************************************************************************************************
```

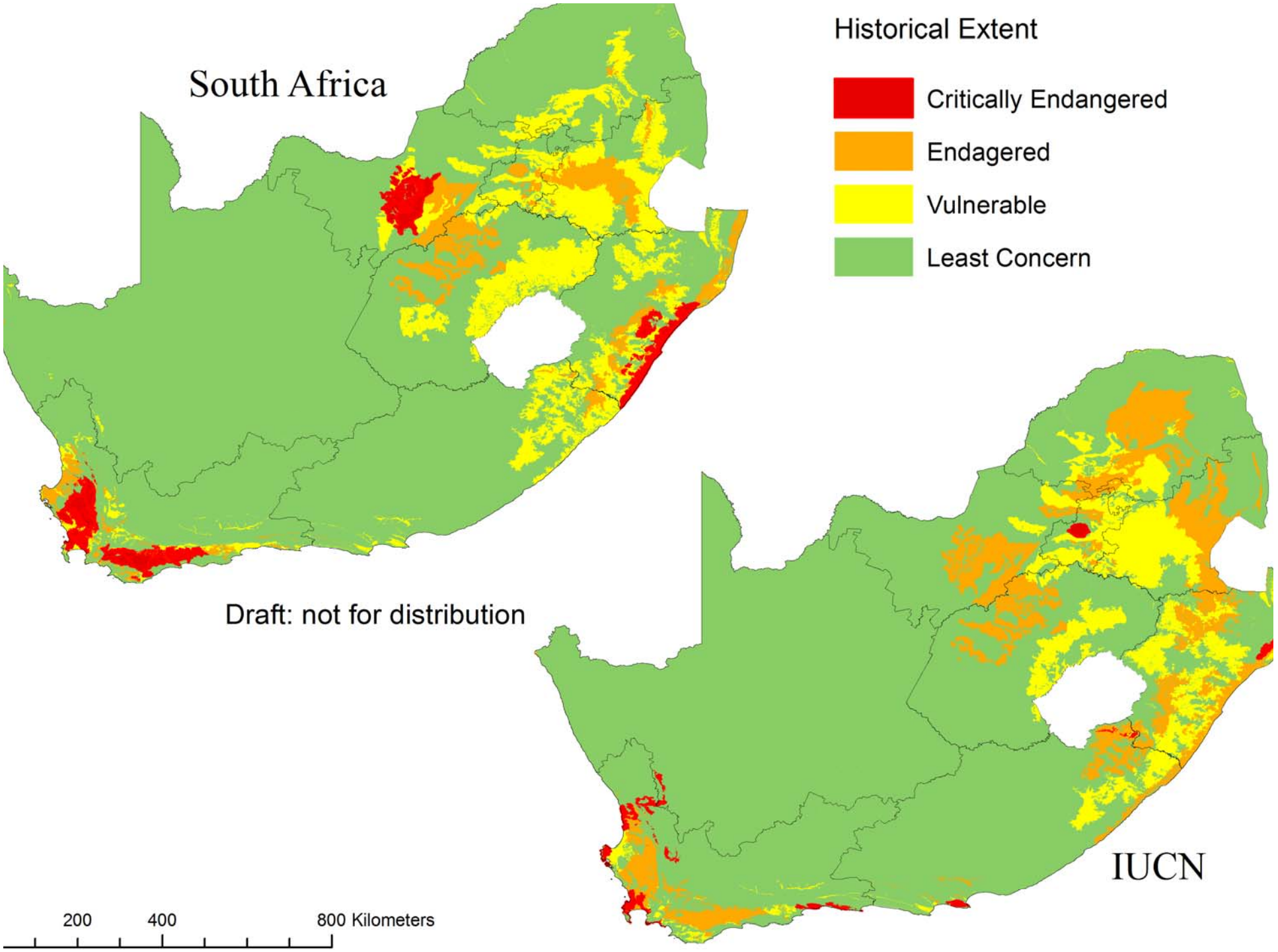
## Number of threatened ecosystems

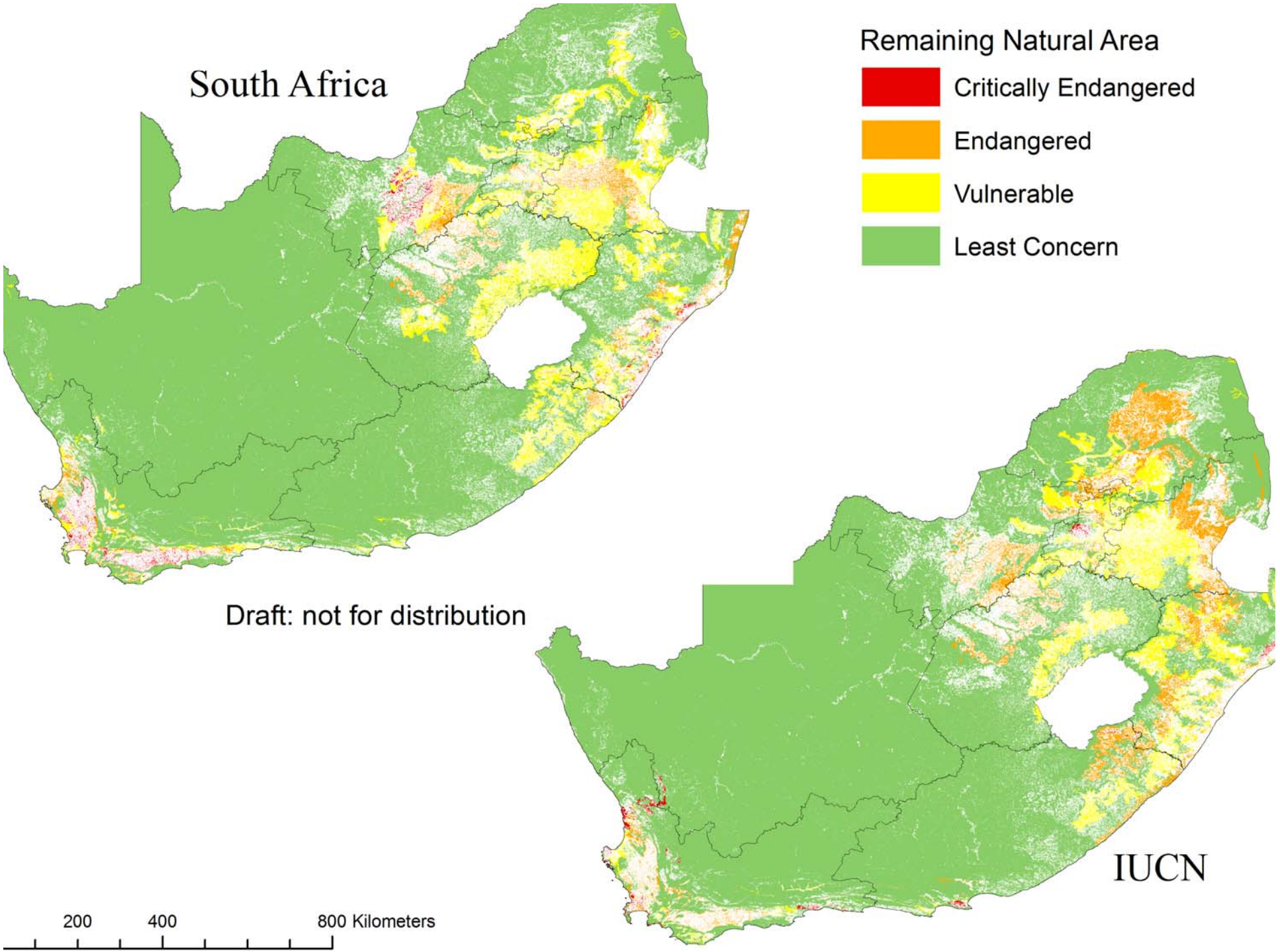
| IUCN Methodology | CR | EN | VU | LT |
|---|---|---|---|---|
| Criterion A | | | | |
| Sub-criterion A3 (Historic) | 0 | 22 | 46 | 379 |
| Sub-criterion A2b (Any 50 year period) | 0 | 0 | 4 | 443 |
| Sub-criterion A2a (Future) | 0 | 3 | 23 | 421 |
| Criterion B (Restricted in distribution) | | | | |
| Sub-criterion B1 (EOO : Extent of Occurrence) | 21 | 28 | 11 | 377 |
| Sub-criterion B2 (AOO: Area of Occupancy) | 0 | 26 | 42 | 375 |
| Criterion D (Degradation-Biotic) | 0 | 0 | 0 | 447 |
| **Overall threatened ecosystems** | **21** | **46** | **35** | **345** |

| South Africa Methodology | CR | EN | VU | LT |
|---|---|---|---|---|
| Criteria A1 (Reduction in distribution | 17 | 26 | 55 | 349 |
| Criteria C (Restricted in distribution) | 0 | 30 | 25 | 392 |
| Criteria A2 (Degradation) | 23 | 0 | 0 | 424 |
| **Overall threatened ecosystems** | **40** | **30** | **54** | **328** |

# Overall threatened ecosystems (SA vs IUCN)




South Africa
Historical Extent
Critically Endangered
Endagered
Vulnerable
Least Concern
Draft: not for distribution
IUCN
200
400
800 Kilometers


South Africa
Remaining Natural Area
Critically Endangered
Endangered
Vulnerable
Least Concern
Draft: not for distribution
IUCN
200
400
800 Kilometers

# Way forward

- Continue to engage with the international audience for guidance and to furthermore strengthen our relationship through the IUCN RLE forum, (and also to share some of our lessons learnt)

- We are to engage with various experts in the country to determine thresholds for degradation and quantifying ecosystem decline

- We are likely to align, the international standards but still is this to be finalized

# Comments/Questions