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Cumulative Impact Assessment Guide: Renewable Energy & Mining – A Case study of the Bushmanland

Integrating Sustainability into Renewable
Energy and Environmental Management

**Presenter:
Peter Cloete**

19 March 2026

Overview

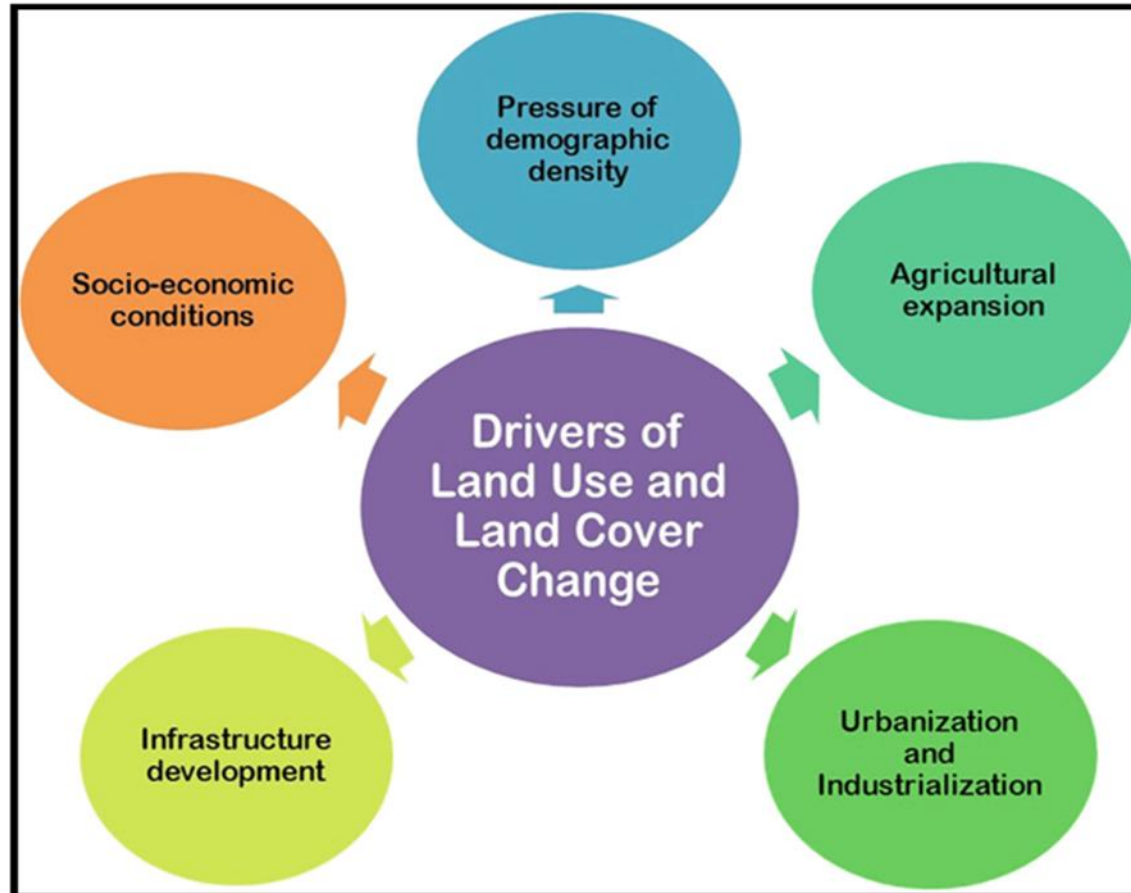


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- ❖ **Introduction to Cumulative Impacts**
- ❖ **Introduction to cumulative impacts in the Northern Cape**
- ❖ **Policy & Legislative Context (South Africa)**
- ❖ **Bushmanland Context**
- ❖ **Key Pressures: Mining & Renewable Energy**
- ❖ **CIA Methodology**
- ❖ **Key Findings**
- ❖ **Recommendations**

Background



Cumulative impacts in relation to an activity are defined in the EIA Regulations (Government Notice R543) as meaning “the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area”

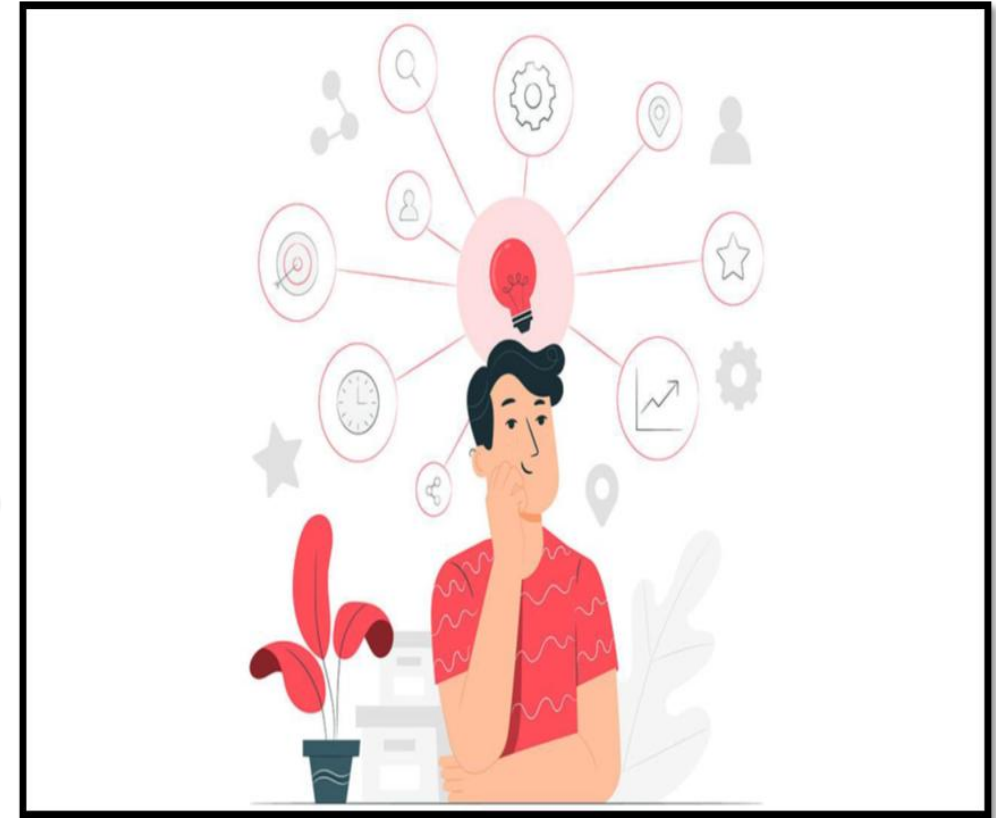


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Why CIA important

- ❖ **Considers spatial and temporal overlap;**
- ❖ **Goes beyond single-project EIA;**
- ❖ **Help decision makers understand broader landscape.**



Legislative Context (South Africa)



❖ NEMA (National Environmental Management Act)

EIA Regulations (2014, as amended)

❖ Requires:

- Consideration of cumulative impacts
- Integrated environmental management

📌 CIA embedded in Scoping & EIA phases



Overview of Environmental Law in South Africa

Background: Northern Cape

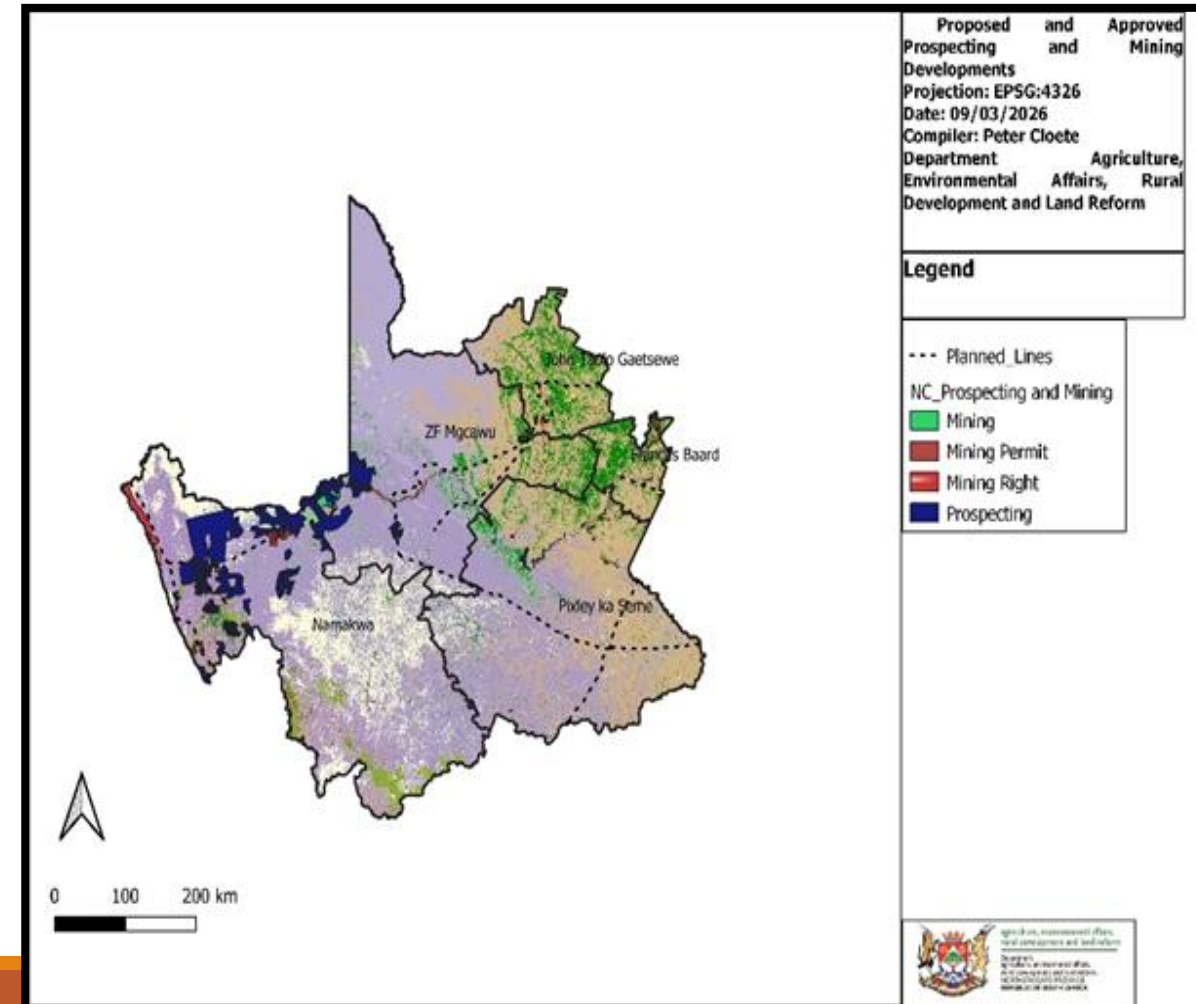
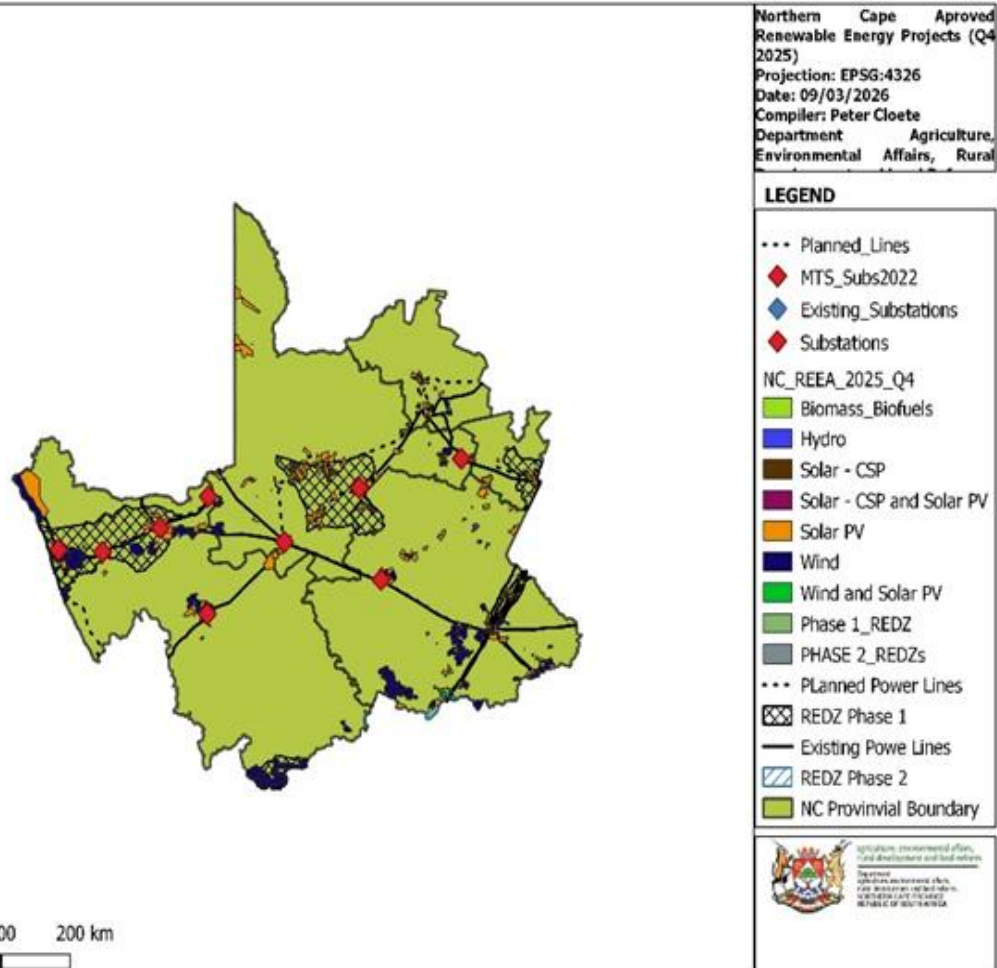
- ❖ NC Area: 37288900 ha (372889 km²)
- ❖ Population Size: 1,355,945 (STATSA 2022) (63,02 million people in SA)
- ❖ Contribute 2,1% of the country's GDP.
- ❖ Mining, Agriculture, Tourism, Renewable Energy.

Sector	Namakwa	NC	National	Namakwa as % of Province	Namakwa as % of National
Agriculture	1.1	6.4	106.1	16.7	1.01
Mining	3.4	19.4	350.9	17.5	0.97
Manufacturing	0.2	3.0	572.9	6.2	0.03
Electricity	0.1	3.3	166.0	4.1	0.08
Construction	0.3	2.8	170.3	10.1	0.17
Trade	1.1	10.5	652.7	10.8	0.17
Transport	0.9	10.7	426.7	8.2	0.21
Finance	0.9	11.9	854.4	7.9	0.11
Community Services	1.5	20.4	1041.3	7.6	0.15

Cumulative Impacts in Northern Cape



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Cumulative Impacts in Northern Cape



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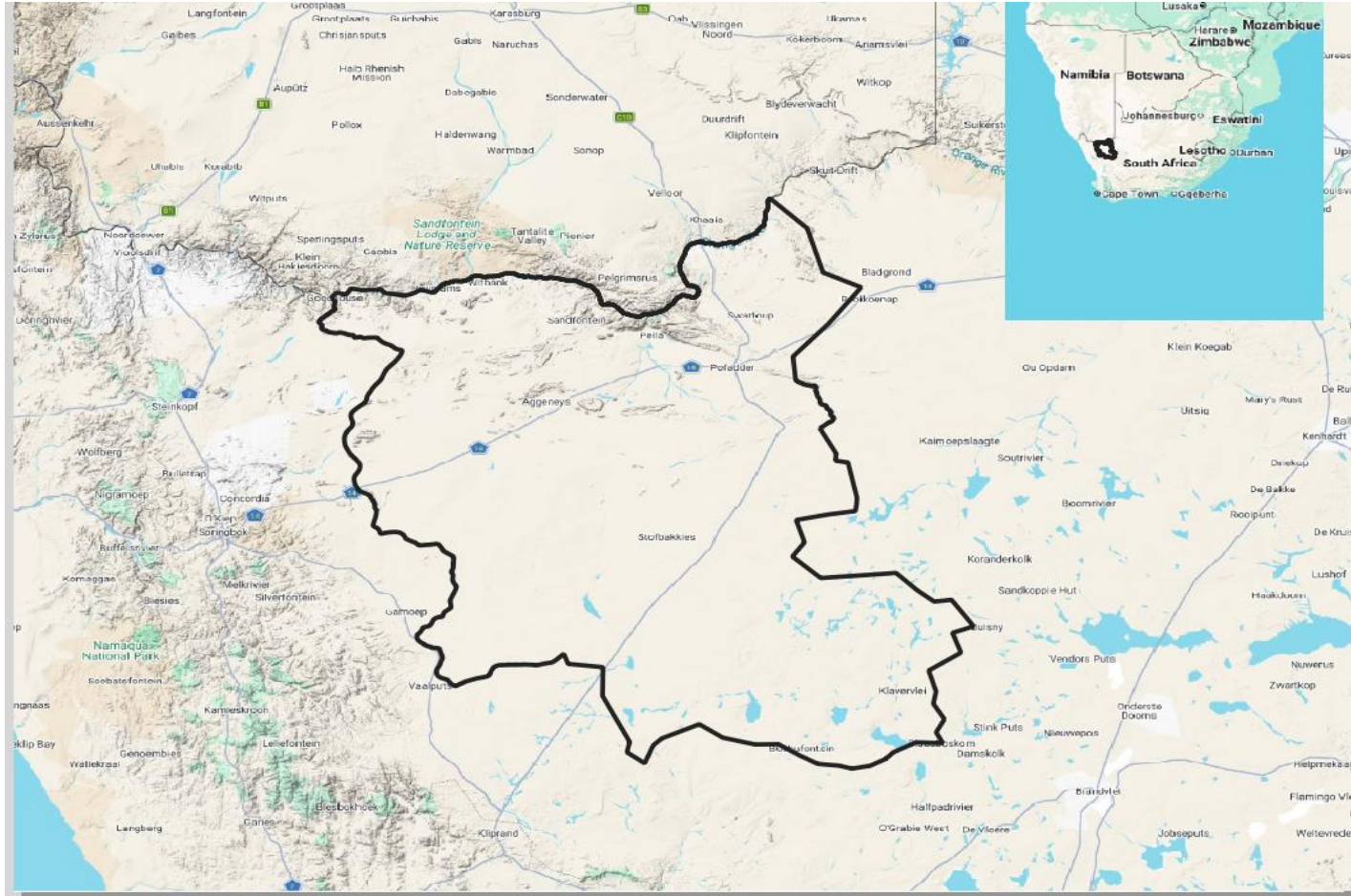
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- ❖ Habitat loss and fragmentation
- ❖ Biodiversity decline
- ❖ Avifaunal impacts
- ❖ Visual and landscape transformation
- ❖ Pressure on water resources
- ❖ Social impacts

Bushmanland Region Overview



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Development Context in Bushmanland



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Land-use intensity (ha/MW)			
Technology	km ² /GW	ha/MW	Reference
Wind	325.41 km ² /GW	32.54 ha/MW	Gaeatholwe, 2021
Solar PV	20 km ² /GW	2.00 ha/MW	Gaeatholwe, 2021
CSP	42.8 km ² /GW	4.28 ha/MW	Gaeatholwe, 2021
Hydro	805.3 km ² /GW	80.53 ha/MW	Gaeatholwe, 2021
Biomass		500 ha/MW	Fthenak and Kim (2009)

2016 -2025

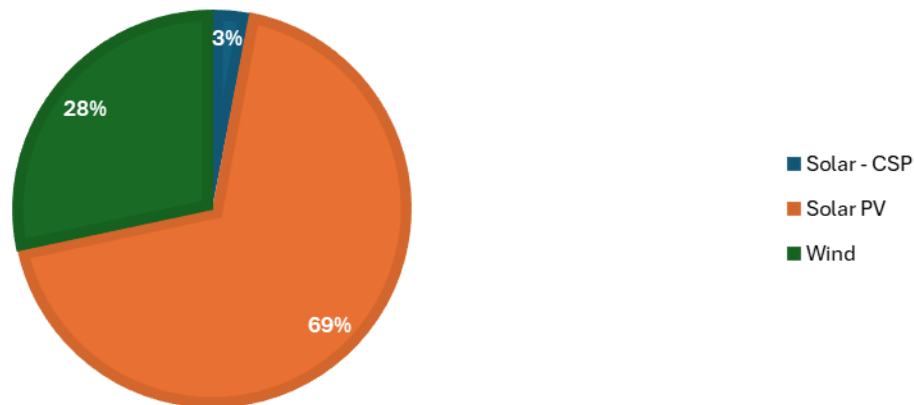
Prospecting Rights

Mining Rights

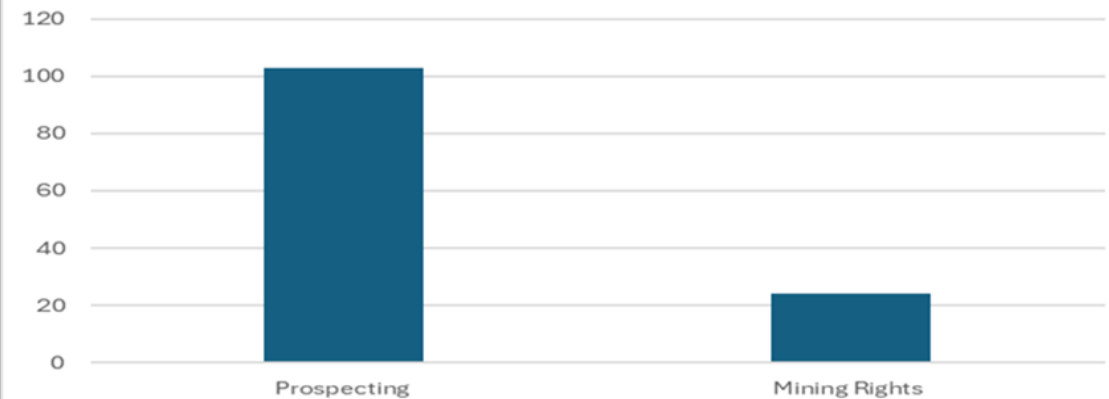
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RENEWABLE ENERGY DEVELOPMENT TYPES



Prospecting Vs Mining





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Key Drivers of Developments

⚡ Renewable Energy

- ❖ Driven by the energy transition toward low-carbon systems
- ❖ Supports decarbonisation goals and climate commitments
- ❖ Responds to growing national energy demand and energy security needs.



⚡ Mining

- ❖ Abundant mineral resources in the region
- ❖ Key example: Gamsberg Zinc Mine
- ❖ Contributes to economic growth and job creation

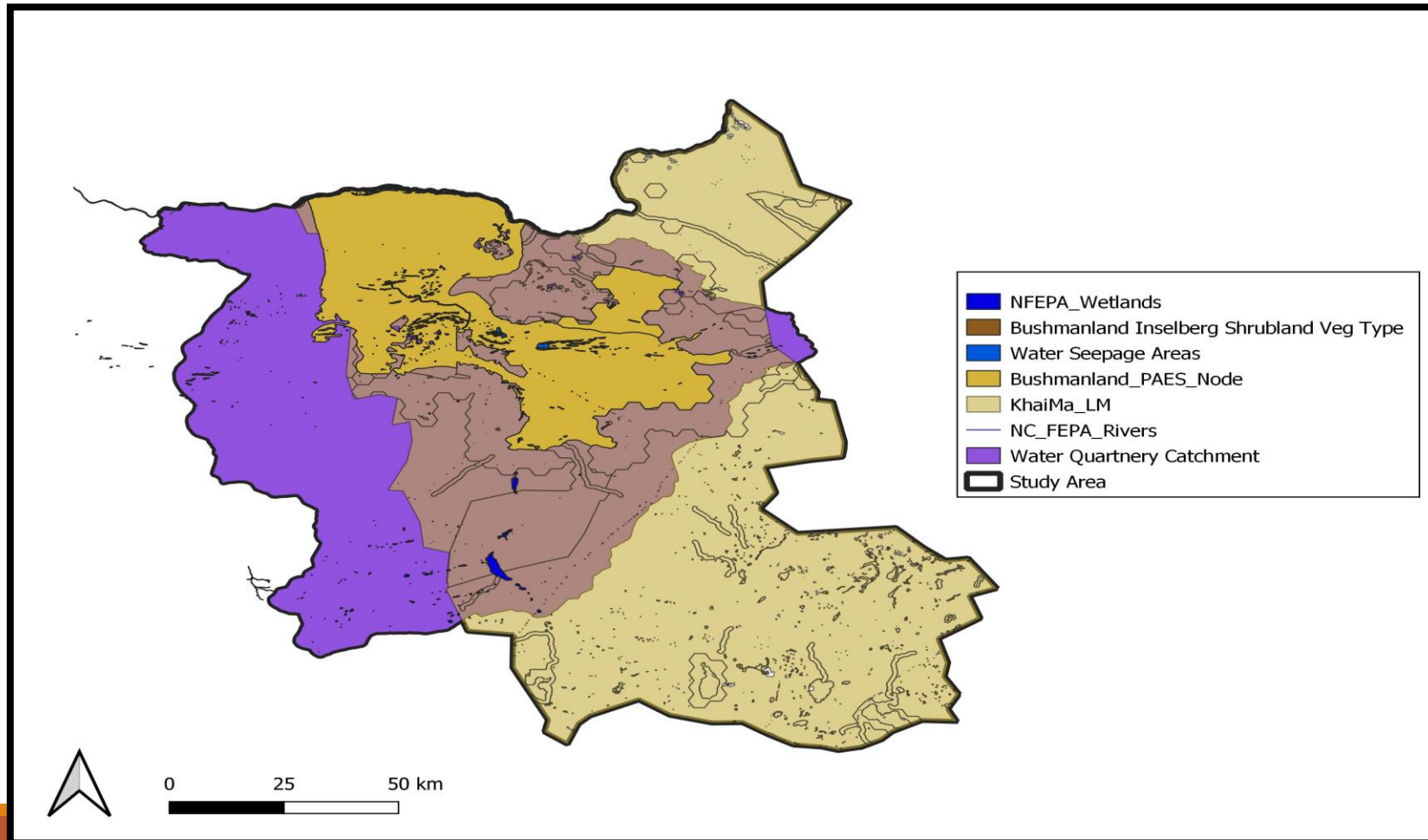




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Key Biodiversity Features

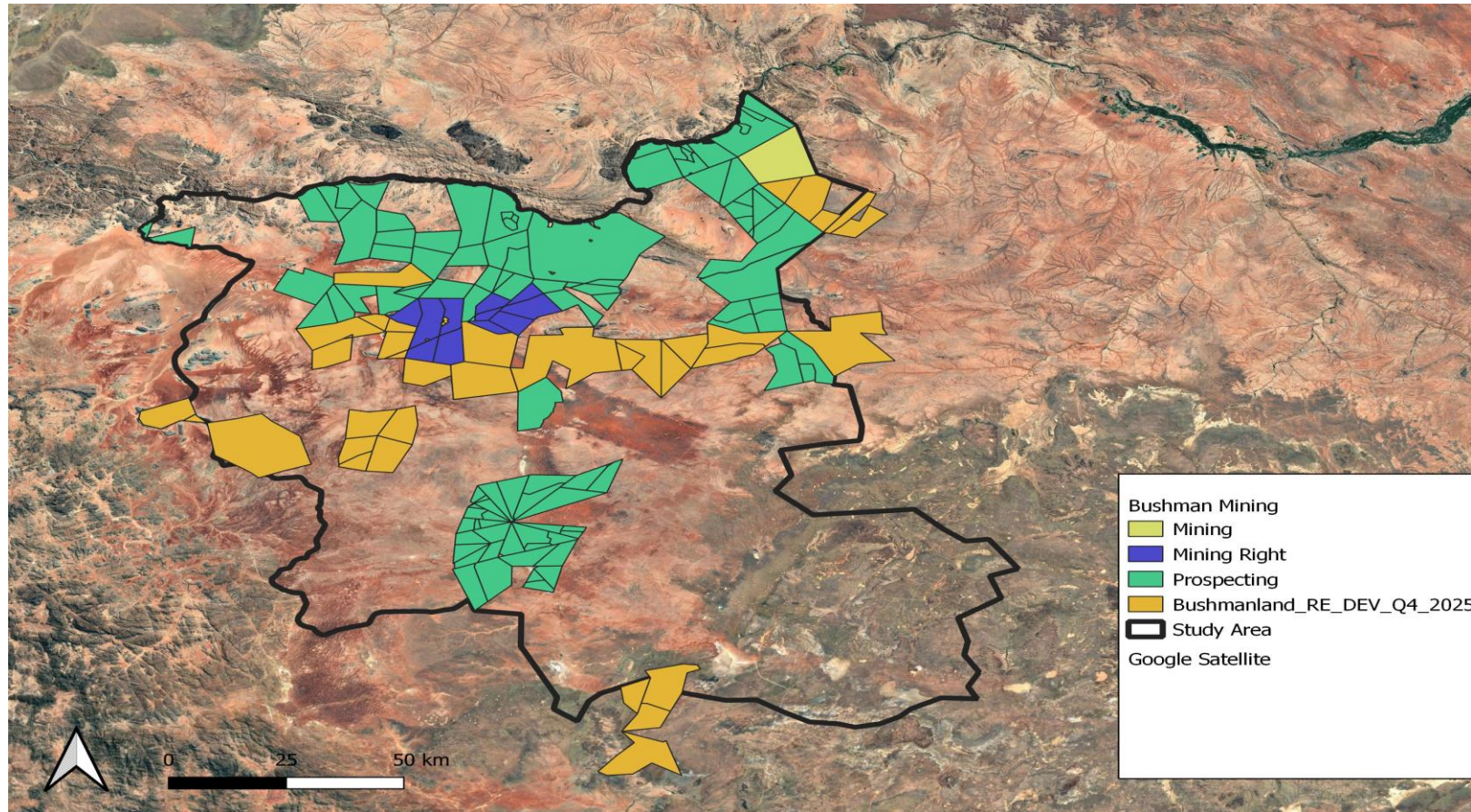




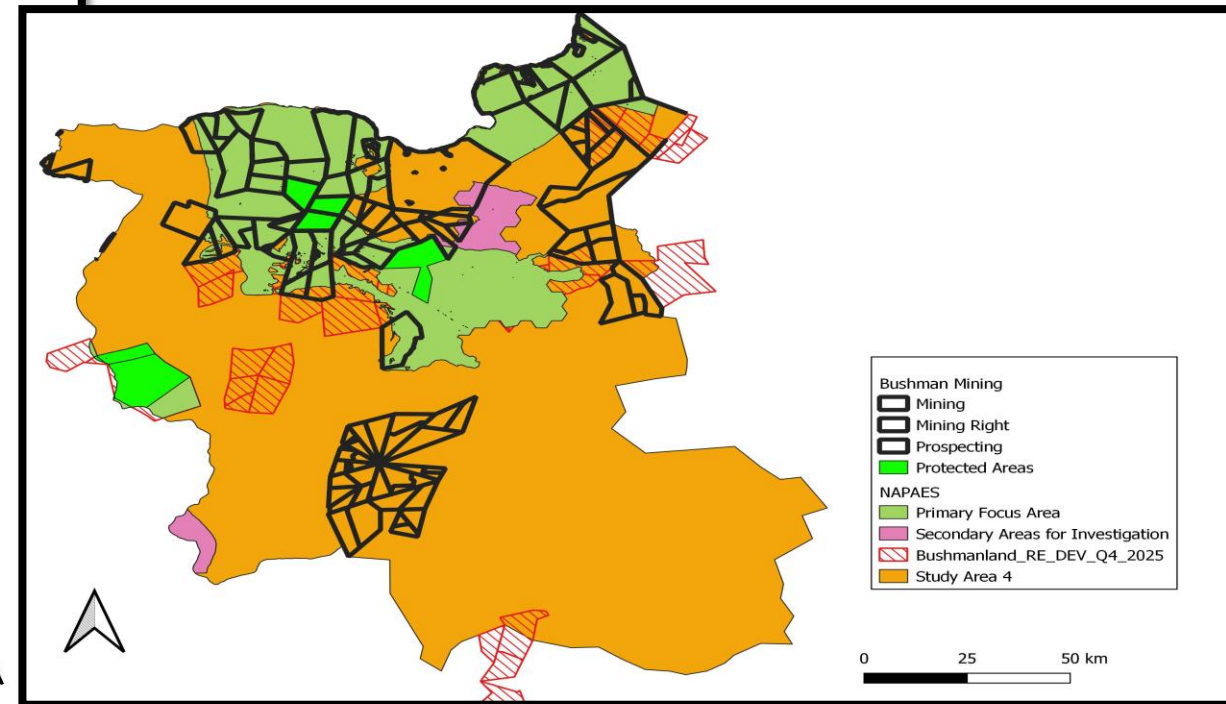
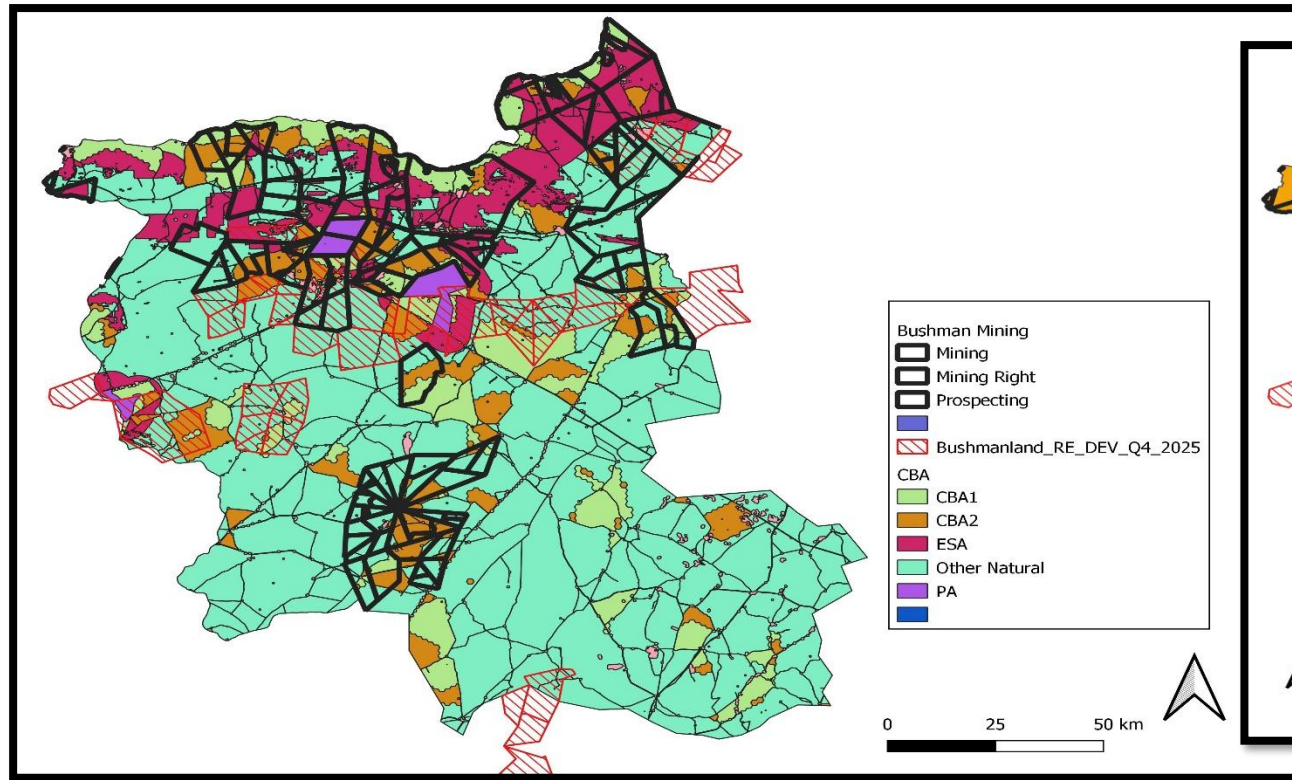
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Cumulative Developments



Developments overlap with key biodiversity



CIA Methodology



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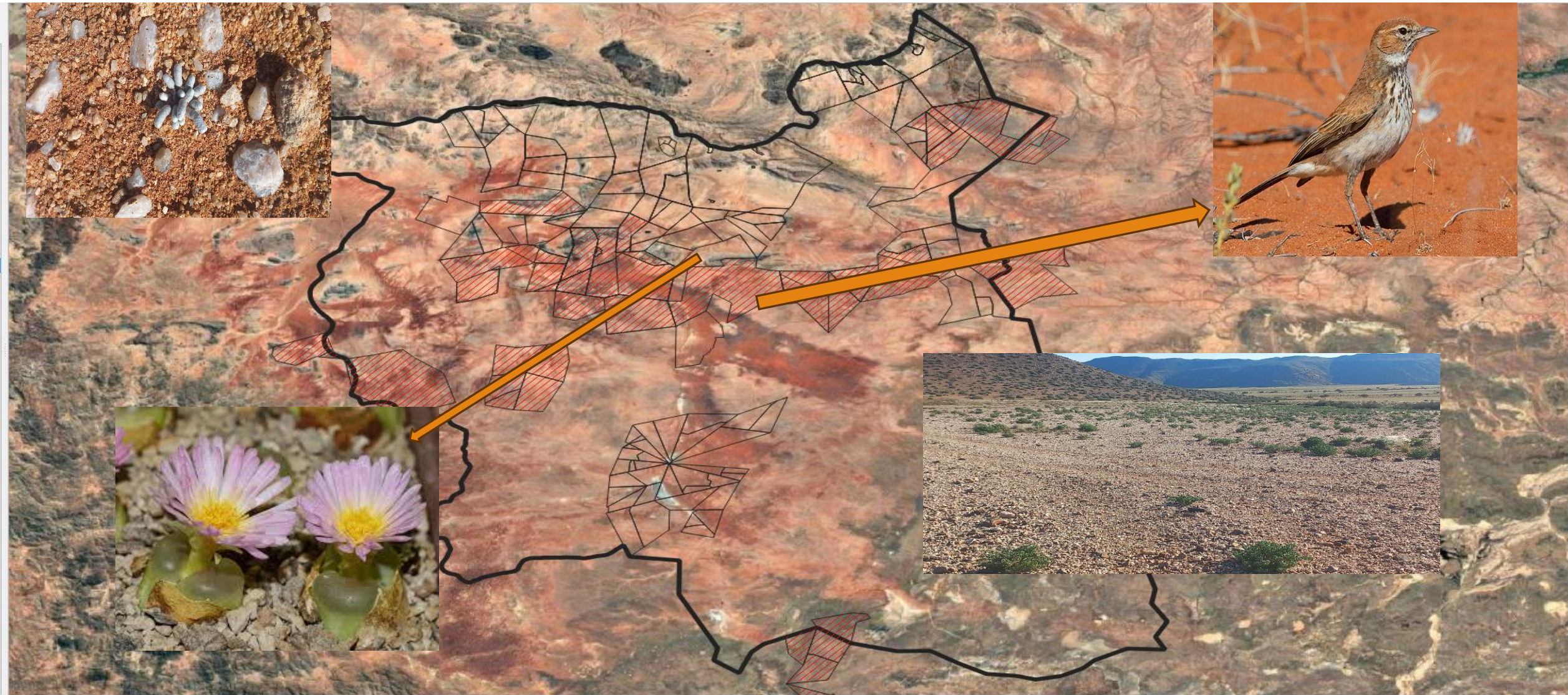
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- ❖ Scoping cumulative issues
- ❖ Defining regional baseline conditions
- ❖ Identifying existing and foreseeable projects
- ❖ Assessing additive/synergistic impacts
- ❖ Developing landscape-level mitigation strategies
- ❖ Monitoring and adaptive management
- ❖ Evaluation: Use spatial and temporal data
- ❖ Mitigation and Management: Propose avoidance, reduction, or biodiversity offset strategies

Biodiversity Impacts



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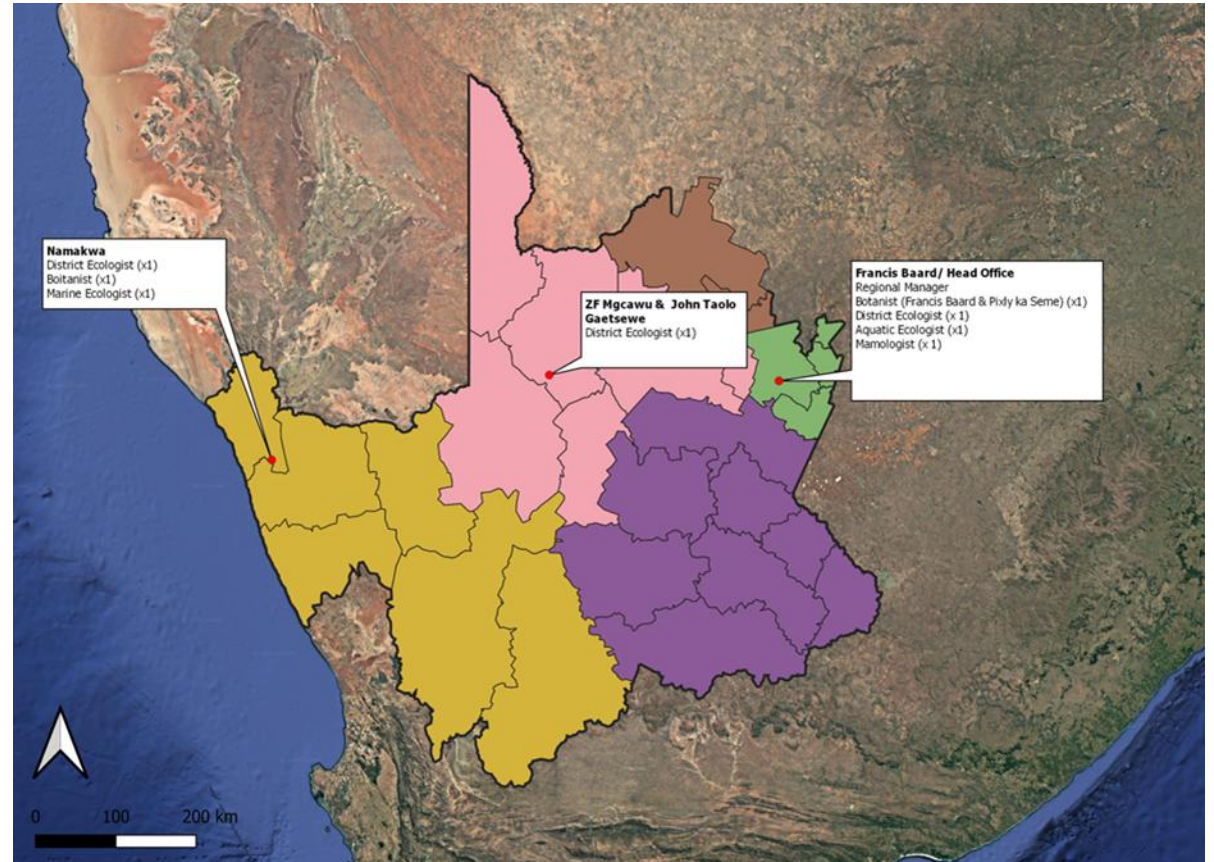
Key Challenges



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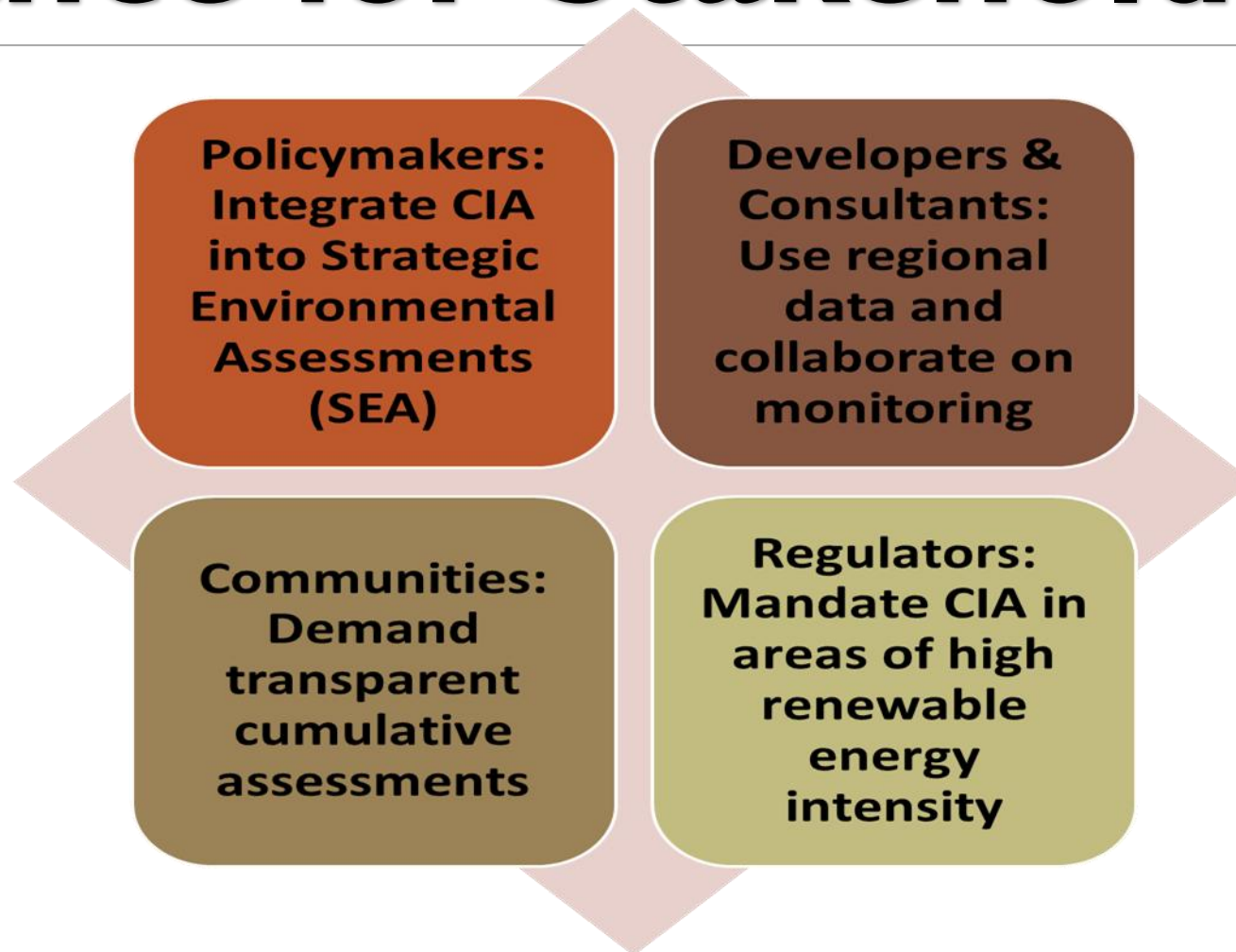
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- ❖ Data availability and sharing
- ❖ Uncertainty of future developments
- ❖ Lack of standardised methodology
- ❖ Coordination across sectors
- ❖ Rapid expansion to monitor
- ❖ Lack of baseline data
- ❖ Conflicting and competing land uses.
- ❖ Future predictions: Climate Change
- ❖ Climate Change
- ❖ Capacity





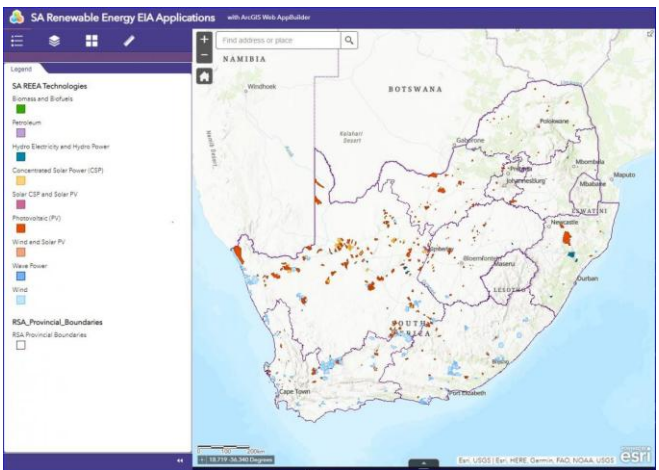
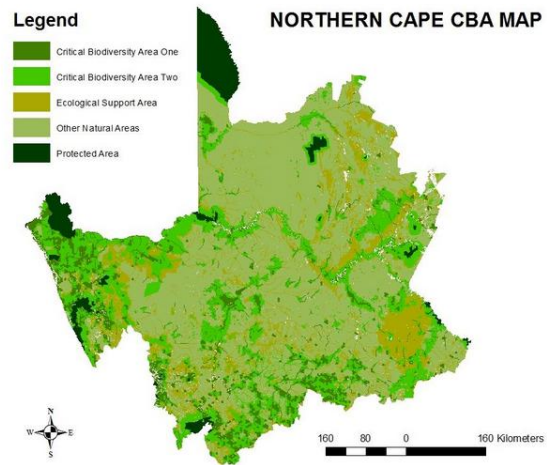
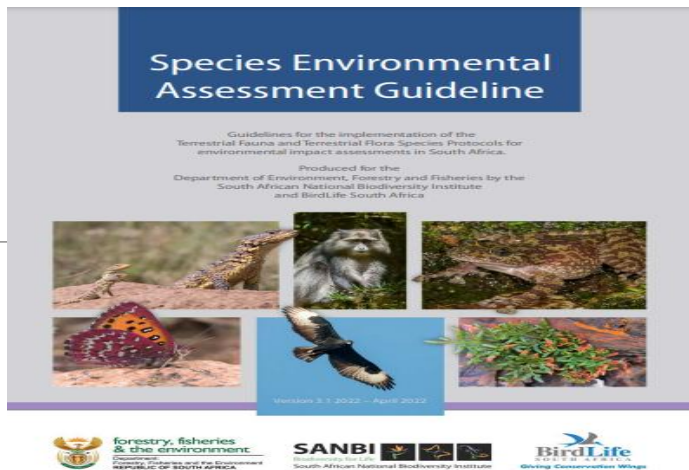
Guidance for Stakeholders





Best Practice Approaches

Integrate	Integrate CIA into early planning
Utilize	Utilize existing SEAs
Engage	Engage local communities throughout project lifecycle
Follow	Follow the mitigation hierarchy: Avoid > Minimize > Rehabilitate > Offset



Recommendations for Bushmanland



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- ❖ Strengthen Biodiversity Protection
- ❖ Implement Strategic Land-Use Planning
- ❖ Adopt Sustainable Development Practices
- ❖ Manage Grazing and Agriculture
- ❖ Control Invasive Species
- ❖ Climate Change Adaptation
- ❖ Monitoring and Research
- ❖ Community Engagement and Capacity Building
- ❖ Policy and Governance

Key Takeaways

CIA is essential to sustainable renewable energy expansion

Biodiversity protection and clean energy must go hand in hand

With robust frameworks, the Northern Cape can lead by example in green development

**HOW CAN WE
BETTER INTEGRATE
BIODIVERSITY
PRIORITIES INTO
OUR MINING AND
RENEWABLE
ENERGY FUTURE ?**

Moving Forward



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**Strengthening the EIA process through CIA
improves long-term sustainability**



**Informed decision-making balances energy
needs and ecological integrity**

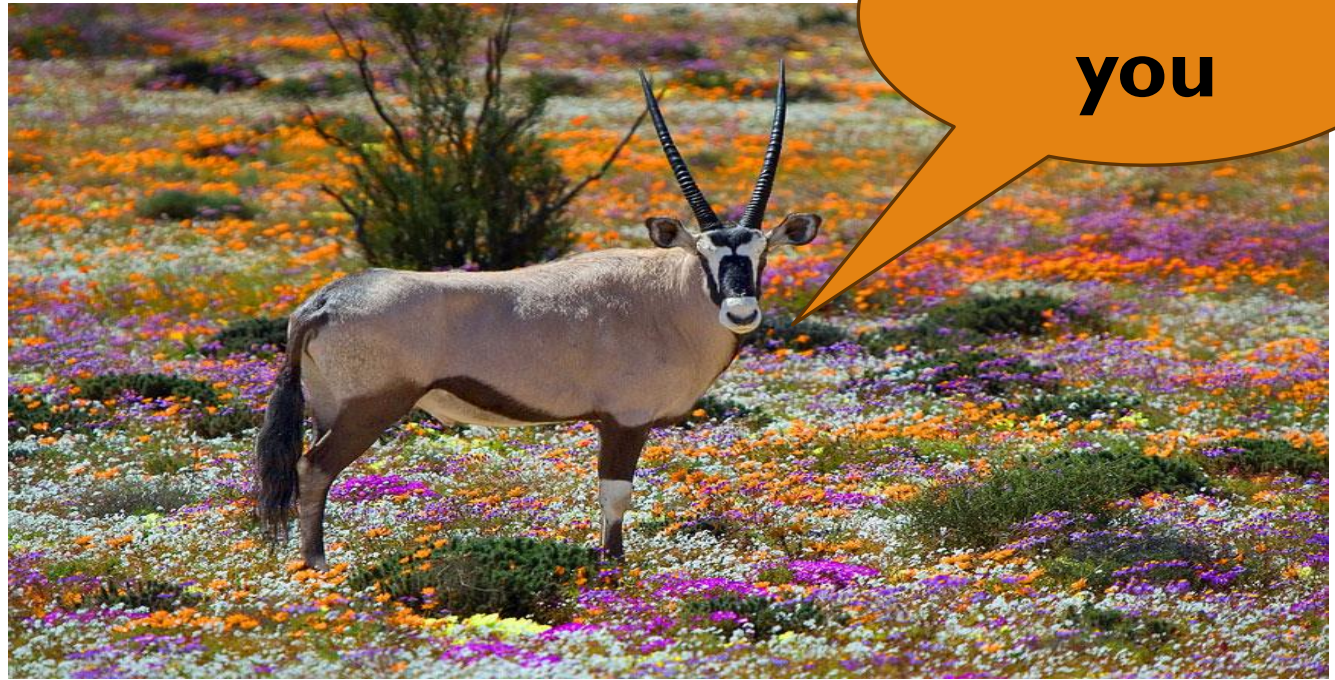


**Northern Cape as a model for responsible
renewable and mining development**

For enquiries feel free to contact:

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CONSERVATION
!!!**



**Thank
you**