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Proposing principles towards responsible waste management in South African protected areas

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Background

- Waste management in protected areas

Waste management in protected areas



Developments and tourism-related activities within **protected areas** may cause negative **waste-related impacts** such as:

- impacts associated with littering,
- waste generated by permanent or temporary staff,
- sewage effluent,
- hazardous waste in the form of hydrocarbons (oil, grease, fuel), and
- food waste.

South Africa, 2003; Przydatek, 2019; Roos *et al.*, 2021

Waste management in protected areas

The **mismanagement** of waste in protected areas may lead to significant and **irreversible environmental, economic and social impacts** (in and around PAs), such as:

- **land degradation,**
- **resource depletion,**
- **surface and groundwater pollution,**
- **loss of biodiversity,**
- negative impacts on surrounding **communities,** and
- **impacts on the aesthetic value of tourism locations.**

Dunjić *et al.*, 2017; Steg and Vlek, 2009; Rodríguez-Rodríguez, 2012

Waste management in protected areas

Globally, **waste management in protected areas** is being recognised as an **area of concern**, requiring further investigation and intervention.

- South African research found that “*waste management in and around national parks require serious attention*” (Nahman et al., 2021).
- Sound waste management ranks “*amongst the top expectations for responsible tourism*” by visitors to South African PAs (De Witt 2015; Du Plessis et al., 2013; Morrison-Saunders et al., 2019); and
- “*Sustainable waste management*” is also suggested as an important component of ecotourism indicator and rating systems (Li 2004; Van der Merwe, Saayman & Bothma 2017).

- The need to standardise waste management practises in protected areas has been recognised

Makgae, 2011, Roos *et al.*, 2021, Roos *et al.* 2022, Claassens *et al.* 2022

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The consideration of waste management in environmental impact assessment (EIA) for developments in protected areas

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ABSTRACT

Waste management is an important consideration for developments within protected areas (PAs). With the growing demand for mainly tourism-related infrastructure in PAs, more urgent and innovative ways of dealing with waste management are required. Internationally environmental impact assessment (EIA) is considered a key policy instrument to inform waste management-related decision-making for new developments. The EIA process makes provision for the identification of waste-related impacts and mitigation measures during the construction, operation and decommissioning phases of a development. However, there has been scant reflection on the role of EIA in dealing with waste management decision-making in PAs. Therefore, this research aims to review the extent to which waste management measures are considered in EIAs for developments in PAs. The results show that waste management measures are, for the most part, poorly considered. For example, EIAs failed to provide estimates of expected waste types and quantities and mostly failed to consider the waste management hierarchy. Recommendations are made towards improving the consideration of waste management measures in EIAs for developments within PAs. These include the drafting of guidelines for waste management in protected areas; training relevant roleplayers on waste management measures; and promoting specialist input on waste-related matters for EIAs in PAs.

ARTICLE HISTORY

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KEYWORDS

Environmental Impact Assessment (EIA); protected areas (PA); waste management; South Africa

1. Introduction

Waste management is an issue of global concern (UNEP 2015; Wilson and Velis 2015). Although good progress has been made in many parts of the world, global annual waste generation continues to increase (World Bank 2018) and add pressure on already stressed waste management systems and infrastructure (UNEP 2015, 2018). The increase in waste production worldwide is mostly driven by trends such as population growth, a fast-growing middle-class, and global changes in consumption. One region where these trends are particularly prevalent is Africa. The African continent currently has a population growth rate of approximately 2.5% per annum making it the fastest-growing continent (World Bank 2022). Coupled with the need to implement sound and sustainable

2018). This unsurprisingly leads to severe environmental degradation and pollution (Wilson and Rogers 2015; Bosman *et al.* 2018).

The effects of ineffective waste management can be especially detrimental to sensitive environments such as protected areas (PAs). PAs can be defined as areas dedicated to the long-term conservation of high-value natural areas (Dudley 2008) and play a significant role in ecological sustainability, climate change adaptation, ecological infrastructure networks, and preserving the ecosystems that provide essential services to communities (DEA 2016). It has been found that tourism-related activities within PAs often cause negative waste-related impacts (Przydatek 2019; Roos *et al.* 2021). These include impacts associated with littering; waste generated



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Challenges and opportunities for sustainable solid waste management in private nature reserves: The case of Sabi Sand Wildtuin, South Africa

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The mismanagement of waste in protected areas may lead to significant and irreversible environmental, economic and social impacts, such as land degradation, resource depletion, surface and groundwater pollution, loss of biodiversity and impacts on the aesthetic value of these areas. This paper aims to identify the challenges and opportunities for sustainable solid waste management in privately protected areas, given the limited research conducted on this topic. A case study approach was followed, which focused on the Sabi Sand Wildtuin, a private nature reserve (PNR) in South Africa. Interviews were conducted with 30 participants, which included representatives from the management authority, commercial lodges, non-commercial properties and a waste service provider. Several challenges have been identified by interviewees. Behaviour was the most frequently mentioned challenge, where interviewees raised concerns about negative attitudes, unwillingness to implement waste management measures and a possible lack of support. Other frequently mentioned challenges included limited difficulties due to the size and location of the reserve and concerns around funding of waste management measures, especially given the financial implications of coronavirus disease 2019 (COVID-19) travel and tourism restrictions. The most frequently identified opportunities included creating jobs and improving livelihoods, providing assurance and transparency of what happens to waste 'beyond the gate' and improving awareness, knowledge and skills related to waste management. To optimise the opportunities towards sustainable solid waste management, PNRs should focus on aligning their strategic direction to achieve legal compliance and support community initiatives to establish waste-related infrastructure and services that cannot be implemented within the reserve.

Conservation implications: The pursuit of waste-related opportunities within privately protected areas could enhance the implementation of sustainable solid waste management in PNRs, whilst also contributing to pollution prevention, community upliftment and other secondary benefits, which could ultimately result in increased conservation efforts.

Keywords: sustainable solid waste management; protected areas; private nature reserves; challenges; opportunities; Sabi Sand Wildtuin.

Introduction

Protected areas are of international importance due to their natural, historical, cultural and ecosystem value (Alberts *et al.* 2021; Sandbrook *et al.* 2019). Ecosystems in protected areas have rapidly increased globally, which has several adverse impacts, including increased waste generation (Rodriguez-Rodriguez 2012). The mismanagement of waste in protected areas may lead to significant and irreversible environmental, economic and social impacts, such as land

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UNDERSTANDING WASTE MANAGEMENT BEHAVIOUR IN PRIVATE NATURE RESERVES THROUGH THE THEORY OF PLANNED BEHAVIOUR

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ABSTRACT

Responsible waste management in protected areas is essential to ensure that these areas remain protected and that negative impacts on visitor experience are reduced. Behaviour plays an important role in establishing and implementing responsible waste management measures. This paper aims to provide insight about the Theory of Planned Behaviour and its application towards understanding waste management behaviour in private nature reserves. The Sabi Sand Wildtuin, a private nature reserve located in the Greater Kruger National Park in South Africa, was selected to explore the research aims. Surveys were used to gather data from the management authority and the owners or managers of the commercial and non-commercial properties in the reserve. The responses from forty participants indicated that all three stakeholder groups generally had positive attitudes towards waste management and supported the development of an integrated waste management strategy. The participants also generally expressed their intention to implement responsible waste management practices. The Pearson Chi-Square test highlighted some statistically significant associations between intrinsic motivation and intent/villages to participate in certain waste-related interventions; attitude (mostly related to perceiving waste management as a benefit) and support as well as support and intent.

Key words: attitudes, intent, villages, support, protected areas, South Africa

INTRODUCTION

Protected areas are increasingly expected to generate tourism revenue and deliver resultant community benefits, placing increased development pressure on already threatened and sensitive environments (Sandbrook *et al.* 2019). One specific concern with increased development within protected areas is effective waste management (Steg & Vlek 2009; Sandbrook *et al.* 2020). The negative impacts of waste on protected areas are well-known (Przydatek 2019), affecting conservation efforts, adjacent communities, and visitor experience (Dietzsch-Schwartz *et al.* 2015; Tafere, 2020). The research by Dietzsch-Schwartz *et al.* (2015), which focused on understanding expectations for responsible tourism in protected areas, indicated that visitor expectations for waste management included:

- Consideration of the 'waste management hierarchy' and the 'circular economy'; and
- Improving 'awareness' of visitors around waste management practices.

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Developing capacity for a protected planet





Aim

To propose **(best practice) principles** for waste management in South African protected areas



Proposing principles towards responsible waste management in South African protected areas



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This article synthesises principles towards achieving responsible waste management in South African protected areas. These principles are distilled from and based on existing legislation, guidelines and best practices applicable to environmental management, waste management and protected areas management. The principles are framed around the South African environmental management principles, and specifically contextualised for waste management in protected areas, based on legislation, guidelines and best practices from the literature. Six key principles are synthesised, which aim to achieve responsible waste management in protected areas through: (1) protection of ecosystems and biodiversity; (2) prevention and remediation of pollution; (3) implementation of the waste management hierarchy; (4) provision of effective waste services and infrastructure; (5) promotion of participation and building of partnerships; and (6) contribution to wellbeing, livelihoods and capacity. These principles provide a first step towards the development of detailed guidance on dealing with waste management in South African protected areas and may have relevance in other countries.

Conservation implications: The suggested principles for responsible waste management in protected areas aim to provide strategic direction, coordinate and standardise waste management in protected areas. The ultimate aim of the principles is to reduce the adverse impacts of waste in protected areas and to align waste management practices with South African laws and international best practice.

Keywords: principles; responsible waste management; protected areas; pollution prevention; waste management hierarchy; waste services; mitigation hierarchy; knowledge sharing; partnerships.

Introduction

Waste management as a concern to protected areas

Because of development pressures, population growth, rapid urbanisation and increased consumption habits, waste management has become a global concern (Kaza et al. 2018). In an effort to mitigate and address the adverse impacts of waste, most governments around the world have developed legislation to regulate the management of waste. While national governments are responsible for developing laws, local municipalities are typically responsible for the collection, transportation and disposal of waste, and for the development and maintenance of municipal waste management infrastructure. In developing countries, municipalities often lack the capacity, budget and skills to effectively manage waste. This leads to pressures such as weak governance and enforcement and waste service delivery backlogs, which contribute to the unlawful disposal of waste, littering and resultant pollution of the environment (DEA 2018; Kaza et al. 2018).

Waste management has been identified as one of the most significant challenges facing many protected areas around the world (Hong & Chan 2010; Rodríguez-Rodríguez 2012; Roos et al. 2022). If not managed responsibly, waste may lead to pollution, land degradation, resource depletion, loss of biodiversity, unsightliness and other negative impacts on ecotourism (Du Plessis, Van Der Merwe & Suayman 2013; Morrison-Saunders et al. 2019; Przydałek 2009; Sieg & Vlek 2009). In his study, 'The relevance and resilience of protected areas in the Anthropocene', Cumming (2016) acknowledged the importance of the spatial connectivity between protected areas and their surroundings. He further recognised that protected areas are in many instances characterised by weak governance, which contributes to challenges in managing these areas. In the context of this study, it is important to highlight that responsible waste management in protected areas management practices within these areas but also those it is interconnectedness. Moreover, it is essential to underscore the interconnectedness of the spatial connectivity between protected areas and their surroundings. He further recognised that protected areas are in many instances characterised by weak governance, which contributes to challenges in managing these areas. In the context of this study, it is important to highlight that responsible waste management in protected areas management practices within these areas but also those it is interconnectedness. Moreover, it is essential to underscore the interconnectedness of the spatial connectivity between protected areas and their surroundings.

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AFFILIATION





Method

Method

Step 1: Framing best practice principles based on South African environmental management principles and legislation

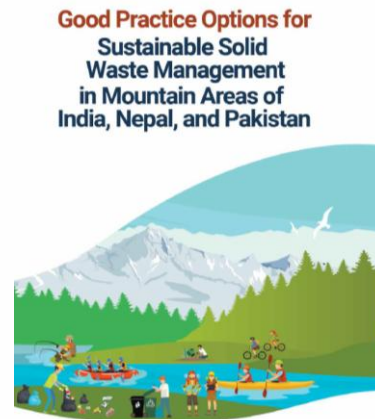
- **Section 2 of the National Environmental Management Act - overall framing.**
- **Align with South African waste management- and protected areas management legislation**
 - National Environmental Management Waste Act
 - The National Waste Management Strategy
 - National Environmental Management: Protected Areas Act
 - National Environmental Management: Biodiversity Act
 - National Biodiversity Strategy and Action Plan

Method

Step 2: Literature review and document analysis to contextualise best practice principles for waste management and protected areas.

Waste

- Best Environmental Management Practice for the Waste Management Sector by the **European Union** (Dri *et al.*, 2018)
- Best Practices for Solid Waste Management: A Guide for Decision-Makers in Developing Countries the **US EPA** (2020)
- Sector Environmental Guideline: Solid waste and Environmental Guidelines for Small-Scale Activities in Africa (EGSSAA) Ecotourism by the **USAID** (2009)
- Bridging the Gap in Solid Waste Management: Governance Requirements for Results by the **World Bank** (2021)

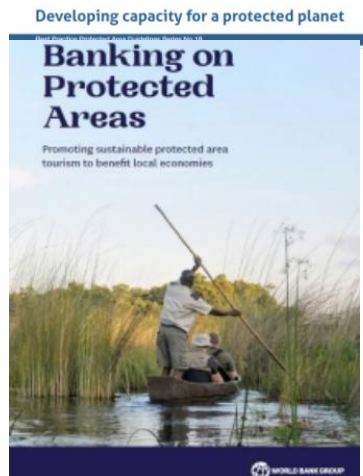
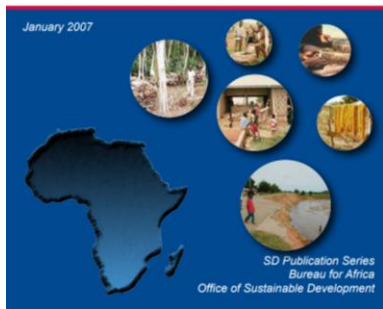
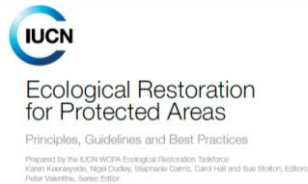


Bridging the Gap in Solid Waste Management Governance Requirements for Results



Method

Step 2: Literature review and document analysis to contextualise best practice principles for waste management and protected areas.



Protected areas

• IUCN Guidelines

- **Sustainable tourism** in protected areas (IUCN PAG 008)
- **Ecological restoration** for protected areas (IUCN PAG 018)
- **Tourism and visitor management** in protected areas (IUCN PAG 027)

• IAIA Principles for Biodiversity in Impact Assessment (Brownlie & Treweek, 2018)

- **USAID** Environmental guidelines for ecotourism activities in Africa
- **World Bank** Guidelines on promoting sustainable tourism in protected areas.

Method

Step 3: Specialist workshop to validate and refine proposed best practice principles for waste management in protected areas.

- The proposed best practice principles for waste management in South African protected areas was **reviewed and refined** during a **specialist workshop**.
- Also ensuring that **principles align** with the following criteria, which are important for waste management in PAs:
 - Provides for **characteristics** of PAs
 - Aligns with **PA objectives**
 - Provides for **operational impacts** of activities in/around PAs
 - Aligns with objectives of **NEMWA and NWMS**
 - Provides for **operational challenges** of waste management in PAs
 - Provides for **social/community benefits**



Results

- Six key principles for waste management in protected areas

Results – 6 key principles

- **Principle 1: Protection of ecosystems and biodiversity**

- NEMA Section 2 (4)(a)(i); NEMWA Section 2(a)(iv); NEMBA Section 2(a)(i) & (iA), 7, 52; NBSAP (Strategic objective 1 and 4); NEMPAA Section 17 (a) to (f); IUCN PAG 003 (Kelleher, 1999); Brownlie & Treweek, (2018); IUCN PAG 031 (Crofts et al., 2020); World Bank, (2021a); Roos et al. (2022)

- **Principle 2: Prevention (avoidance) and remediation of pollution**

- NEMA Section 2 (4)(a)(ii); NEMWA Section 2(a)(iv); 2(a)(viii), Section 21 – 27, 39; NWMS Pillar 3 (focus area: reduce littering and illegal dumping); IUCN PAG 008 (Eagles et al., 2002); IUCN PAG 018 (Keenleyside et al., 2012); IUCN PAG 019 (Day et al., 2012); Rodríguez-Rodríguez (2012); Mwangi & Thuo (2014); IUCN PAG 024 (Gross et al., 2016); Brownlie & Treweek, (2018); USAID (2018); IUCN PAG 031 (Crofts et al., 2020); US EPA (2020); World Bank (2021a)

Results – 6 key principles

- **Principle 3: Implementation of the waste management hierarchy**
 - NEMA Section 2 (4)(a)(iv); NEMWA Section 2(a)(ii)(iii)(iv), Section 16, 17, 26; NWMS Section 4.3 & Pillar 1 (waste minimisation); NEMBA Section 2(a)(ii); NBSAP (Strategic objectives 1 and 4); Cointreau (2001); IUCN PAG 008 (Eagles et al., 2002); USAID (2009); Mwangi & Thuo (2014); IUCN PAG 022 (Trzyna, 2014); Mwangi & Thuo (2014); Dudley et al., (2017); Dunjić et al. (2017); Dri et al. (2018); IUCN PAG 029 (Mitchell et al., 2018); Strydom (2018); USAID (2018); US EPA (2020); World Bank (2021a); World Bank (2021b); World Bank (2021c)
- **Principle 4: Provision of effective waste services and infrastructure**
 - NEMWA Section 2(a)(vii), Section 23 and 24; NWMS Pillar 2 (effective and sustainable waste services); Mwangi & Thuo (2014); Dri et al., (2018); USAID (2018); World Bank (2021a); World Bank (2021b)

Results – 6 key principles

- **Principle 5: Promotion of participation and building of partnerships**

- NEMA Section 2 (4)(f)(g); NWMS Pillar 1 (Focus area: Build sustainable partnerships), Pillar 3 (Focus area: Awareness and community participation); Cointreau (2001); Mwangi & Thuo (2014); Dunjić et al. (2017); IUCN PAG 027 (Leung et al., 2018); USEPA (2020)

- **Principle 6: Contribution to wellbeing, livelihoods and capacity**

- NEMA Section 2 (4)(g); NEMA Section 2 (4)(f)(h); NWMS Pillar 1 (Focus area: Build sustainable partnerships), NWMS Pillar 1 (Focus area: Increase technical capacity and innovation for beneficiation of waste), Pillar 3 (Focus area: Awareness and community participation); NEMBA Section 2(a)(iii); NBSAP (Strategic objectives 1, 2, 4, 5 and 6); NEMPAA Section 17 (g)(h)(j)(k); Cointreau (2001); Rodríguez-Rodríguez (2012); Mwangi & Thuo (2014); Dunjić et al. (2017); IUCN PATRS 002 (Appleton, 2016); IUCN PAG 032 (Verschuuren et al., 2021); World Bank (2021b); World Bank (2021c)



Conclusions



- The proposed principles for waste management in protected areas aim to provide **strategic direction** and to **coordinate and standardise** waste management practices in protected areas.
- We believe that these principles will provide a **useful framework for ultimately developing more detailed guidance** for the management of waste in protected areas and will serve as a **measure to evaluate current practices**.



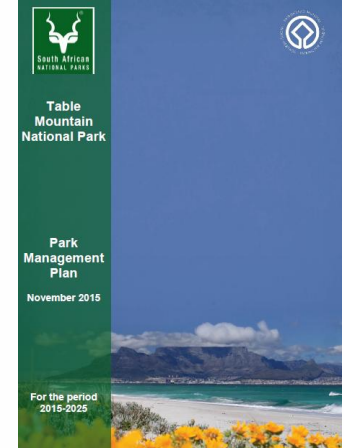
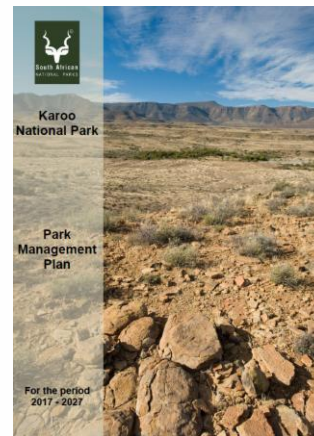
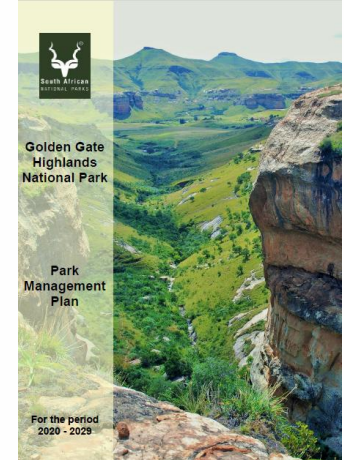
**Are these
principles
addressed?**



Perspectives on the future of waste management in South African protected areas

Inception report prepared by: Claudine Roos, Francois Retief, Reece Alberts
& Dirk Cilliers

February 2024



Extent to which proposed principles for responsible waste management is provided for in the protected areas management plans of 20 South African national parks, with A = addressed (green), B = partially addressed (yellow), C = not addressed (red)

Park management plans	Principle 1 Protection of ecosystems and biodiversity	Principle 2 Prevention and remediation of pollution	Principle 3 Implementation of the waste management hierarchy	Principle 4 Provision of effective waste services and infrastructure	Principle 5 Promotion of participation and building of partnerships	Principle 6 Contribution to wellbeing, livelihoods and capacity
Addo Elephant National Park	C	C	C	B	C	C
Agulhas National Park	C	C	A	B	C	C
Augrabies Falls National Park	C	C	A	A	B	C
Bontebok National Park	C	C	C	C	C	C
Camdeboo National Park	C	C	C	C	C	C
Garden Route National Park	C	A	A	B	C	C
Golden Gate Highlands National Park	C	C	A	A	C	B
Karoo National Park	C	C	C	A	C	C
Kgalagadi Transfrontier Park	C	C	C	B	C	C
Kruger National Park	C	B	A	A	A	A
Mapungubwe National Park	A	C	A	A	C	C
Marakele National Park	C	C	C	C	C	C
Meerkat National Park	C	C	C	C	C	C
Mokala National Park	C	C	C	B	C	C
Mountain Zebra National Park	C	C	C	B	C	C
Namaqua National Park	C	C	A	B	C	C
Richtersveld National Park	C	C	C	B	C	C
Table Mountain National Park	C	C	C	C	C	C
Tankwa Karoo National Park	C	B	C	C	C	C
West Coast National Park	C	B	C	C	C	C

Thank You!

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