A MODEL FOR UNDERSTANDING AND CONSERVING RIVER AND ESTUARINE SYSTEMS IN SOUTH AFRICA

A CASE STUDY BASED ON NVT'S SOURCE-TO-SEA PROJECT

Garden Route Interface and Networking (GRIN) Meeting, Knysna

October 1st, 2024

Lauren Moriarty[1] and Prof Hendri Coetzee[1]

[1] NVT, Nature's Valley, South Africa

WFN SUPPORTING CONSERVATION LEADERS

South African NATIONAL PARKS

NVT *In support of conservation*

Introduction to Salt River Source to Sea Project

Environmental Importance

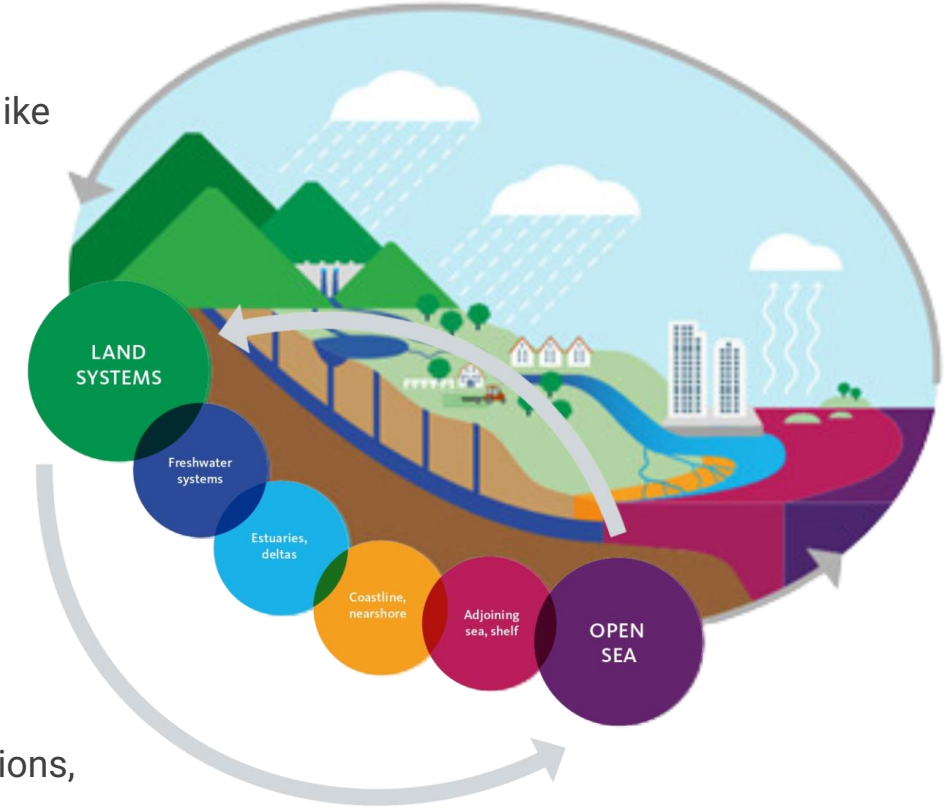
The Salt River is vital to biodiversity and ecosystem services. It faces challenges like pollution and habitat degradation due to human activities.

Source to Sea Approach

This approach emphasizes connectivity between land and sea, assessing impacts from upstream to downstream. It aims to maintain natural flows and ecological functions.

Nature-Based Solutions

Leveraging nature to solve environmental problems. By implementing these solutions, the project aims for sustainable conservation and community benefits.

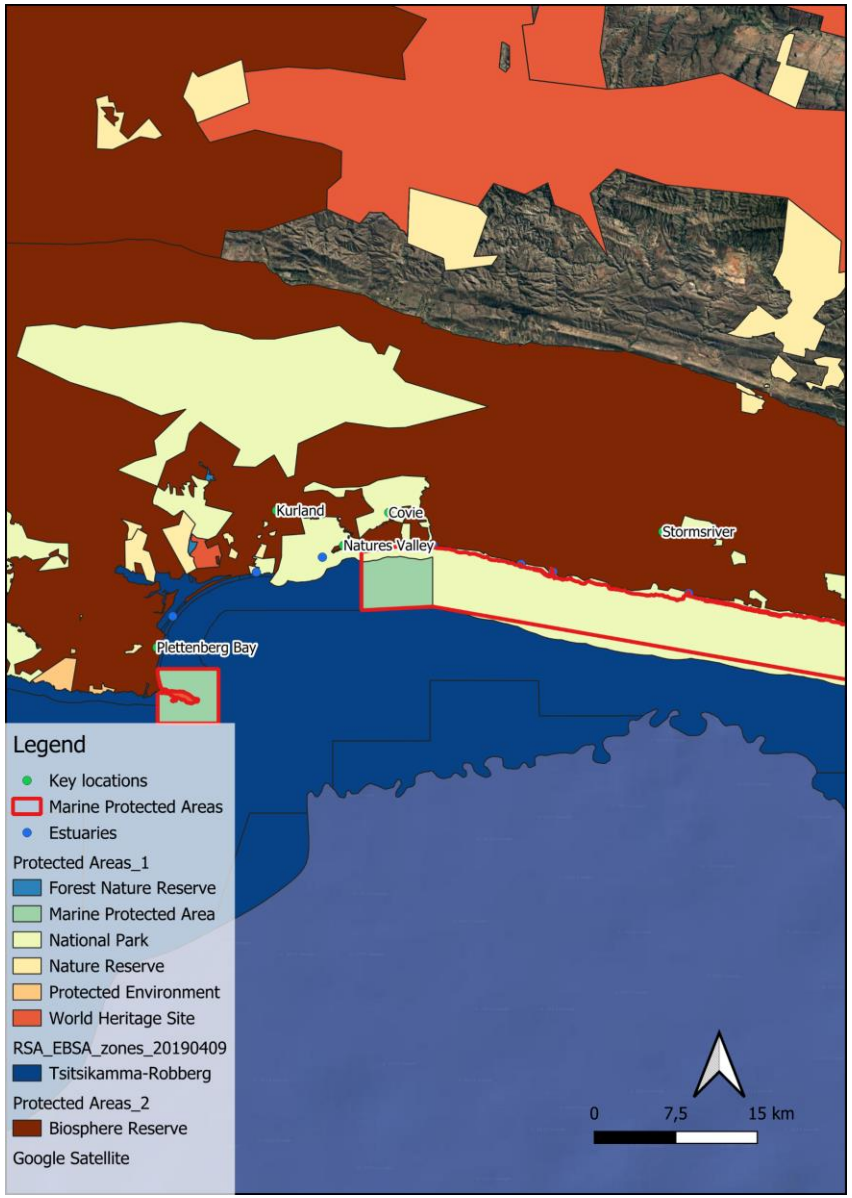


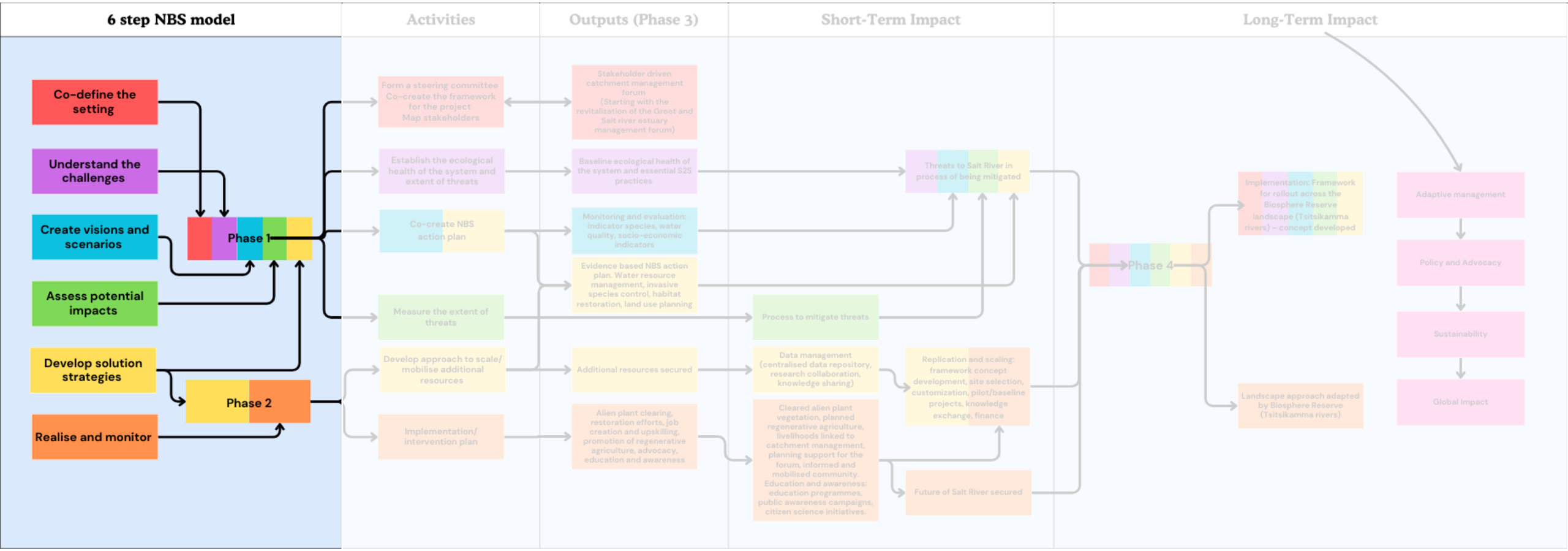
Source: SIWI

Aim and scope of the project

Starting with the Salt River Catchment, the project embarked on a 2-year multidisciplinary study of the river, from source into sea, to:

- Determine **baseline ecological health** of the system.
- Its value as a **carbon sink**.
- Identify mechanisms that contribute to the **functioning of the system**.
- Identify the threats, their drivers, and actions required to **restore, maintain and improve the resilience of these ecosystems** to deliver effective ecosystem services.





Albert et al. (2021)

Objectives & Methodology Overview

WP 1: Form a Steering Committee and co-define the setting

Key stakeholders, 2 local NGOs, 2 civil society stakeholders, members from 3 local and affected communities

WP 2. Understand the challenges and map the stakeholders

Determine the ecological health of the Salt River system and its value as a carbon sink.

Understand the challenges and quantify the threats to the catchment's ability to deliver ecosystem services for society and biodiversity.

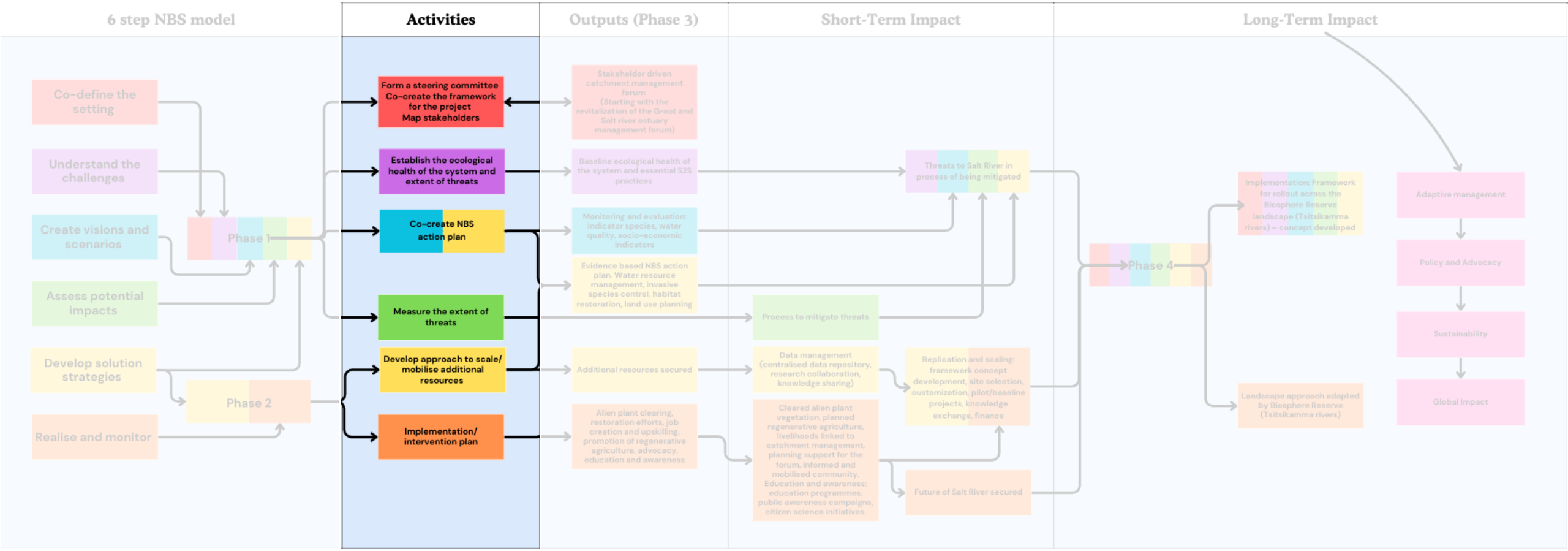
Develop a stakeholder map and within 6 months have preliminary meetings with all stakeholder groups

WP 3: In collaboration with the stakeholders, create visions and scenarios, assess potential impacts, and develop solution strategies to create an agreed action plan

Using the baseline information from the ecological health studies, the threats assessments and building on the Salt River EMP, vision, we will co-design a programme to develop strategies and solutions to tackling the identified threats.

WP 4: Realise and monitor through implementing the action plan and planning for scale

Year 2 will be dedicated to implementing the action plan and monitoring and evaluation. As part of the evaluation the framework being used will be assessed for its applicability in 2 other key catchment areas with a view to replicating the model across the 13 rivers landscape that flow through the Garden Route National Park.



Albert et al. (2021)

Phase 1: Stakeholder Analysis and Social Baseline

Role of Steering Committee

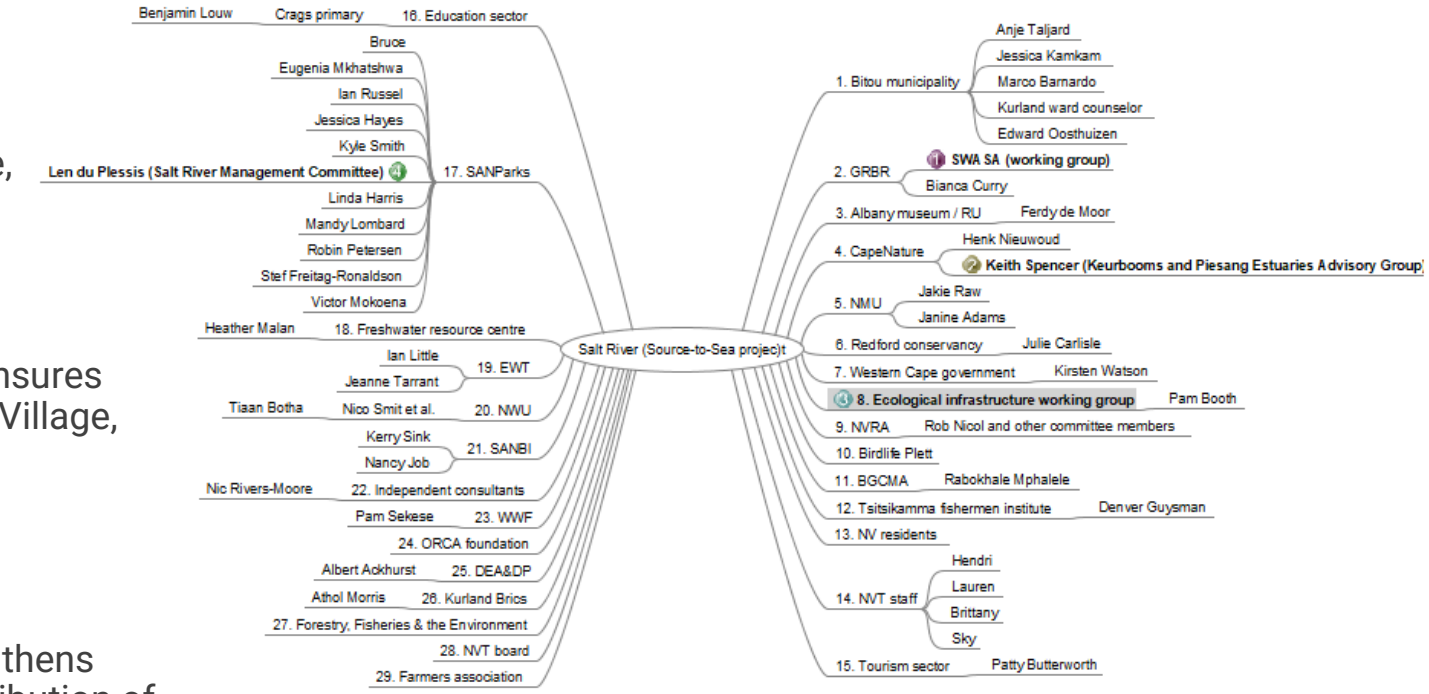
Composed of diverse stakeholders who guide the project. The committee enables effective governance, aligning conservation goals with community needs.

Stakeholder Involvement

Engaging local NGOs, civil groups, and government ensures inclusive decision-making. Communities like Kurland Village, the Crags, and Nature's Valley are key to sustained conservation efforts.

Community Empowerment

Fostering ownership of conservation activities strengthens commitment. Involving locals ensures equitable distribution of benefits and enhances sustainable outcomes.



Phase 1: Ecological Health

Water Quality Monitoring

Includes monitoring basic parameters with pollutants and nutrient levels across seasons. This data is vital in assessing the impact of human driven activities and conservation strategies on water systems.

Biodiversity Surveys

Focus on aquatic invertebrates, bird species, and riparian vegetation to gauge ecosystem health. These metrics help track progress in habitat restoration efforts.

Carbon Baseline Mapping

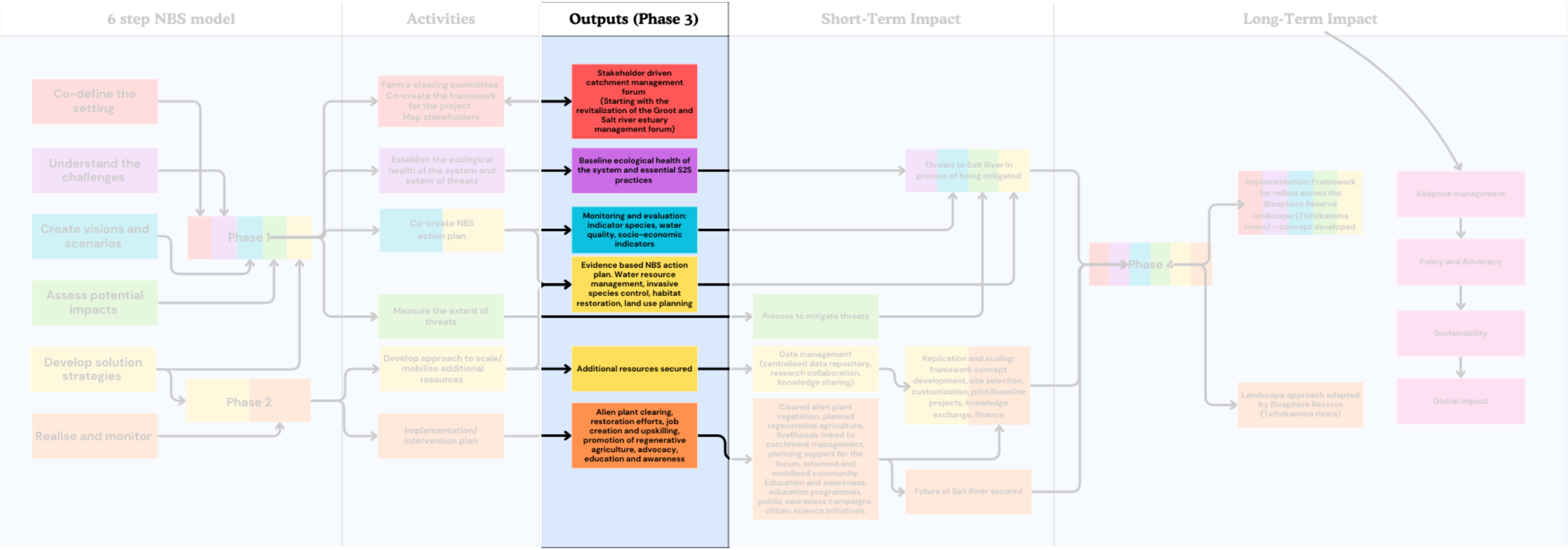
Quantifies carbon stocks in wetlands and forests. Understanding these dynamics contributes to climate change mitigation and ecosystem service enhancements.

Threats and Drivers

Invasive Species and Ecosystem Impact:
The catchment faces significant threats from invasive alien plants, particularly in the middle and lower catchment, as well as introduced native fish species threatening endemic macroinvertebrates and water quality.

Human Activity and Land Use Changes:
Development, urbanization, monocultures, and agricultural runoff (fertilizers, pesticides) are driving degradation, especially in the middle catchment. Illegal dams and water extraction further disrupt natural river flow and water quality.

Climate Change and Water Quality Vulnerabilities:
The Salt River system's natural low pH and oligotrophic state make it highly vulnerable to climate change, pollution (e.g., wastewater), and over-abstraction, which can exacerbate ecological degradation.



Albert et al. (2021)

Key Challenges

- Fragmented Governance
- More opportunity for continued coordination and collaboration
- Invasive Species
- Pollution Sources
- Efficient communication
- Better understanding of carbon
- Challenges in adapting and implementing the approach
- Challenges in financial mechanisms to support Source to Sea management
- Benefits are not always shared equally

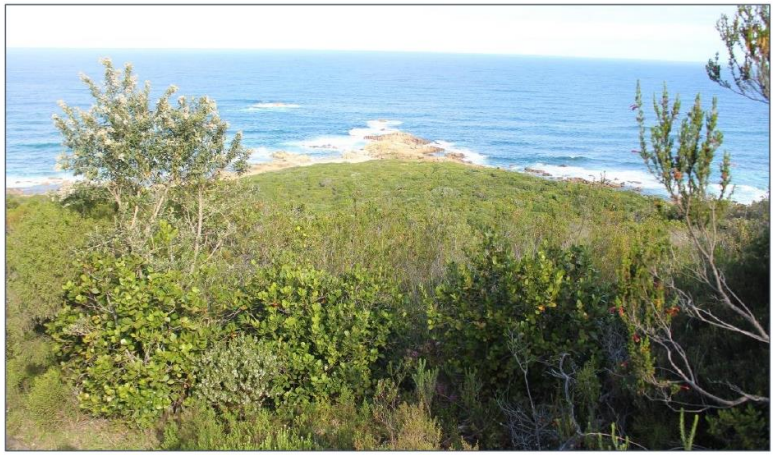
SALT RIVER PROJECT

SOCIAL BASELINE ASSESSMENT AND STAKEHOLDER ANALYSIS

REPORT 2023

CARBON QUANTIFICATION AND MAPPING OF THE SOUT (OOS) RIVER CATCHMENT

Progress Report: High-resolution spatial Landcover mapping



February 2024

Huchzermeyer, N; Powell, M

Basic Assessment of the biota and water quality of the Sout (Oos) River, Natures Valley.
(First survey)

Wynand Vlok and Nick Rivers-Moore
(December 2023)

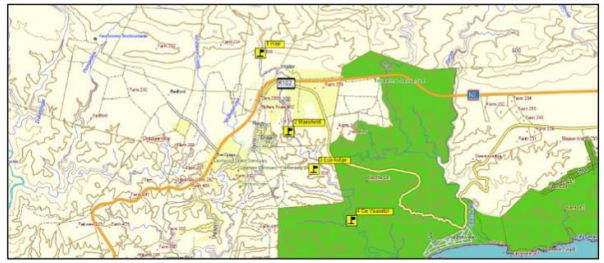


Figure 2.1: Image of the four sites selected for the project.

Figure 2.2: An aerial image of the four selected sites.

Community needs, assets, psycho-social well-being and environmental attitudes in Kurland and Covie, Western Cape, South Africa

Implications for interventions and community-based conservation

Researchers:

Werner Nell & Hendri Coetzee

April 2024

FROM SOURCE TO SEA – NATURE-BASED SOLUTIONS FOR A RIVER LANDSCAPE

PHASE 2: INTERVENTION PLAN TO IMPROVE THE FUNCTION AND RESILIENCE OF THE SALT RIVER SYSTEM, FROM SOURCE TO SEA

Aim and objectives

The aim of the overall project is a stakeholder driven forum that conserves, manages and enhances sustainable economic and social use of catchments without compromising the ecological integrity and functioning of ecosystems. Phase two interventions aim to improve the function and resilience of the Salt River system, from source to sea. This will be done by (1) restoring the riparian zone (up to 20 meters on both sides of the river course); restoring/ rehabilitating the rest of the catchment (in partnership with local stakeholders, and where feasible); and (3) addressing the human activities and behaviours that threatens the system.

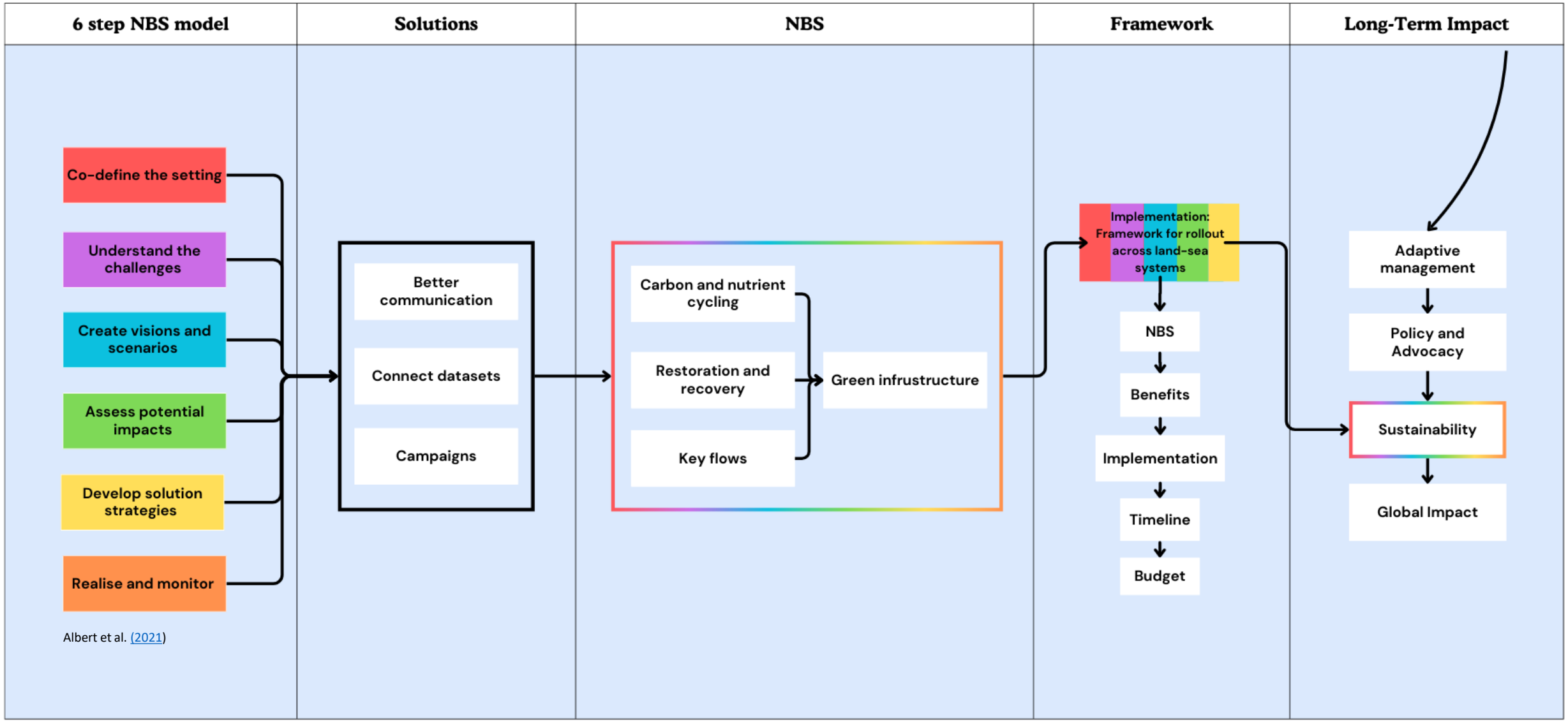
Threats and drivers

The threats and drivers have emerged from the key focus areas of the project, which include conducting a carbon baseline assessment, an ecological baseline assessment, and stakeholder mapping. Vlok and Rivers-Moore (2023) highlighted that the system's vulnerability to degradation is exacerbated by its unique combination of water quality, biotic, and trophic characteristics. Failure to restore and conserve the system by Nature's Valley Trust (NVT) and its partners (all relevant stakeholders) will ultimately impact the resilience and functioning of the system.

The main biotic threats and drivers that were identified by Vlok and Rivers-Moore (2023) and Huchzermeyer and Powell (2024) are **alien invasive plants** in the catchment and the riparian zone, the presence of **non-native and introduced native fish** (that poses a threat to several unique macroinvertebrates that are only found in the system) in the lower catchment, and the low pH and oligotrophic ecology that make the system vulnerable to **climate change impacts** – a unique set of variables that can be expedited and amplified by direct human activities such as **wastewater pollution, water extraction** and **agricultural runoff** (fertilisers and pesticides). SASS5 scores from the December 2023 survey conducted by Vlok and Rivers-Moore (2023) were

Draft: Salt River Awareness and Education Plan 2024

Nature-Based Solutions



Albert et al. (2021)

Interventions & Mitigation of Threats

Targeted Intervention Areas

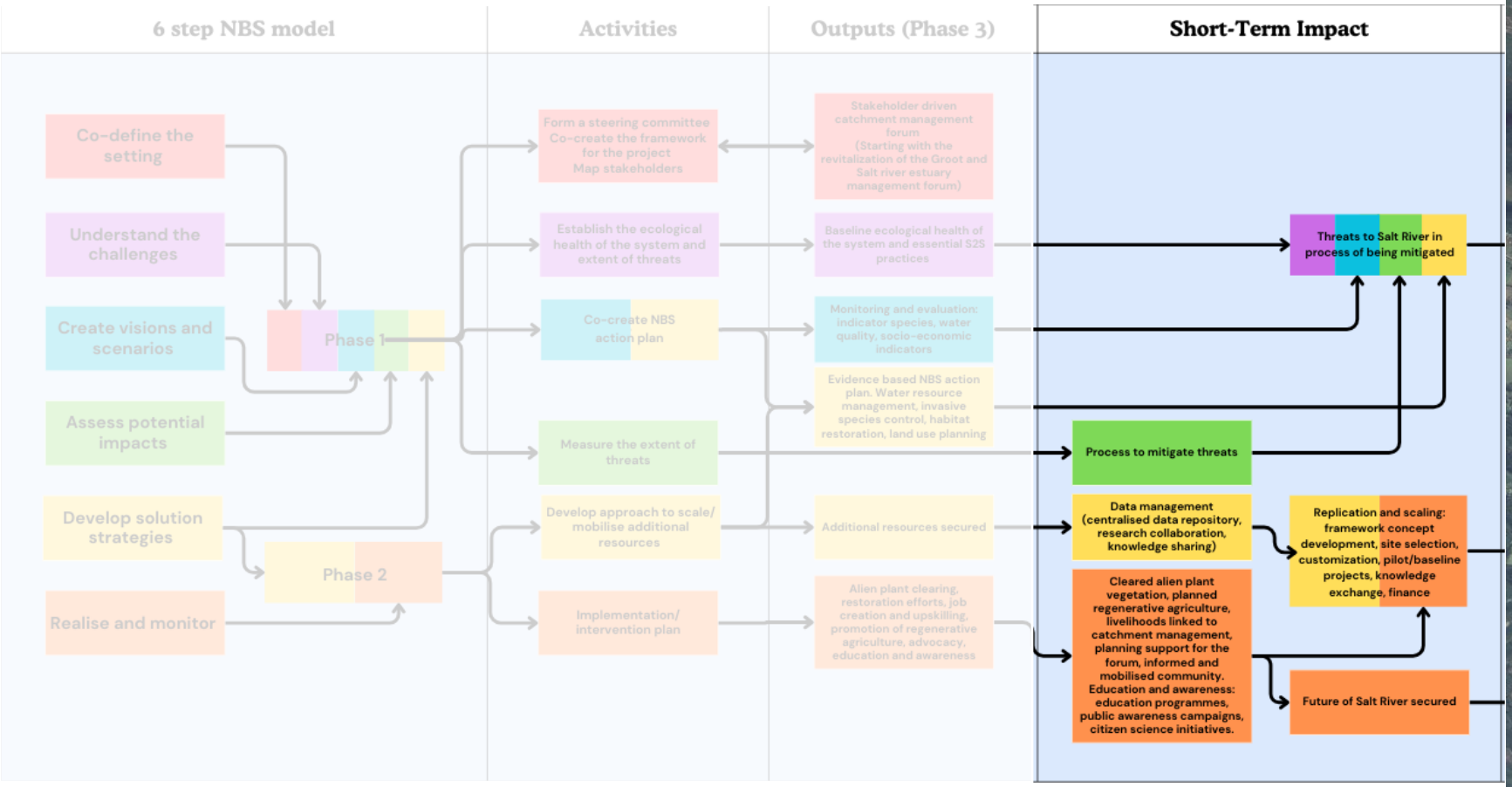
Phase 2 focuses on restoring and maintaining the catchment's resilience, prioritizing the upper and lower catchment areas with high biodiversity, particularly in the fynbos habitats and riparian zones. The goal is to protect and rehabilitate vital ecosystems while mitigating climate change and ensuring sustainable water management.

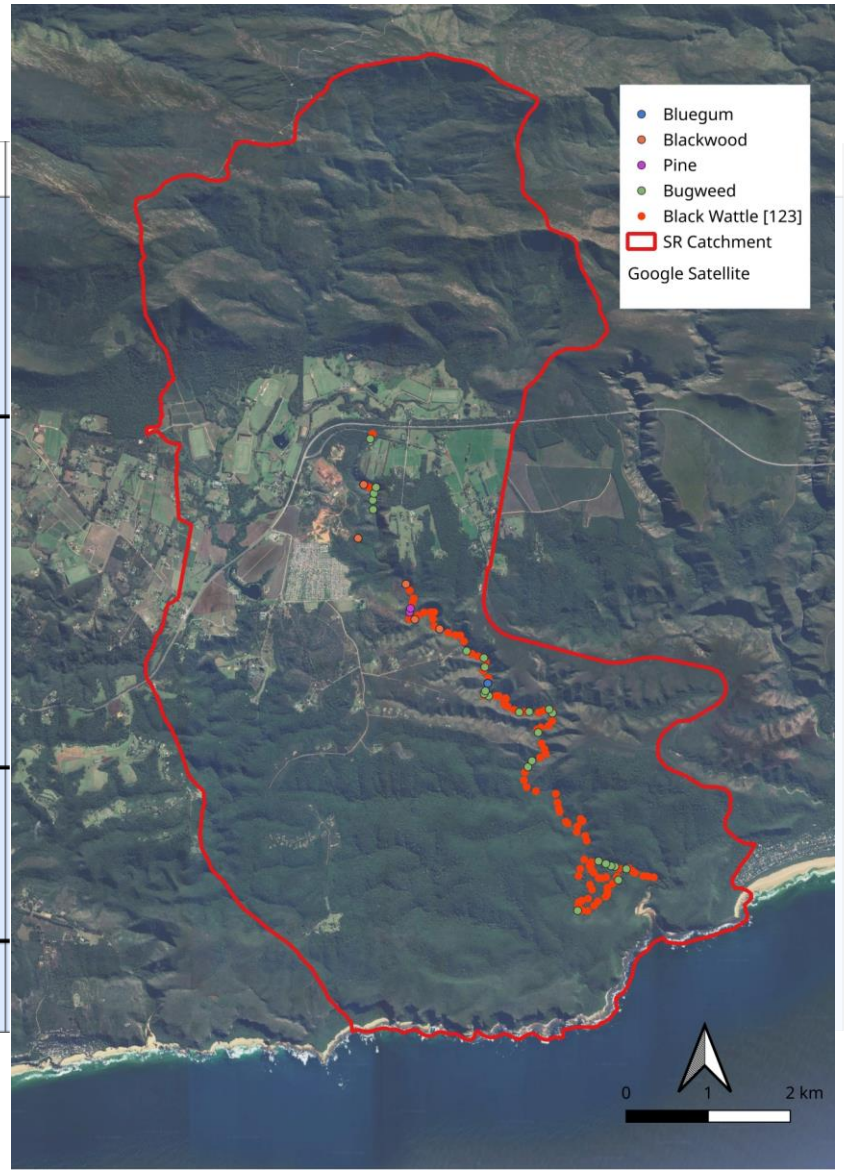
Collaborative Action Plan

Through stakeholder collaboration, an action plan is being implemented that integrates ecological restoration, invasive species management, and regenerative agriculture. Community participation, job creation, and education are key to fostering long-term sustainability and economic resilience.

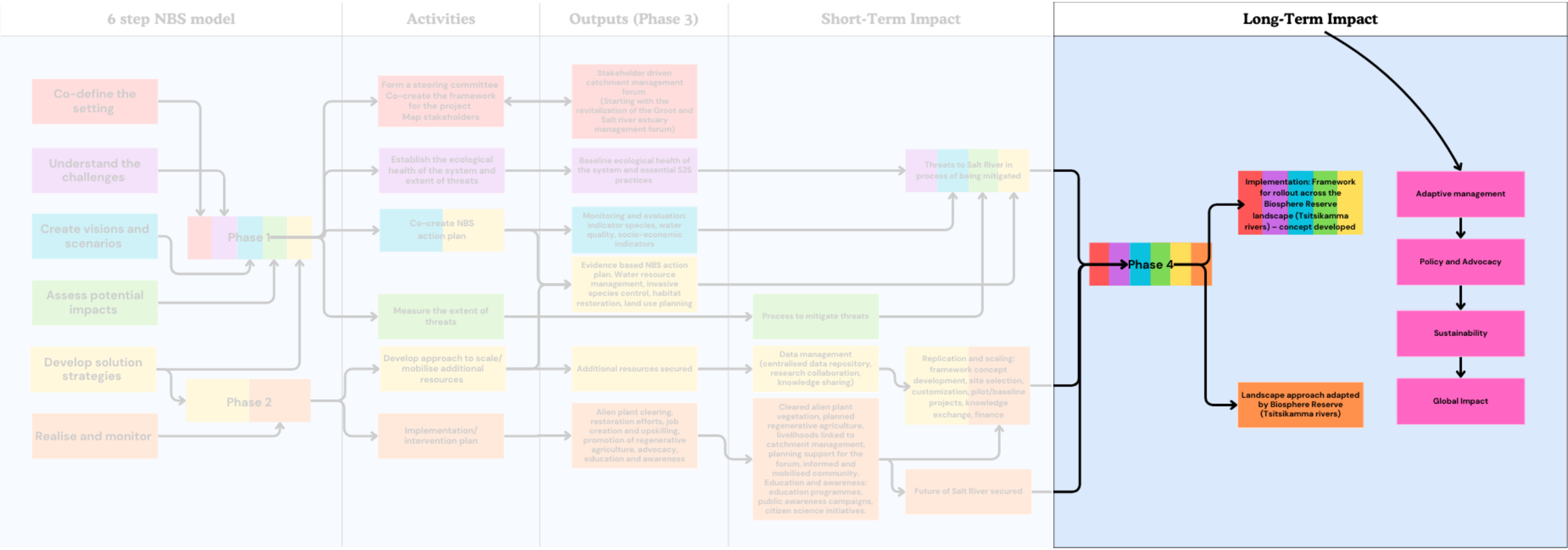
Monitoring and Adaptive Management

Regular monitoring of water quality, agricultural runoff, and river flow patterns is essential to maintaining ecosystem health. Follow-up surveys, water testing, and adaptive strategies informed by climate change studies will ensure the resilience of both natural systems and communities.





Albert et al. (2021)



Albert et al. (2021)

Monitoring & Outcomes

Enhanced Biodiversity

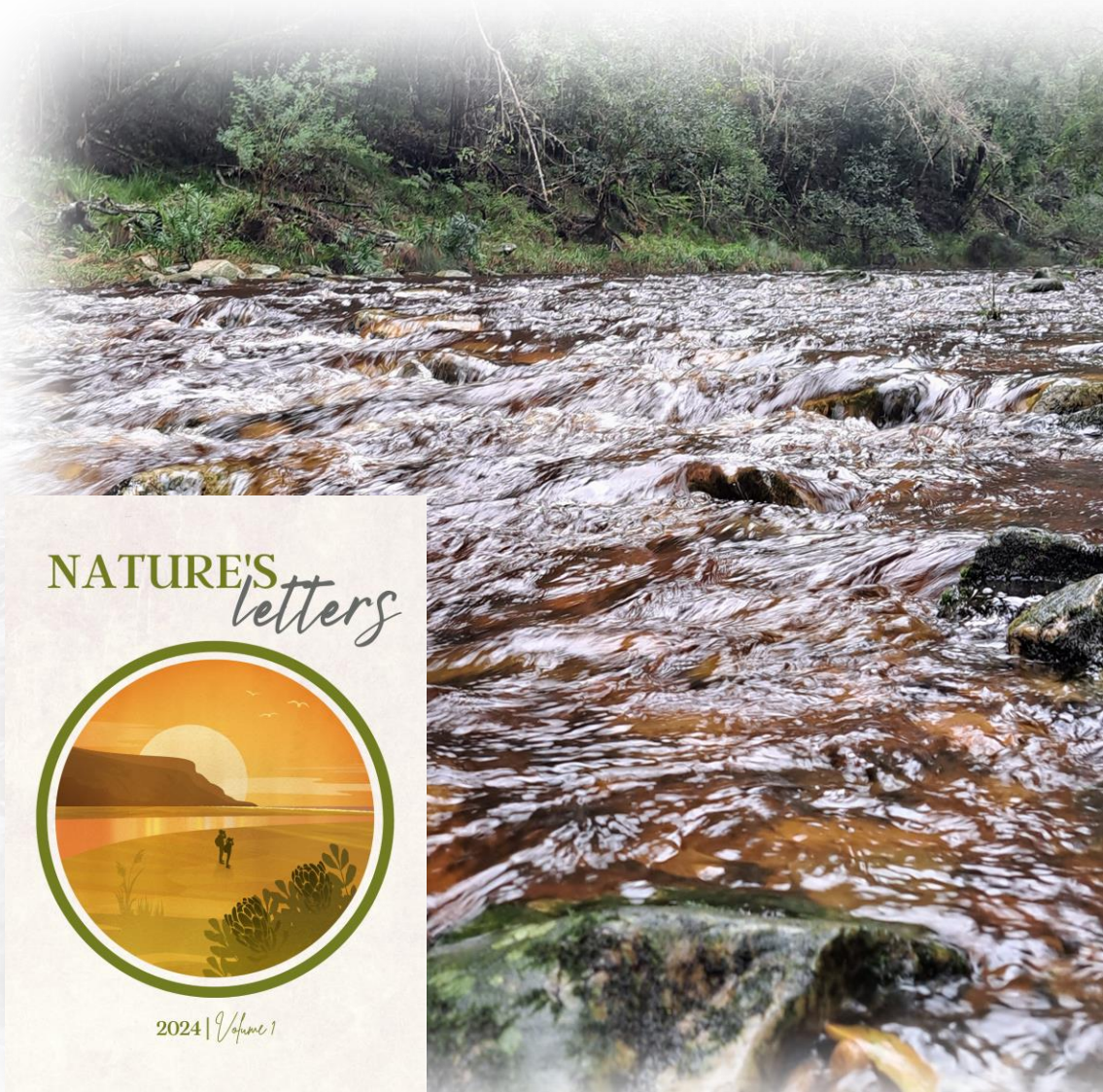
Significant improvements in species diversity and habitat quality. Enhanced ecosystems support more aquatic invertebrates and bird populations.

Improved Water Quality

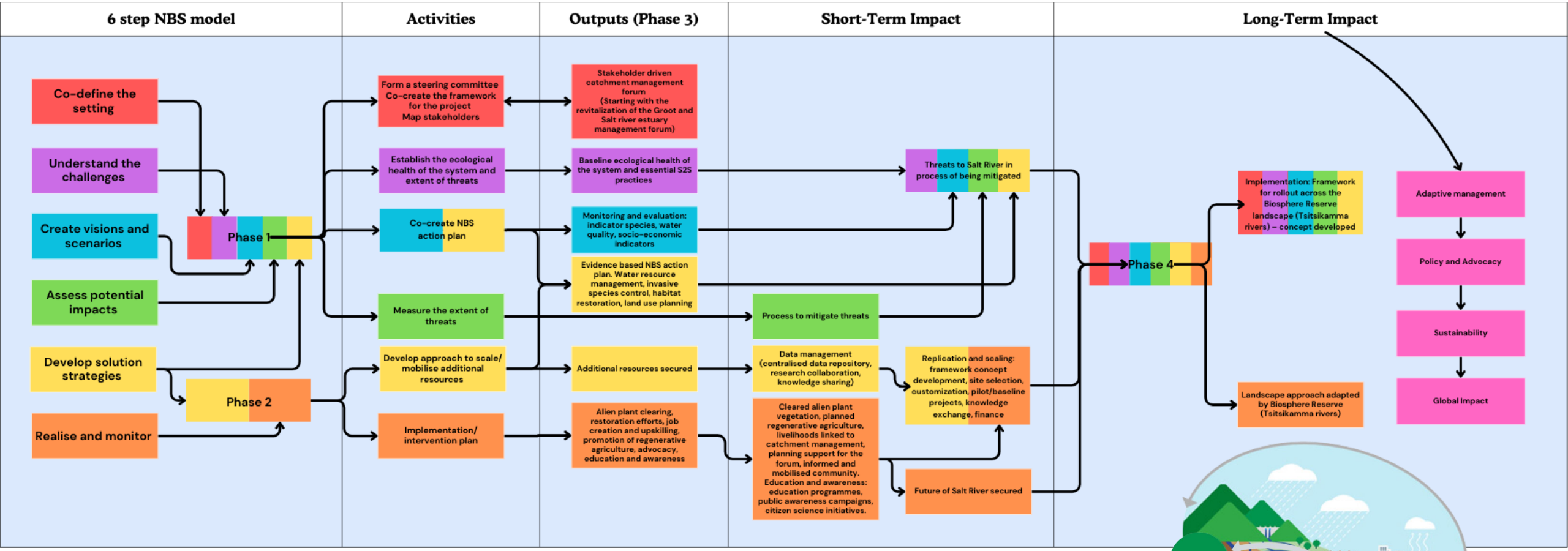
Notable reductions in nutrient and pollutant levels. Achieved through strategic pollution management, contributing to better ecosystem health.

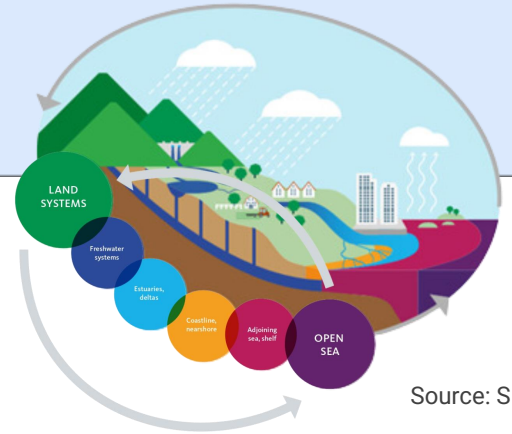
Transparency and Feedback

Regular feedback loop with local communities informs adaptive management. This ensures the project's strategies align with real-world conditions and needs.



S2S NBS Conservation Model





Source: SIWI

Albert, C., Brillinger, M., Guerrero, P. et al. Planning nature-based solutions: Principles, steps, and insights. Ambio 50, 1446–1461 (2021).

Contact Information

Lauren Moriarty

Conservation Scientist and Educator

Lauren.Moriarty@nvt.org.za

+27(0) 82 572 0948

Prof Hendri Coetzee

NVT Executive Director

Hendri.Coetzee@nvt.org.za

+27(0) 82 213 4816

www.naturesvalleytrust.co.za