

Adaptive Management and Monitoring

Executive Summary

Scientific wildlife management applies ecological principles to achieve defined conservation and production objectives through the sustainable use of natural resources. Effective management integrates animal and vegetation management and recognises the complexity of interactions between biotic and abiotic components.

Active adaptive management, supported by continuous monitoring, is essential for responding to changing ecological and social conditions. Monitoring programmes should be based on baseline surveys and include key indicators such as veld condition, vegetation biomass, game populations, environmental variables, and erosion. Fixed monitoring sites and consistent assessment methods are required to track long-term trends and management outcomes.

Veld condition assessments provide the foundation for determining grazing capacity, evaluating animal impacts, and guiding fire management. Annual monitoring of vegetation condition and biomass enables informed stocking and fire decisions, with conservative stocking rates applied to prevent veld degradation and adjusted as conditions change.

Game management is guided by ecological carrying capacity and population dynamics. Regular population monitoring, including sex ratios and age structure, supports sustainable harvesting and optimal population performance.

Environmental monitoring, particularly of rainfall, temperature, and erosion, is critical for assessing land condition and the effectiveness of rehabilitation measures. Together, these processes support informed decision-making, sustainable resource use, and long-term ecosystem resilience.

Adaptive Management and Monitoring

Scientific wildlife management applies ecological principles to achieve clearly defined objectives. Explicit goals are essential, as problems can only be identified as deviations from predetermined targets. Wildlife management is best described as conservation through wise use—utilising natural resources sustainably for human benefit while maintaining ecological processes, preserving genetic diversity, and supporting the sustainable use of associated renewable resources.

Wildlife management encompasses both animal and vegetation management. Problem solving in wildlife systems is inherently complex due to the numerous interactions between plant communities, animal populations, and the abiotic environment. Two broad management strategies may be applied: passive management, which delays intervention until systems are well understood, and active adaptive management, which implements informed actions immediately and adjusts them as new information becomes available.

A core component of active adaptive management is continuous monitoring of sensitive environmental indicators to assess whether management actions are achieving their objectives (Stuart-Hill 1989). Ecological inventories should assess veld condition, game numbers, species diversity, environmental variables, and erosion. Social inventories should focus on human dimensions, including community needs and the skills required to manage the ranch effectively. Where skills are lacking, objectives should include training or recruitment; if neither is feasible, management goals should be aligned with existing capacity (Rethman 1989).

Baseline surveys are essential for establishing a monitoring programme and for evaluating progress toward objectives. These surveys may include assessments of veld condition and bush encroachment. Data from initial resource surveys should be used to identify and mark fixed monitoring sites to ensure consistency in long-term assessments (Rethman 1989). Regular monitoring of vegetation and animal populations is critical. Stocking decisions should consider species-specific habitat requirements, landowner preferences, and financial constraints, with conservative stocking rates applied to prevent veld degradation. Stocking rates should be adjusted based on monitoring results.

Veld Condition

An effective veld management plan requires a comprehensive assessment of veld condition (Trollope 1990). Veld condition reflects vegetation performance in terms of productivity, erosion resistance, structural integrity, and fuel availability for fire. Accurate knowledge of veld condition enables managers to determine grazing capacity and evaluate animal impacts on vegetation.

Phenology describes seasonal growth phases in plants and animals in response to climatic cycles (Van Rooyen and Theron 1996). Because phenophases typically recur annually, monitoring of homogeneous plant communities should be conducted at the same time each year. Monitoring sites were established in each management unit, with GPS coordinates recorded to allow long-term assessment of vegetation change. Step-point and BECVOL results were recorded, supported by photographic records. The highest veld condition score recorded at each site should serve as a benchmark for assessing ecological potential. Biomass production should be monitored annually, using tools such as a disc pasture meter to guide fire management decisions.

Game

Ecological carrying capacity represents the maximum number of animals an area can sustain and is determined by habitat characteristics and social pressures. Species-specific carrying capacity reflects densities found in large natural systems (Grossman, Holden and Collinson 1999). Population growth rates are critical for setting harvesting quotas and vary across population growth phases, with faster growth occurring during the exponential phase.

Regular population monitoring is essential to evaluate management effectiveness and to refine strategies. Birth rates, mortality rates, sex ratios, and age structures should be assessed to ensure optimal reproduction and productivity. Unbalanced sex ratios can reduce mating success and overall population performance. Game counts form the foundation of effective veld management. In highland areas, known or individual counts are appropriate, with population estimates derived from repeated observations of herd size and composition (Bothma 2002).

Environmental Conditions and Erosion

Environmental variables such as rainfall and temperature should be monitored due to their influence on vegetation dynamics. Long-term climatic data can be obtained from the Department of Agriculture in Bela-Bela to assess monthly and annual trends.

Erosion monitoring is essential for evaluating land condition and the effectiveness of rehabilitation measures. Erosion risk and recovery should be assessed regularly, with annual monitoring of erosion features and more frequent monitoring of rehabilitated areas.
