



South Africa

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**Management Effectiveness Assessment
of Protected Areas in KwaZulu-Natal
using WWF's RAPPAM Methodology**

Figure 1. Management regions and protected areas in KwaZulu-Natal Province. uKhahlamba-Drakensberg Park and the Greater St Lucia Wetland Park are World Heritage Sites.



Figure 2. The topography of KwaZulu-Natal showing the broad tropical coastal plain in the northeast, rising steeply to the Drakensberg escarpment at 3,400 metres in the west.

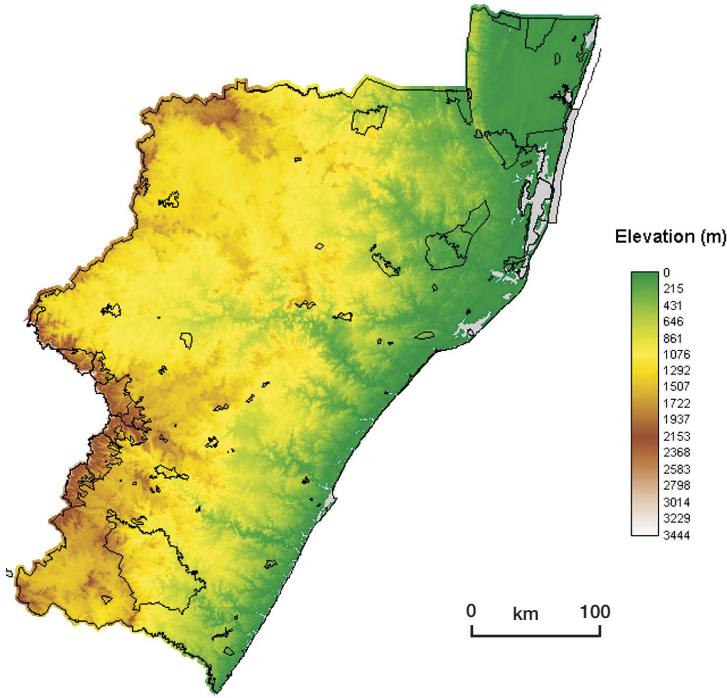
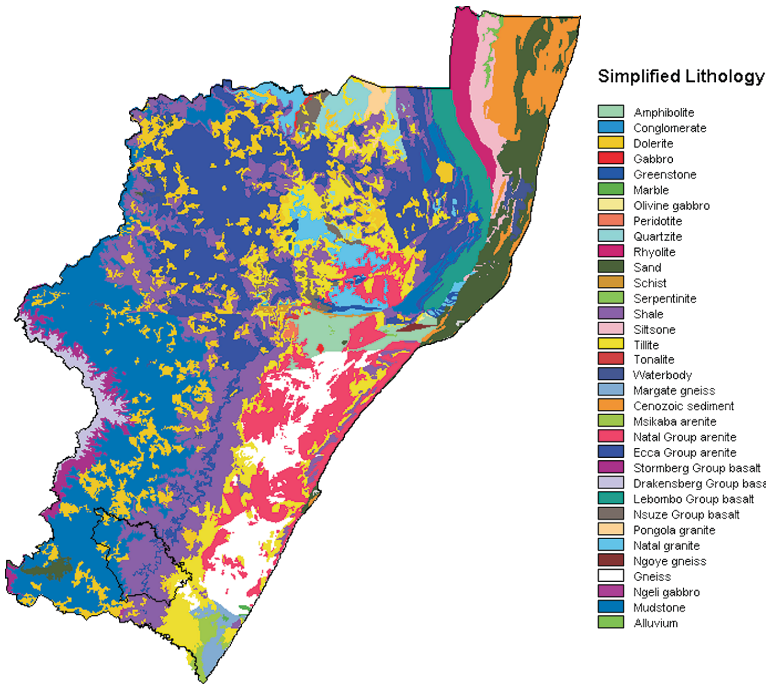


Figure 3. The geology of KwaZulu-Natal.





SOUTH AFRICA

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WWF's RAPPAM Methodology**

P. S. Goodman

KwaZulu-Natal Wildlife

CONTENTS

INTRODUCTION AND BACKGROUND	3
IMPLEMENTING THE METHODOLOGY	6
FINDINGS AND ANALYSES	10
RECOMMENDATIONS	25
FOLLOW-UP ACTION	28
REFERENCES AND ACKNOWLEDGEMENTS	

INTRODUCTION AND BACKGROUND

KwaZulu-Natal Wildlife (KZN Wildlife) is a parastatal conservation body responsible for the conservation of biodiversity in the province of KwaZulu-Natal, South Africa. The province is situated on the east coast of South Africa in the biologically rich transition zone between the tropical biota found to the north and sub-tropical biota to the south (Figure 1, see inside front cover). In addition, rich ecosystems and habitats found within the province are also the result of the altitudinal range. This stretches from sea level in the east to the top of the Drakensberg (3,450 metres) in the west (Figure 2, see inside front cover). Furthermore, the diverse geology (Figure 3, see inside front cover) is another factor explaining the rich natural environment.

Major ecosystems include marine coral and rocky reefs, beaches, numerous estuaries and coastal lakes, moist lowland and upland grasslands, dry forest and a variety of moist forests dependent on altitude, and, finally, semi-arid savannah systems which contain the megafauna typical of these habitats in Africa. As a result, KwaZulu-Natal is an important area internationally from a biodiversity conservation perspective. This importance has been recognized by the World Heritage authority (UNESCO), which has granted World Heritage status to the Greater St Lucia Wetland Park and the uKhahlamba-Drakensberg Park (Figure 1).

KZN Wildlife is a recently formed entity, arising out of the amalgamation of the former Natal Parks Board and the KwaZulu Department of Nature Conservation, following South Africa's democratic elections. The newly formed organization immediately became responsible for the management of 110 protected areas in two regions and 6 sub-regions proclaimed under state



Kosi Bay estuary, north eastern Zululand (Greater St Lucia Wetland Park)

or provincial law. These protected areas, all effectively under state control, covered a total area of 7,128 square kilometres or 7.72 per cent of the land area of the province. Shortly after amalgamation, the new organization found itself critically short of the resources required to effectively manage many of its protected areas. The nature of this resource shortage was complex, but in essence the amalgamation had caused an imbalance in the ratio between the salary and operational components of the budget – too many staff with too few resources to operate effectively. This precipitated a restructuring and down sizing of the staff of the organization, thus creating the opportunity to re-align resource allocation to various operational sectors of the organization. This, and the perceived general shortage of funds for conservation management, emphasized the need for a means of resource re-allocation which was transparent, participatory but at the same time was best for the conservation of the province's biodiversity.

Photo: © KZN Wildlife

Two home grown attempts to prioritize resource allocation ensued. One emphasized the biological values of protected areas while the other focused on prioritizing management interventions in each of the 110 terrestrial protected areas now under the control of the new organization. For various reasons (both political and logistical) neither attempt resulted in improved resource allocation to critical management programmes.

At this time the organization adopted a more performance-related philosophy to the management of protected areas, and wanted to know the current state of protected area management in addition to the most critical areas of resource and skills shortage. Naturally, the results and recommendations were required as soon as possible and were to be generated in an open participatory manner. Fortuitously, the WWF Forests for Life Programme was in the process of developing and piloting the Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) Methodology, which was chosen over other methodologies because of its rapid and broad comparative approach. Overall the objectives of the assessment were to:

- ◆ Assess the current management effectiveness of formally protected areas in KwaZulu-Natal.
- ◆ Identify priorities for management action and resource allocation.

At the same time, a provincial scale systematic conservation planning project based on the approach of Margules and Pressey (2000) was commenced to evaluate conservation effectiveness and priorities at this broader scale. From an operational perspective it is important to stress that these two projects are seen to be inextricably linked (Figure 4).

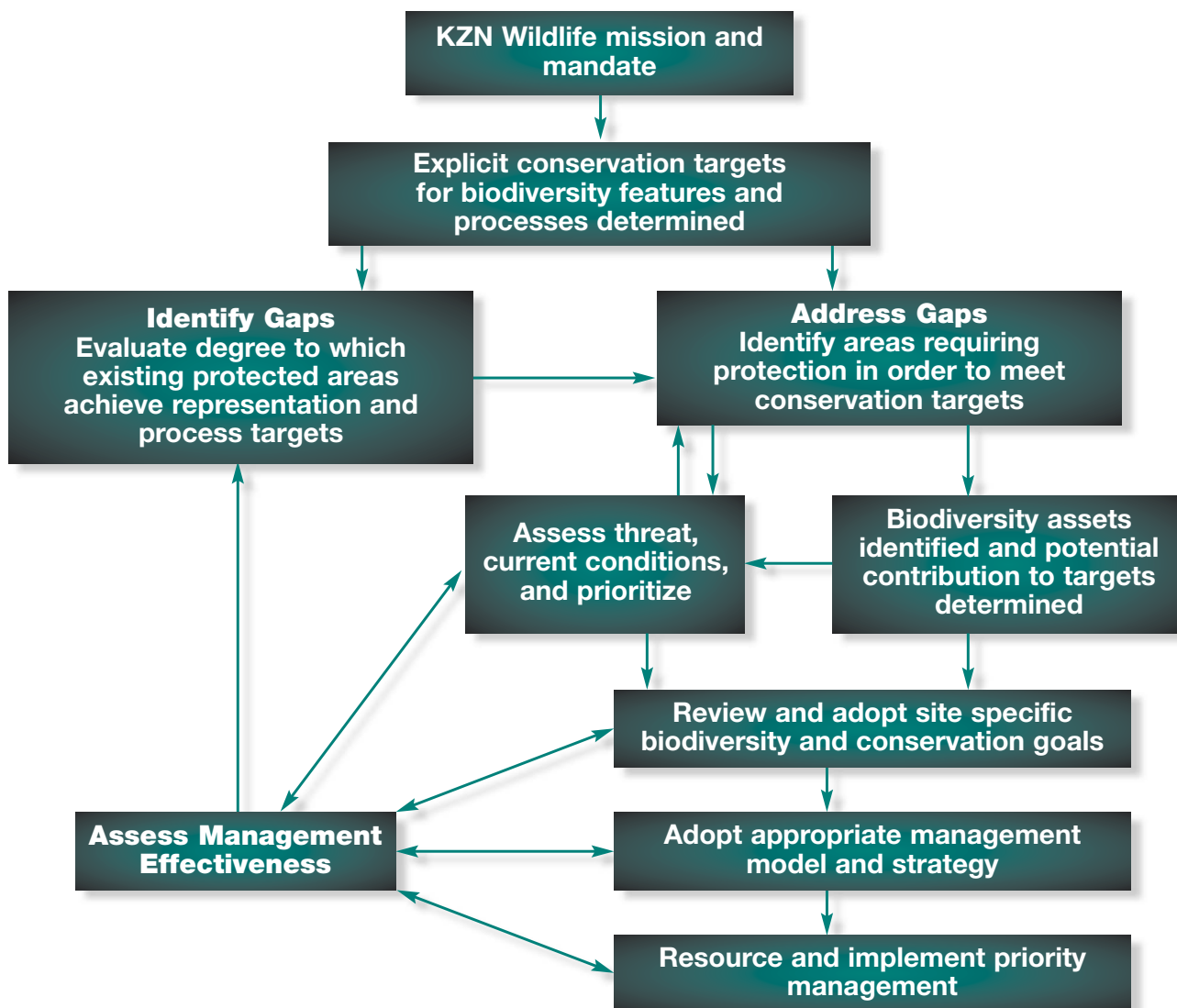
Management effectiveness assessment plays a major role in evaluating site specific conservation goals determined at a broader system-wide scale, evaluating site specific pressures and threats, evaluating the effectiveness of the selected management model and strategy, and evaluating and prioritizing resource allocation (Figure 4).



Photo: © KZN Wildlife

Summit of the Drakensberg escarpment (uKhahlamba-Drakensberg Park)

Figure 4. Protected Area Management Effectiveness Assessment Seen in the Broader Context of Conservation Planning and Implementation



IMPLEMENTING THE METHODOLOGY

SELECTION OF PROTECTED AREAS

Since the purpose of the evaluation was to give a broad perspective and guidance to the organization as to where priorities and problems were with respect to protected area management, it was decided at the outset that all 110 proclaimed protected areas under the control of KZN Wildlife should be evaluated. These protected areas, which varied in size from the smallest of 5 hectares to the largest proclaimed unit of 53,020 hectares, provided an 'organizational unit' which, for management accounting purposes, enabled resources such as staffing and budget to be allocated. From a functional biological perspective,

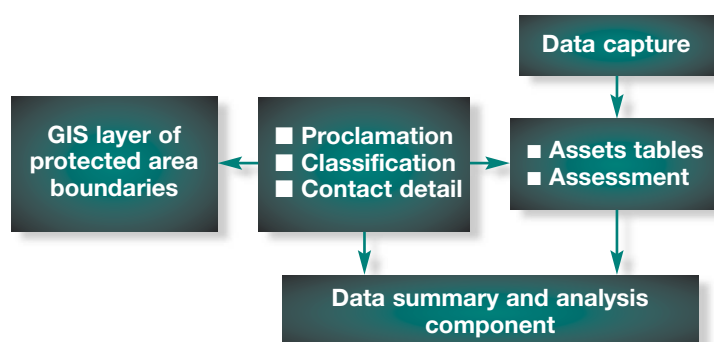
several of these independently proclaimed protected areas are grouped into larger units, examples being the uKhahlamba-Drakensberg Park, the Greater St Lucia Wetland Park and the Hluhluwe-Umfolozi Park.

Non-state managed protected areas such as private game farms and nature reserves, conservancies, municipal parks and reserves, national monuments, and historical reserves were not chosen to be evaluated since the objectives of the management of these areas are mostly not associated with the conservation of biodiversity.

REVIEW OF EXISTING DATA

Prior to the implementation of the questionnaire at a series of workshops, participants were requested to gather all appropriate biological and management information and have it available for the workshop. This included existing and draft management plans where available, zonation plans, general situation and annual management data. In addition, a geographical information system (GIS) and associated database was available centrally, which held basic information such as the area, IUCN classification of the protected area and contact details of the manager (Figure 5).

Figure 5. Broad Structure of the KwaZulu-Natal Wildlife Protected Areas Database

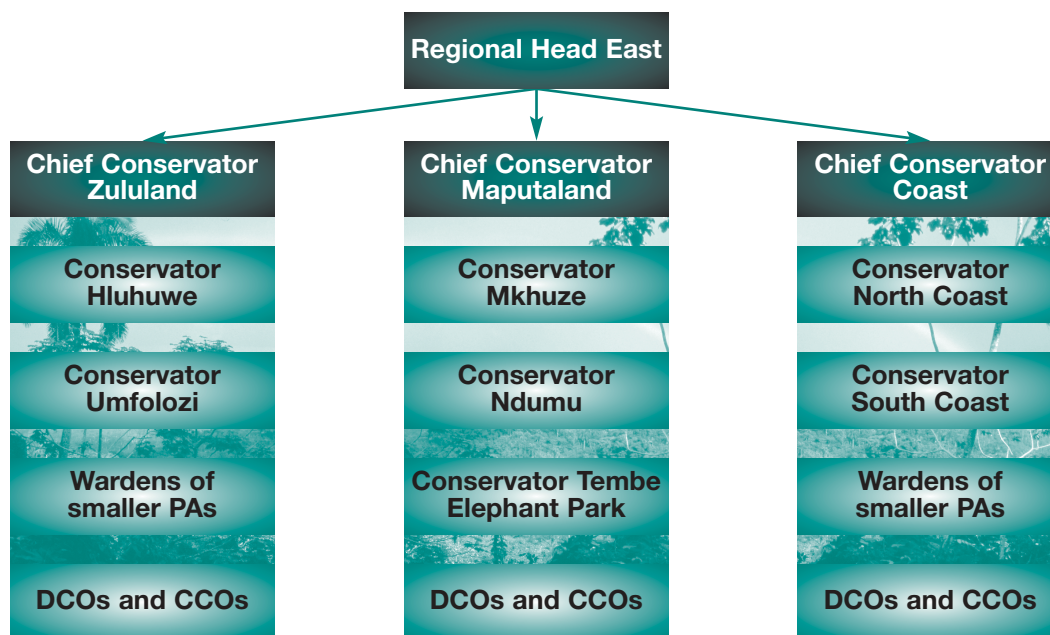


DATA COLLECTION

The questionnaire, which formed the foundation of the data collection phase, was applied at a series of six interactive workshops scheduled from February to July 2001. The workshops were organized in such a way that all the relevant staff from a particular sub-region participated (Figure 6).

This included the regional head, the sub-region head or chief conservator, protected area managers (conservators and wardens) and the district and community conservation officers (Figure 6). The latter staff are largely responsible for interacting with the community on conservation

Figure 6. Typical Regional and Sub-regional Staff Structures



matters outside of protected areas. There were a total of 15 to 20 participants at each workshop representing each management sub-region.

Each workshop started with a broad introduction, which included an overview of the aims and objectives of the evaluation, followed by an introduction to the methodology itself and the procedures that were to be followed in completing the questionnaire. Initially, participants were then divided into small groups of three to five people grouped on the basis of similar or closely related protected areas, given the questionnaire with resource material and definitions and requested to work their way through the document. Coordinators were on hand to assist with the interpretation of questions and definitions. As the individual questionnaire sheets were completed these were collected from participants and the scores captured into a database. After sections 3, 5, 7, 12, and 15 were completed, plenary sessions were held to evaluate and standardize the scoring across all reserves under consideration. This was done by projecting the scores for each question for each reserve (now captured into the database) onto a screen and on the basis of the ensuing discussion and debate between managers and supervisors, scores were amended accordingly. During the first and second workshop, these review sessions were found to be extremely valuable and

were employed throughout all six workshops; they revealed that despite the written and verbal guidance available to participants, there was still a high degree of variability in the interpretation of some of the questions. To address this, the manner in which the workshops were managed changed slightly for the last three workshops. Here each question was projected onto an overhead screen, and the question, along with any definitions interpreted and explained simultaneously to all participants. Only once all participants achieved a complete understanding was the question scored and the next question attempted. Apart from a much more uniform interpretation, this had the



Participants at the management effectiveness workshop for the South Zululand sub-region

Photo: © J. Ervin

advantage that the pace with which the questionnaire was completed could be better regulated.

To facilitate and control the answering of the pressures and threats sections, at the first workshop a comprehensive set of pressures and threats was developed by all workshop participants, and the protected areas for that sub-region were then rated for all pressures and threats. At subsequent workshops the list of pressures and threats was added to where justified, resulting in the overall list of pressures and threats used for the evaluation (Figure 7). This led to a situation where pressures and threats which were added at later workshops, were not evaluated by participants and hence regions which were

evaluated earlier. Earlier workshops had to be reconvened to evaluate pressures and threats that were added by consultations at later workshops. This was not ideal but seemed to be the only practical way in which the development of a comprehensive list of perceived pressures and threats could be developed.

Questions pertaining to system-wide analyses (questions 17–19) were not evaluated at the sub-region workshops. Instead, a separate and much smaller group of senior personnel comprising the head of conservation, the head of planning and the head of biodiversity research were assembled to evaluate these questions for the whole province. This ensured that those personnel most familiar with these broader issues were consulted.

DATA ANALYSIS

All data collected at the workshops were captured into the protected areas database which was specifically enhanced to capture, store, and analyse these data (Figure 5). Standard analyses, recommended by Ervin (2001), were built into the database to facilitate rapid analysis of the data. Additional means of viewing and comparing the

data were also built into the database so as to facilitate discussion at meetings with management staff and ultimately to ensure that the data and information they contain are in a form that makes it accessible to scientific, advisory, and managerial users.

FOLLOW-UP STEPS

After the first round of workshops had taken place and preliminary analysis of the data undertaken, a further set of meetings with senior staff from each region took place (due to the restructuring taking place in the organization, regions, now three, had been realigned and many staff changes had taken place). These meetings were aimed at giving decision-making staff initial exposure to the results of the evaluation, and at gauging the usefulness of the outcomes in terms of the likely impact on

decision making. In addition, the need and frequency of re-evaluation and future database maintenance were discussed, as were the mechanisms for implementing the results of the evaluation. After the data were fully analysed and preliminary recommendations developed, these were presented to the organization's Biodiversity Forum (senior conservation management and scientific staff) for discussion and adoption.

Figure 7. List of Pressures and Threats used in the Evaluation of Protected Areas in KwaZulu-Natal

Pressure/ Threat Source	Pressure/ Threat Description
Alien Animals	Includes feral cats, dogs, donkeys, cattle, rodents, reptiles, birds and fish.
Alien Plant Invasion	Non-indigenous plants which establish and advance aggressively and out-compete natural indigenous vegetation, resulting in dense infestations.
Arson/Uncontrolled Fires	Refers to fires started as a result of human action, but does not include planned burning. Could be deliberate or accidental, uncontrolled, external fires which enter the PA, or runaway, internal fires.
Bush Encroachment	Increase in the density of woody plants to the detriment of grassland-dependent species.
Dam Building	Flooding of a river basin within the PA or building of a dam upstream which changes the flow of water in a river/stream within the PA.
Destruction of Archaeological Assets	Wanton destruction of assets and/or collection of artefacts; poor management practices resulting in inadequate protection of assets.
Disease – Exotic	Tuberculosis, anthrax, rinderpest, foot-and-mouth.
Disease – Indigenous	Corridor disease, nagana, foot-and-mouth, rabies.
Erosion (Human-induced)	As a result of cattle, management tracks, etc. (Erosion as a result of tourist activities must be scored under Tourism Pressure/Threat.)
Land Invasion	Unlawful occupation of the land, e.g. "squatting" and/or illegal grazing.
Land Use Change	Change to the form of land use to something other than biodiversity conservation.
Management Solid Waste	This refers to waste generated by management activities (not tourism), e.g. old buildings, rubble, fencing materials, scrap metal, implements, etc.
Mining	This includes mining of minerals, quarrying, and sand winning.
PA Isolation	Isolation of PA as a result of incompatible, external land use change.
Poaching	Illegal destruction, or removal of indigenous organisms, e.g. poaching of plants or animals, poisoning of birds of prey/predators, cranes, guineafowl.
Pollution	Airborne, river-borne, groundwater. Agro-chemicals and pesticides, insect control (internal and external), sewerage spills, seepage from mine dumps, etc. Does not refer to global pollution.
Purposeful Species Eradication	This refers to the deliberate attempt to eradicate an indigenous species, e.g. tsetse fly, mosquito, and jackal.
Resource Utilization	Legal utilization – includes thatch, fodder, wood, medicinal plants, bark, tapping of sap, fishing etc.
Siltation	This refers to the siltation of natural water bodies, such as rivers and estuaries, and not to man-made impoundments.
Tourism	Includes facility footprint, roads, paths, trampling, solid-waste, and refuse, sewerage, petro-chemical pollution (from outboard motors in lakes and estuaries), etc.

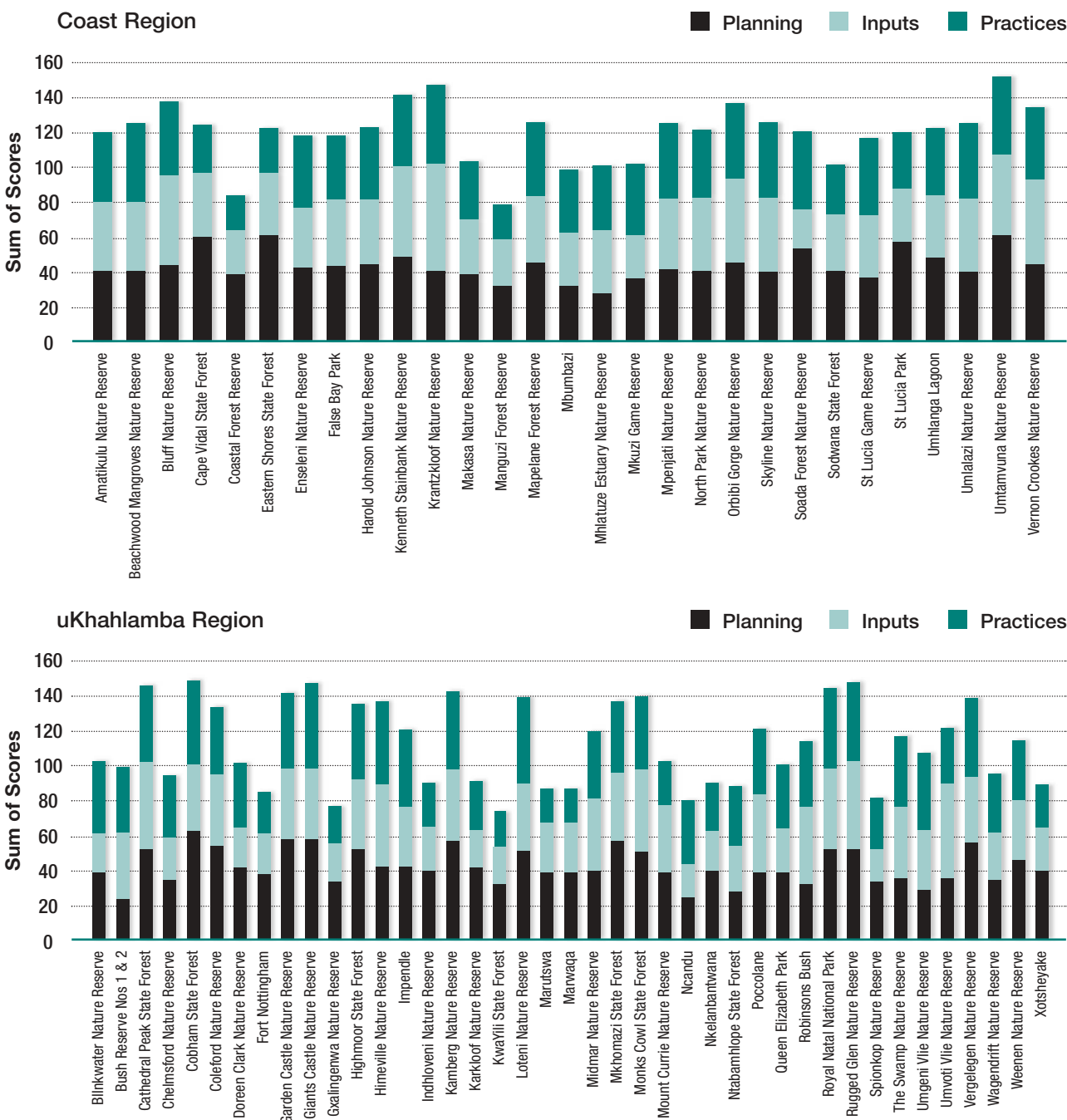
FINDINGS AND ANALYSES

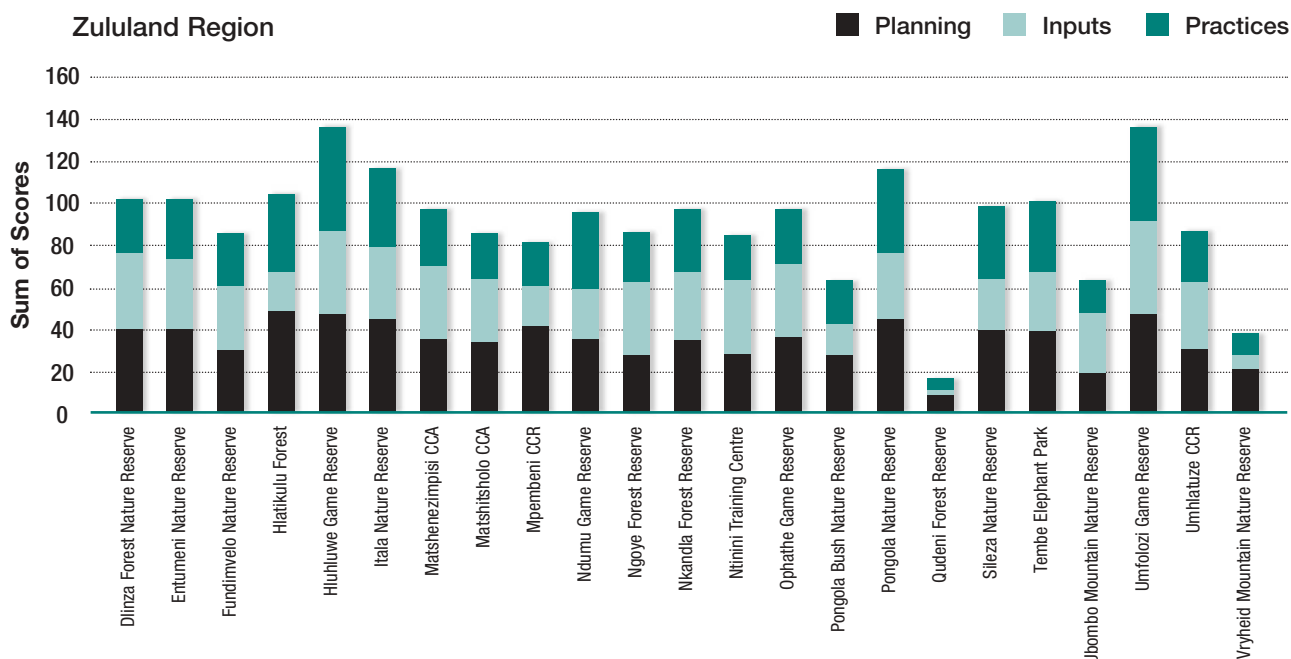
MANAGEMENT STRENGTHS AND WEAKNESSES

When considering management effectiveness across all reserves in each of the three management regions, all regions showed similar levels and ranges of management effectiveness,

with the sum of scores for planning, inputs, and practices varying from a minimum of 18 to a maximum of 150 (Figure 8).

Figure 8. Overall Management Effectiveness of all Protected Areas in Each of the Current Management Regions of KwaZulu-Natal





Six protected areas scored less than 75 of a potential score of 225, the worst of which suffered from an almost complete lack of inputs across all effectiveness areas. In general however, there was no consistent explanation of why these reserves scored low. Occurring frequently was the lack of clearly defined objectives, boundary demarcation, adequate staff, and funding. In the case of two reserves, there was no long-term legal binding protection for the reserve, and in some instances there was perceived to be a lack of local support.

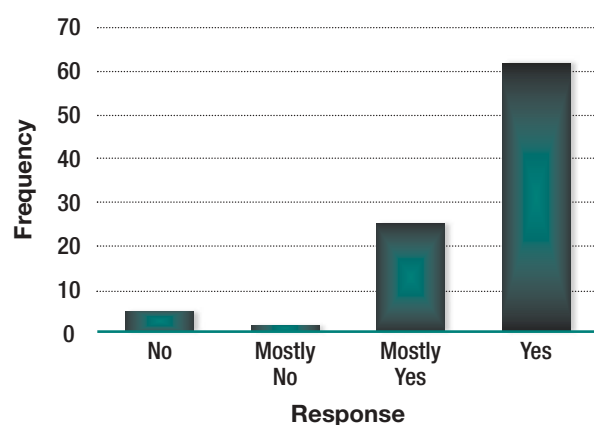
Noticeable is the high degree of variation in scores within the uKhahlamba and Zululand regions. This is largely because these regions contain protected areas which have historically been managed for biodiversity objectives (by dedicated nature conservation organizations) and have also recently been inherited from the previous Department of Forestry where the management inputs were very low, and not necessarily focused on biodiversity conservation.

PLANNING

With respect to planning, and more specifically objectives, most protected areas had objectives that were aimed to protect biodiversity and were stated in a specific plan for the reserve (or conglomerate of reserves). Management policies were largely consistent with these objectives. The

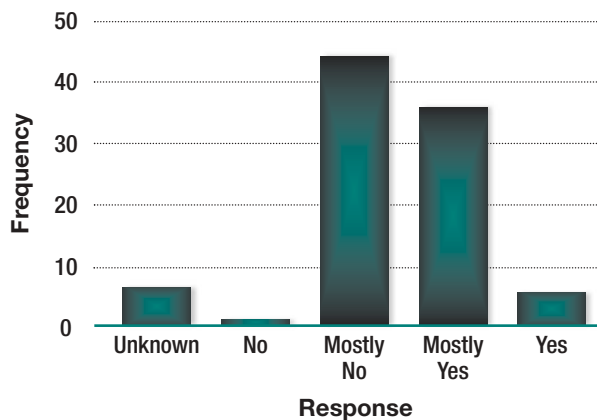
response to these three questions was relatively consistent across all regions and the typical response pattern is summarized in Figure 9. While this evaluation is positive, on examination many of the objectives in the management plans were found to be rather general and did not provide specific enough direction for management.

Figure 9. Combined Provincial Responses to the First Three Questions Regarding Protected Area Objectives



Quite disturbing were the responses to the question regarding the employee and administration's understanding of the objectives, practices, and policies of the protected area. The responses to this question were fairly uniform across all regions with the weight of opinion indicating that there was not a clear understanding of protected area objectives by employees (Figure 10).

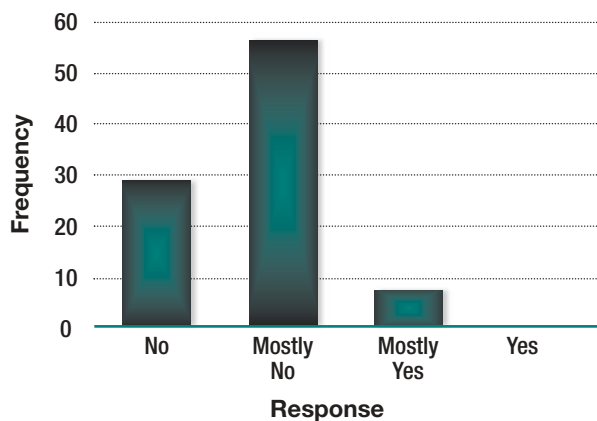
Figure 10. Combined provincial responses reflecting KZN Wildlife employee understanding of protected area management objectives



The recorded response is in keeping with the widely held opinion that the less educated members of staff have difficulty in grasping what is a fairly complex concept, namely that of biodiversity conservation. Nevertheless, it must rate as one of the most important weaknesses in the organization and one that must be addressed as a matter of urgency. With this in mind, it was surprising to find that most respondents felt that there was overall support by local communities for the objectives of the protected areas, although there was a strong opinion that this question should be addressed by an independent survey as the answers given by staff were likely to be subject to bias.

With respect to the questions on legal status and security, nearly 90 per cent of protected areas were perceived to have long-term binding protection.

Figure 11. Combined Response of Managers to the Adequacy ('Yes' Response) of Funding for Critical Management Activities. Note, there were no 'Yes' Responses.

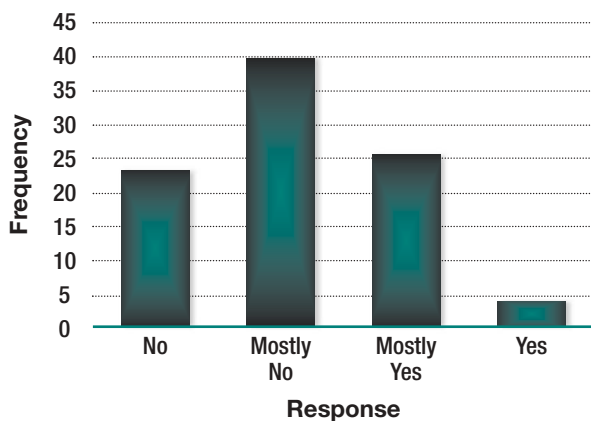


However, nearly 25 per cent of protected areas had unsettled disputes regarding land tenure or use rights. The majority of protected areas (72 per cent) had adequate boundary demarcation, while only 60 per cent of managers felt that there was effective enforcement of the law in protected areas under their control. Despite the fact that KZN Wildlife is one of the better if not the best funded state conservation organization in Africa, the vast majority of managers expressed the opinion that there was inadequate funding to conduct all critical management activities (Figure 11).

While the inadequacy of funding does not come as much of a surprise, since during the evaluation the organization was undergoing a restructuring exercise specifically to address resource shortages, disturbing is the apparent complete lack of resources allocated to some important protected areas.

The evaluation of protected area design and planning indicated this to be a serious weakness in the current protected area system in KwaZulu-Natal. The layout and configuration of over half the protected areas did not optimize biodiversity conservation, nor did the land use in the surrounding landscape enable effective protected area management (Figure 12).

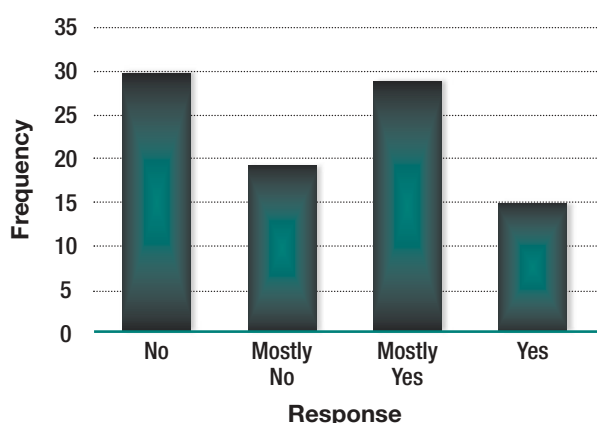
Figure 12. Combined Response to Questions Regarding the Layout, Configuration, and Effect of Surrounding Land Use on Biodiversity Conservation and Protected Area Management



On the positive side, the placing of the protected areas was seen to be largely consistent with objectives of the protected area. However, in most instances existing protected areas were seen to be too small to meet the objectives (i.e. viable

populations of umbrella species) and in over half of all protected areas, there were no links to other protected areas or areas of protected land (Figure 13). In this context, the definition of protected lands included game ranches and private nature reserves, which were largely sustainable use orientated and did form buffers to unconserved land and linkages to other formally conserved areas. Since there are very few formal linkages between protected areas, the number of yes and mostly yes answers, received does highlight the important role that private, conservation-friendly land use can play in this respect (Figure 13).

Figure 13. Combined Responses to the Question of Whether Existing Protected Areas were Linked in any way to Other Areas of Conserved Land



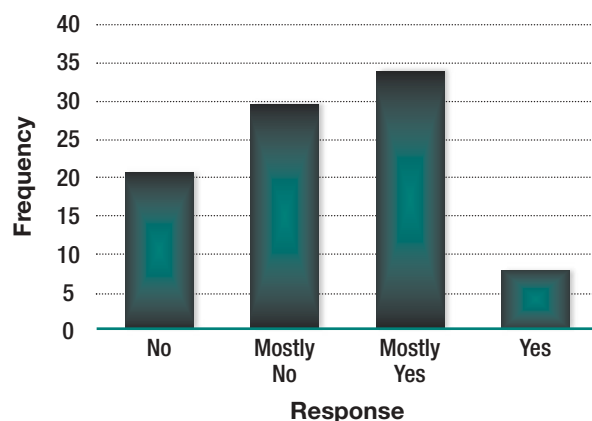
The placement and size of the existing set of protected areas in KwaZulu-Natal is largely the result of historical opportunism. The planning of protected areas has not in many instances extended to the development of buffers around, and linkages to other protected areas. This must be construed as a huge weakness in the protected area system in the province.

INPUTS

Management inputs comprised questions concerning staff, communication and information, transport, and facilities. With respect to staff, approximately half of the respondents were of the opinion that there was sufficient staff to effectively manage their protected areas, while the other half thought not (Figure 14). Managers frequently expressed the opinion that it was not the number of staff that was frequently the issue, but where

they were located, and the skills and responsibility level of the staff. This was particularly significant in the light of the restructuring exercise in progress.

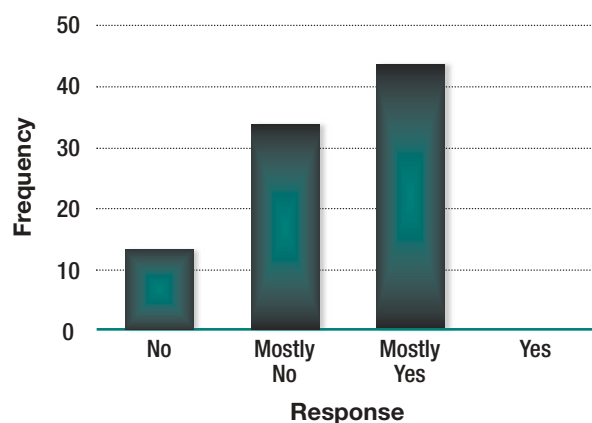
Figure 14. Combined Response to the Question Regarding the Numbers of Staff Available for Effective Protected Area Management



However, respondents were in broad agreement that staff had adequate skills to conduct management activities, and that there was a clear internal organization to manage staff and management tasks. In no instance was staff support thought to be completely appropriate to needs, and 50 per cent of responses indicated that staff support was inadequate.

With respect to employment conditions (Figure 15), there was an almost even split between the negative response and the largely positive response. This is explained by the expressed opinion that employment conditions for lower level

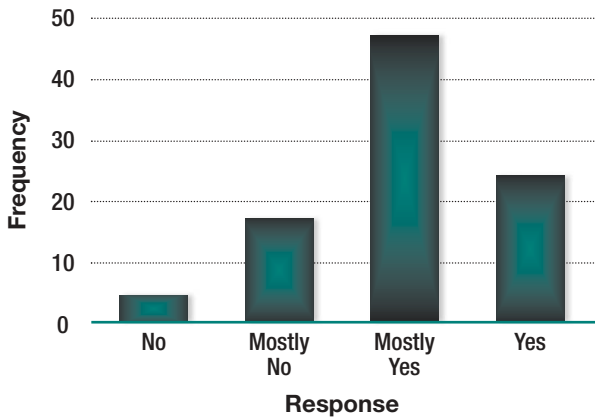
Figure 15. Combined Response to the Question as to Whether Staff Employment Conditions were Sufficient to Retain Staff. Note there were No 'Yes' Responses.



positions were good and it was relatively easy to retain staff. On the other hand, employment conditions for positions with higher skill requirements and responsibility levels were not good enough to retain staff. The bulk of opinion was that this led to a high turnover in the more skilled staff that were likely to take on leadership roles in the future. This tendency to lose highly skilled and experienced staff from the organization should be recognized as a critical weakness and needs to be addressed by improving employment conditions within the organization.

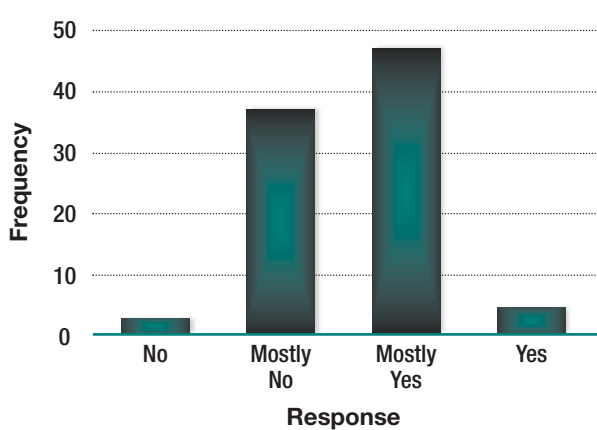
The means and effectiveness of communication between staff in the field, and staff in the field and administrative staff appeared in the majority of instances, to be of an acceptable standard (Figure 16). In addition, 67 per cent of respondents felt that there were adequate systems for processing information and data associated with management.

Figure 16. Combined Response to the Questions Regarding the Means and Effectiveness of Communication



Just over half (52 per cent) of the respondents felt that the data about the protected areas were available and up to date. However, the fact that just under half expressed opinions to the contrary is an important weakness that requires addressing. In a similar vein, nearly half of the respondents were of the opinion that there was not effective communication with local communities regarding protected area management (Figure 17).

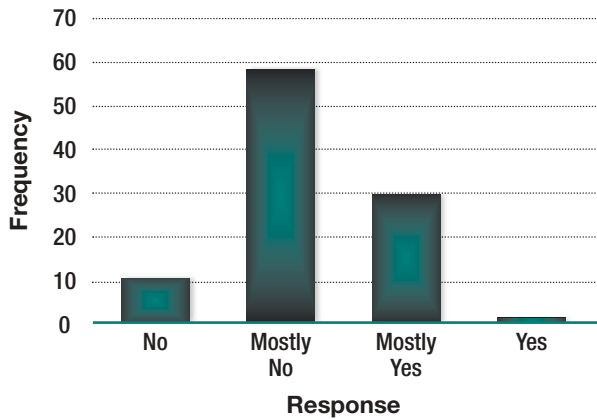
Figure 17. Combined Response to the Question Regarding the Effectiveness of Communication with Local Communities



Again, this should be recognized as an important weakness in management effectiveness since improved communication with local communities is likely to lead to a much better understanding of the value of the protected area, a greater degree of participatory management and acceptance of the protected area, and hence to improved management effectiveness. This will require urgent attention in the future.

When considering transportation and facilities, most respondents felt that the means of transport were adequate for management and monitoring purposes, but on the other hand most (over 60 per cent) felt that the equipment for field level data collection was not (Figure 18).

Figure 18. Combined Response to the Question Regarding the Adequacy of Field Level Equipment for Data Collection

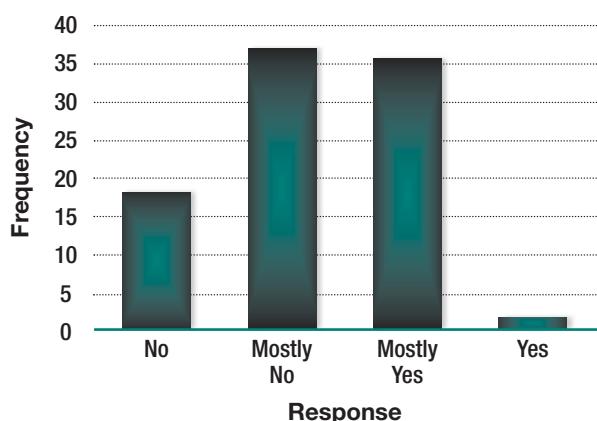


This response is significant in that without adequate equipment for field data collection, many management activities cannot be properly monitored and evaluated, and as a result, the effective use of the small amount of resources currently available for management activities cannot be properly monitored.

The majority (56 per cent) of respondents felt that staff facilities were adequate, but this hides a dichotomy often expressed in the organization, where the high profile protected areas are very well equipped and housed, while those protected areas with a lower profile do not meet similar standards.

A critical weakness identified is that concerning the maintenance and care of equipment, which the majority of respondents regarded inadequate to ensure long-term use (Figure 19). This assessment was reinforced by the opinion frequently expressed that not only equipment but structures such as buildings, roads and tourist infrastructure were suffering due to a lack of funding for maintenance.

Figure 19. Combined Response to the Question Regarding the Adequacy of Equipment Maintenance and Care

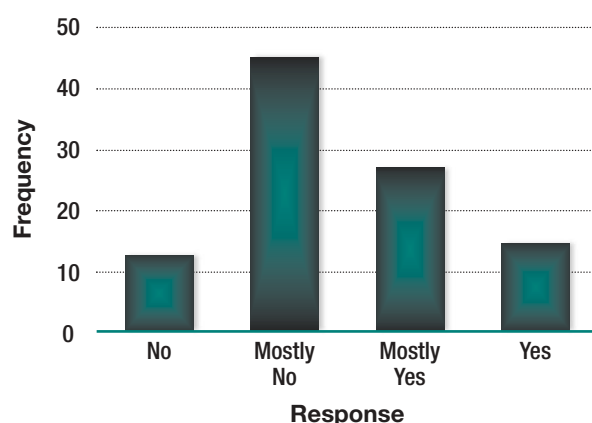


With respect to the adequacy of visitor facilities, again a strong dichotomy was detected with half of the respondents giving a generally negative response, and the other half a positive response. Clearly those areas that have high visitation rates which have inadequate visitor facilities will need urgent management attention.

PRACTICES

Practices comprise questions on management planning, management practices, and research, monitoring, and evaluation. At the heart of protected area management effectiveness is a comprehensive and up-to-date management plan. Despite the long tradition (30 years) of protected area management planning in the organization, the majority of protected areas (54 per cent) did not have current management plans and for only 15 per cent of protected areas were current and complete management plans available (Figure 20).

Figure 20. Combined Response to the Question Regarding the Availability of a Relatively up-to-date Written Management Plan



Clearly this is a critical weakness with respect to management effectiveness and requires urgent attention.

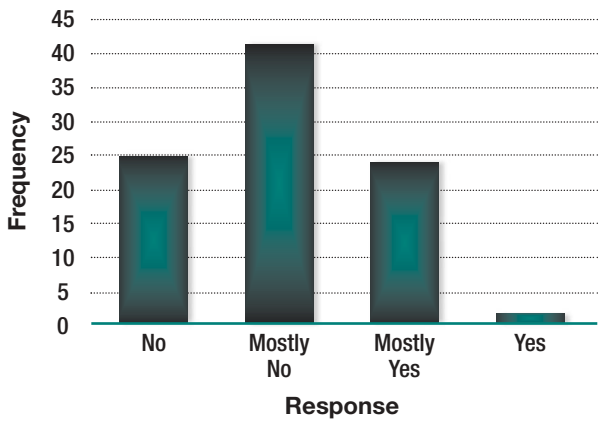
Although most respondents felt that there were up-to-date natural resource inventories in place, almost 40 per cent felt that these were inadequate for their protected areas. In this regard, important (threatened, rare, endemic) species inventories were felt to be incomplete, and in many instances medium scale (1:50,000) soil and vegetation classifications and maps not available. Clearly more effort is required to address this need.

Around 55 per cent of respondents felt that there had been an analysis of, and a strategy for addressing, threats and pressures. Few, if any, of these were formally documented however, and managers expressed frustration at the shortage of resources for implementing these strategies.

Particular strengths identified in the current management system is the adoption of specific targets and goals for achieving management objectives (90 per cent of respondents) and the continuous adoption of new learning into management (88 per cent of respondents).

With respect to management practices, 70 per cent of managers felt that management goals and targets were completed within a reasonable timeframe. Again, the lack of resources was often blamed for non delivery on goals. On the other hand, a high proportion of respondents (55 per cent and 40 per cent respectively) felt that restoration and prevention programmes were not consistent with the degrees of pressures and threats experienced by protected areas. These sentiments were echoed when asked about the level of outreach and education programmes where 68 per cent of respondents felt that these were not consistent with the need in the area (Figure 21).

Figure 21. Combined Response to the Question Regarding the Adequacy of Education and Outreach Programmes Adjacent to Protected Areas

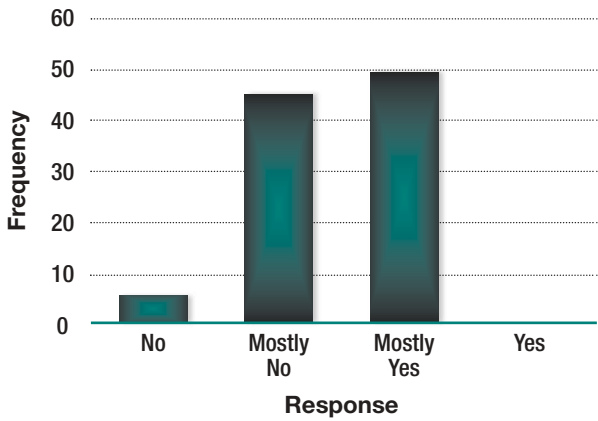


The response to the question on financial management practices was split 50 per cent either way. Those managers that felt that the current practices did not enable efficient and effective management expressed frustration with the level of bureaucracy and inefficiency inherent in the centrally controlled financial system.

While few respondents were unequivocal regarding the recording and monitoring of legal and illegal uses of protected areas, most (75 per cent) were confident that this was undertaken to a large

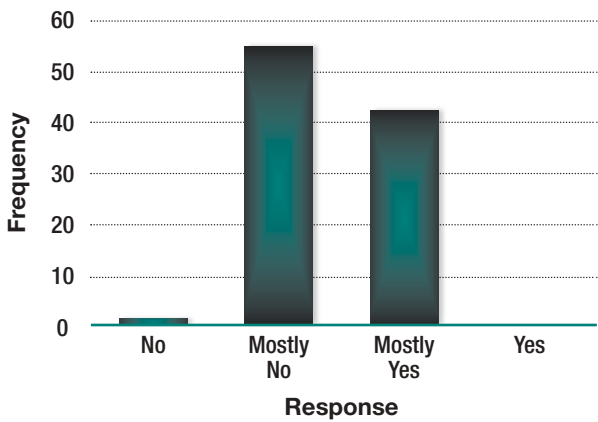
degree. On the other hand, at least half of the respondents felt that research needs had not been clearly identified and prioritized (Figure 22).

Figure 22. Combined Response to the Question on the Identification and Prioritization of Research



Staff performance with respect to goal and target achievement is routinely monitored, so it was not surprising to find a largely positive (75 per cent) response to this question. This was also the case for the incorporation of research results into management planning. However, most managers felt that actual research on key ecological and social issues was not in keeping with the degree of pressure and threat (Figure 23).

Figure 23. Response to the Question Regarding the Consistency of Research and the Degree of Pressure and Threat Experienced



In this respect, it was clear that the larger protected areas with the more attractive fauna and flora, and interesting interactions between the two,

were well serviced with research infrastructure since it was easier for universities and other institutions to justify the development of an on going research

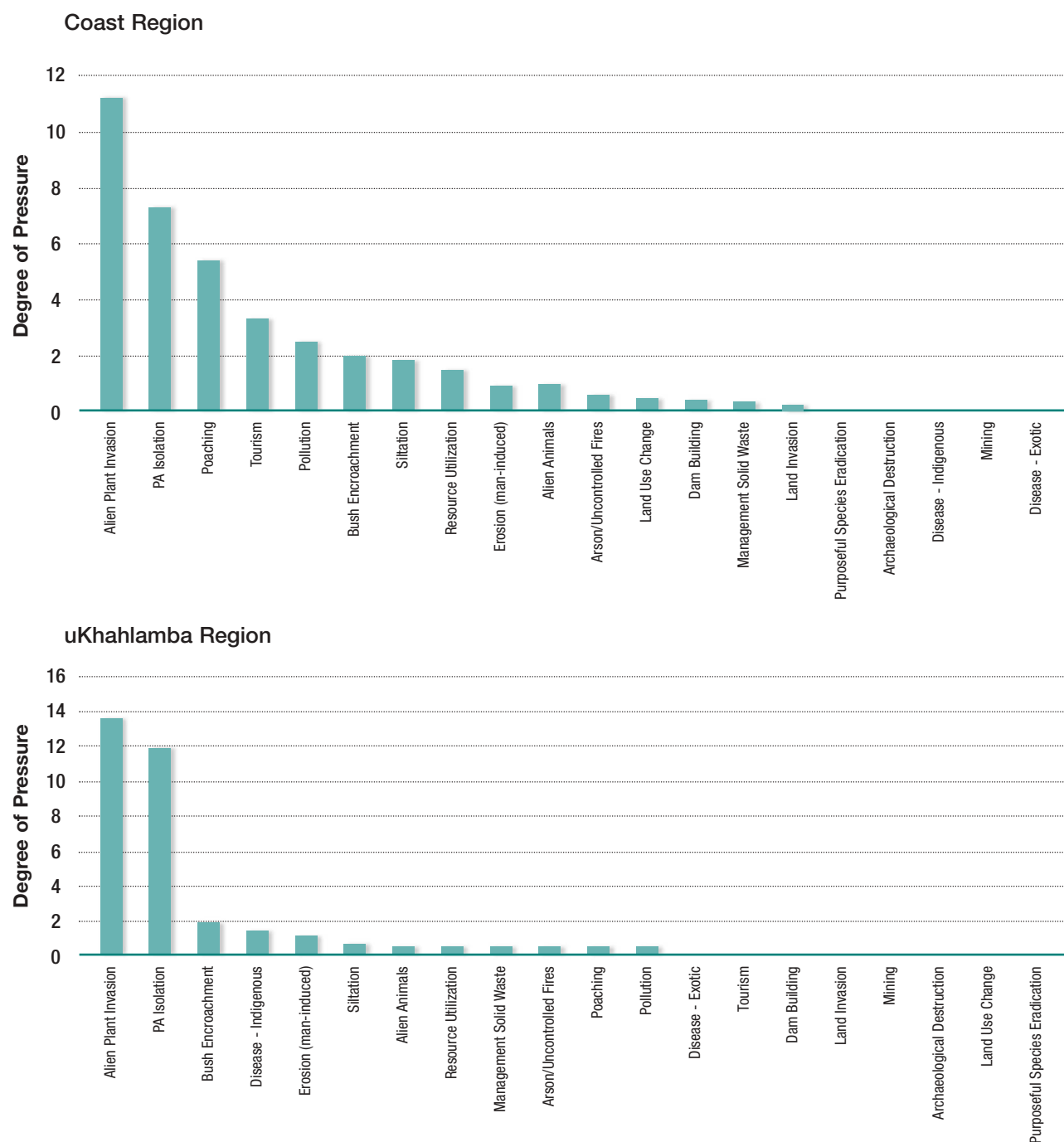
programme. There is little doubt that the smaller protected areas that are in the vast majority in the province lack adequate research inputs.

PRESSURES AND THREATS

The perceived importance of the major pressures on and threats to protected areas identified for the province varied between management regions. This is not unexpected due to the spatial variation in biological potential in the province, and uneven

human population distribution. Individually the three most important pressures from each region account for almost twice the impact when compared with the remaining pressures (Figure 24).

Figure 24. An Assessment of the Most Important Past Pressures Experienced by Protected Areas in KwaZulu-Natal



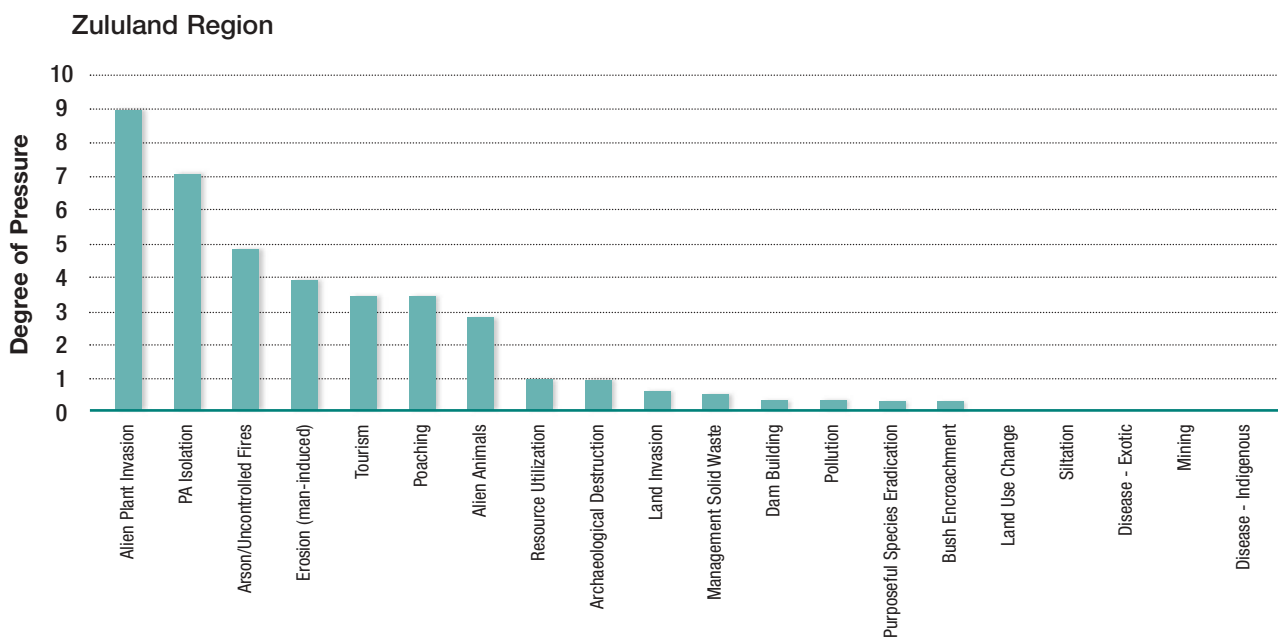
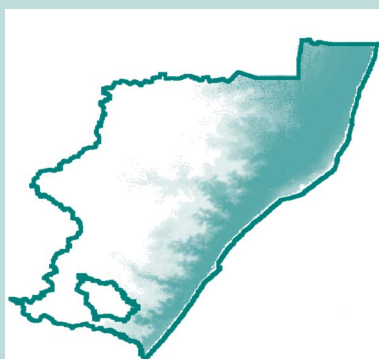


Figure 25. The Pressure and Threat of Alien Plants to Biodiversity in KwaZulu-Natal

Alien plant invasion poses a major threat to biodiversity throughout KwaZulu-Natal. Protected areas, which are set aside specifically to conserve biodiversity, have suffered severe infestation. This has been recognized for some time and while there is a list of 73 invader alien plants for the province, three stand out as posing the greatest threat, namely: trifid weed (*Chromolaena odorata*), lantana (*Lantana camara*), and the black and silver wattles (*Acacia mearnsii* and *Acacia dealbata*).

Chromolaena odorata is a scrambling shrub native to Mexico, the West Indies and tropical South America. It grows up to 4 metres or higher and forms dense thickets in and on the margins of forest and closed woodlands and water courses. Its seed is largely wind, water, and human (via vehicles) dispersed. It prefers warm moist environments and has the potential to invade a large portion of the coastal lowlands of KwaZulu-Natal.

Potential distribution of *Chromolaena odorata* in KwaZulu-Natal



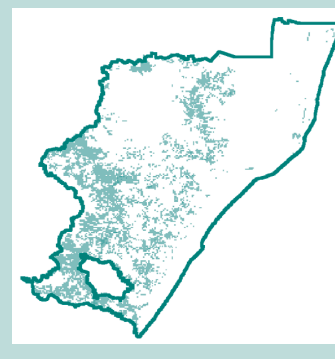
Lantana camara is a compact, scrambling shrub from Central and South America, which grows to 3 metres in height forming dense thickets. It invades forest margins, savannah, water courses and degraded land. The seed is dispersed by birds and down river courses by water. It prefers the warmer regions, but has the potential to be a threat throughout the province.

Potential distribution of *Lantana camara* in KwaZulu-Natal



Acacia dealbata and *Acacia mearnsii* are evergreen trees introduced from Australia. They grow to 5–15 metres high. They invade grasslands, forest fringes, and water courses. The seeds are largely dispersed by animals and water. Both species prefer the cooler regions of the province.

Potential distribution of *Acacia dealbata* and *Acacia mearnsii* in KwaZulu-Natal



In all three regions, alien plant invasion ranks as the most important (see Figure 25 on alien plants in KwaZulu-Natal). Alien invader plants are non-indigenous plants which establish and advance aggressively, out-competing indigenous vegetation, causing losses in biodiversity and productivity.

The isolation of protected areas is the second most important pressure in the Coast and Zululand regions. Isolation of protected areas takes place as a result of land transformation, and the land uses at the heart of land transformation in KZN are agriculture (sugar, maize, and potatoes), plantation forestry, and urban and industrial development. The coast and Zululand are the most productive areas of the province from an agricultural and plantation forestry perspective, while the coast is also heavily transformed by urban and industrial developments. More recently the midlands area of the province has become greatly transformed by tree plantation development.



Large-scale land transformation adjacent to protected areas

The second most important pressure in the uKhahlamba Region is arson fire. The uKhahlamba Region primarily comprises wetlands and moist grassland areas interspersed with small patches of forest. During the dry season the grass dries out and becomes highly flammable and for this reason an important management activity involves the burning of fire breaks. Any fires that do burn cause a green flush of grass which is sought after by domestic stock and wildlife. Neighbouring communities purposely burn grass both to improve the quality of grazing and to attract wildlife for hunting. These arson fires are, due to the nature of



Burning fire breaks in the uKhahlamba-Drakensberg Park

the terrain, almost uncontrollable. Under adverse conditions they can cause extensive damage to forests and forest margins.

Poaching is the third most important pressure in the Coast Region and has also been an important pressure in the other two regions. Poaching not only refers to the illegal hunting of large mammals, but also the illegal collection and harvesting of plant materials, including medicinal plants. The actions normally profiled with respect to poaching in Africa are the illegal hunting of rhino and elephant for horn and ivory by sophisticated and organized poaching gangs. This has to a large extent been contained in South Africa and in KwaZulu-Natal in particular. More extensive, is the illegal hunting of antelope in protected areas for meat. This is undertaken using wire and cable snares and is largely indiscriminate in terms of the species being entrapped, maimed, or killed. The level of impact varies largely with the season (peaking in the dry) and the level of food shortage in the communities surrounding protected areas. Currently the impact

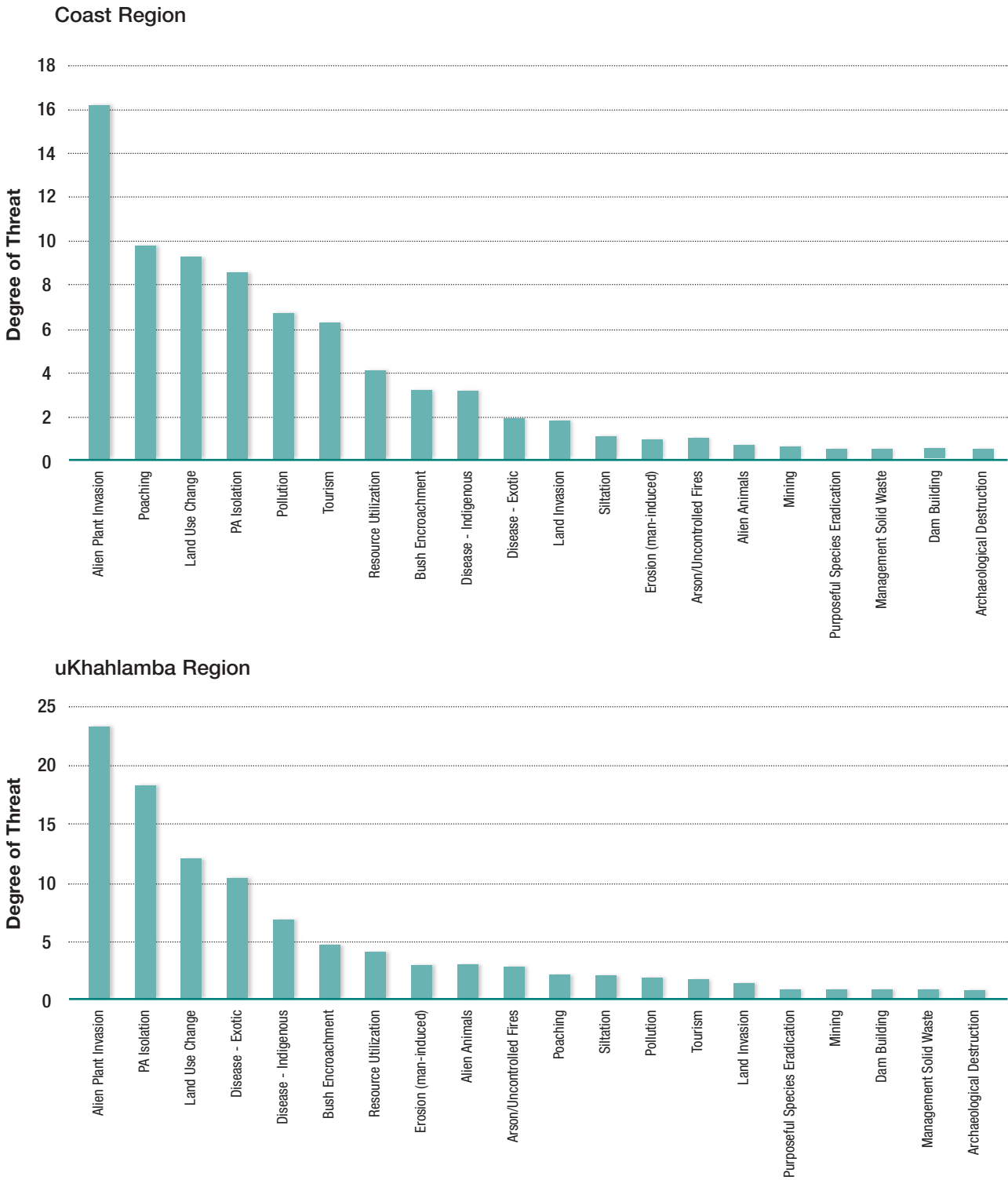


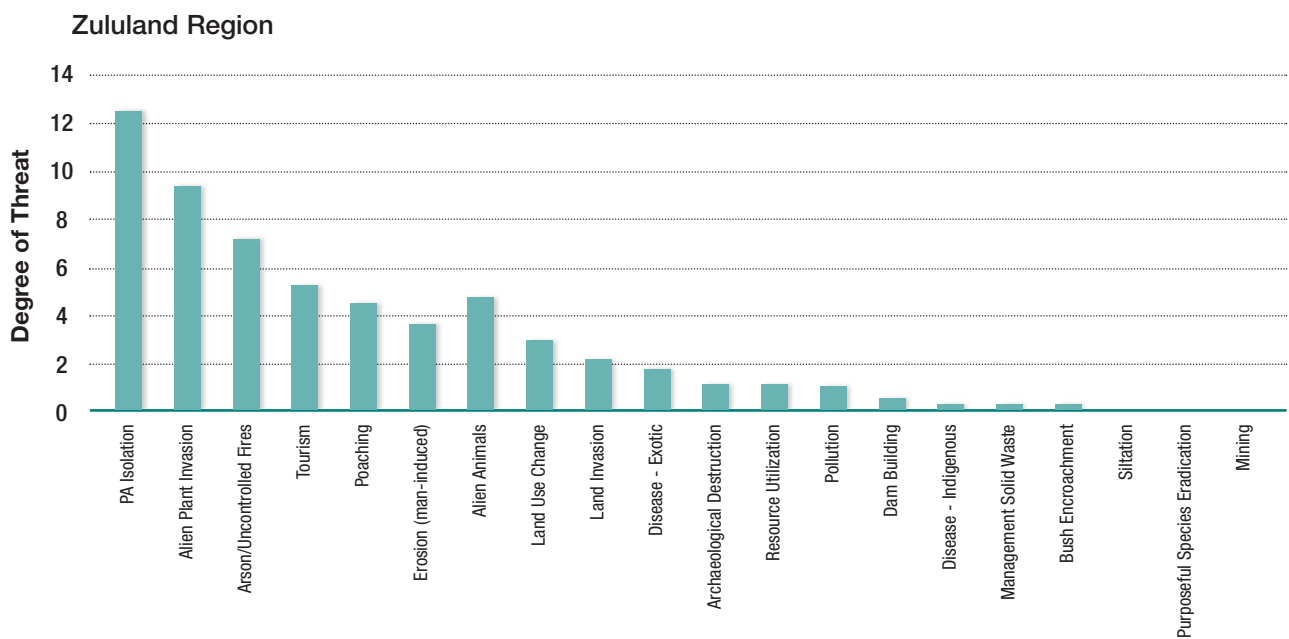
A killed and dehorned white rhino – a rare reminder of the pressure posed by poaching

although costly from an economic perspective, has been limited to depressing the populations of species below carrying capacity. However, uncontrolled harvesting of plants in particular has been responsible for the local extinction of many important medicinal plants such as the pepper tree (*Warburgia salutaris*) and isiPhephetho (*Siphonochilus aethiopicus*).

The most important threats to protected areas are largely consistent with the past pressures and have a great degree of congruence between regions (Figure 26). Alien plant invasion is seen as the greatest threat to the integrity of protected areas in the Coast and Zululand regions and the second highest in the uKhahlamba Region. The magnitude of this threat is perceived to be greatest in Zululand, followed by the Coast Region (Figure 26).

Figure 26. An Assessment of the Most Important Future Threats Anticipated by Protected Area Managers in KwaZulu-Natal





The process currently perceived to be the greatest threat to protected area integrity in the uKhahlamba Region is the isolation of protected areas through land transformation. Transformation of the land cover from a largely natural state under stock ranching (which is largely compatible with nature conservation) to more intensive forms of crop agriculture such as plantation forestry, sugarcane, maize and potato is taking place at an increasing rate, severing connections between protected areas and fragmenting the natural landscape.

Land use change ranks as the second highest threat in the Coast Region, the third highest in Zululand and the fifth highest in uKhahlamba (Figure 26). This reflects the concerns managers have regarding legal claims for ancestral land that have been made for protected areas since the advent of democratic government in South Africa. To date however, no protected area has been degazetted in favour of another land use. Instead, partnerships between traditional and conservation authorities have been mandated, ensuring that the benefits emanating from conservation are equitably shared by the original occupants of the land.

The threat associated with poaching ranks third in the Coast Region and much lower in other regions. With respect to this, one would have expected at least for the Coast and Zululand regions to have scored this threat similarly due to their close proximity and similarities in at least the large mammal assets of the protected areas in the regions. However, this situation is currently better controlled in the Zululand Region and given current resourcing levels, managers do not perceive this to be a major threat in the future.

Tourism developments and impact rank as the fourth highest threat in the uKhahlamba Region and sixth in the Coastal Region. This reflects the anxiety managers have with respect to the impacts of tourism in the two more sensitive areas to development. Of particular concern are the impact of footpaths, tracks and roads in the mountainous regions of the Drakensberg and in the soft dune and beach environment of the coast.

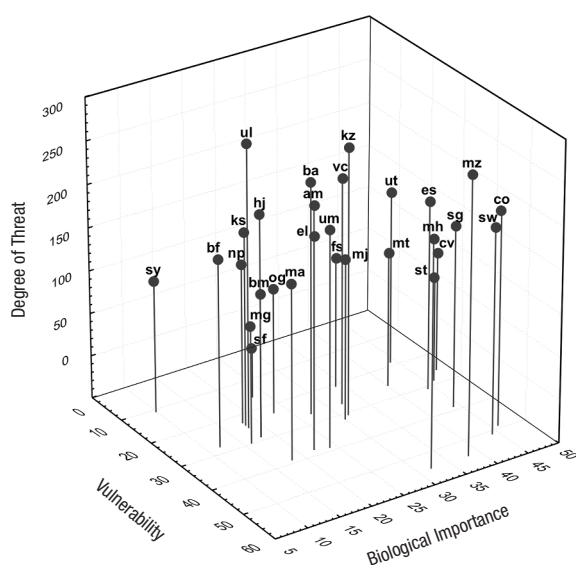
CONSERVATION PRIORITIES

Protected areas have been prioritized on a regional basis to assist managers with resource allocation. Due to the financial crisis in the organization, this form of analysis has been of particular interest and in demand. A regional approach to this analysis was more appropriate than a broad provincial analysis since budgets are allocated on a regional basis annually, and once allocated the regions operate independently of one another in distributing this budget between protected areas under their control.

Our analysis focused on biological importance, threat, and vulnerability (Figure 27). This clearly identified the protected areas in each region that were biologically the most important, the most highly threatened and the most vulnerable. Since the degree of threat was highly correlated with the urgency of threat (Figure 28), relations, interpretations and recommendations emanating from the analysis of any one of these variables will hold for the other.

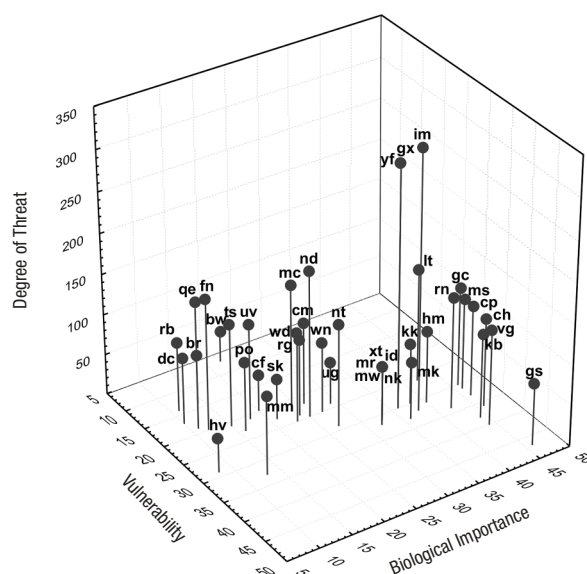
Figure 27. Comparison of the Degree of Biological Importance with the Degree of Threat and Vulnerability for each Protected Area

Coast Region



Individual protected areas from each management region plotted in the three-dimensional space defined by the degree of threat, biological importance, and vulnerability. Annotations associated with each symbol are the individual protected area abbreviations.

uKhahlamba Region



Zululand Region

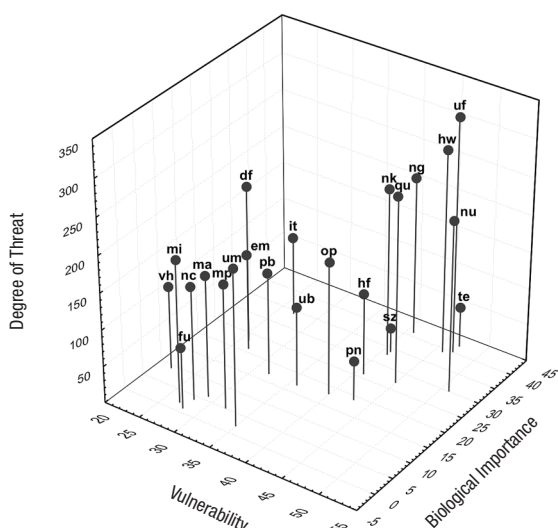
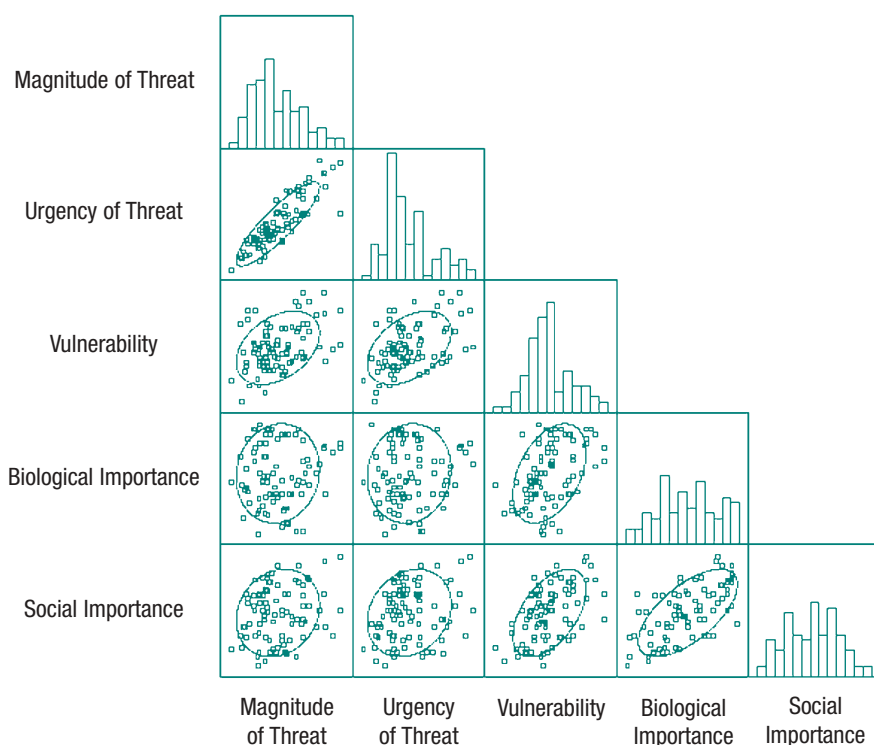


Figure 28. Cross Correlation Matrix between Degree of Threat, Urgency of Threat, Vulnerability, Biological Importance, and Social Importance

	Degree of Threat	Urgency of Threat	Vulnerability	Biological Importance	Social Importance
Degree of Threat	1.000				
Urgency of Threat	0.878	1.000			
Vulnerability	0.391	0.433	1.000		
Biological Importance	0.084 ^{ns}	0.083 ^{ns}	0.422	1.000	
Social Importance	0.172 ^{ns}	0.205 ^{ns}	0.525	0.6550	1.000

Note: ^{ns} Not statistically significant



Of further interest is the positive relationship between biological importance and social importance as it was measured in the survey. This is important from a management perspective since in this instance, a management approach which prioritizes resource allocation based on biological importance will also be justified from a social, human benefit perspective.

From this analysis, it is quite clear that the protected areas that deserve priority attention in the Coast Region are; Mkhuze Game Reserve (mz),

KranzKloof Nature Reserve (kz), Coastal Forest Reserve (co), Sodwana State Forest (sf), Mhlathuze Estuary (mh), and the Umhlanga Lagoon (ul). Clearly the areas in need of priority action in the uKhahlamba Region are Impendle Nature Reserve (im), Gxalungenwa Forest Reserve (gx), and KwaYili State Forest and in the Zululand Region are Umfolozi Game Reserve (uf), Hluhluwe Game Reserve (hw), Ngoye Forest (ng), Nkandla Forest (nk), Ndumu Game Reserve (nu), and Qudeni Forest Reserve (qu).

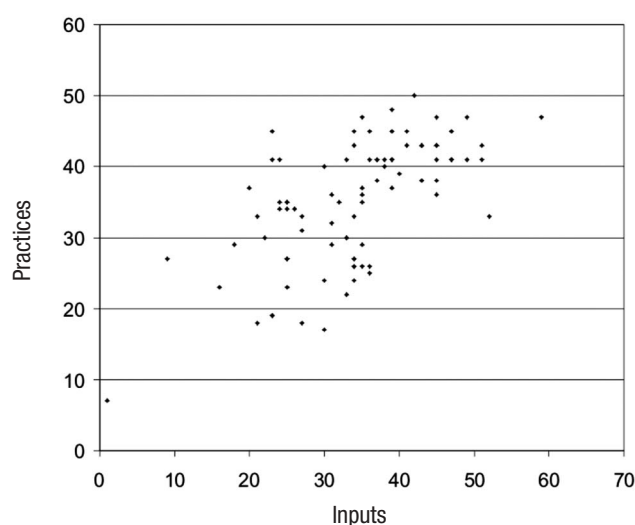
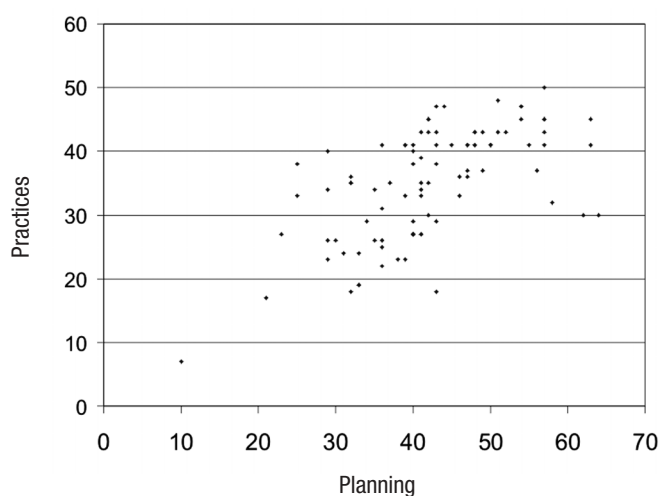
ADDITIONAL ANALYSES

The management effectiveness index developed for this analysis is reflected as the sum of the scores from questions relating to protected area planning, inputs, and practices. From a strategic management perspective however, it is important to understand the relationships between these three variables. With regard to this, one might expect that with better planning of protected areas and greater inputs into protected area management, that management practice would also be of a higher standard. This is borne out by a comparative analysis of these elements (Figure 29).

This has an important implication for protected area management namely that if you do not plan, you cannot be expected to perform well. This

emphasizes the importance of management planning in ensuring a high level of management practice. Secondly, in the context of protected areas in KwaZulu-Natal, inputs into management will be reflected directly in the level of management practice. In a situation where resources for protected area management are limited, this is problematic when re-allocating resources since one must expect a drop in the level of management practice in a situation where resources are being re-allocated to another protected area. This reinforces the need to prioritize resource allocation on the basis of trying to maximize gains for biodiversity conservation.

Figure 29. Relations between a) protected area planning and practices, and b) inputs into protected area management and practices



RECOMMENDATIONS

During the follow-up regional workshops, the assessments were presented to and discussed with a representative group of staff from each region. The following recommendations were discussed and developed at these forums.

LEGAL STATUS

Critical to the implementation of good management practice is the legal status and demarcation of protected areas. High priority must be given to the settling of all outstanding legal land claim and use right issues. Furthermore, appropriate boundary demarcation must be implemented and maintained where this is deficient.

MANAGEMENT OBJECTIVES

The foundation of effective management is a current management plan and more especially a set of specific management objectives for each management unit. While most managers responded positively to the questions regarding the currency of management plans and the existence of management objectives, on re-examination these were often found to be rather general, outdated and lacking a regional context. It is therefore strongly recommended that as a matter of priority, the critically important biodiversity and cultural assets in each protected area are identified, and based on this, specific objectives are documented for each protected area.

ASSESSMENT OF BIOLOGICAL ASSETS

Prioritization requires comparative analyses and hence a comparable level of knowledge of the most important assets of each protected area, for a valid analysis to be undertaken. This was clearly of some concern to participants, who expressed the opinion that the assessment of biological importance was biased as a result of the lack of comparative data between protected areas. This is not only a problem when it comes to assessment, but also with the determination of specific

management objectives and goals for each protected area and for this reason must be viewed as a critical weakness. It is therefore strongly recommended that the knowledge of the biological assets in each protected area be critically evaluated and addressed with appropriate surveys where this is found wanting.

STAFF UNDERSTANDING

In order to address the problem of the poor understanding that staff have for protected area objectives, it is recommended that the process of developing protected area objectives should be as inclusive as is possibly practical. Subsequent to the development and adoption of a set of objectives for a protected area, specific attention needs to be paid by senior management to ensure that reserve staff develop an understanding of the values of the protected area and therefore for the stated objectives, policies, and practices of the protected area.

REPORTING AND APPROVAL OF MANAGEMENT PLANS

Part of the reason for the retarded state of management plan development and use in the organization, is the rather circuitous adoption procedures that are required to be followed, and the widely held perception that a management plan is a static management recipe to be followed until the next revision of the plan. To address this it is recommended that:

- ◆ The practice of sending only complete plans to the Board for approval is dropped. Instead, Section C (Vision and Objectives) and only this section of all plans should be developed to completion and sent for Board approval.
- ◆ Protected area managers are held responsible for reporting achievements against these objectives each year.
- ◆ Procedures are adopted that allow annual revisions of management plans based on adaptive management principles. These revisions should only require senior executive approval.

ANNUAL THREAT ANALYSIS

The identification and analysis of pressures and threats is currently undertaken within the framework of the existing management plans, and although most managers felt that this was adequate for their protected area, the strategy to address these was clearly deficient since managers expressed frustration at not being able to implement these plans. This was also reflected in the large number of respondents who felt that restoration and prevention programmes were not consistent with the degrees of pressure and threat. Apart from the vision, objectives, and specific goals of a protected area, the identification and mitigation of the major threats to the integrity of a protected area is probably the most important management activity undertaken. Since the relative importance of threats can change over a short period of time, it is recommended that a formal threat analysis for each protected area is undertaken each year and included/updated in the management plan. Furthermore, this should then become the foundation of work planning and resource allocation in the following financial year.

STRATEGIC RESEARCH AND MONITORING

The identification and prioritization of key research questions that need to be addressed and the undertaking of strategic research programmes in each protected area was highlighted as an area of concern. While each protected area's management plan requires the identification and prioritization of research and monitoring programmes, this has in many instances not been completed nor incorporated into the draft plans. Following the threat analysis and during the development of management prescriptions to address these threats, it is recommended that a list of key questions revolving around critical information gaps is developed and then collated into a strategic research and monitoring programme which can be updated each year.

SITE DESIGN AND PLANNING

The important components of protected area design and planning including layout and

configuration, buffer zones, and linkages to other protected areas, have been highlighted as a glaring weakness in the protected area system of the province. With the ever increasing rate of land transformation, the opportunity to address these shortfalls is diminishing rapidly. Consequently, it is recommended that this be addressed at least partially by the conservation planning project currently under way in the province, and also at a higher regional (in this case municipal) planning level. The planning and implementation of formal buffers around protected areas and appropriate movement corridors between protected areas is imperative if the current set of protected areas is to fulfil their role in the future.

EQUIPMENT AND INFRASTRUCTURE MAINTENANCE

With the exception of the newer protected areas and those inherited recently from state bodies such as the Department of Water Affairs and Forestry as part of a national restructuring, protected areas in KwaZulu-Natal are relatively well-endowed with appropriate infrastructure and field equipment. However, there is widely expressed opinion that the maintenance and care of equipment and infrastructure is substandard, thus posing as a serious threat to the sustainability of current levels of management inputs by the organization. Consequently, it is recommended that comprehensive equipment and infrastructure status and maintenance schedules are developed and prioritized for critical components in each protected area, and that future maintenance is strategically resourced based on these schedules.

PRIORITIZATION

Currently resource allocation to protected areas is based very much on increments to previously allocated budgets. It is recommended that medium term and annual budgets be allocated based on a prioritization which reflects biological and social importance as well as threat to the protected area system. Immediate priorities for consideration in each region are highlighted in the section on conservation priorities (page 22).

LOCAL COMMUNITY SUPPORT

The degree to which local communities understand and support the objectives of protected areas has been rated largely from a park manager perspective, and it is critical to obtain an unbiased opinion and understanding of this. It is recommended that this is addressed through an independent survey of a broad sample of protected areas in the province. This could be seen as the starting point for increased dialogue and more effective communication between park management and neighbouring communities, which was also found to be a critical weakness requiring urgent attention.

INVASIVE ALIEN PLANT THREAT

The most important threat by far in all three regions is perceived to be alien plants. The 'Working for Water Programme' is an innovative and uniquely South African programme run under the auspices of the Department of Water Affairs and Forestry to combat the hydrological, biodiversity, and economic impacts of alien plant invasion and to address the social issues of poverty and underdevelopment in priority areas in the country. It is strongly recommended that KZN Wildlife as an organization engages fully with this programme at all levels, in order to maximize the benefits for biodiversity and protected area management.

FOLLOW-UP ACTION

The nub of the analysis revolved around biological importance, threat, and vulnerability. While assessment teams were reasonably happy that threat and vulnerability could be fairly judged across all protected areas, this was not the case for biological importance. Largely through circumstance, protected areas in different areas of the province had not had the same amount of attention paid to them from an inventory and research perspective and consequently knowledge of the important biological attributes of protected areas was uneven. Thus it was felt that the analyses may have led to an unfair 'down weighting' of those protected areas with poor knowledge of biological attributes. To address this, KZN Wildlife biodiversity research and ecological advice staff must continue to coordinate the inventory of important biodiversity assets in protected areas under its jurisdiction in a structured way. The data need to be captured into the protected areas database which is held centrally, and distributed to regional planning and advice staff at regular intervals to ensure its incorporation into updated management plans.

There was clear support for the adoption of the methodology as a means of monitoring trends in management effectiveness and prioritizing resource allocation. It was decided that the methodology could be used in two modes namely:

- ◆ Continuous assessment – where the regional manager and ecological advice coordinator would continually set priorities, management tasks and actions and undertake local

re-evaluations re-scoring questions and updating the database on a continuous basis. In this way the database would become a dynamic planning, action and monitoring tool for regionally based managers with a timeframe and turn around of a year or less. In this respect the methodology would be refined and developed to serve as a site specific assessment and management tool.

- ◆ Periodic reassessment – where an independently managed reassessment of all protected areas in the province is undertaken (as was done in this project) at two to three yearly intervals, and the results reported and acted on by policy makers at a provincial level across all protected areas.

There is a clear need to streamline the management planning process and this will be undertaken with the express purpose of developing a strategic, dynamic and live document for each protected area that becomes the backbone of protected area management in the province.

The process of re-allocating resources between protected areas is currently cumbersome and contentious within the organization, with the result that few decisions of this nature are ever made, and the status quo remains. The adoption of procedures to objectively rank protected areas (based on biodiversity value and threat) and reallocate resources to priority areas will be pursued.

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South Africa



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