

APPENDIX 2: BATS

MANAGEMENT AND CONTROL OF BATS

1. GENERAL INFORMATION

Nearly 80% of all bat species in South Africa occur within the Kruger National Park (KNP). Of the 42 species recorded within the park, four species are also listed as threatened and have Red Data status.

Bats play an important role in the ecosystem in that they control insect numbers and also contribute towards the pollination and further propagation of various flowering plants. Mosquitoes are among the primary prey of many insectivorous bats and a thriving bat population can consume huge numbers of these potentially dangerous insects. Fruit eating bats on the other hand play a very important role in the pollination of certain fruit bearing trees and the dispersal of their seeds. Despite the above, people often view bats as household pests due to the unpleasant sounds, smells and possible unhygienic conditions associated with bats roosting in the roofs of houses and accommodation units.

With the development of rest camps, staff villages and concession lodges in the KNP, bats started colonizing many of these buildings as the thatched roofs, attics and eaves provided ample shelter and roosting sites. Unfortunately, this brought bats into conflict with people. Foreign and local visitors to the KNP often feel threatened by the presence of bats in their accommodation units and the noises, as well as the smells emanating from the bat urine and dung, often lead to complaints regarding quality and maintenance standards in our camps.

In order to minimize the problem, bat colonies need to be evicted from the roofs of all accommodation units and houses and all buildings need to be sealed to prevent bat re-colonization. To achieve this may prove to be technically complicated, e.g. in thatched roofs where it is impossible to seal every crack between the thatch and wooden poles.

The aim of this document is to provide practical guidelines on the removal of bats and to highlight preventative measures to be taken to minimize re-colonization by bats.

2. MANAGEMENT AND CONTROL OF BATS

Unfortunately there are no quick-fix solutions to the bat problems experienced. To achieve any lasting measure of success both a preventative and crises management approach needs to be followed. Preventative management will necessitate a large scale and long term approach, whilst crisis management will focus on interim solutions to the most immediate problems. The Section Ranger from the area should be involved to ensure that no bats are injured and that conservation ethics are upheld during implementation.

2.1 PREVENTATIVE MANAGEMENT (LONG TERM AND LARGE SCALE)

This approach is aimed at preventing bats from establishing new roosting sites in huts/chalets/houses not yet infested. Management action must therefore specifically be aimed at the systematic sealing of all uninhabited units to make them bat proof. This process must be completed before any evictions of bats can start from colonized units. If not, the evicted bat colony will just relocate themselves to the nearest unsealed units once removed. Preventative management thus requires a large scale approach necessitating proper planning and the cost-effective use of available funds and manpower. It remains the only long term solution to the bat problem within the park.

The suggested approach should be the following:

Phase 1: Seal – off all units not already occupied by bats

- Identify all structures that are not already colonized by bats and identify all possible bat entry points (usually where the roof and the wall meet);

- Systematically seal all possible entry points in each unoccupied unit using Sista Expanding Foam Filler (Henkel Product available at Mica). This process can take a couple of weeks and will necessitate proper planning between Technical Services and Hospitality staff;
- Sista Expanding Foam Filler is both rodent and insect proof, easy to apply and will cut down on the time needed to seal the units. Cement is the cheaper option and can be used, but it will crack over time and the bats will re-enter the unit.

Phase 2: Evict bats from units already colonized

- Ensure that all adjacent chalets/houses are sufficiently sealed before bat eviction start;
- Identify all the chalets/houses occupied by bats as well as the access points the bats use to gain entry;
- Ensure that no access is possible through the thatch/roof of the chalet/house to be sealed;
- Proceed to seal all possible access/exit points, but allow for at least one opening to be left unsealed to allow the bats to escape. If infection is severe allow for 2 or 3 exit points;
- Determine the roost site/s (the colony may have more than 1) within the chalet/house and apply deterrent solution;
- **HTH (Chlorine)** should be administered as a deterrent by spraying or painting it onto rafters and beams;
- **DO NOT APPLY THE DETERRENT DIRECTLY TO THE ROOST SITE.** This is merely general practice to avoid any *unknown* complications;
- The colony should be sufficiently disturbed and leave after the first application, but one may have to apply continuously to remove all individuals;
- If the situation calls for removal by hand, the Section Ranger should be present. Removal by hand should be done with discretion and the utmost care must be taken not to injure any bats;

- The structure must be sealed immediately after exclusion to prevent the bats from returning to the site after the deterrent's smell has dissipated. Sealing should be done so that the entire perimeter of the structure is secure;
- The structure must be monitored subsequent to exclusion and sealing to ensure that the process was successful and bats do not re-enter.

Eviction should preferably be implemented from **May to October** during the non-breeding season, but special allowance will be given to individual situations outside of this period. If bats have to be evicted from November to April, special care must be taken to ensure safe removal. If the colony that has infested the structure does not have young, then one can follow the above procedure. However, if the colony has young, then it is best to remove the entire colony by hand. All efforts must be made to ensure that the entire colony is caught and moved together. The group should be moved together to a new site, preferably not far from their original roost. The structure should then be sealed as discussed above.

The exclusion of bats can be avoided during breeding season through continual management of the structures throughout the year.

Phase 3:

Monitor and re-evaluate all the units on a regular basis and ensure that systematic maintenance is done to seal/close any new holes or entry points which might appear.

Squirrels might pose a limited problem even though bats are not likely to use these entry points. However to ensure that these do not become problem areas these sites must be sealed too as soon as they are located. Many Bat experts and Bat Interest Groups are of the opinion that these areas are not true points of concern; however there is still a belief that if these sites are left long enough Bats will use them.

2.2. CRISIS MANAGEMENT (SHORT TERM AND SMALL SCALE)

This approach requires immediate intervention and only provides an interim solution. It is aimed at immediate eviction of bats from a unit and should not take more than 1 to 2 days to complete. No phases are involved, just systematic exclusion:

- Locate the roost site of the bat colony within the hut/chalet/house;
- Spray chlorine on rafters/beams around the roosting site. This will disturb the colony sufficiently and the bats will vacate the unit within a day or two;
- If any bats remain, remove them by hand using gloves. Release the bats at an alternative site nearby only once the unit where they were evicted from has been sealed properly. Approach the Section Ranger for assistance;
- Once all bats have vacated the unit, immediately seal all openings and possible bat entry points with Sista Expanding Foam Filler.

3. POST-REMOVAL TREATMENT OF ROOSTING SITES

Once all bats are removed from a unit and the entry points sealed, all roosting sites must be cleaned and disinfected.

The following approach is recommended:

- Mix 10ml **Starycide (Bayer)** with 10l of water and add 80ml **Responsar (Bayer)**. Do not exceed the prescribed dosages and always wear protective clothing, gloves and a mask;
- Spray this mixture liberally over the bat faeces and sediment in the roof in order to kill all larvae and other insects.

4. RESPONSIBILITY MATRIX

- Wait for 30 minutes and then remove the faeces and sediment and clean the roof;
- Disinfect the area with the disinfectant **Virkon-S** to kill all viruses and bacteria.

5. SAFETY GUIDELINES WHEN HANDLING BATS

- Don't handle bats unless you have to;
- Always wear gloves when handling bats to prevent being bitten;
- If bitten or scratched, use soap and iodine to disinfect wounds;
- Immediately seek medical attention if rabies infection is suspected.

RESPONSIBLE PERSONS	ACTIONS	TIME FRAMES
Hut Attendants and Supervisors	<ul style="list-style-type: none"> • Conduct daily inspections of huts/accommodation units for the presence of bats. • If any signs are found that bats are starting to occupy a hut/accommodation unit, immediately report it to supervisor and camp hospitality staff. 	<ul style="list-style-type: none"> • Daily
Hospitality and Duty Managers	<ul style="list-style-type: none"> • Conduct regular ad-hoc inspections to ensure that units are bat proof and that scheduled maintenance is done to prevent bat infestation. • Ensure that all reports and complaints regarding bat problems are reported to the maintenance officer and that action is taken to resolve the problem. 	<ul style="list-style-type: none"> • Ad-hoc • Immediate
Maintenance Officers (Camp Level)	<ul style="list-style-type: none"> • Conduct regular inspections of all facilities and implement preventative measures. • Systematically seal all units to make them bat proof. • Evict bats from units and seal all entry/exit points in accordance with these guidelines. • Once bat eviction completed, clean and disinfect the units in accordance with these guidelines. 	<ul style="list-style-type: none"> • Bi-Monthly • On-going • Immediate • Immediate

Section Rangers	<ul style="list-style-type: none"> • Monitor and oversee the eviction of bats to ensure safe and ethical handling in accordance with these guidelines. 	<ul style="list-style-type: none"> • As required
Technical Officers	<ul style="list-style-type: none"> • Conduct random inspections of all facilities to ensure maintenance are done timeously and in accordance with these guidelines. • Partakes in inspections with Hospitality staff to ensure that units are bat proof and that maintenance is done effectively. 	<ul style="list-style-type: none"> • Ad hoc and Random • Bi-Monthly
Corporate Technical Services	<ul style="list-style-type: none"> • Monitor and conduct spot checks to ensure maintenance procedures and programs are in accordance with these guidelines. 	<ul style="list-style-type: none"> • Ad hoc and Random