APPENDIX 1 (A): MANAGEMENT AND CONTROL OF ALIEN AND INVASIVE RODENTS

MANAGEMENT AND CONTROL OF RATS AND MICE

1. GENERAL INFORMATION

Rats and mice include alien species such as Brown or Norwegian Rats (*Rattus norvegicus*), Black Rats or Roof Rats (*Rattus rattus*) and House Mice (*Mus musculus*) which are mainly nocturnal with strong territorial tendencies. In order to survive they must have easy access to a convenient and regular supply of food and water, and a secure nesting area where they can breed to the maximum limits of this sustenance. Rodents may transmit various diseases such as salmonellosis, typhus, rat-bite fever and trichinosis.

They have poor eyesight, but they make up for this with their keen senses of hearing, smell, taste and touch. Rats and mice constantly explore and learn about their environment memorizing the locations of pathways, obstacles, food and water, shelter and other elements in their domain. They quickly detect and tend to avoid new objects placed in a familiar environment. Thus, objects such as traps and baits are often avoided for several days or more following their initial placement. Mice and young rats can squeeze beneath a door with only 2cm gap. If the door is made of wood, rats may gnaw to enlarge the gap.

Rats and mice eat a variety of foods including cereal grains, meats, fish, nuts, fruits, slugs and snails. When searching for food, rats and mice can travel up to 150m from their nests or burrows. Females can wean between 3 – 6 letters per year, each litter containing between 3 – 5 young. They consume and contaminate foodstuffs, damage storage containers and can also cause damage to electrical wires and wooden structures.

2. MANAGEMENT OF RATS AND MICE

Rodent infestations can be attributed to careless disposal of edible foodstuffs or any other materials such as wood, electric cables and bricks, which are required to wear away their constantly growing incisors.

2.1. IDENTIFY THE SPECIES PRESENT:

1. Black Rat or Roof Rat *(Rattus rattus)* is the most common rodent pest we have and it is a fairly large rodent (about 200 mm long) with a similar length tail and round ears.
2. Norwegian Rat or Brown Rat *(Rattus norvegicus)* is the same size, but with pointed ears;
3. House Mouse *(Mus musculus)* is a tiny, grey rodent and is well known to everyone.

2.2. MECHANICAL CONTROL

Examine the area and note that rodents travel along a definite route, leaving behind trails, droppings, hair, food scraps, etc.

Three elements are necessary for successful mechanical control:

- Sanitation;
- Building construction and rodent proofing; and
- Trapping.

2.2.1. SANITATION

Sanitation is fundamental to rat and mouse control and must be continuous.
If sanitation measures are not properly maintained, the benefits of other measures will be lost and they will quickly return:

- Good housekeeping in and around buildings will reduce available shelter and food sources;
- Thinning dense vegetation will make the habitat less desirable including climbing hedges such as jasmine and ivy. Trees with branches hanging closer than 1m to the roof should be trimmed;
- Clear away any loose garbage and clear up any other unsanitary conditions. Remove refuse promptly and store foodstuff in containers;
- If storage of items such as old timber, bricks, old equipment or any other debris is required, place these items at least 1 meter above the ground or at least 1 meter away from any wall or fence. **Note:** The surrounding area must be cleared of any debris;
- Seek out any rat burrows or holes - close such openings by placing a ball of chicken wire so tightly it cannot be removed, then cement over the hole.
- **Note:** When using fresh concrete, the use of chicken wire is essential to prevent rodents from breaking through before it solidifies completely;
- Prevent access to water by ensuring that there is no standing water on the premises and maintaining good drainage;
- Neat, off-the-ground storage of pipes, timber, crates, boxes, gardening equipment and household goods will help reduce the suitability of the area for rats and will also make their detection easier.

2.2.2 BUILDING CONSTRUCTION AND RODENT PROOFING

The most successful and long lasting form of rat control in buildings is to “build them out”. Seal off cracks and openings in building foundations, and any openings for water pipes, electric wires, sewer pipes, drain spouts and vents.

No hole larger than 7mm should be left unsealed. Make sure doors, windows and screens fit tightly. Their edges can be covered with sheet material if gnawing is a problem.

Coarse steel wool, wire screen and lightweight sheet material are excellent materials for plugging gaps and holes. Plastic sheeting, wood, caulking and other less sturdy materials are likely to be gnawed away.

Because rats and house mice are good climbers, openings above ground level must all be plugged; especially all access points in the roof. Chimneys should be covered with wire netting or gauze to prevent rat and mice entry. Check all screens on windows, doors, and air vents are in good condition. Make sure all exterior doors are tight fitting and weatherproofed at the bottom.

2.2.3. TRAPPING

This is the safest and most effective way of controlling rats and mice in and around homes. Traps can be used more than once therefore it is a cost effective but more labor-intensive method.

2.2.3.1. KINDS OF BAIT

Dried fruit or bacon makes excellent bait for rats and should be fastened securely to the trigger of the trap with a light string or bit of glue.
Soft baits such as peanut butter or cheese on brown bread can also be used, but rats sometimes take soft baits without setting off the trap.

Leaving traps baited but unset until the bait has been taken at least once improves trapping success by making the rodents more accustomed to the traps. Set traps so the trigger is sensitive and will spring easily.

2.2.3.2. WHERE TO SET TRAPS

The best places to set traps are in secluded areas where rats and mice are likely to travel and areas located between their nests and food sources. Place traps in natural traveling paths such as along a wall, so the rodents will pass directly over the trigger

of the trap. Position traps along a wall at right angles, with the trigger end nearly touching the wall. If traps are set parallel to the wall, they should be set in pairs to intercept rodents traveling from either direction. If a rat sets of a trap without getting caught, it will be very difficult to catch the rat with the trap again. Other good places for traps are behind objects, in dark corners, on ledges, shelves, branches, fences, pipes or overhead beams. In overhead places, the traps should be attached securely with screws or wire. In areas where children or birds and other animals might contact traps, place the trap in a box or use a barrier to keep them away.

Use as many traps as are practical so trapping time will be short and decisive. A dozen or more traps for a heavily infested home may be necessary. Place rat traps about 5-10 meters apart.

3. DISPOSING OF DEAD RATS AND MICE

Dispose of dead rats and mice by burying them. Do not touch the dead animal with bare hands and wash hands thoroughly after handling traps. Live traps are not recommended because trapped rats must either be killed or released elsewhere.

The use of owl boxes is not recommended to manage rodents and is against ecological principles in a protected natural environment. Owls of different species are present all over in the KNP and one cannot disturb the ecological balance and processes that are in place by trying to attract more owls to camps. It is extremely unlikely that owls will only predate on black rats – the nature of the black rat is unlikely to make it a primary target for the owls while indigenous rodents will fall prey.

4. CHEMICAL CONTROL

While trapping is generally recommended for controlling rats indoors, when the number of rats around a building is high, it may be necessary to use toxic baits to achieve adequate control, especially if there is a continuous infestation from

surrounding areas. Most toxic baits for rodents contain active ingredients that work as an anticoagulant, causing death by internal bleeding. Most anticoagulant baits have been considered as relatively safe baits to use around the house and garden because they require multiple feedings to be effective. This is referred to as a first generation poison, as only the target animal will be killed. Some of the more lethal rodent poisons that are prohibited for use in a National Park, contain a single feed, second generation poison, that will result in death to anything that eats the poison directly from the baits, or indirectly, by eating the dead rodents (predators including owls, genets etc.).

For chemical control of rodents, one or more of the products from the *RACUMIN* range may be used:

- tracking powder,
- wax blocks,
- paste or
- liquid rat poisons.

With rats it is extremely effective (mortality after 4 days of baiting), with mice it takes up to 10 days to exterminate them. RACUMIN's active ingredient, *coumatetralyl*, is a multiple feed rodenticide. This means that a single ingestion will not have an effect on the rodent. The animal has to ingest the product successively over at least three days before death is imminent. The use of RACUMIN does not guarantee that nothing will get poisoned and it is a case of limiting the possibility of secondary poisoning. Owls will have a very limited chance of being poisoned when they eat rodents that were killed with RACUMIN.

4.1. RACUMIN LIQUID BAIT STATIONS

A successful bait formula that can be administered in a Bayer Rodent Bait station can be made up as follows:

Dilute 1 part ***Racumin*** (made by Bayer) in 30-40 parts water (8g/l). Dilute 1litre of *Lecol Pine Nut flavour* with 7 litres of water, and add 40ml of Racumin. This liquid bait should be applied in the appropriate RACUMIN Liquid Bait stations. It may also be put out in open dishes, but then only where no other animals or birds would gain access to it. Keep this available for 16 days and refill as required. This is a first generation poison, so animals need multiple feeds to die. It will therefore not affect predators feeding on them. Rats drink every 24 hours, therefore bait after dark, in secluded spots to minimize contaminating other small animals. Remove bait stations during the day.

4.2. RACUMIN TRACKING POWDER

Powder is applied to their burrows and tunnels, and liquid inside buildings. Mixing crushed maize and RACUMIN Tracking Powder according to the instructions may also be used to prepare bait.

4.3. RACUMIN PASTE AND BAIT BLOCKS

HOME-MADE BAIT STATIONS:

It is easy to obtain and simple to apply and it is good practice to bait in the ceiling of the house. Four small Bait Blocks or 8 Paste blocks should be placed in different areas in the ceiling and should be replenished after 4 days. Baiting should continue for at least 16 days. RACUMIN Bait Blocks and Paste may also be put out in a home-made bait station. Take a 2-litre ice cream container, make two holes of 25 mm diameter on opposite sides of the container and use this as a bait station. Put two small RACUMIN Paste baits or Bait Blocks inside and secure the lid with

masking tape. **Bait stations may only be used indoors**. One could also use a 50 mm PVC water pipe for Bait Blocks. The pipe should be 300 mm long and the wax block should be secured in the middle of the pipe by driving a 100 mm nail through it. These home-made bait stations are simple to make and effective against rodents. Always use fresh bait and position the bait station against walls inside buildings. Note: The bait may remain untouched for a while, as the rodents will first have to become used to the new object. Inspect the bait stations regularly and dispose of dead rodents by burying them, or placing them in a marked plastic bag, and putting them in the rubbish for incineration. Use gloves and wash hands thoroughly after handling dead rodents, traps or bait stations.

4.4. BAYER BAIT STATIONS:

These bait stations protect the bait from weather and restrict accessibility to rodents, providing a safeguard for people and other animals. Place bait stations next to walls or in places where rats will encounter them. Stations that may be accessible to children must be made of sturdy, tamper resistant material and be secured in a way that they cannot be tipped. All bait stations should be clearly labeled. It may take several days for them to enter and feed in bait stations. For best results, make sure there is a continuous supply of bait until feeding stops. It usually takes 5 days or more once the rats start feeding for them to succumb.

These baits should be kept dry at all times and must be applied strictly according to the manufacturer's prescription. The only rodenticides that may be used are those containing *coumatetralyl* as active ingredients as it poses virtually no risk of secondary poisoning to owls and raptors that may predate on these rodents.

Rodenticide of the wax block formulation must be used in plastic bait stations to prevent non-target species access to baits. Continuous baiting is required to maintain pressure on exotic rodent species. If rodent burrows are found along the outside perimeter of buildings it should be treated with *coumatetralyl* tracking powder.

Remember that for every rat seen or heard, there are many more lurking away unobserved. As dominant rats are killed the sub-dominant ones move into their area, thus creating the impression that the rodenticide did not work. Many people think that they failed to kill the rats. But this may not always be the case as they just failed to kill the entire population due to insufficient baiting or trapping. Baiting with RACUMIN rodenticides and catching with traps should therefore continue until the entire population is brought under control.

5. IMPORTANT NOTICE ON THE USE OF RODENTICIDES!!

No rodenticide baits and bait boxes should be applied outside of buildings.
The management of a rodent control program is critical and any formulation should be applied responsibly to ensure that non-target animals, such as owls and other predators are not poisoned;
Take care of owls, snakes, mongooses and genets - leave them undisturbed and do not allow people to harass them as they help control rodents;
Keep your rodenticides and other poisons locked away and ensure that children do not have any access to it.

DO NOT USE ANY OTHER PESTICIDES SUCH AS ALDICARB OR CARBOFURAN!! THESE PRODUCTS ARE NOT REGISTERED AS RODENTICIDES AND CAUSE ENORMOUS PROBLEMS. THEY INFLICT SERIOUS PAIN IN RODENTS AND THUS GENERATE RESISTANCE TO POISONED BAITS. ITS USE IS ILLEGAL AND ARE EXTREMELY DANGEROUS TO WILDLIFE AND PEOPLE.

Two products that is permissible to use and do not contain chemical poisons (but are alpha-cellulose), are ***ECO MOUSE*** and ***ECO RAT***.