On the trail of the Mountain Bongo

A wealth of new data, collected and analysed over the past four years, is shedding new light on the slow recovery in Kenya of this rare and beautiful endemic forest antelope subspecies. ***Mike Prettejohn*** *reports.*

The conservation status of that most elusive and striking forest antelope – the Mountain Bongo, *Tragelaphus euryceros isaaci* – is at last becoming clearer.

Data the ongoing Bongo Surveillance Project has accumulated over more than four years in the field have produced fresh insights into Mountain Bongo ecology, while shedding new light on the distribution and genetic diversity of the few remaining wild groups of these rare antelopes.

The Surveillance Project's findings may yet prove crucial to the survival of this endangered eastern Bongo subspecies – which occurs only in Kenya.

Considerable progress has been made since the Surveillance Project was last the subject of a detailed report in SWARA [in Vol. 27 No. 1/ January–March 2004; pp. 26–31]. We have, for example, been able to confirm the Mountain Bongo's existence at a number of precise locations in the Aberdare Forest, as well as at sites on Mount Kenya and in both the Mau and Eburu forests.

Through DNA sampling and analysis, we have also been able to determine the extent to which inbreeding within today's population has compromised the subspecies' genetic diversity. Of 113 samples of Mountain Bongo DNA tested to date, only two haplotypes have been identified (compared with 23 for waterbuck samples collected in the same areas). This suggests that the whole of today's remaining Mountain Bongo population may be descended from just two maternal lineages.

The Mountain Bongo is the largest and heaviest of all forest antelopes. It is also one of the most richly coloured and statuesque, having a hunched, rather than a flat-backed, appearance. A large adult male can weigh as much as 405 kg (almost 900 pounds), while standing 1.3 metres (four feet three inches) at the shoulder and measuring fully 2.5 metres (more than eight feet) from nose to tail. In males, the bright chestnut hair darkens with age. Disposed down the shoulders, flanks and hindquarters are 11 to14 striking vertical white stripes, and there are other white patches about the face and legs. The animal's large, flared ears provide for excellent hearing.

Exceedingly shy animals, Bongos are forest browsers exclusively, being restricted to densely forested areas with an abundant year-round growth of accessible under-storey leaves and shoots. They are also fond of decaying wood, and males in particular range widely in their quest for this – and, of course, for females in season. The females stick together, generally in small groups, each frequenting a circumscribed home range encompassing perhaps one or two thickly forested mountain ridges. On reaching maturity, young males leave the maternal group, and look for another group to join – outside their native home range. Older males often lead a largely solitary existence.

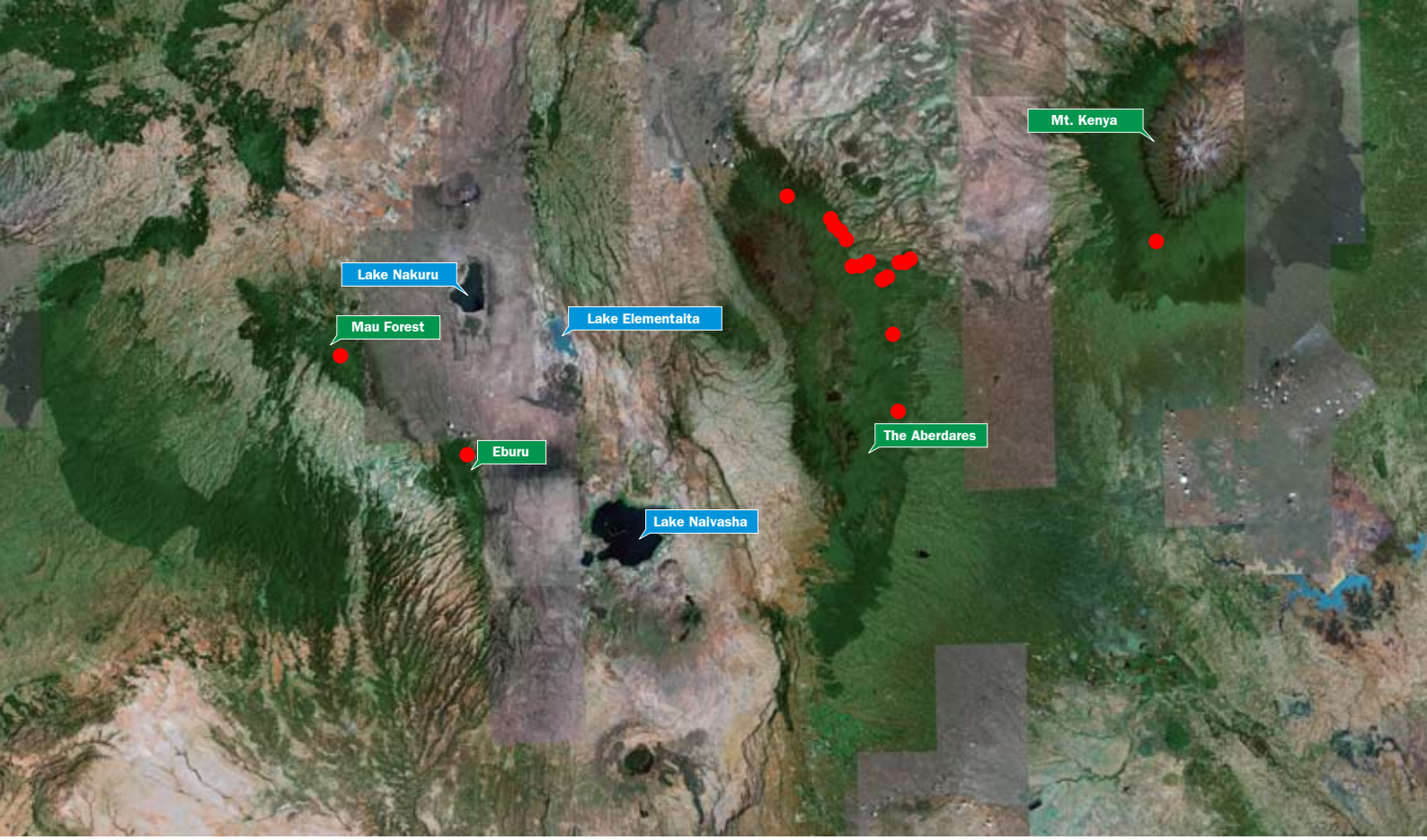
The extreme nature of the Mountain Bongo's core habitat – impenetrable high-altitude forest and bamboo on the sides of precariously steep ravines that gushing rivers have gouged into the dark, wet mountainsides – make a mockery of conventional tracking and monitoring. So figures arrived at in the past for Mountain Bongo numbers are, at best, the product of educated guesswork based mainly on extrapolations from the dung and spoor.

A 1975 survey carried out by the then Kenya Game Department estimated there to be "around 500" Mountain Bongos on the Aberdares alone. At that time, it was sometimes still possible to observe groups of the shy antelopes, as they visited the salt lick at The Ark forest lodge in the Aberdares Salient. Such sightings came to an abrupt end in the 1980s, however; the last record of a Mountain Bongo sighting from The Ark was in 1988.

For several years thereafter, the Mountain Bongo simply vanished from the record. A combination of disastrous developments – including an epidemic of rinderpest (a disease against which cattle are inoculated nationwide on a yearly basis, but which can still be lethal to buffaloes and other wild bovids) – sparked fears in the late 1990s that the Mountain Bongo might have been wiped out altogether from some parts of its range.

Exploding human population numbers in areas bordering the mountain forests, meanwhile, had triggered a proliferation – within these forests – of a host of destructive activities, ranging from illegal logging and charcoal production to active poaching with snares and dogs. Along with other wild animals, many Bongos were killed for consumption as bush meat. This, coupled with the effects of encroachment and habitat loss, meant that signs of the Mountain Bongo's presence could no longer

'Back from the brink': The Mountain Bongo (captive specimen on facing page) **is rarely ever seen in the wild, despite evidence of a recovery in its population over the last few years. The recovery is reflected in the findings of remote monitoring, conducted through the lenses of camera traps. Most of the trap photographs on record have been taken at night. So this image** (near left), **of an adult male (complete with Red-billed Oxpecker) taken in a clearing near the Honi River in the northern reaches of the Aberdares Salient in June 2005, is unusual in having been captured before nightfall.**



'Isolated clusters': The Mountain Bongo, *Tragelaphus euryceros isaaci*, occurs only in Kenya, where its current known distribution (indicated in red on the map, above) **is restricted mainly to parts of the Aberdare and the Mount Kenya Forests, east of the Great Rift Valley. Small groups of the Critically Endangered subspecies that have been found in the Mau Forest and on Mount Eburu, west of the Rift, are especially vulnerable. The race's entire surviving wild population is believed to number fewer than 200 animals.**

be traced over vast tracts of the subspecies' documented range.

On the Aberdares, long the key stronghold for most of the remaining Mountain Bongos, there was another major threat – in the form of an explosion in the population of Lions, some of which had been introduced to the mountains from Laikipia in the early 1970s. Come the 1990s, when the Aberdare Lion population was at its peak, there were few, if any, sightings of Bongos. And it became evident, moreover, that other, more commonly seen prey animals (such as the Giant Forest Hog) were likewise absent from large areas.

A then widely held view was that the Mountain Bongo, if not extinct already in the wild, was likely – at best – to be on the verge of extinction.

The outlook was not entirely bleak, however; for there were, at the time, also some quite promising developments. Between 1989 and 1991, the initial KWS/Rhino Ark conservation fence, skirting the Aberdares Salient (the eastern 'tongue' of the Aberdare National Park), was constructed. As a deterrent to would-be poachers and logging gangs, while at the same time keeping wild animals out of neighbouring farmlands, this fence proved so successful that it was subsequently extended around the entire Aberdare National Park and Conservation Area.

With time, the fence's conservation benefits became apparent on the ground, spurring a marked recovery in some of the Bongo's prime remaining natural habitat. The other hopeful development, from the Mountain Bongo's point of view, came via a dramatic reduction in the Aberdare Lion population. This was achieved through a series of culling operations carried out in the 1990s by a specialist task force under the then-KWS Problem Animal Control Unit.

When, against this background, our Bongo Surveillance Project came into being in 2003, we were still by no means certain – even on the Aberdares – that there would be any Mountain Bongo groups left on which to carry out surveillance! A lone Bongo carcass found in the Mount Kenya forest in 1994 seemed to offer us some hope; but there, too, the living animals – or signs of them – continued to prove elusive, despite occasional anecdotal claims. The outlook for the Mau, though, and for the Cherangani Hills, and other parts of the subspecies' previously documented range, seemed far less encouraging, given the extensive habitat loss and degradation suffered in those areas.

Having assembled a dedicated team of experienced trackers, we set about methodically combing through vast areas of promising habitat on both the Aberdares and Mount Kenya, often spending weeks at a time on the move between remote forest locations. In places, the going was extremely tough, owing to the uncompromising nature of the terrain. And from all too many of these early forays we returned with precious little to show for our efforts! Our perseverance was eventually rewarded, however, when – early in 2004 – we at last succeeded, in the remote NE forests of the Aberdares, in locating four small Bongo groups, numbering perhaps 30 animals in all.

That our Bongo Surveillance Project has come a long way since those early days is thanks in large measure to the generous support we have received – and continue to receive – from the Kenya Wildlife Service (KWS), as well as from conservation charities such as Rhino Ark (driving force behind the recently completed Aberdare fence), the Bill Woodley Mount Kenya

Trust, the Eden Wildlife Trust, the International Fund for Animal Welfare (IFAW), the Rare Species Conservatory Foundation, and Tusk Trust (UK), among others.

This support has not only enabled our teams to maintain a continual monitoring presence in the forests; it has also given us access to some of the most advanced modern surveillance equipment, including global positioning systems (from which the exact co-ordinates of Mountain Bongo sightings, or of sites where faecal and hair samples have been collected for DNA analysis, can be logged directly on to satellite maps), and camera traps, giving us the considerable added advantage of being able to carry out remote monitoring, even at night.

We have benefited, too, from the scientific expertise of Lyndon D Estes, a Research Associate of the Rare Species Conservatory Foundation, and a doctaral student in the Department of Environmental Sciences at the University of Virginia in the US, who for long periods has joined our field surveillance teams, and whose work, on the vegetation structure especially, has greatly enhanced our understanding of the Mountain Bongo's habitat requirements. The services, meanwhile, of a helicopter and a pilot – both kindly donated by Halvor Astrup, of Enasoit Ranch – have enabled us to make food and supply drops to tracking teams combing inaccessible stretches of forest.

To begin with, in our quest for images of the wild Bongos, we had equipped the members of our tracking teams with digital cameras, in the hope that they might get close enough on foot to photograph some of the animals they were following. Our one big success came in 2004, when KWS ranger Corporal James Nyagah managed to stalk a large adult male in the Aberdares Salient. His spectacular photograph – the first of a wild Mountain Bongo that most of us had seen in more than 12 years – was later widely reproduced.

Since then, with the help of camera traps, in place since 2006 at a number of strategic sites identified in the course of our earlier groundwork surveillance, the Project's image bank has grown considerably! The hope, now, is that we might even be able – in the coming months (or years, possibly) – to come up with a database of individual animals.

With the technical equipment and wherewithal we now have at our disposal, it has been possible to map the home ranges of some Bongo groups. In the process, we have located additional groups, enabling us to revise upward – to nearly 90 animals – the number of Bongos that we know about on the Aberdares. It is much too early, though, to put a figure on the range's total population, as there are still areas of potentially suitable habitat (replete with the 'right mix' of food plants and suchlike) that we have yet to explore thoroughly.

On Mount Kenya, meanwhile, we achieved a big breakthrough in 2005 in being able to confirm the existence (after an absence from the local record spanning more than ten years) of a group of 10–12 Bongos. More recently, in January 2008, we have been able to locate another, slightly larger group, so bringing to nearly 30 the number of animals we are now aware of in the Mount Kenya Forest, where of course the Mountain Bongo used to be fairly common and widespread. But, although we now have camera traps trained on a number of the game trails in the SW reaches of the Forest that are used by these animals, we have yet to obtain any photographs of individuals from this population.

Since 2006 we have broadened our search to include reconnaissance in the Mau Forest, west of the Great Rift Valley, as well as on Eburu, a volcanic outlier of the Mau rising from the Rift floor NW of Lake Naivasha, and on the Cherangani Hills, much further to the north and west. All these areas once supported sizeable Mountain Bongo populations.

On the Mau, a surveillance team has – with the help of local Ogiek honey-hunters, who know this forest (what is left of it) better than anyone – been able to verify the presence of Bongo tracks and to collect droppings (since also verified through DNA testing) from one of two widely separated observation sites. As we have not

Photos: © Mountain Bongo Surveillance Project

'On the trail': Members of one of the Bongo Surveillance Project's tracking teams scour potential habitat high on the Aberdare Mountains (left, this page) **for signs of the elusive antelopes. The teams have spent weeks at a time in the forest, often relying on helicopter drops to replenish their food supplies. In the process** (below)**, they have collected countless snares and have intercepted poachers carrying stashes of bush meat off the mountains (such as that of the Bushbuck whose head is shown here).**

managed, yet, to see any of the antelopes from this population, or even to obtain camera-trap photographs, we cannot say how many Bongos there are likely to be on the Mau; only that there would seem to be at least two small groups.

On Eburu, our Surveillance Project has been fortunate in being able to co-opt the assistance of Nigel Carnelley, a Lake Naivasha resident who since 2004 has made numerous visits, often lasting several days, to the small but now increasingly threatened expanse of forest lining the upper western flanks of this mountain's summit crater. Having learned of Bongo sightings in this area from forest guides (Ogiek honey-hunters introduced to him by friend and fellow environmental campaigner Isaac Ouma), Carnelley was determined to see these animals for himself. When not on the mountain, he left his conventional print-film camera with the guides, urging them to take pictures for him of the animals. On Eburu, he photographed what tracks he came across, while also collecting a number of hair and faecal samples.

'Winning ways': Members of the Surveillance Project's tracking team, including (from left) **Stanley Mwangi, Honorary Warden Peter Mwangi, Kariuki Maina, Mike Prettejohn (with trophy), Boniface Nderitu, Laban Kariuki, and KWS Assistant Warden for the Aberdare National Park, Francis Muturi, gather in a forest clearing with the Michael Werikhe Award for Conservation that was presented to them in November 2007.**

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In November 2004, Carnelley's guides informed him that a band of illegal loggers had snared a Bongo in the Eburu Forest, and that after killing and eating the animal they had chopped up and stashed its remains into a charcoal kiln of theirs, in an attempt to "destroy the evidence". The guides had then raided the kiln and retrieved one of the horns, along with pieces of the skin. This was Carnelley's first encounter on Eburu with the physical specimen of a Bongo. Then, in 2006, one of the forest guides, Solomon Kiriu, produced a photograph – not a particularly good one (the camera in question was not fitted with a long lens), but one unmistakably showing a living Mountain Bongo.

Carnelley's findings to date suggest that there could be two small groups of Bongos in the Eburu Forest, amounting in all to perhaps 15–20 individuals. What wildlife remains on Eburu (and this also includes buffaloes and Giant Forest Hogs – and possibly Yellow-backed Duikers as well) is severely threatened, however, by wanton habitat destruction and bush meat poaching. So prospects for the Mountain Bongo's continued survival here are worrying to say the least.

On the Cherangani Hills, the other habitat our surveillance team has visited, the Mountain Bongo would seem already to have lost the battle for survival – probably many years ago. As it is, there have been no credible records, of either sightings or signs, for more than three decades. The subspecies lives on, though, in the memory of some local community elders, who still claim (out of wishfulfilment, perhaps, or nostalgia) that the Cherangani Bongo population has, even today, not been *entirely* extirpated. The scale of the deforestation that has occurred over most of this range in the past 30 years makes it difficult to imagine where any surviving Bongo group, were there to be such, could possibly live.

It is perhaps worth mentioning, here, that our Surveillance Project has from the outset taken seriously – and in most cases followed up – reports received from local people concerning Bongos. There have been some 'wildlife buffs' who, on learning of our plans to investigate reports from the Mau Forest, for example, or Eburu, have roundly dismissed such an exercise as "a complete waste of time," arguing that no Bongos could possibly have survived in such areas! On the Cherangani Hills, though, even we are sceptical; but we do still hope, if we get the chance, to visit the upper reaches of the isolated northern massif of Sekerr, where at least (we understand) there is *some* remnant forest cover left to explore.

Locating the animals and carrying out physical surveillance to determine the numbers and the sizes of surviving groups, along with their habitat requirements and approximate home ranges, is just one important component of our work, however. The other major component in the jigsaw of arriving at a more complete understanding of the Mountain Bongo's present conservation status involves analysis of the subspecies' DNA.

Any Critically Endangered animal with a surviving wild population down in the low hundreds will inevitably face the severe added constraint of repeated inbreeding. This results in a greatly impoverished genetic diversity, which in turn renders any prospective recovery in the overall population vulnerable to potentially lethal setbacks, such as maybe triggered by epidemics of disease. It is only through DNA analysis that the full extent of this additional risk can be ascertained. Such testing also makes it possible to establish the sexes and ages of individual animals, while revealing their relationships to one another, thus giving a far more accurate picture of a wild population, and its make-up, than can ever be reached through physical surveillance alone.

DNA testing is extremely costly, however. So our Surveillance Project has been fortunate, in getting this work done, to have been able – with funding support and assistance from the US-based Rare Species Conservatory Foundation – to call upon the combined expertise of the International Livestock Research Institute (ILRI) and of both the Universities of Nairobi, in Kenya, and of Cardiff in Wales.

Samples of fresh dung collected from Mountain Bongo trails at all the sites where the subspecies has so far been located (the Aberdares,

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Mount Kenya, the Mau Forest, and Eburu) have been preserved in test tubes using ethanol and sent to the University of Cardiff, where analysis of DNA taken from the faecal mucous membranes has been carried out. The GPS co-ordinates of each sample's origin have been painstakingly recorded.

In collecting the faecal samples, it has not always been easy to distinguish Bongo dung from that of waterbuck, which can also take the form of large, partially congealed pellets, and which is often found on the same trails. Not surprisingly, then, a good many of the faecal samples we have collected have turned out to be from waterbuck. Far from confounding our ongoing genetic research, however, this has given us the added advantage of being able to compare genetic diversity in today's Mountain Bongo population with that reflected in waterbuck, still a relatively common and widespread animal.

Of 212 faecal samples DNA-tested to date, 113 proved to be from Bongo, while most of the other 99 were from waterbuck, which occur in all the Mountain Bongo's remaining haunts. As markers for the DNA analysis, 35 bovid primers were used. Only seven yielded polymorphic loci for Bongo. And only two haplotypes were found within the Bongo samples (versus 23 haplotypes for waterbuck).

This suggests that all today's remaining Mountain Bongos can be classified as having descended from just two maternal lineages, underlining the extent to which inbreeding already represents a serious threat to the population as a whole.

With the data the Surveillance Project is accumulating, both on the ground and through DNA analysis, it should eventually be possible to devise a conservation strategy to safeguard the long-term survival in the wild of this magnificent and rare antelope subspecies that is of course also endemic to Kenya. To this end, we are pleased to be able to confirm that we have just received, through The Rhino Ark Charitable Trust, a further grant from the UN Development Project (UNDP) to continue our surveillance activities.

With the new grant, the Project – which received special acclaim last November in being named recipient for 2007 of the East African Wild Life Society's annual Michael Werikhe Award for Conservation – will now also be able to build further on the success of the four

'A race apart': The Mountain Bongo (captive animal shown, main picture) **is both larger and much heavier than the Lowland Bongo,** *Tragelaphus euryceros euryceros* (inset)**, which by contrast is not endangered, being found in forest mosaics across much of West and Central Africa. The two races are believed to have been isolated for more than 1,000 years. The wild Lowland Bongo in the photograph reproduced here is from a camera trap set in the Ivindo National Park in Gabon, West Africa.**

Photo by Paolo Torchio, reproduced with the kind permission of Lyndon D Estes

wildlife clubs it has set up in primary schools bordering the eastern fringes of the Aberdare Forest as part of a community awareness programme aimed at nurturing active local involvement in securing a safe future for the endangered Mountain Bongo.

An *in situ* captive-breeding programme, meanwhile, is still under way at the Mount Kenya Wildlife Conservancy, which in January 2004 – as part of the Bongo Repatriation Program spearheaded by The Rare Species Conservatory Foundation – took delivery from zoos in the US of 18 Mountain Bongos, all the descendants of antelopes originally trapped in Kenya and exported in the late 1960s and early 1970s. The eventual aim of this project is to release into the wild the progeny of some of these repatriated animals, in a bid to restore the Mountain Bongo to parts of the Mount Kenya Forest.

Like the Bongo Surveillance Project, this repatriation exercise began at a time when, in the absence for several years of Mountain Bongo sightings on Mount Kenya, there were fears that the subspecies might already have been extirpated from this part of its range. It soon became apparent, though, that the repatriated captive-bred Bongos had lost their immunity (which develops naturally among their wild counterparts within Kenya's forests) to some locally common bovine diseases – not least those (such as theileriosis) that are transmitted by African ticks.

Since this early setback, the repatriated animals at the Mount Kenya Wildlife Conservancy have been breeding well, although current veterinary opinion is that wild release from this *in situ* breeding herd may now have to be deferred until at least such time as a second generation of Kenya-born offspring has reached adulthood, if the released animals are to survive in the wild state.

It is important that the repatriation programme succeeds, not only because it will help to boost the recovery of Mount Kenya's decimated and genetically fragile wild Mountain Bongo population, but also because its success will be a measure of the role that an *ex situ* captive breeding programme can play in safeguarding the survival in the wild, over potentially difficult periods in the future, of what – by any standard – is a Critically Endangered mammal.

As it is, there can be no doubt that the Mountain Bongo has – in the very recent past – come perilously close to extinction from the wild. The slow natural recovery that we are now just *beginning* to detect in this population remains fraught with potential hazards. Yet now, with the Bongo Surveillance Project and other conservation measures in place, we might at least be in a position to pre-empt any catastrophic future population crash through taking timely actions that will ensure that this unique, charismatic antelope subspecies can be preserved – at all costs.

Artist's impression: This tapestry (facing page, actual dimensions: 51 cm by 45 cm)**, based on one of the camera-trap images showing the Honi male featured on p. 44, was commissioned for Lyndon D Estes, of the Department of Environmental Sciences at the University of Virginia in the US, whose pioneering study of the ecology of the Mountain Bongo is the subject of a forthcoming doctoral thesis. Reproduction of this photograph is with the owner's kind permission.** This page: **A calf and two females in a Bongo group from the Aberdares Salient that on the afternoon of 29 April 2007 was the subject of a particularly rewarding series of camera-trap images.**

MOUNTAIN BONGO – A Race Apart

Now found only in Kenya, the **Mountain Bongo**, *Tragelaphus euryceros isaaci*, is one of only two recognised subspecies of the Bongo Antelope, *T. euryceros*. The other subspecies – the **Lowland Bongo**, *T. e. euryceros* – is found in scattered forest mosaics on, or to the north of, the Equator, across much of West and Central Africa from Sierra Leone in the west to the DR Congo and the Southern Sudan in the east.

Adult Mountain Bongos are both larger and considerably heavier than their Lowland counterparts. And, unlike the Lowland Bongo, which is relatively common and widespread over most of its broad range, the Mountain Bongo is a Critically Endangered subspecies now known to be restricted in the wild to just a few upland forests in Kenya – on the Aberdare Mountains, Mount Kenya, the Mau Escarpment, and Mount Eburu.

It is possible that today's entire surviving Mountain Bongo population may number fewer than 200 animals.

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The subspecies was originally described by scientists at the London Natural History Museum from a specimen F W Isaacs (hence the sub-specific name, *isaaci*) collected in 1902 from near Eldama Ravine, on the Mau Escarpment NW of Nakuru. The Lowland Bongo's introduction to science, by contrast, came more than 60 years earlier, with the discovery in 1836 – by the French hunter-explorer Paul B du Chaillu – of a skull (complete with horns) lodged in the forked trunk of a forest tree in West Africa.

– MP

*The **Bongo Surveillance Project** is grateful to **Juliette Shears** in the UK for her assistance with compiling the draft text of this report, and for her efforts (as a voluntary liaison officer) in promoting and raising funds for the setting up and running of Mountain Bongo education and awareness programmes in Wildlife Clubs at Kenyan schools.*

*The Project is also very grateful to **Jake Veasey**, Manager of the **Woburn Safari Park** in England with responsibility for captive Mountain Bongos in Europe, for his support in making educational resource materials available for dissemination in schools, and to **Rob Prettejohn** in Australia, cousin of the author of this report, for his generous financial contributions.*

Additional information is posted on the website < www.mountainbongo.org >.