MICHAEL MASON

rocky road

Cape Rockjumper

TEXT & PHOTOGRAPHS **KRISTA OSWALD**

I watched as a male Cape Rockjumper finally showed himself, calling and standing proudly on a prominent rock along a montane fynbos ridge, his elegant white malar stripe pointed directly at me. Worried that the slightest move would send him skittering over the edge, I froze, binoculars propped on my knees and a sharp rock digging into my back as usual. When a female followed him down to a tiny rock and ducked underneath, I knew they had to be at a nest.

I quickly made my way through the fynbos to check under the rock and had two surprises. Firstly, there were three eggs (until then I had only seen nests of two), and secondly, one was slightly damp, indicating that the female had just laid.

I thought yet again how lucky I am to call what I do 'work'.

As part of my PhD I am collecting the second full season of reproductive data at Blue Hill Escape in the Kouga mountains of the Western Cape. The broad overview of my research comes down to one question: why are populations of the Cape Rockjumper *Chaetops frenatus* declining, mostly in areas where its habitat is warming? While I am also looking at the physiology, behaviour and genetics of this endemic and Near Threatened species, it seems likely that the main reason is as a result of its low reproductive success.

The 2017 breeding season proved disastrous for Cape Rockjumpers. There was an inordinate degree of nest failure, possibly as a result of the continuing drought or early heatwaves (or both). Out of a potential 24 fledglings from 14 nests that reached the two-egg stage, our team recorded only one successful fledging. While it is accepted that ground-nesting birds have high levels of nest failure, 95.8 per cent is extreme.

My research was initially intended to examine whether declining rockjumper populations were as a result of its inability to maintain provisioning rates during high temperatures, but after 2017 the focus has necessitated a slight shift. Provisioning data are being collected by way of high-quality video cameras placed at active nests supporting nestlings at different stages of development, but such data are obviously hard to collect when nestlings are not surviving long enough to be filmed.

Nest failure came about for different reasons; one nestling (the sibling of the one fledgling that survived) died when an unidentified thorn penetrated its abdomen, and one nest failed because the male parent disappeared and the lone female could not keep up with feeding and nest maintenance. With only one parent to perform nest-care duties, this nest was overrun by ants on a hot day. The nestlings, which were only 10 days into their 21-day nestling period, tried to throw themselves out of the nest to escape the ants and did not survive. When both parents are in attendance, occasionally with an additional adult helper, they are able to share not only provisioning but also 'cleaning', and they will often eat any nearby ants to avoid just such an outcome, while also gaining a tasty snack.

We also collected footage of a fair amount of direct predation. Although we had one instance of a nest being raided by a honey badger and a few by grey mongooses, by far the main culprits were boomslang. We began erecting trail cameras opportunistically at nests in 2015, before the start of my current study, and I had seen footage of a boomslang preying on a rockjumper nest in that season. At the time I assumed this was unusual and had no idea how prevalent these predation events were.

In 2017, as a result of equipment failure, we only obtained definitive footage of predation at 11 of the 14 nests. Of >

above *Weighing the slightly older nestlings could be nerve-wracking; this one was 15 days old and already a bit feisty and active. By the end of day 16 we stopped approaching the nest, as the nestlings were so active we worried about them fledging prematurely.*

top, left *Like many altricial birds, nestling Cape Rockjumpers seem to have a face only a mother could love. This nestling was estimated to be about two days old.*

top, right *A Cape Rockjumper nestling about 15 days old. After being filmed on day 15, nestlings were ringed and not monitored again until after they had fledged.*

opposite *Young birds are supplementarily fed by the resident adults for up to three months after fledging.*

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A male Cape Rockjumper in a typical alert position mid-call, possibly either defending his territory or communicating some unknown rockjumper message to others in the vicinity.

those, seven showed boomslang predation and it only ever occurred after the chicks had hatched. Two of these predation events were caught on our high-quality video cameras, leaving us with stunning footage of exactly how a boomslang repeatedly checks the nest to ensure that there are no survivors. Adult rockjumpers, aware of what is happening but helpless to deter a two-metre-long venomous snake, alarm call and display in the background to no effect.

Despite the generally held perception that boomslangs occur only in trees, they seem quite at home in montane fynbos, where the tallest plant is at most a metre high. While snake predation on bird nests is well known, we were unaware that boomslangs are active ground-nest hunters and had assumed that rockjumper nests would be more vulnerable to mammal predation. It is interesting that during the non-breeding season rockjumpers have been observed reasonably close to boomslangs with nary an alarm call being given.

Despite a massive, unseasonal snowstorm in early September 2018, the rockjumpers were intent on producing the

next generation. Admittedly it would not take much to improve on the results from the previous season, and the presence of at least four fledglings at the time of writing already shows an advance. Hopes are high that this season's crop of Cape Rockjumpers at Blue Hill will boost the numbers back to the level of that in January 2015.

It is possible that cool (or downright cold) temperatures early this season may have limited the activity of some of the bird's prey items, such as midday agamas and crag lizards, and a shortage of food may compromise the birds' success. As a ground-nesting species, rockjumpers face many threats during their breeding cycle, especially given their long incubation and nestling periods; according to a previous study, both average 21 days.

Despite this encouraging start, I have already recorded two nests being preyed upon by grey mongooses. It seems Cape Rockjumpers may go from facing mongoose predation early in the season when it is still cool, to snake (and ongoing mongoose) predation late in the season when it is hot. Spending 42 days on the ground in an area with many such opportunistic predators is a perilous affair.

This season I also had the first recorded instance of nest failure in this species as a consequence of extreme weather. While the rockjumpers generally build their nests under rock overhangs facing downslope, two did not provide adequate cover for the intense snowstorm that occurred in early September and trail camera images show that the eggs were covered in snow for more than 24 hours. The parents were unable to access the eggs properly in order to keep them warm and it is likely the clutch

WHENEVER POSSIBLE WE CATCH AND RING THE ROCKJUMPERS, USING UNIQUE COLOUR COMBINATIONS SO WE CAN **ACCURATELY ACCOUNT FOR RE-NESTING ATTEMPTS AND OVERALL REPRODUCTIVE SUCCESS**. IT ALSO ENABLES US TO TRACK DISPERSAL MOVEMENTS BETWEEN TERRITORIES

became unviable as a result of the low temperatures.

Some studies suggest that, especially in long-lived species, it is more advantageous for individuals to prioritise their own preservation over that of their young. On a warm day (which for rockjumpers means above about 15 °C) they may not return to incubate for hours, relying on the ambient warmth of the insulating nest material to help eggs retain heat. Leaving the nest unattended for so long seems to be a risky strategy, although in most territories it seems that at least one of the parents keeps the nest within sight, as evidenced by the alarm-calling whenever I approached the nest.

The likelihood of rockjumpers abandoning a nest decreases exponentially depending on the stage. While the species can be prone to deserting nests in the early stages, once the eggs are laid the parents tend to remain, due to high female investment in egg production. As soon as there are nestlings, it seems the adults do not abandon the nest unless the youngsters have gone.

The main rockjumper breeding pair in each territory share parental duties: both male and female incubate, brood and provision. Occasionally young from the previous season will stay to assist, with some males remaining as helpers for an additional two seasons before moving away to establish their own territory. Despite this, most of the territories I monitor have only the one main breeding pair and rarely have any helpers. This could be due to a change in overall population levels, since in 2015 when I arrived many of the territories we monitored comprised three to five individuals.

Rockjumpers begin breeding as early as late July and the season continues into January, so by mid-September the birds are in various stages of the cycle: some territories have nests that failed, some pairs have nestlings ready to fledge, while others are starting to re-build and try again.

One pair in particular surprised me by laying their second three-egg clutch for the year after the first was one of those covered by snow. A pair in a nearby territory also produced a three-egg clutch, which is interesting as the literature states (and my previous experience bears

above *After filming on days 15 and 16, we fitted the nestlings with a SAFRING ring and a unique three-colour combination and only returned to check the nest after day 20. This fledgling provided me with some of the cutest footage of the project.*

above, left *Snow early in the 2018 breeding season was a disaster for nests that were still at the egg stage, but in this instance the eggs hatched before the snows fell in early September. The three adults – one female (pictured) and two males – successfully raised and fledged the two nestlings.*

out) that Cape Rockjumpers lay two-egg clutches. Larger clutches may be resulting from higher food availability due to more precipitation in 2018. As with many birds, it seems the rockjumpers will keep breeding as long as food is available and the female is capable of producing more eggs.

Whenever possible we catch and ring the rockjumpers, using unique colour combinations so we can accurately account for re-nesting attempts and overall reproductive success. It also enables us to track dispersal movements between territories; for example, a young male ringed as a juvenile in 2014 is now dominant in a nearby territory. Currently, the oldest rockjumper at Blue Hill is a male ringed as an adult in 2013, making him at least six years old. >

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above *One of our provisioning cameras caught this image of a boomslang preying upon seven-day-old nestlings.*

top *A male on his way back to provision his young brood warily surveys the area around the nest .*

On a positive note, recent fires appear to have increased suitable rockjumper habitat. Studies have shown that the species does best about three years post-fire and it has not taken the birds long to move into the newly burned areas around Blue Hill. While the birds are 'territorial' in the broader sense of the word, their boundaries and group composition seem to shift at a far greater level than previously thought. On a practical level, that means rockjumpers are now coming within 200 metres of the farmstead; this not only makes my job easier as I have far less distance to carry camera setups, but we may be close to having rockjumpers in the backyard!

The increased probability of both fire and drought due to future climate change scenarios will be a mixed bag for rockjumpers. Whereas a more regular fire regime across the fynbos will in all likelihood increase their habitat, if more frequent droughts result in increased snake activity, their overall population may continue to decrease.

Our results from 2017 suggested the main threat to rockjumper reproduction was predation (by boomslang in particular), but data from one season are not sufficient to draw any firm conclusions. Hopefully, a second full season of data will help determine whether the predation of 2017 was normal or simply a combination of circumstances lining up against this iconic South African endemic. ◆

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References

Holmes RT, Frauenknecht BD, Du Plessis MA. 2002. 'Breeding system of the Cape Rockjumper, a South African fynbos endemic.' *The Condor* 104: 188–192.

Lee AT, Barnard P. 2016. 'Endemic birds of the Fynbos biome: a conservation assessment and impacts of climate change.' *Bird Conservation International* 26: 52–68.