

Using radio-telemetry to locate cryptic nests of the ground nesting kakapo *Strigops habroptilus* on Codfish Island, New Zealand

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SUMMARY

Experiments with hidden transmitters showed that people undertaking radio-telemetry of kakapo *Strigops habroptilus*, often walked over the transmitter prior to locating it. In a real situation, this could equate to a risk of causing nest failure through trampling of a nest or disturbance of the incubating female. A new telemetry nest approach procedure was therefore developed to avoid potential mistakes.

BACKGROUND

The kakapo *Strigops habroptilus*, a critically endangered flightless parrot endemic to New Zealand, nests on the ground in natural cavities at the base of trees, under or between rocks, in fallen hollow logs, under overhanging vegetation and in the decaying remains of tree root mats. Many of these sites are fragile and are hard to distinguish from amongst the background of trees, logs, rocks, rotting tree stumps and overhanging vegetation which are typical of kakapo habitat. Concerns over damaging nest cavities or causing female desertions while attempting to find nest for management purposes prompted the development of specific telemetry procedures.

The first procedure determined that a female was nesting using remote telemetry and triangulation, and the second a safe way of approaching the nest without accidentally causing unintentional damage or disturbance. All kakapo are fitted with a radio transmitter as radio-tracking is essential for the success of detailed management procedures currently being applied to conservation of this species.

ACTION

Approximation of nest location using radio-telemetry: A protocol was established to determine whether a female kakapo might be nesting using standoff remote telemetry with signals given out from a transmitter attached to each bird. Triangulation on a daily basis from set points, was initiated from the onset of the

breeding season. These data were mapped using a computer mapping programme and the daily telemetry fixes checked to see if they clustered within 30 m (margin of error).

If four consecutive fixes were recorded within a 30 m cluster on the fifth day, the presence of a nest would be confirmed in the field, the presumed nesting female being very carefully approached to determine whether she was sitting on eggs. It is imperative that females are not flushed from their roost/nest during the breeding season as this may result in disturbance which could be critical to breeding performance or cause desertion. To ensure that a nest is not damaged during location and that the female did not desert due to disturbance before the nest was located, a close approach procedure was developed.

Close approach procedure: When trying to find a kakapo nest it is essential to have a good idea of how close one is to it so that a cautious approach can be made and potential damage to the nest and flushing of the female can be avoided. The following method is now used to eliminate these dangers and this procedure is followed whenever a female is approached within 50 m during the breeding season. The close approach procedure is shown in a diagram (Figure 1) and consists of six consecutive steps:

1. Track the bird as usual until the signal is audible from all directions with the volume of the receiver turned up to maximum, i.e. the signal can be heard regardless of which way a

three element standard Yagi tracking antenna is pointed.

2. When the bird's signal is audible all round, check to see how far away the transmitter (female kakapo) is by:

i) taking a bearing of the direction to the transmitter

ii) moving 20 m uphill (if not on flat ground) at right angles to the signal and taking another bearing

3. If the difference between the two bearings is greater than 20° then the nest is less than 50 m away.

4. If the difference between the two bearings is less than 20° the bird is greater than 50 m away. Advance toward the bird for a further 20 m then repeat procedure 2.

5. If the bird is less than 50 m distant, plug your head phones into your receiver and proceed using these, setting a course that is offset at 45° from the line to the bird on the uphill side. Walk along this line until the strongest signal is over your shoulder, i.e. until you have walked to a point just passed 90° to the direction of the bird. Set another course at 45° to the direction of the bird and walk until the strongest signal to the bird is over your shoulder, and then do it a third time. You will now be between 10 and 20 m below the nest and will have circled the potential nest site.

6. Continue to approach the nest by walking at a 45° angle to the direction of the strongest signal, but spiral into the nest, rather than walking in a straight line.

Staff initially believed their prowess at telemetry did not necessitate the need for such a system. However, on testing staff by burying a transmitter in a featureless open area most walked over or within one metre of the transmitter on one or several occasions prior to locating the device. Given that kakapo nests

are cryptic and can be located in shallow subterranean cavities the potential for collapsing a nest without the above procedure was considered high.

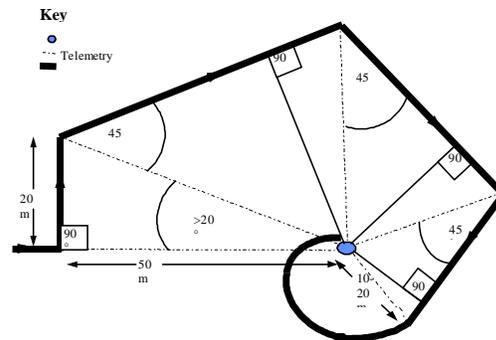


Figure 1. Close approach procedure diagram.

CONSEQUENCES

Prior to the use of this nest location technique 21 nests had been approached. Many of these nests were unsuccessful though this outcome could not be directly attributed to disturbance on discovery. Since 1997, 39 nests have been approached using the new approach technique. No nests have been damaged and all nests have been discovered with the female within the nest cavity. While there is no evidence that the old methodology for nest location was causing loss of breeding success, the new system reduces many of the potential risks of causing nest failure through damage to the nest or disturbance of the female kakapo.

Such a nest approach procedure might be useful for a number of other threatened ground-nesting bird species where disturbance during nest finding activities might cause damage or destruction of nest sites, or desertion through disturbance of adult birds.