

adequate means of assessing their status. For most ducks this technique worked well. However, some ducks (even those considered to be part of stable pairs) wandered widely over considerable areas, making them particularly difficult (if not impossible) to locate from the ground.

3.5.2 Aerial monitoring

Following the application of toxic baits over the study area, accurate position fixes of each radio-tagged bird were recorded using the techniques described in detail in Appendix 4. These positions were plotted on a map for each bird and compared with those obtained on previous flights. Any differences between these fixes were assumed to reflect the movements of the individual and suggest that the bird was still alive. If the fixes remained in close proximity, the status of the individual was investigated by observers on the ground. For those kaka carrying mortality transmitters, a roll call only was required which considerably simplified our ability to determine the status of these birds.

Both the ground and aerial approaches to monitoring radio-tagged birds complemented one another. Observers on the ground were able to calibrate the accuracy of aerial position fixes by visually locating individual birds and noting their position while being simultaneously tracked from the air. Small scale movements particularly in areas where the density of kaka was high could also be identified. Aerial observers were able to track down individuals moving over large distances and birds for which observers on the ground could either get very weak or no signals.

4. Results

4.1 PRE-POISON MONITORING

All monitoring of radio-tagged birds prior to the application of the toxin was conducted from the air. These flights efficiently covered the entire study area confirming both the continued presence of 20 kaka and 18 blue ducks within the area and the correct functioning and tuning of the transmitters and their signals. This latter aspect was particularly important for those birds carrying mortality transmitters.

Contact was lost with only two radio-tagged birds (blue duck RR-M and kaka YBR-M) prior to the poison drop. No further contact was made with these birds during subsequent operations. It is unclear, however, whether this was caused by transmitter signal 'failure' resulting from a fault in the transmitter package or whether the birds concerned simply left the area. Other birds occasionally 'disappeared' for periods throughout the monitoring process but this could be traced to movements (sometimes significant) in the fine tuning of transmitter frequencies and aerial breakages in blue ducks.

4.2 POST-POISON MONITORING

Between 21/7/94 and 12/8/94 the Waihaha Ecological Area south of the Mangatu Stream was poisoned using 1080 delivered by carrot baits. Immediately prior to, or directly following the application of the toxin, intensive monitoring of radio-tagged kaka and blue duck commenced on both the ground and from the air.

4.2.1 Ground based observations — Kaka

Of the eight sites used to record compass bearings to radio-tagged kaka (Fig. 4) relatively few provided useful information. For this reason, bearings from only one site for each kaka (usually that from which most bearings were obtained and/or those with a high proportion of stronger fixes) are plotted in Figure 5 along with an estimate of their relative strengths. All bearings collected at other sites are included in full in Appendix 5.

Those bearings plotted in Figure 5 were collected for 5 to 7 days following the application of poison baits in a given area. The diagrams are an attempt to visualise the scale of movement (from the ground) of individual kaka (due to the inability to simultaneously triangulate positions by ground based observers) by examining the distribution of bearings. Where there is little change in the angle of bearings for given bird (from a specific point i.e., < 20 degrees) and the signal strength remains constant over a period of consecutive days (i.e., the lines remain very close together and are of the same length), the results suggest that the bird is stationary and requires either visual confirmation or comparison with results obtained from aerial monitoring to confirm its status. If, however, bearings remain variable in terms of direction and (less importantly) strength, a given individual is assumed to be still active and alive.

In most instances, ground based observations indicated that kaka were highly mobile with the majority of birds displaying considerable variation in both bearing direction and strength. For only three kaka (YBG-M, YRG-M and M-YWR) were these plots of bearings sufficient to cause concern. When compared with the more accurate position fixes obtained from the air (Figures 6a-e), however, the narrow arc over which signals were received and their relative weakness could be explained by their distance from ground observers and/or topographic interference. The fact that YRG-M and M-YWR were both carrying mortality transmitters that continued to operate at 40 pulses/minute throughout the monitoring period meant we could be fairly certain that these birds were still alive even though position fixes for M-YWR were rare.

4.2.2 Ground based observations — Blue Duck

Monitoring the movements of blue ducks from the air (see below) was an adequate means of assessing their status but limitations imposed by the accuracy of the method, particularly for those more sedentary ducks, required visual confirmation from the ground. All radio-tagged blue ducks (except for RR-M whose transmitter appears to have failed) were confirmed as alive four weeks after the completion of poisoning operations from direct observations on the ground.

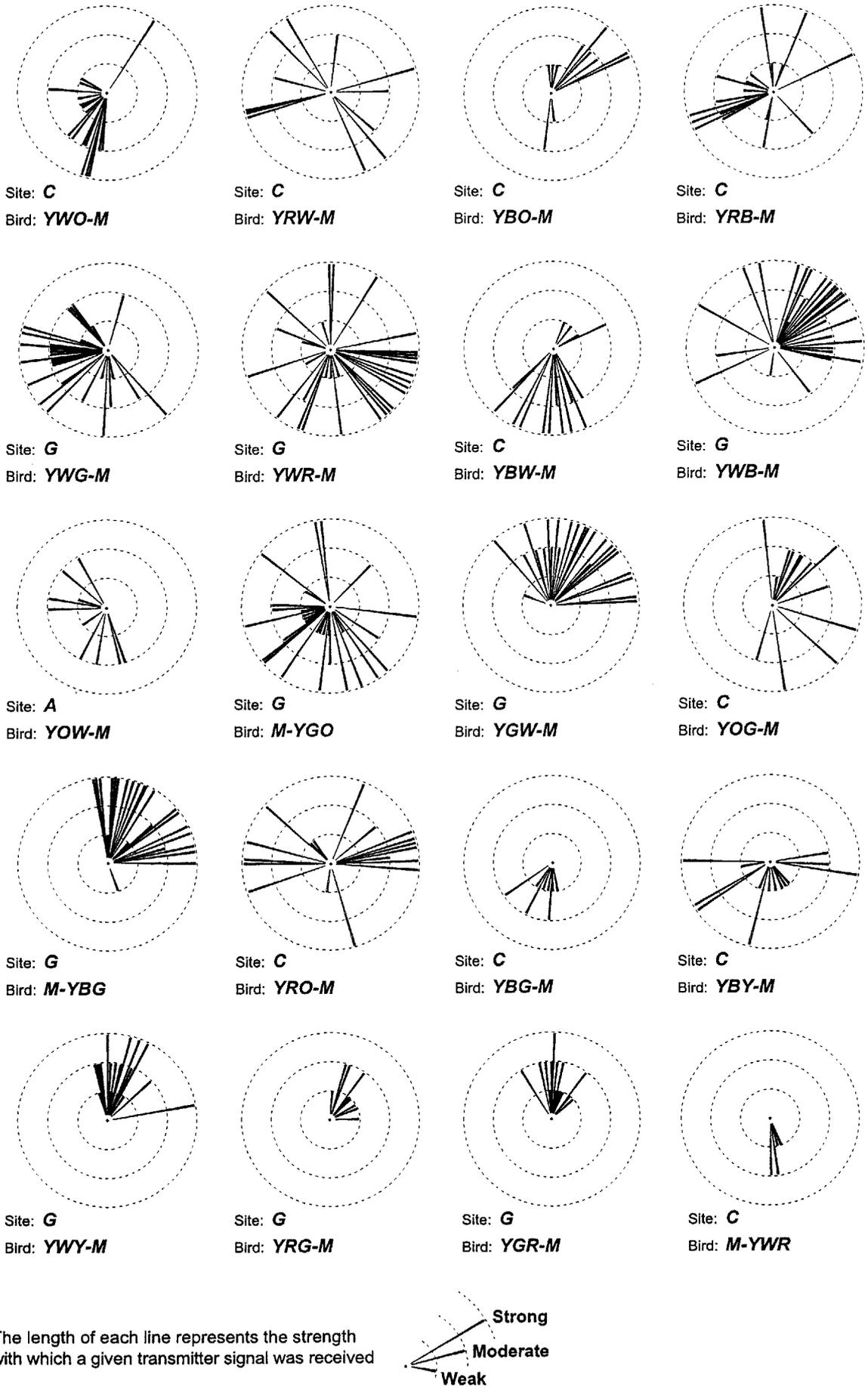


FIGURE 5. KAKA MOVEMENTS DERIVED FROM FIXED POINT OBSERVATIONS OF COMPASS BEARINGS.

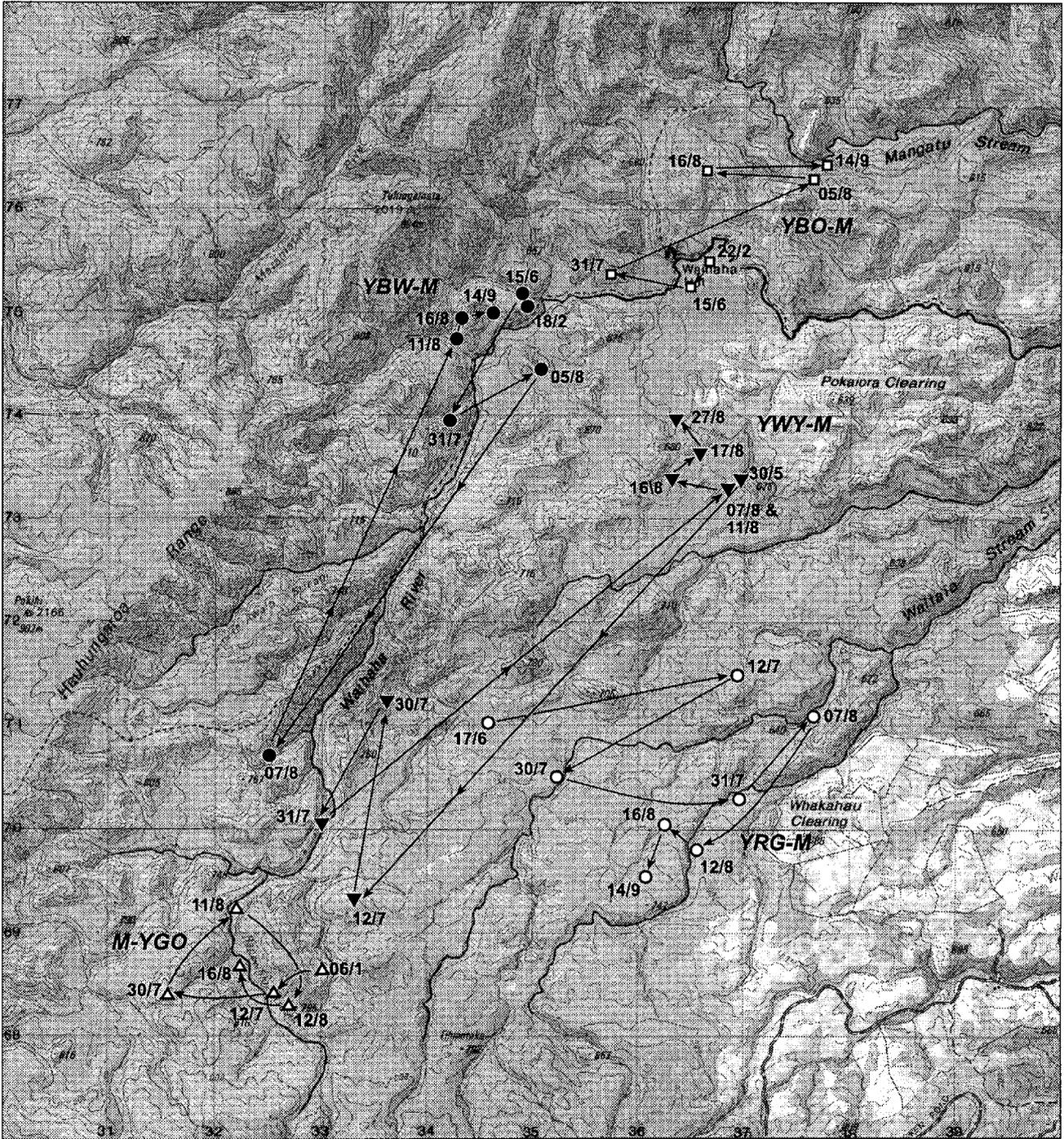


FIGURE 6a. AERIAL POSITION FIXES FOR KAKA YRG-M, M-YGO, YBO-M, YWY-M AND YBW-M.