



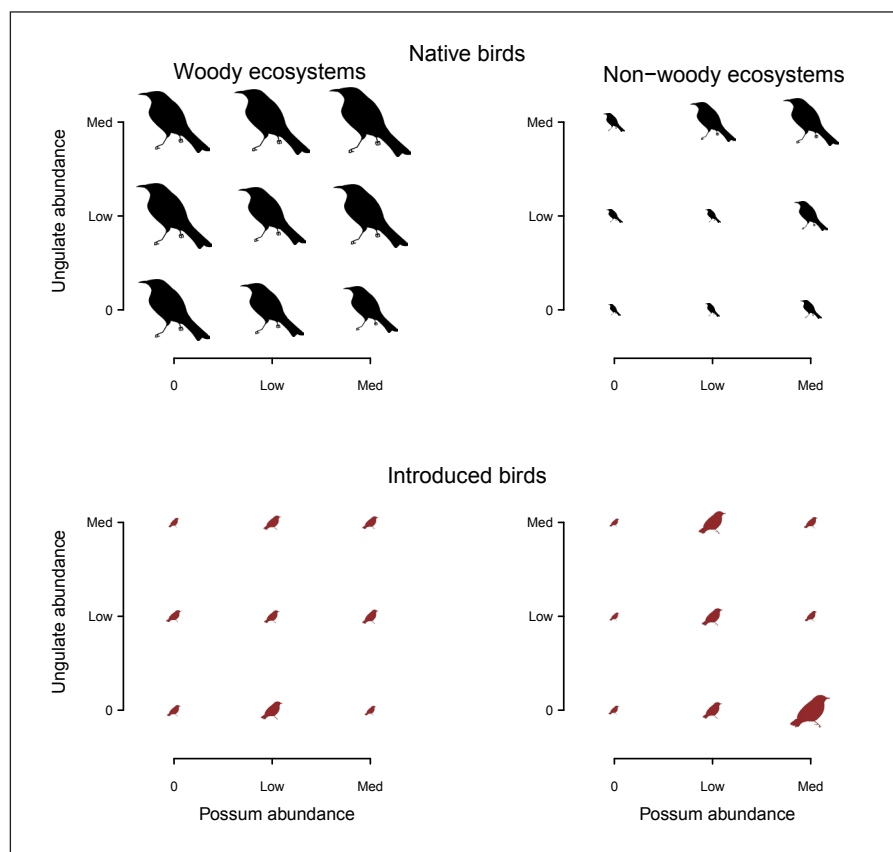
How do bird abundances relate to ungulate and possum abundance across public conservation land?

Summary

Abundances of both native and introduced birds were not greater when both ungulates and possums were either absent or not detected. Surprisingly, in non-woody ecosystems, native birds were most abundant when both possums and ungulates were in medium abundance. The reasons for these variations in distribution are presently unknown, but should be investigated further.

Main findings

- The abundances of native birds (all species combined) and of introduced birds (all species combined) were independent of the abundances of ungulates (deer, goats, chamois, etc.) and possums in woody ecosystems (forests and shrublands) on public conservation land.
- The abundances of native birds were not greater when both ungulates and possums were either absent or not detected or their abundances were low.
- Across the combinations of ungulate and possum abundance (zero, low, or medium), native birds were always more numerous than introduced birds in woody ecosystems.
- In non-woody ecosystems, native birds were more numerous than introduced birds in all cases where ungulates were in medium abundance and, surprisingly, native birds were most abundant when both possums and ungulates were in medium abundance.
- Introduced birds in non-woody ecosystems were more numerous than native birds when ungulates were either absent or not detected and when possums were in medium abundance.



Why is this important?

It is surprising that in non-woody ecosystems the greatest abundances of native birds are where numbers of ungulates and possums are also greatest. This suggests that the optimum sites for birds are also optimum sites for some introduced browsing mammals, and we need to understand why this is so, and whether these sites are also more resilient to the damage caused by these mammals. For example, they could be highly productive sites where the biomass consumed by browsing mammals recovers rapidly in a way that does not impoverish them as habitat for native birds. Also, when predatory mammals (e.g. rats, stoats) are common they depress the abundances of many native bird species, so we also need to quantify the abundances of predatory mammals and relate these to the range of abundances of browsing mammals to understand the patterns shown. Understanding these relationships will help us identify the actions that are most likely to assist in maintaining and enhancing native bird populations.

Definitions and methodologies

- This uses information from two Measures, 2.2.1 (“Distribution and abundance of exotic weeds and pests considered a threat – Pest mammals”) and 5.1.2 (“Demography of widespread animal species – Birds”), assessed at the same points across all public conservation land (Tier One systematic national sampling).
- Possum abundance was calculated using the Trap Catch Index (TCI), following National Possum Control Association protocols. At each location, four 200 m trap lines were set radiating out from the central 20 m × 20 m vegetation plot, with each line having 10 traps at 20 m spacings. Research led to a change in the possum trap catch method from two nights to one night in 2013. Relative abundance for possums was calculated by dividing the number of captured animals by the number of trap-nights, with corrections made to account for factors such as sprung traps and captures of non-target species. We note that possums can and do occur at locations where there were no trapped possums, as evidenced by possum pellets recorded during faecal pellet surveys for ungulates.
- Ungulate abundance was calculated using the Faecal Pellet Index (FPI), by counting faecal pellets along four 150 m pellet lines at each sampling location. Individual pellets for all ungulates (deer and goats combined) were counted in a circle of 1 m radius every 5 m, resulting in 30 circular sub-plots per pellet line. The estimate of relative abundance was the total number of pellets counted per line, averaged across the four lines.
- For the purpose of examining potential relationships between birds and ungulate/possum abundance, possum abundance was classified as low for non-zero TCI values less than 5, and medium for TCI > 5. Similarly, ungulates were classified as low for non-zero FPI values less than 40 and medium for FPI > 40.
- There were a total of 419 woody and 236 non-woody sampling locations where bird, possum and ungulate abundance were measured, with 72% of those having data from all five count stations, 17% from four, 8% from three, 2% from two, and 1% from 1 count station only.
- The bird data are observed counts only and do not therefore account or attempt to correct for non-detection (i.e. a species was present but was not counted).
- In woody ecosystems, there were 168 sampling locations where possum abundance was nil, and ungulate abundance was nil at 66 of these locations, low at 65 and medium at 37. There were 119 sampling locations where possum abundance was low, and ungulate abundance was nil at 28 of these locations, low at 52, and medium at 39. There were 132 sampling locations where possum abundance was medium, and ungulate abundance was nil at 21 of these locations, low at 54, and medium at 57.
- The largest symbol size corresponds to an average count of 7 for native birds and 3.8 for introduced birds. The smallest symbol size corresponds to an average count of 1.1 for native birds and 0.9 for introduced birds.

Where can I find more information (links)

http://www.landcareresearch.co.nz/publications/researchpubs/department_of_conservation_biodiversity_indicators_2013_assessment.pdf