

Summary

1. Unprecedented global human population growth and rapid urbanization of rural and natural lands highlight the urgent need to integrate biodiversity conservation into planning for urban growth. A challenging question for applied ecologists to answer is: *What pattern of urban growth meets future housing demand whilst minimizing impacts on biodiversity?*

2. We quantified the consequences for mammals of meeting future housing demand under different patterns of compact and dispersed urban growth in an urbanizing forested landscape in south-eastern Australia. Using empirical data, we predicted impacts on mammals of urban growth scenarios that varied in housing density (compact versus dispersed) and location of development for four target numbers of new dwellings.

3. We predicted that compact developments (i.e. high-density housing) reduced up to 6% of the area of occupancy or abundance of five of the six mammal species examined. In contrast, dispersed developments (i.e. low-density housing) led to increased mammal abundance overall, although results varied between species: as dwellings increased, the abundance or occurrence of two species increased (up to ~100%), one species showed no change, and three species declined (up to ~39%).

4. Two ground-dwelling mammal species (*Antechinus stuartii*, *Rattus fuscipes*) and a tree-dwelling species (*Petaurus australis*) were predicted to decline considerably under dispersed rather than compact development. The strongest negative effect of dispersed development was for *Petaurus australis* (a species more abundant in forested interiors) which exhibited up to a 39% reduction in abundance due to forest loss and an extended negative edge effect from urban settlements into adjacent forests.

40 5. *Synthesis and applications*. Our findings demonstrate that, when aiming to meet demand
41 for housing, any form of compact development (i.e. high-density housing) has fewer
42 detrimental impacts on forest-dwelling mammals than dispersed development (i.e. low-
43 density housing). This is because compact development concentrates the negative effects of
44 housing into a small area whilst at the same time preserving large expanses of forests and
45 the fauna they sustain. Landscape planning and urban growth policies must consider the
46 trade-off between the intensity of the threat and area of sprawl when aiming to reduce
47 urbanization impacts.

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