

Supplementary material 2 to:

Hanslowe EB, Yackel Adams AA, Nafus NG, Page DA, Bradke DR, Erickson FT, Bailey LT (2022) Chew-cards can accurately index invasive rat densities in Mariana Island forests. *NeoBiota* 74: 29-56. <http://doi.org/10.3897/neobiota.74.80242>

Appendix 2. Density estimator comparison.

We compared three density estimators for rats (*Rattus* spp.) using capture-mark-recapture data from nine grids sampled a total of 11 times in forest habitats on Guam (G1–4) and Rota (R1–5) in the Mariana Islands during June 2018–August 2019. Specifically, for each grid we report: 1) model-averaged Huggins' closed-capture conditional likelihood model abundance estimates (\hat{N} s) divided by effective trapping areas (ETAs) calculated as the grid area plus half of the mean maximum distances moved by rats captured more than once (0.5MMDM; $\hat{N}/\text{ETA}_{0.5\text{MMDM}}$), 2) \hat{N} s divided by ETAs equaling the grid area plus a boundary equal to the full MMDM ($\hat{N}/\text{ETA}_{\text{MMDM}}$), and 3) the model-averaged spatially explicit capture-mark-recapture (SECR) density estimates (SECR \hat{D}) for Rota grids only. We followed the same modeling steps across density estimators for each grid as described in our methods and Supplementary material 1 (e.g., one step for R1–3, two steps for R4–5).

For grids with enough data to test all three density estimators (i.e., Rota grids), SECR models always produced the lowest, most precise estimates of density, and these estimates were always contained within the confidence intervals of the non-spatial estimates. Density estimates produced using the full MMDM buffers, $\hat{N}/\text{ETA}_{\text{MMDM}}$, were closer to SECR \hat{D} s than those obtained using 0.5MMDM (Fig. S1). Accordingly, we reported density estimates using effective trapping areas calculated using the full MMDM ($\hat{N}/\text{ETA}_{\text{MMDM}}$) for Guam grids and used these estimates in our regression analyses used for index calibration.

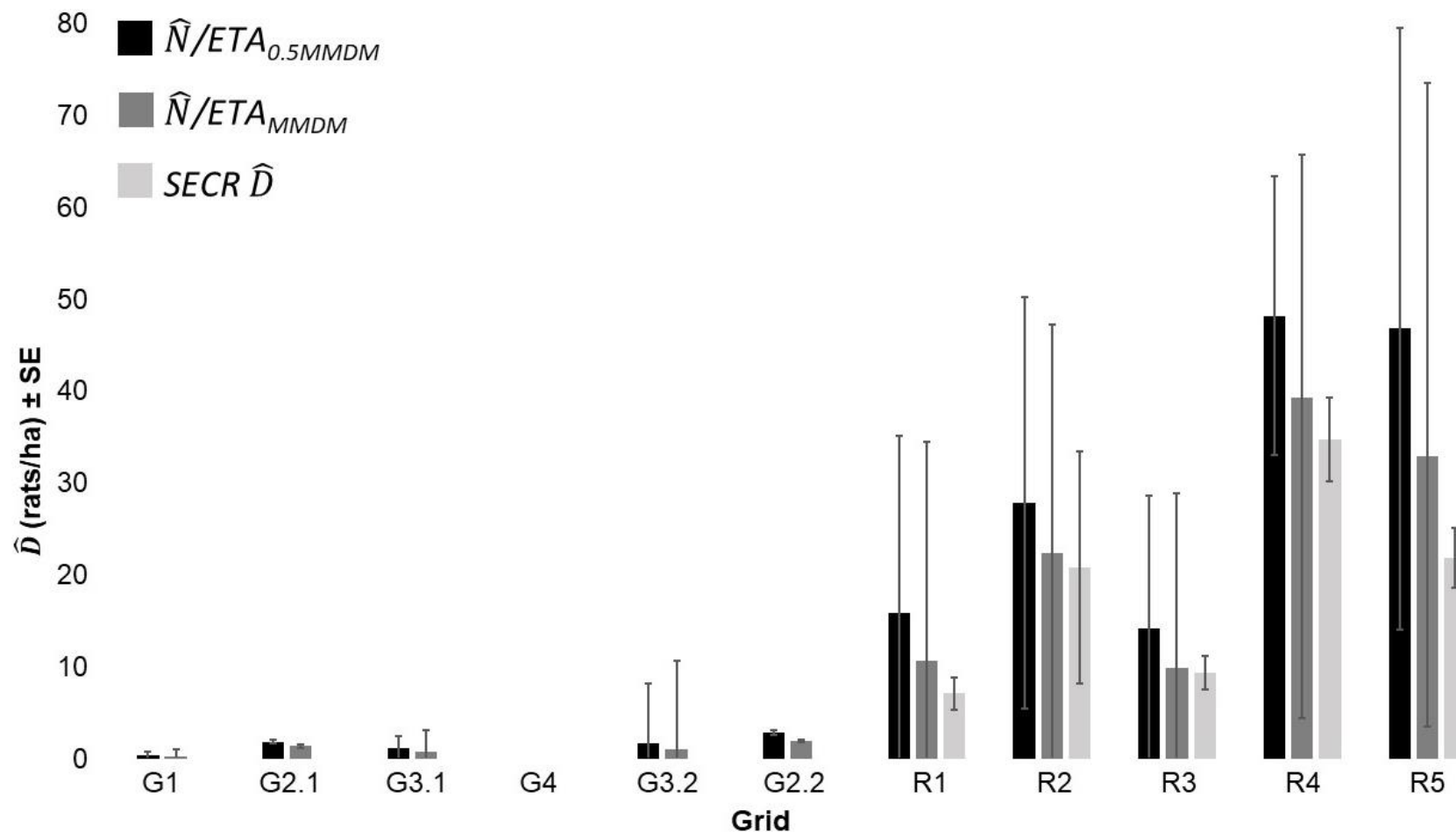


Fig. S1. Comparison of three density estimation approaches for rats (*Rattus* spp.) using capture-mark-recapture data from forest habitats on Guam (G1–4) and Rota (R1–5) in the Mariana Islands during June 2018–August 2019. Black and dark gray bars represent density estimates (\hat{D} s) calculated from model-averaged abundance estimates (\hat{N} s) divided by effective trapping areas (ETAs) calculated by adding boundary strips equaling half of the mean maximum distances moved by rats captured more than once (0.5MMDM) and the full MMDM, respectively. Light gray bars represent \hat{D} s from spatially explicit capture-recapture (SECR) models for sites on Rota only.