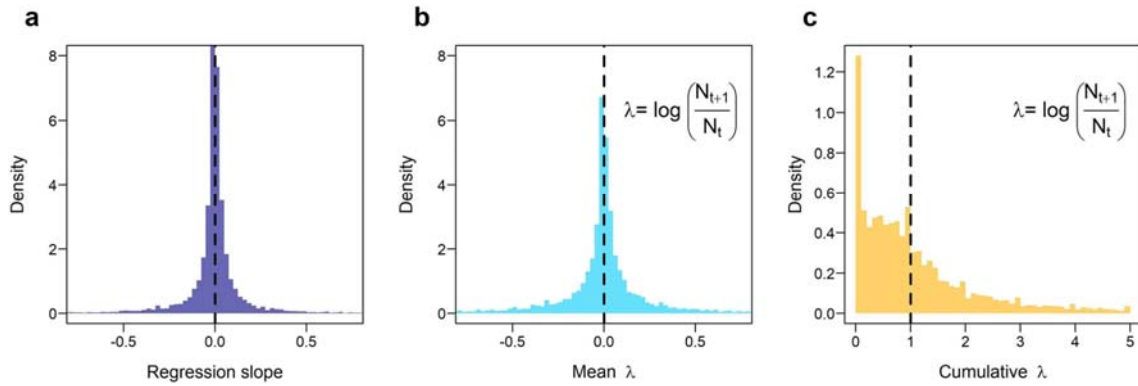


Extended Data Fig. 8: Cumulative population declines can occur in the Living Planet Index even when average population declines are zero.

From: Random population fluctuations bias the Living Planet Index



a, Fitting linear regressions to log₁₀-transformed population time series in the Living Planet Database produces a normal distribution of regression slopes centred on zero, where increases and decreases are equally likely across the 15,348 time series. **b**, Similarly, calculating population changes as the mean of year-on-year changes, $\lambda = \log_{10} \left(\frac{N_{t+1}}{N_t} \right)$, also produces a normal distribution centred on zero, with increases and decreases equally likely. **c**, However, calculating cumulative population changes as the sum of year-on-year changes, $\lambda = \log_{10} \left(\frac{N_{t+1}}{N_t} \right)$, produces a right-skewed distribution (here populations are scaled as in the Living Planet Index, so that starting values are 1). This is because the sum and mean of population changes do not scale proportionally when population trajectories are nonlinear (see discussion in main text).