Figures for: Catastrophes, connectivity, and Allee effects in the design of marine reserve networks

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Fig 2

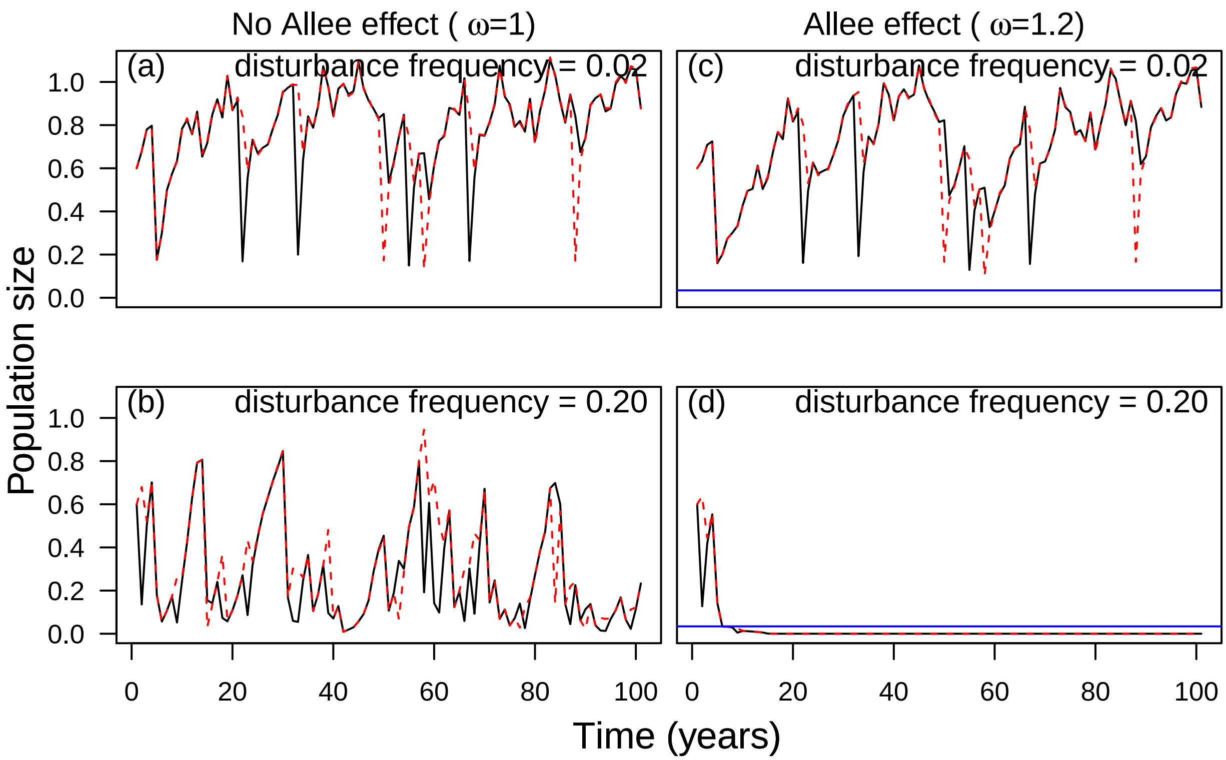

Figure 1: Example two-patch model simulation, each line denotes a different patch. The four panels represent different combinations of disturbance frequency and the presence ($\omega > 1$) or absence of an Allee effect. The horizontal line denotes the Allee threshold. The simulation is with the following model parameters: $r = 2.0$, $K = 1$, $\delta = 0.01$, $\epsilon = 0.5$, and distance between patches of 40.

Fig 3

```
## mapping: x = ~x, y = ~y
## geom_text: na.rm = FALSE
## stat_identity: na.rm = FALSE
## position_identity
```

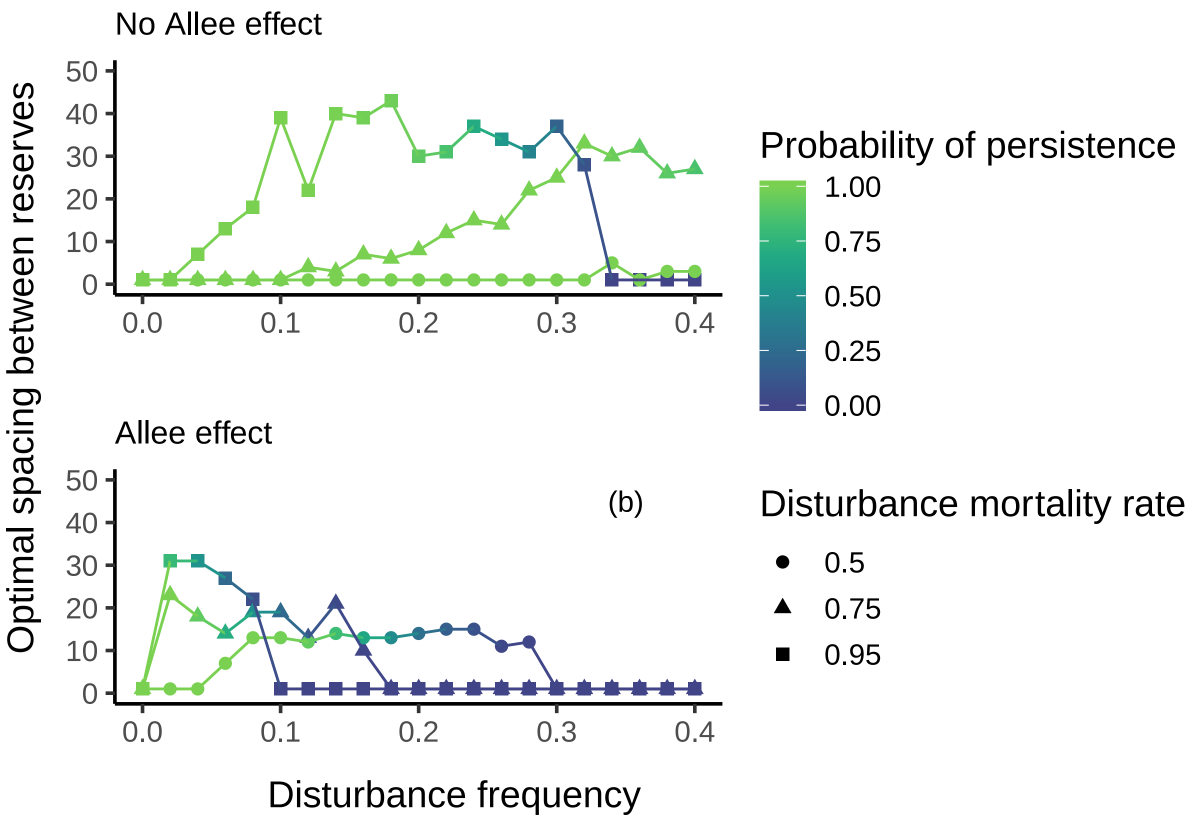

Figure 2: Optimal spacing for different disturbance frequencies and mortality rates. Optimal spacing for the Beverton-Holt model (a) without ($\omega = 1$) and (b) with an Allee effect ($\omega = 1.2$). Each line indicates a different disturbance mortality rate. The color of each point is the fraction of runs where the end population size was non-zero, a measure of persistence. These simulations are with the same model parameters as in Fig. 2.

Fig 4

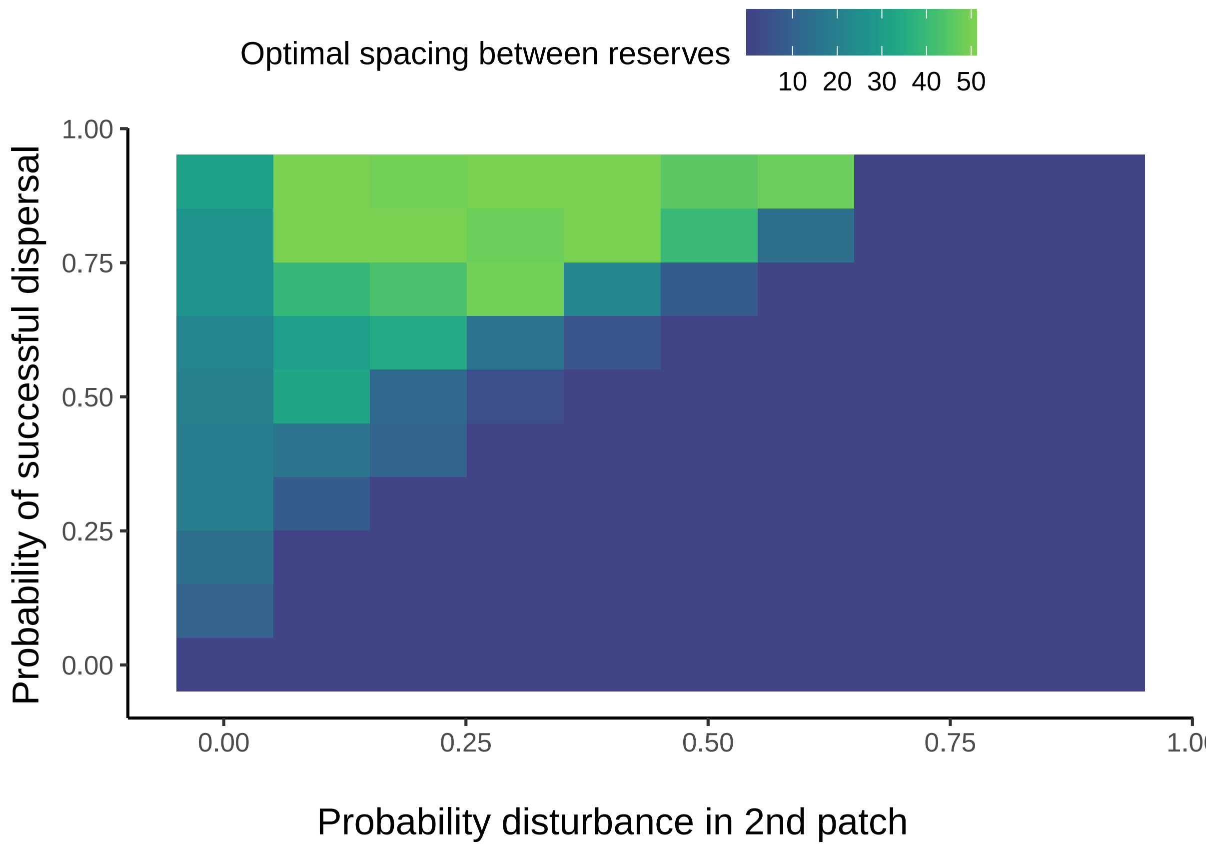

Figure 3: The optimal spacing between reserves for population persistence given different combinations of successful dispersal probability (to a patch 50 units away) and the probability that a disturbance in one patch affects the nearby second patch (at a distance of 50 units away). Simulations here are for a two-patch model (a) without and (b) with an Allee effect and the same parameter values as in figure 2.

Figure 5

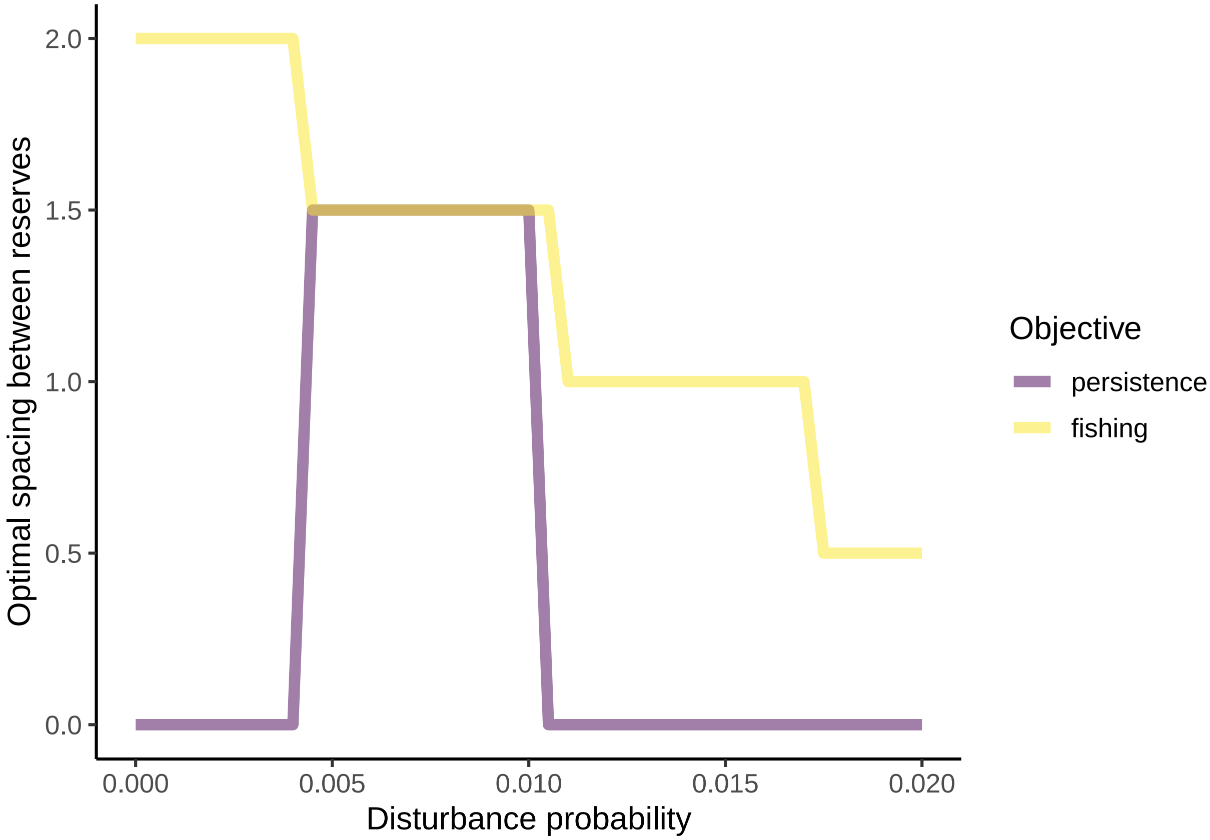

Figure 4: Optimal spacing between reserves (in an n-patch model) versus the probability of disturbance for three different objective functions. The parameter values used are: $\delta = 0.7$, $\omega = 1.2$, r = 3, and $\mu = 0.9$.

Figure 6

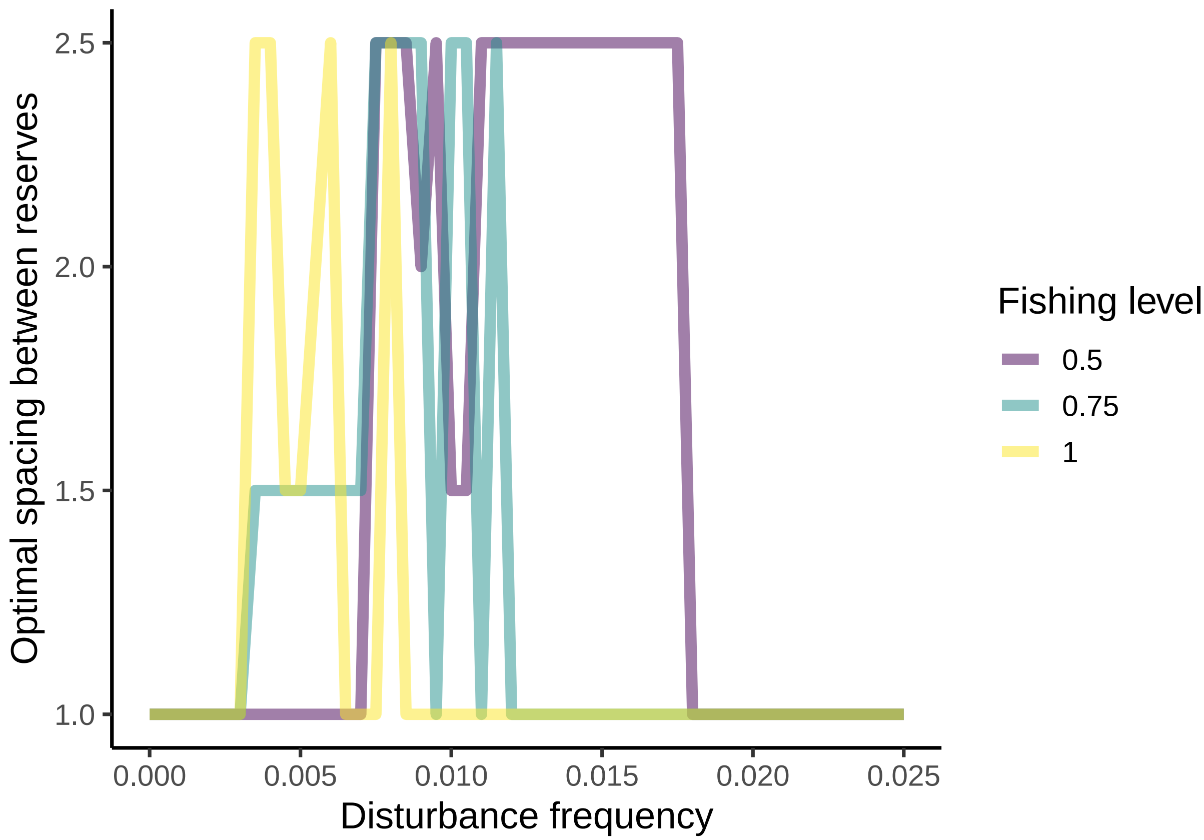

Figure 5: Optimal spacing between reserves (in an n-patch model) to maximize persistence for different disturbance frequencies and fishing levels outside of reserves (fraction of population harvested in each patch). The parameter values used here are: $\delta = 0.7$, $\omega = 1.2$, r = 3, and $\mu = 0.9$.