

Good trap, bad trap: Under what conditions can an ecological trap benefit a population?

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Abstract

Ecological traps are a challenge to conservation, potentially increasing extinction risk. However, not all traps were made equal. We suggest that sites that usually constitute ecological traps may benefit populations of r-selected species. As a model system we investigate the effects of man-made ephemeral pools such as storm-water catchments on the population dynamics of an r-selected amphibian species, and compare it to a k-selected species. Ephemeral pools may act as breeding sites and habitat for adult individuals however they often desiccate too early for tadpole metamorphosis, leading to offspring mortality. We use agent-based simulations over multi-generational timescales to study a range of ecologically-reasonable parameters. We find that the contribution of traps to population viability, thanks to rare years in which their hydro-period suffices for metamorphosis, exceeds the detrimental effects in other years. Counterintuitively, eliminating such potential traps from the environment may reduce the viability of meta-populations and increase extinction risk.

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