



CONTRIBUTED PAPER

Multiple drivers of invasive lionfish culling efficiency in marine protected areas

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Abstract

Designing effective local management for invasive species poses a major challenge for conservation, yet factors affecting intervention success and efficiency are rarely evaluated and incorporated into practice. We coordinated regional efforts by divers to cull invasive lionfish (*Pterois* spp.) on 33 U.S. Atlantic, Gulf of Mexico, and Caribbean protected coral reefs from 2013 to 2019 and estimated removal efficiency and efficacy as a function of environmental and habitat conditions, invasion status, and personnel expertise. Highly experienced individuals culling during crepuscular periods (<2 hr from sunrise/sunset) are three times more efficient (in terms of minutes) than novice divers during mid-day, suggesting: (a) retention of experienced individuals is key for efficient programs, and (b) planning culls with personnel and time of day in mind increases the number of sites covered with the same effort. Lionfish behavior and habitat characteristics had little effect on removal efficiency and efficacy, but divers had higher capture success at reefs with higher lionfish densities. We suggest reefs with persistently <20 fish ha⁻¹ as low priority, given that