

Restoration Strategies are Preventing the Local Extirpation of Two Critically Endangered Coral Species

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The unprecedented marine heatwave of 2023 and 2024 caused widespread coral bleaching and mortality throughout the Caribbean. In the Florida Keys, two foundation species that particularly suffered were the elkhorn coral, *Acropora palmata*, and the staghorn coral, *A. cervicornis* (Lamark, 1816), which have been the primary focus of reef restoration in Florida for decades. Substantial losses of these species occurred in outplanted populations, ocean-based nurseries, and among remnant wild colonies. The near extirpation of these species on Florida's Coral Reef leads to uncertainty over their future in the Florida Keys and their utility as restoration species given the observed trends in climate conditions. However, we posit that the past two decades of restoration activity created a community of experts, a network of ocean-based and land-based coral-rearing infrastructure, and two independent land-based coral gene banks, which prevented regional extirpation and preserved much of the genetic richness of these critically endangered coral species. Without the past decades of effort and the emergency response associated with the 2023 bleaching event, Florida acroporids would largely have been lost. This outcome afforded by the restoration network in Florida demonstrates the value of proactively establishing resources prior to major disturbances. We identified several critical strategies that may be applied in other regions prior to major threats to prevent local extirpation of coral species including: i) extending collaborative restoration efforts to solidify a network of trained experts, ii) establishing trust-focused relationships among management agencies and restoration groups, iii) testing direct interventions to reduce light/temperature stress early during thermal anomalies, iv) developing redundant ocean-based and land-based nurseries, and v) establishing living coral gene banks prior to major threats to prevent the local extirpation of coral species.