**OAR OUTSTANDING SCIENTIFIC PAPER AWARD**

**Nomination and Justification Form**

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**Title of Paper and Journal Citation:**

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| Title: **Geographic differences in vertical connectivity in the Caribbean coral *Montastraea cavernosa* despite high levels of horizontal connectivity at shallow depths**Citation: **X. Serrano,** I. B. Baums, K. O’Reilly, T. B. Smith, R. J. Jones, T. L. Shearer, F. L. D. Nunes and A. C. Baker. 2014. Geographic differences in vertical connectivity in the Caribbean coral *Montastraea cavernosa* despite high levels of horizontal connectivity at shallow depths. *Molecular Ecology* 23 (17): 4226-4240 |

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| **Ocean and Great Lakes** |

**Category of Paper:**

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**Name of Proposed Expert Reviewer:**

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**JUSTIFICATIONS (No word count limit):**

**What are the current citation statistics for the paper? How many times has the paper been cited?**

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| To date, the paper has been cited 20 times (1 in 2014, 11 in 2015 and 8 in 2016). The current impact factor of the journal Molecular Ecology is 5.95 |

**How does the paper relate to other recent work in the field, particularly with regard to originality in approach?**

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| **This is one the first studies aimed at examining the genetic relationship between shallow and deep reefs in the Caribbean region.** It used some of the latest genetic tools to assess the degree to which deep-water coral communities (20-40 m) in the Florida Keys (within the Upper Keys, Lower Keys and Dry Tortugas), Bermuda, and the U.S. Virgin Islands can act as important sources of larval replenishment for nearby shallow-water reefs (<10 m) that have been devastated by climate change-related episodes of coral reef bleaching and other direct anthropogenic influences. In addition, this study represents the most comprehensive genetic analysis for the reef-building coral *Montastraea cavernosa* to date. Surprisingly, findings revealed that shallow reef corals in the Caribbean region are more closely related to their shallow-water counterparts over a thousand miles away than they are to deep-water corals on the same reef. Furthermore, findings also demonstrated for the first time the presence of two coral populations separated by depth in Florida. The depth at which these coral populations interact varied among regions, suggesting that while some sites might be able to recover via larval supply from nearby deep reefs (e.g., Dry Tortugas), other locations (e.g., Lower Keys) might be unable to recover from their deep-water counterparts and will have to rely on the supply of larvae from distant deep reefs. |

**What is the evidence or likelihood that the paper will have an important and enduring impact on progress in its field?**

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| Corals throughout the Caribbean region are in decline due to a variety of local and global stressors, including climate change, disease, pollution, and overfishing. Because coral reproduction is energetically costly, any physiological stress can alter the reproductive output, quality of gametes and larvae produced, and the potential for post-settlement success. As such, understanding a coral population’s reproductive potential will help elucidate the population’s ability to sustain itself or nearby populations. Furthermore, the degree of connectivity among populations is particularly important for managers because it can reveal if a population produces excess larvae (source) or relies on the import of larval recruits (sink) for recovery. On the other hand, the lack of understanding of the reproductive potential and connectivity of corals hinders our ability to effectively manage these resources. For example, in this study, we reveal that in the case of the Florida Keys, we need to do all we can to protect its shallow water corals, as we cannot rely on deeper reefs to help out in this time of crisis. That means protecting Florida's corals may require efforts to boost reef conservation throughout the Caribbean. These results are in agreement with findings published this year (2016) by the same authors for another widespread Caribbean coral species (the mustard hill coral *Porites astreoides*) despite the fact that the two coral species reproduce in different ways. These findings recently caught the attention of the local media and have been featured in the news:<http://www.rsmas.miami.edu/news-events/press-releases/2016/um-researchers-found-shallow-water-corals-in-florida-are-not-related-to-the/><http://wlrn.org/post/floridas-coral-getting-help-hundreds-miles-away> |

**What is the relevance of the paper to NOAA missions in terms of applied research contribution or the value of contribution in terms of pure research?**

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| Results from this study directly align with NOAA’s mission “To conserve and manage coastal and marine ecosystems and resources”. Overall, results can help determine whether reef coral populations have the potential to recover over short (vertical) distances, rather than long (horizontal) distances. These findings can translate into alternative management strategies designed to maximize reef recovery, with implications for Marine Protected Area (MPA) design and coral reef restoration activities. Findings can also be used to ensure that potential deeper sources of larval recruits are adequately protected, preventing further habitat loss and degradation. Finally, this information will contribute to develop a set of hypotheses that might be easily tested at a number of other sites in the U.S. and wider Caribbean, and can be used for a variety of scientific uses, such as improving existing mathematical models that predict connectivity between coral reefs in the Caribbean region. |