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Photo identification: a critical tool for monitoring and understanding manta ray populations in Raja Ampat, West Papua

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Abstract

Despite their iconic megafauna status and importance to the global tourism economy, both species of manta ray (*Mobula alfredi*, *Mobula birostris*) are considered internationally threatened (Lewis et al., 2015, Anderson et al., 2011, Cisneros-Montemayor et al., 2013), primarily due to the high demand for their gill rakers in traditional medicine markets. Population declines have been reported in multiple locations and the conservation of remaining populations is now of critical importance (Ward-Paige et al., 2013, Rohner et al., 2013). Effective management and protection at a regional and global level requires an in-depth understanding of the size, structure and dynamics of manta populations. Long-term photo identification databases have proved to be a vital tool for understanding and monitoring regional and global manta ray populations, and form a solid foundation for further research and the development of management and conservation strategies.

Indonesia's Raja Ampat archipelago is one of the few places in the world where both reef (*M. alfredi*) and giant (*M. birostris*) manta rays can be reliably encountered. It is a critical habitat for these threatened species and provides an excellent opportunity to gain further insight into their biology and ecology. Photo identification catalogues dating back to 2009 have identified ~ 675 *M. alfredi* and ~ 220 *M. birostris* individuals in the region and have provided valuable insight into population size and structure, seasonality, residency and movement patterns. We present an overview of what we have learned so far and demonstrate the important role citizen science can play in collecting long-term data of this nature in the development and refinement of efficient management and conservation strategies for Raja Ampat's manta ray populations.

Keywords: manta ray, photo-identification, Raja Ampat, West Papua, population demographics, movement, citizen science.

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