

The Age of Plastics meets the Age of Invasions?: How Tsunamigenic Megarafting, Coastal Development, and Climate Change may all relate to a new Ocean Vector

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The 2011 Great Japan Earthquake generated a massive tsunami that launched an extraordinary transoceanic biological rafting event with no known historical precedent. More than 400 living species of Japanese marine animals and plants were transported to North America and Hawai'i over a 7 year period on drifting objects that traveled many 1000s of kilometers across the North Pacific Ocean. As of April 2018 Japanese tsunami marine debris with living species continued to arrive in North America. We suggest that the astonishing multi-year survival of coastal species at sea, also never before documented, is sustained by the modern-day non-biodegradable nature of these rafts, which sets anthropogenic-based ocean dispersal in clear contrast to historical processes. Plastic availability and use increased vastly in the last half of the 20th century at the same time as growing shoreline infrastructure poised these plastics at the land-sea interface. In turn, amplified storm activity due to human-mediated climate change will serve to sweep these plastics in unprecedented quantity into the sea. This expanded plastisphere may provide greater rafting opportunities for invasive species.