Rapidly spreading seagrass invades the Caribbean with unknown ecological consequences

The non-native seagrass *Halophila stipulacea* has spread rapidly throughout the Caribbean Sea (Willette et al. 2014); without additional research, the ecological ramifications of this invasion are difficult to predict. Diversification, connectivity of marine ecosystems, and recovery of degraded coral reefs could all be affected. The invasive seagrass, native to the Red Sea and Indian Ocean, has taken over invertebrates in the Caribbean (Jun Bando 2006), thereby reducing erosion of nearby coastal shorelines due to habitat preferences of the native Mediterranean seagrasses is minimal to absent due to habitat preferences. *H. stipulacea* grows deeper, bare sand habitats and over submerged dead mats of native seagrass (*Sghaier et al. 2011*). The only other known invasive seagrass species, *Zostera japonica*, has displaced a native seagrass at some locations off the coast of the Pacific Northwest (Jun Bando 2006). Experimental introduction of *Z. japonica* to bare mud flats increased the density and number of animal species observed therein (Posey 1988). Sediment disturbance, such as the excavation of underwater substrate by storms, provides an advantage to both these fast-growing invaders over their native counterparts (Jun Bando 2006; Willette and Ambrose 2012).

In the Caribbean, *H. stipulacea* could stabilize previously unvegetated sand bottoms, thereby reducing erosion of nearby coastal shorelines during storm events, which are expected to become more frequent and stronger under a changing climate. Improved understanding of the potential effects of this invasive seagrass in the Caribbean requires more
data on herbivory rates, selective feeding, and relative nutritional values of the native and introduced species. For example, the proximity of seagrasses, mangroves, and coral reefs in the Caribbean supports high levels of fish biomass and diversity (Nagelkerken et al. 2001), which could decline if the invasive seagrass reduces the extent of native seagrasses, if native seagrasses are preferred by herbivorous fish, or if native seagrasses provide superior nutrition.

Recovery of degraded coral reefs (Jackson et al. 2014) could be either hindered or promoted indirectly by the spread of this invasive seagrass, depending on its effects on the abundance and diversity of herbivorous fish and sea urchins that, by feeding on algae, open up substrate for coral recruitment and growth. Preliminary data from experimental fish traps placed in seagrass beds dominated either by H. stipulacea or by S. filiforme showed the former had larger individual fish, fewer juvenile fish, and more fish species (Willette and Ambrose 2012). Notably, few herbivorous fish were caught in traps within either of these seagrass beds. Moreover, a significantly greater abundance of epibiotic (surface-attached) organisms – particularly members of the Crustacea, many of which serve as important prey species for fish – was associated with the invasive seagrass (Willette and Ambrose 2012). More data are needed on the role of H. stipulacea beds as nurseries and foraging areas for parrotfish, green sea turtles, sea urchins, and other herbivores.

Further research is also required to determine whether positive effects of the spread of this seagrass outweigh the negatives and what, if any, management actions should be taken. Given the rapid spread of H. stipulacea, only weekly monitoring of bays and removal of the invasive would keep it from getting a foothold. Physical removal of the seagrass after it has become established, however, would likely not be feasible due to logistic and monetary constraints.

H. stipulacea now joins a growing list of habitat-altering species, including the Indo-Pacific lionfish (Pterois volitans), invading the Caribbean.

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doi:10.1890/14.WB.016