

Strong ocean currents connect geographic regions

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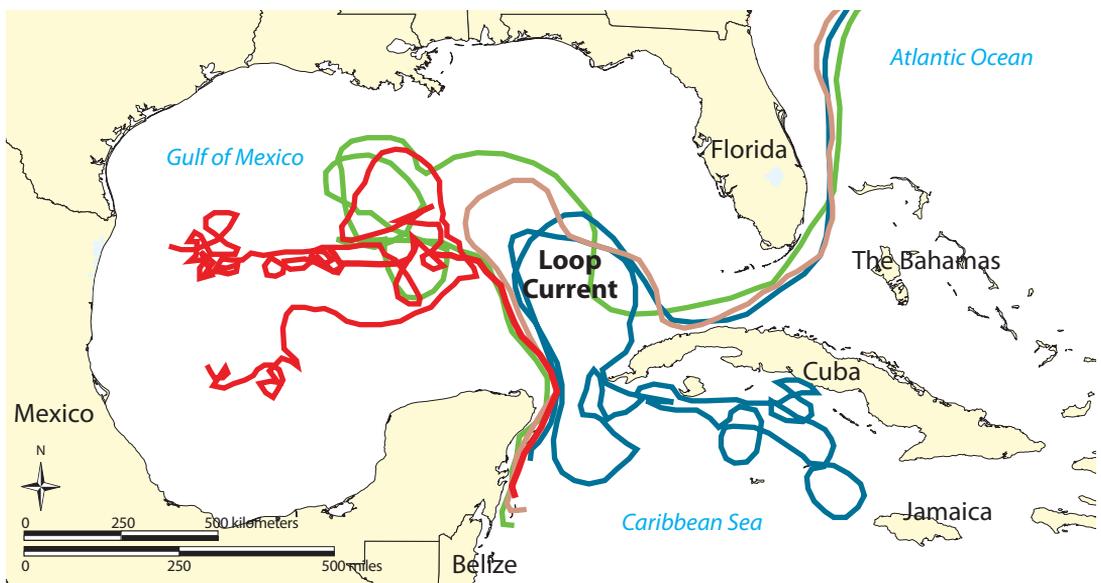
Strong ocean currents connect south Florida with upstream waters of the western Caribbean Sea and the Gulf of Mexico. In particular, the Caribbean Current, emanating from the Caribbean Sea and flowing north past the Yucatán Peninsula, and the Loop Current in the Gulf of Mexico provide a rapid conduit for transport of materials from the Caribbean Sea, Mexico, and Belize into the coastal zones of northern Cuba, south Florida, and the Bahamas.

Planktonic larvae are dispersed by ocean currents. Thus, ocean currents between geographically separated reefs and marine habitats provide a means of biological connectivity between regional populations. This feature may have a direct influence on the ability of an ecosystem to recover from disturbances. For this reason, Marine Protected

Areas should be strategically placed to maximize connectivity and protect biodiversity.

Dispersal of larvae can be simulated by computer models. At present, models are mainly useful in providing generalities and generating hypotheses. Studies of individual larval behavior, the ability of larvae to move up and down in the water column, and detailed life histories are required to produce more accurate simulations of population connectivity.

Currents also have the potential to carry pollutants, nutrients, diseases, and other stressors downstream to coral reef communities and other habitats. Cooperation between neighboring countries and an improved understanding of how external stressors degrade local marine resources are required to reduce negative impacts from upstream sources.



Trajectories of surface drifters deployed in March 2006 just east of the Yucatán Peninsula in Mexico show the complexity of regional currents. One drifter (red) became entrained in eddies in the western Gulf of Mexico and remained there. One (green) became entrained in eddies for a time and then joined the Loop Current and exited the Gulf of Mexico through the Florida Straits. One (orange) took a straightforward trip via the Loop Current, through the Florida Straits, and off to the North Atlantic. One (blue) meandered south of Cuba for several months before rejoining the Loop Current and rapidly exiting the area.