The Kuroshio Extension Current Bifurcation Region: A pelagic hotspot for juvenile loggerhead sea turtles

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Abstract

Satellite telemetry of 43 juvenile loggerhead sea turtles (*Caretta caretta*) in the western North Pacific together with satellite-remotely sensed oceanographic data identified the Kuroshio Extension Current Bifurcation Region (KECBR) as a forage hotspot for these turtles. In the KECBR juvenile loggerheads resided in Kuroshio Extension Current (KEC) meanders and the associated anti-cyclonic (warm core) and cyclonic (cold core) eddies during the fall, winter, and spring when the KEC water contains high surface chlorophyll. Turtles often remained at a specific feature for several months. However, in the summer when the KEC waters become vertically stratified and surface chlorophyll levels are low, the turtles moved north up to 600 km from the main axis of KEC to the Transition Zone Chlorophyll Front (TZCF).

In some instances, the loggerheads swam against geostrophic currents, and seasonally all turtles moved north and south across the strong zonal flow. Loggerhead turtles traveling westward in the KECBR had their directed westward movement reduced 50% by the opposing current, while those traveling eastward exhibited an increase in directed zonal movement. It appears, therefore, that these relatively weak-swimming juvenile loggerheads are not passive drifters in a major ocean current but are able to move east, west, north, and south through this very energetic and complex habitat.

These results indicate that oceanic regions, specifically the KECBR, represent an important juvenile forage habitat for this threatened species. Interannual and decadal changes in productivity of the KECBR may be important to the species' population dynamics. Further, conservation efforts should focus on identifying and reducing threats to the survival of loggerhead turtles in the KECBR.

Keywords: loggerhead turtle, Transition Zone Chlorophyll Front, Kuroshio Extension Current Bifurcation Region, satellite altimetry, tagging, nursery grounds habitat, geostrophic flow