Shipping intensity

Data used to produce the map on shipping intensity originate from the work of Halpern et al. 2008. "A Global Map of Human Impact on Marine Ecosystems". Science 319: 948-952 – which represents an ecosystem-specific, multi-scale spatial model that synthesizes 17 global data sets of anthropogenic drivers of ecological change for 14 distinct marine ecosystems.

All open-access data layers used for this global analysis are available for download from the project website: http://www.nceas.ucsb.edu/globalmarine

A detailed description of the methods used is available in the “Supplementary Online Material” for the 2008 Science paper at: http://www.sciencemag.org/content/319/5865/948/suppl/DC1

The main purpose with the map on shipping it to provide a general overview of the main shipping lanes. The original data used are for 12 months beginning in October 2004 (collected as part of the World Meteorological Organization Voluntary Observing Ships Scheme; http://www.vos.noaa.gov/vos_scheme.shtml) as that year had the most ships with vetted protocols and so provides the most representative estimate of global ship locations.

The data include unique identifier codes for ships (mobile or a single datum) and stationary buoys and oil platforms (multiple data at a fixed location). All stationary and single point ship data was removed, leaving 1,189,127 mobile ship data points from a total of 3,374 commercial and research vessels, representing roughly 11% of the 30,851 merchant ships >1000 gross tonnage at sea in 2005. All mobile ship data points were connected to create ship tracks, under the assumption that ships travel in straight lines. Any tracks that crossed land were removed, and the remaining 799,853 line segments were buffered to be 1 km wide to account for the width of shipping lanes. These buffered line segments were summed to account for overlapping ship tracks, and converted to raster data. This produced 1 km2 raster cells with values ranging from 0 to 1,158, the maximum number of ship tracks recorded in a single 1 km2 cell at global level.

For the Wider Caribbean Region, the maximum number of ship tracks recorded in a single 1km2 cell is 184 (high).

Because the VOS program is voluntary, much commercial shipping traffic is not captured by these data. The estimate of the impact of shipping is therefore biased (in an unknown way) to locations and types of ships engaged in the program. In particular, high traffic locations may be strongly underestimated, although the relative impact on these areas versus low-traffic areas appears to be well-captured by the available data, and areas identified as without shipping may actually have low levels of ship traffic. Furthermore, because ships report their location with varying distance between signals, ship tracks are estimates of the actual shipping route taken.