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The footprint of ship anchoring on the seafloor

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With the SARS-CoV-2 coronavirus came what media has deemed the “port congestion pandemic”. Since it began, thousands of ships have been reported waiting outside heavily congested ports relying on anchoring gear to hold fast. While the shipping industry is known to contribute to air, water and noise pollution, the physical impact of shipping practices, such as anchor use on the seafloor, has received much less attention. With a regional survey using high-resolution (1 m) bathymetry data of a comparatively low congestion port in New Zealand-Aotearoa, we demonstrate that high-tonnage ship anchors excavate the seabed by up to 80 cm and the associated impacts are preserved for at least 4 years. This is the first characterisation of the intensity and extent of damage to the seafloor and benthic environment caused by high-tonnage ship anchoring. We demonstrate that the observed seabed damage is attributed to high-tonnage passenger and cargo vessels. Anchor use in port regions has significantly changed the structure of the seafloor, with downstream impacts on benthic habitats and ecosystem functions. Extrapolating these findings to a global scale, we estimate that between 6,000 and 20,000 km² of coastal seafloor is adversely affected. With the predicted increase in global marine traffic, a less destructive method of managing high-tonnage vessels awaiting port calls is necessary to mitigate the impact of maritime activities on chemically and biologically important shallow marine environments.