L145-146, “developed a one dimensional coastline” is unclear, do you mean you just examined abundance as a function of latitude?  What are the units on the one dimensional coastline?

Response: The kernel smoothed distribution of otters is in units of kilometers. We used a simplified or one-dimensional shoreline because the nearshore bathymetry off the Olympic coast is not high enough resolution to generate an accurate two-dimensional region. In addition, a one dimensional coastline is a reasonable approximation owing to the high rugosity of the shoreline (i.e., otters likely follow a straight line across fined grained embayments rather than hugging the exact shoreline). We provide references to other papers that have constructed linear shorelines for these waters as well. (Shelton et al. 2017 J. of Ecol.)

Paragraph in question

To estimate trends in sea otter abundance at each focal site, we developed a kernel-smoothed distribution of otters along the a “one-dimensional” coast to incorporate uncertainty about how snapshot surveys translate to effective numbers of otters present at a given site. Using Esri ArcGIS, we created the “one-dimensional” coast by head-up digitizing a simplified or reduced resolution shoreline polyline that generally stayed within 2 km of shore and depths < 20 m (bathymetry based on Grothe et al. 2010 and Taylor et al. 2008). We then divided that shoreline polyline into ~20,000, 10 m long segments and determined which 10 m segment was nearest to each of the sea otter survey points. This identified the approximate position of each observed sea otter along the entire length of the Olympic Peninsula coastline. We generated a smooth density of otters (units: km) along the coastline using kernel density estimates, which approximate the observed otter data using a mixture of Gaussian (Normal) distributions. Specifically, we placed a Gaussian distribution centered at each observed sea otter location with a standard deviation *h* (the bandwidth) that corresponds to the estimated sea otter home-range size of 40 km for the Washington coast (*h* = 10.2; Laidre et al. 2009, their Fig. 3). After calculating the kernel probability density, we calculated the proportion of the total sea otter population that was present within a radius of 10 km of each focal site by integrating the probability density and multiplying by the total sea otter population. Due to uncertainty in the effective home range size of sea otters, we used sensitivity analyses with a range of bandwidths (*h* = 5 and 15). The qualitative pattern of results did not change with alternate bandwidths.

Refs Cited

Grothe, PR, LA Taylor, BW Eakins, KS Carignan, RR Warnken, E Lim & RJ Caldwell (2010) Digital Elevation Model of Taholah, Washington: Procedures, Data Sources and Analysis. NOAA Tech. Memo. Boulder, CO, United States Department of Commerce: 30.

Taylor, LA, BW Eakins, KS Carignan, RR Warnken, T Sazonova & DC Schoolcraft (2008) Digital Elevation Model of La Push, Washington: Procedures, Data Sources and Analysis. NOAA Tech. Memo. Boulder, CO, United States Department of Commerce:31.