

Supplemental Material.

Text S1. Methodology for aging snapper and shark species.

Fish lengths were converted to TL for age classification. For lane snapper (SEDAR 2016) and red snapper (SEDAR 2018), we used the length conversions from the species' stock assessment. Age classes of lane snapper were defined based on a Bermuda study that measured numerous juveniles (Luckhurst et al. 2000), which were not well described elsewhere. Based on Luckhurst et al. (2000), we defined age-0 lane snapper as those < 199 mm TL and age-1 or greater were \geq 199 mm TL. Because only 0.01% of red snapper captured were post-settlement juveniles (< 50 mm TL) (Gallaway et al. 2009), we discarded them from analyses. Red snapper < 172 mm TL have mostly been found in open habitats, whereas the majority of those \geq 172 mm inhabit reef habitats (Szedlmayer & Lee 2004). This threshold is also supported by Powers et al. (2018), who found age-0 red snapper were \leq 170 mm, age-1 were 175–297 mm, and age-2 = 320–360 mm TL. Therefore, we categorized red snapper as age-0 = 51–172 mm TL ($n = 25,528$) and age-1 = 173–300 mm TL ($n = 5,670$). Larger individuals were not included.

Sharks were primarily measured by natural total length (nat TL), and FL measures were converted to nat TL using equations derived from MSLABS-BL data. The conversion equations were: Atlantic sharpnose, nat TL (mm) = $57.308 + 1.118$ (FL mm), $r^2 = 0.95$, $n = 5,873$; blacktip shark, nat TL (mm) = $44.129 + 1.162$ (FL mm), $r^2 = 0.95$, $n = 1,215$; spinner shark: nat TL (mm) = $25.811 + 1.170$ (FL mm), $r^2 = 0.97$, $n = 1,341$. To classify sharks into life stages, we investigated the literature on length-age class associations. For Atlantic sharpnose shark, the classifications used by Drymon et al. (2012) and Hoffmayer and Parsons (2003) were used as: young-of-year = 330–590 mm nat TL, juvenile = 600–840 mm nat TL, and adults \geq 850 mm nat TL. We defined blacktip shark young-of-year using the maximum of 660 mm nat TL recorded near Florida (Castro 1996). To distinguish juveniles from adults, adults were classified as those \geq 1,407 mm nat TL. This is the median length reported for female blacktip sharks at maturity (Carlson et al. 2006). Carlson et al. (2006) showed male median length at maturity was slightly lower (1,246 mm TL); therefore, our estimate is likely to be slightly biased towards juveniles rather than adults. However, not all sharks were sexed, so more detailed discrimination between sexes was not possible. Based on Carlson and Baremore (2005), we defined those spinner shark < 70 cm as young-of-year, 70–116 cm as juvenile, and those > 116 cm as adults.

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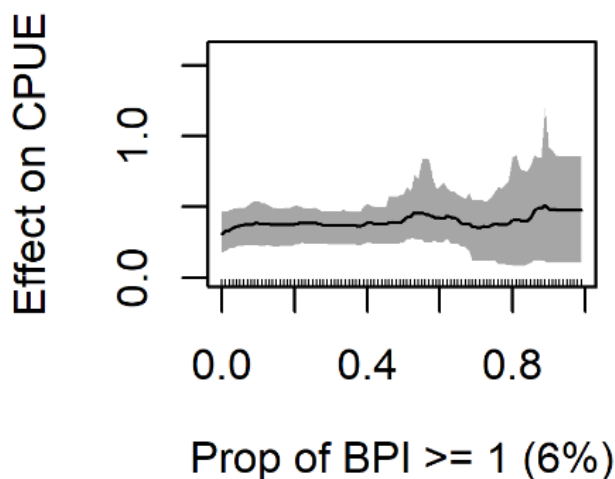


Figure S1. Age-0 red snapper partial dependence plot of the effect of a positive bathymetric position index.