



Updated Biomass Estimates of CSNA

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Farallon Institute has updated biomass estimates of the central stock of northern anchovy (CSNA) from the CalCOFI ichthyoplankton-based model (i.e., MacCall et al. 2016, Thayer et al. 2017), as new CalCOFI data have become available. We report on estimates for 2015- 2017.

Previous estimation methods utilizing mean density over the CalCOFI area (e.g., Fissel et al. 2011) revealed a hyperstability bias because of the nearshore concentration of CalCOFI stations and the tendency of the anchovy population to contract into this area when abundances are low (MacCall et al. 2016). Another hyperstability bias is revealed by utilizing stations that are not part of the entire CalCOFI time-series, from 1951-present, e.g., using the SCCOOS stations introduced in the mid 2000s.

Our current method weights sample egg and larval densities to the local area represented by that sample, and then sums each contribution to obtain total egg or larval abundance. Here, we develop total egg and larval abundance estimates for winter (January) and spring (April) surveys, form a combined index, and calibrate it to the absolute biomass estimates produced by the Daily Egg Production Method (DEPM) from the early 1980s (MacCall et al. 2016).

Spatially, the core CalCOFI survey covers primarily the Southern California Bight, which is the population center of the CSNA, and accounts for the upper water column, but does not sample extensively inshore. The inner-most standard CalCOFI stations, however, are used to scale all the way to shore (Davison et al. 2017). The DEPM estimates span CalCOFI line 60 (off Pt. Reyes, California) to CalCOFI line 110 (at Bahia del Rosario, Baja California, Mexico; Lasker 1985, Bindman 1986), allowing the core survey results to be scaled up to population biomass (Methot et al. 1989, Jacobson et al. 1994). Therefore, the anchovy biomass estimates from this method are calibrated to represent both nearshore and northern Baja regions.

The CalCOFI-based spawning biomass in 2015 was updated from values presented in Thayer et al. (2017). The new estimate is ~92,000 mt, with reasonable precision (CV = 0.14; Table 1). Biomass for 2017 (only spring data available) was estimated at 1,169,400 mt (CV = 0.36). This is the first time in 11 years that the biomass has been higher than the long-term mean of ~500,000 mt (MacCall et al. 2016). Before this, 2016 represented the first time in 8 years that biomass was estimated to be higher than 100,000 mt (Thayer et al. 2017).

Table 1. CSNA biomass estimates for recent years.

Year	Biomass (Kmt)	CV	SE
2015	92.1	0.14	12.9
2016	153.2	0.95	144.8
2017	1169.4	0.36	421.4

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