

CDFW–CWPA COASTAL PELAGIC SPECIES AERIAL SURVEY AUGUST 2017 SURVEY RESULTS

The California Department of Fish and Wildlife (CDFW) and the California Wetfish Producers Association (CWPA) have conducted nearshore aerial surveys off the California coast for coastal pelagic species (CPS), specifically Pacific Sardine (Sardine) since 2012 and Central Subpopulation of Northern Anchovy (Anchovy) since 2013 (Lynn et al. 2017). The survey work was conducted within the Southern California Bight (SCB) during the first five years. The survey underwent a Pacific Fishery Management Council (PFMC) methodology review in April 2017 (PFMC 2017). The Science and Statistical Committee (SSC) conditionally approved the survey protocol for use in management (described as “Project 1”), and recommended a focus on providing nearshore biomass estimates of sardine and anchovy shoreward of the area represented by acoustic-trawl method (ATM) survey estimates.

The CDFW and CWPA extended the CPS aerial survey from Southern California to north of Point Conception in August 2017. This survey was intended to sample nearshore coastal areas corresponding to offshore transects of the summer National Oceanic and Atmospheric Administration (NOAA) ATM survey conducted at the same time. The survey period was scheduled to coincide with the southernmost extent of the ATM as it proceeded south from Vancouver, British Columbia.

Surveys were flown on 3, 4 and 10 August, covering coastal areas from just south of Point Arena to just north of Morro Bay (Figure 1). The survey estimated 67,684 metric tons (mt) of Anchovy and 18,118 mt of Sardine were observed (Figures 2 and 3). Weather conditions precluded a survey on 9 August, but were sufficient for aerial spotting to direct F/V *Trionfo* to collect samples from an Anchovy school within Half Moon Bay estimated at approximately 100 tons (Figure 4). Two five-gallon buckets of fish were collected from the haul and a 25-fish sample was analyzed for biological data (Figure 5). Sample lengths ranged from 119-137 mm (mean = 126.2, SE = 1.03) and sample weights from 19.5-30.5 g (mean = 24.3, SE = 0.61). Ages ranged from 1-5 years (mean = 3.2, SE = 0.20).

As with previous surveys, these are minimum estimates of biomass for the area the Survey covered. These are visual surveys limited to depths less than 10 m, and conducted in daytime when many CPS in California are found in deeper waters. In addition, this survey covered a fraction of the respective ranges of the Pacific Sardine northern subpopulation and Anchovy stocks. However, the observed CPS from the Survey are exclusive of those observed by the ATM survey conducted at the same time offshore, as the area surveyed was shoreward of and shallower than the ATM transects (PFMC 2017). These estimates represent significant biomass in nearshore areas compared to offshore estimates from the 2017 ATM survey for both Sardine (ATM estimate = 36,

644 mt, Hill et al. 2018) and Anchovy (preliminary ATM estimate ~ 180,000 mt, Demer et al 2018). Potential biomass for these stocks outside of ATM surveys are a continuing concern, and can be addressed by aerial and possibly acoustic surveys covering nearshore waters.

A collaborative nearshore research survey effort for summer 2018 within the SCB involving CDFW, CWPA, and NOAA personnel will validate aerial observer tonnage estimates and species identifications, and will use multiple observers to examine observer variability (PFMC 2018). Additional aerial surveys are planned for spring and summer/fall 2018 within the SCB, and as far as possible in areas north of Point Conception, to collect additional nearshore biomass information for Sardine and Anchovy.

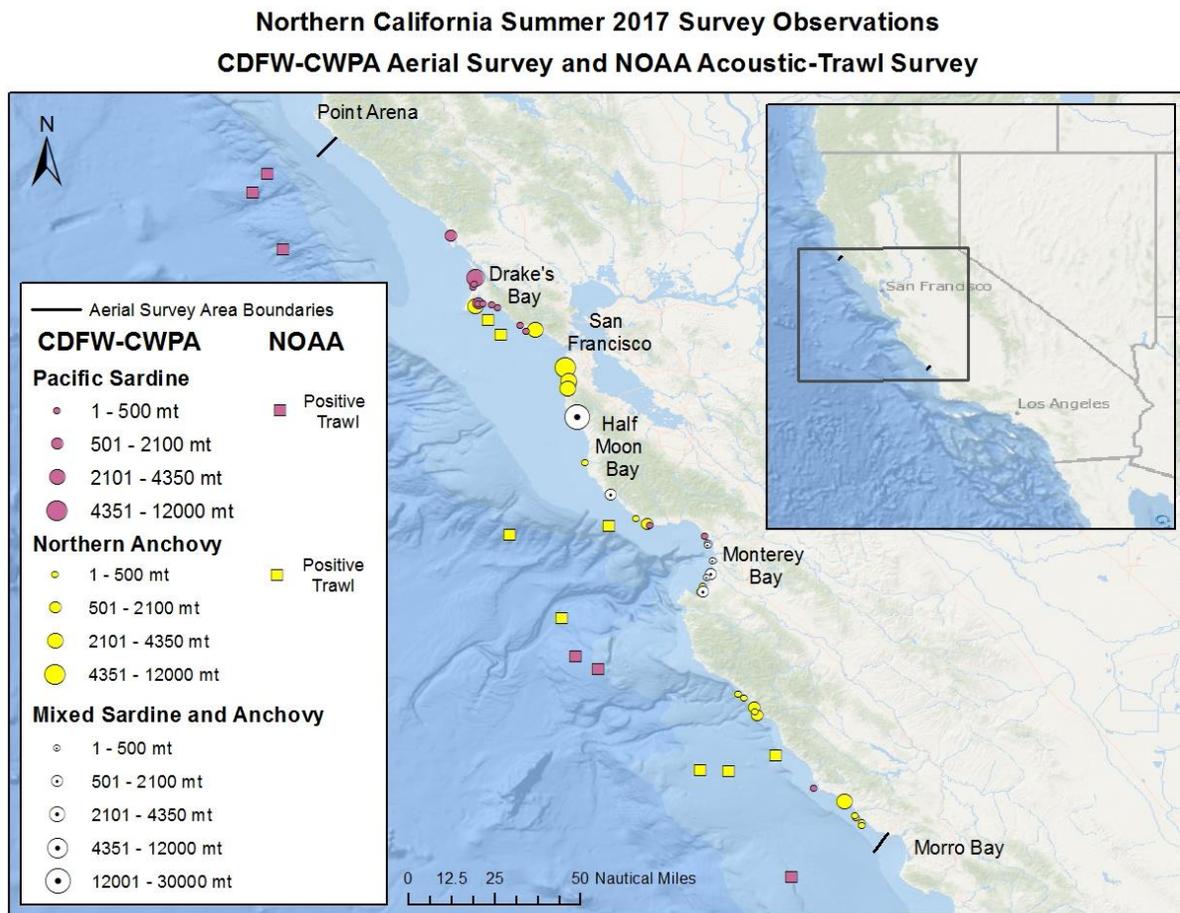


Figure 1. August 2017 CDFW aerial survey observations within 1.3 nautical miles of shore and offshore NOAA ATM trawl catch of Sardine and Anchovy.

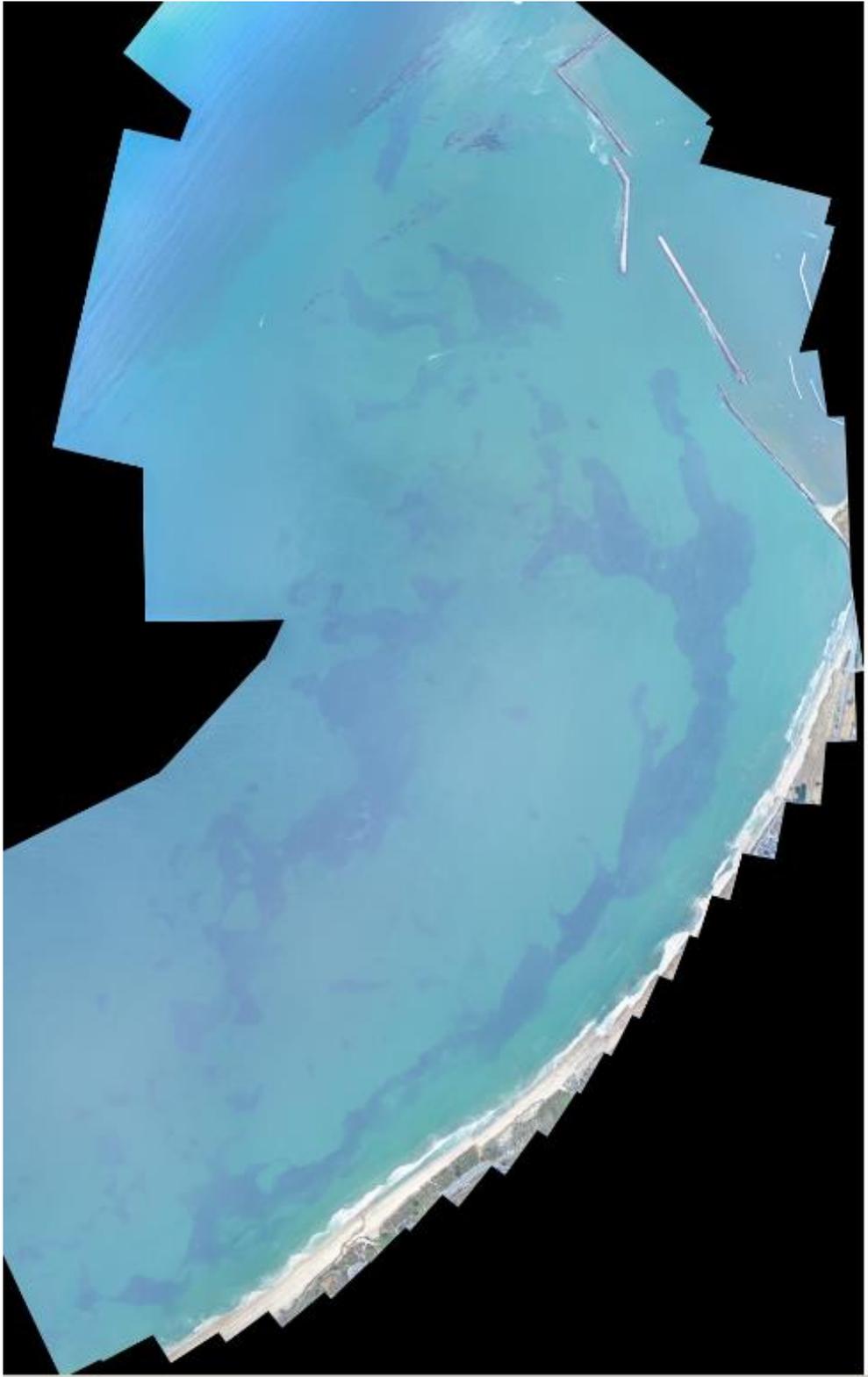


Figure 2. CDFW-CWPA aerial survey observations of Anchovy schools in Half Moon Bay (August 3, 2017). Photos taken at approximately 3,500 feet altitude.

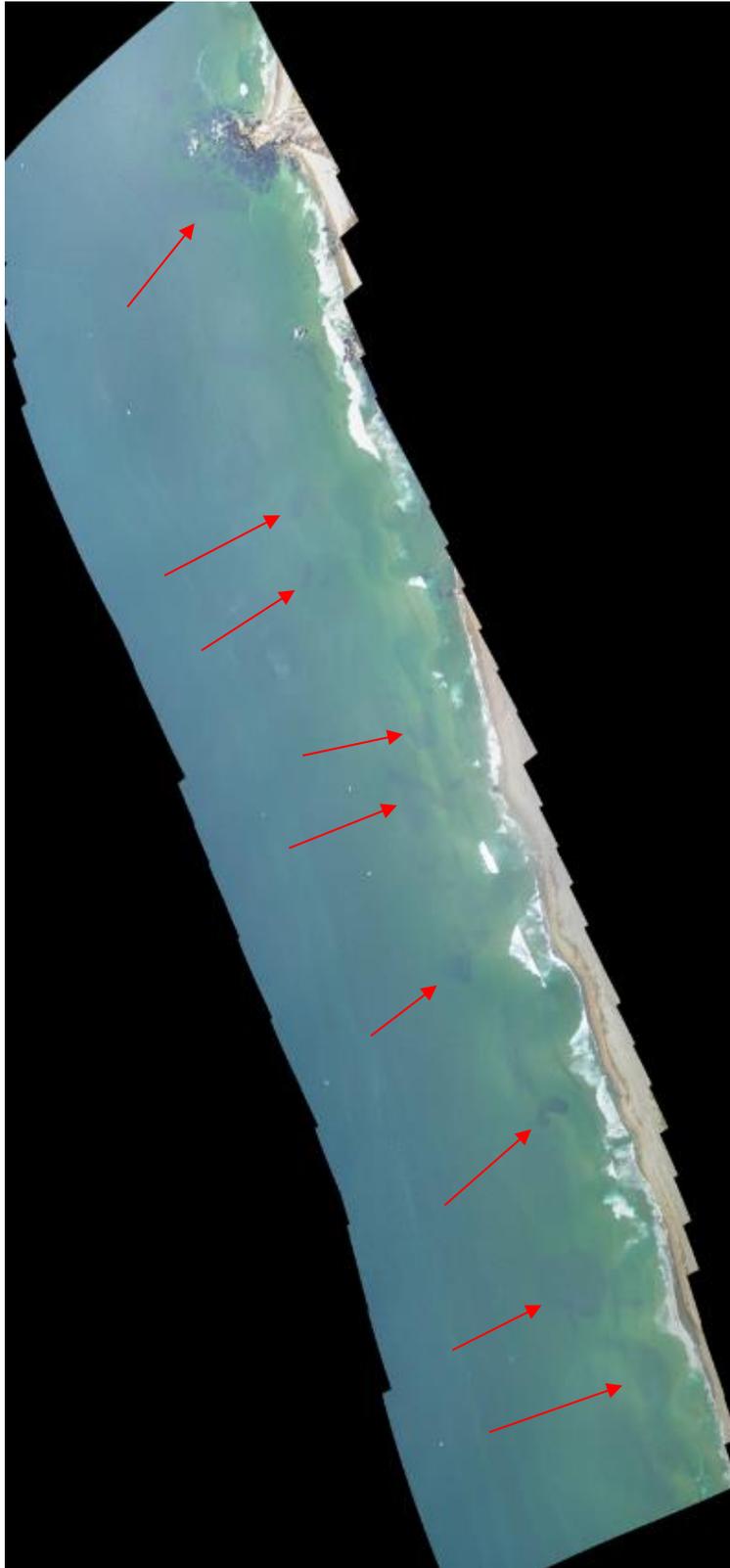


Figure 3. CDFW-CWPA aerial survey observations of Sardine schools (indicated by arrows) off Point Reyes National Seashore (August 4, 2017). Photos taken at approximately 1,500 feet altitude.



Figure 4. Anchovy and Sardine (primarily Anchovy) in Half Moon Bay, August 9, 2017.



Figure 5. Sampled Anchovy from setting of F/V *Trionfo* in Half Moon Bay, August 9, 2017.

References

Demer, D., J.P. Zwolinski, K.L. Stierhoff, J.S. Renfree, D. Palance, S.A. Mau, D.W. Murfin, and T.S. Sessions. 2018. 2018 Methods Review: Acoustic-trawl survey. Fisheries Resources Division Advanced Survey Technologies Group January 29 – February 2, 2018.

<ftp://ftp.pcouncil.org/pub/2018%20ATM%20Methodology%20Review/Supplemental%20PPTs%20and%20other%20materials/>.

Hill, K.T., P.R. Crone, and J.P. Zwolinski. 2018. Assessment of the Pacific sardine resource in 2018 for U.S. management in 2018-19. (April 2018 Briefing Book AGenda Item C.5

Attachment 1)

Lynn, K., D. Porzio, T. Nguyen, and L. Ryley. 2017. Southern California Aerial Survey for Pacific Sardine (*Sardinops sagax*) and Northern Anchovy (*Engraulis mordax*). California Department of Fish and Wildlife Report, 43 pp. http://www.pcouncil.org/wp-content/uploads/2017/05/D2a_CDFW_Rpt_Jun2017BB.pdf

PFMC (Pacific Fishery Management Council). 2017. Southern California Coastal Pelagic Species Aerial Survey Methodology Review. http://www.pcouncil.org/wp-content/uploads/2017/05/D2_Att1_Meth_Review_Panel_Rpt_Jun2017BB.pdf

PFMC (Pacific Fishery Management Council). 2018. Revised application for experimental fishery permit to allow take of Pacific Sardine in 2018 nearshore research program. (April 2018 Briefing Book Agenda Item C.2 Attachment 2)