

Pacific Sardine Management: 2019/2020 and beyond

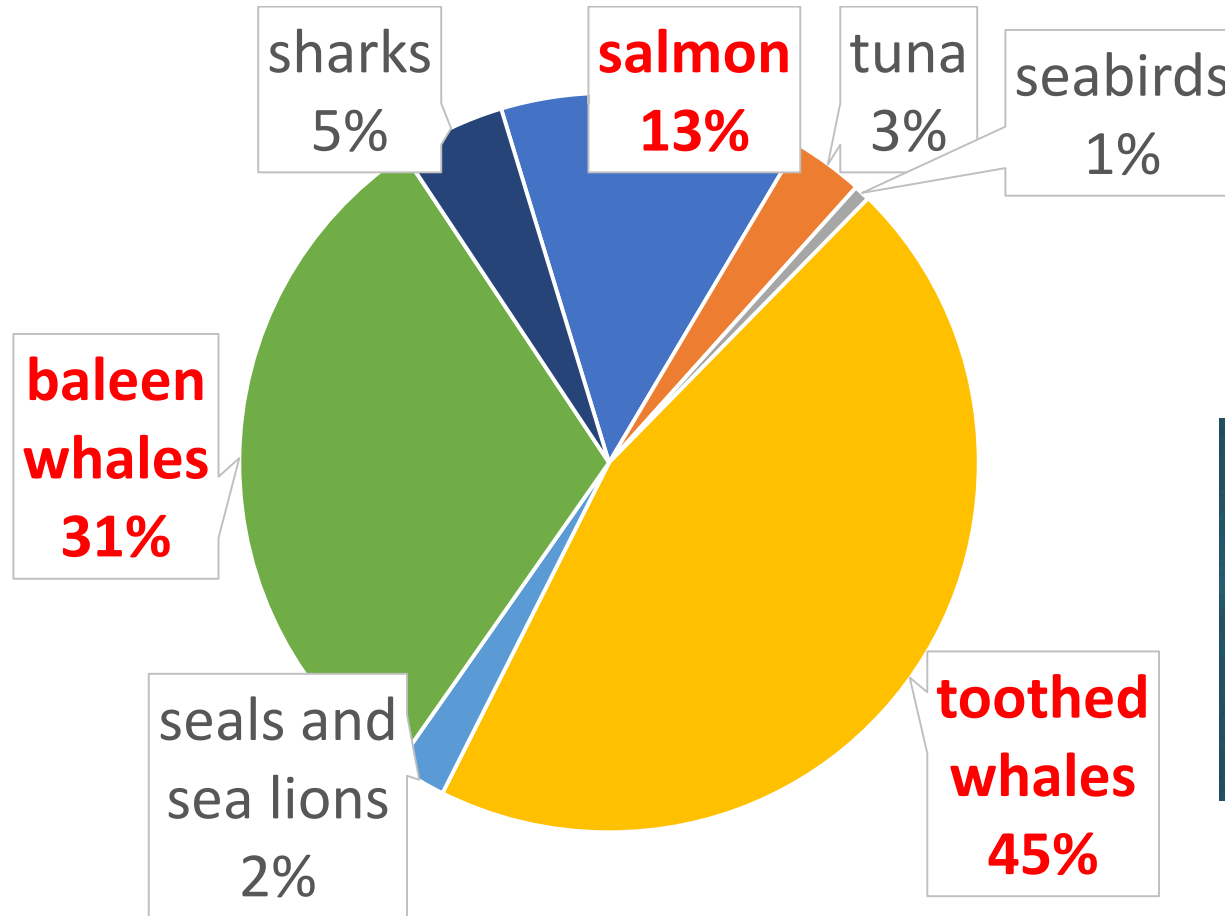


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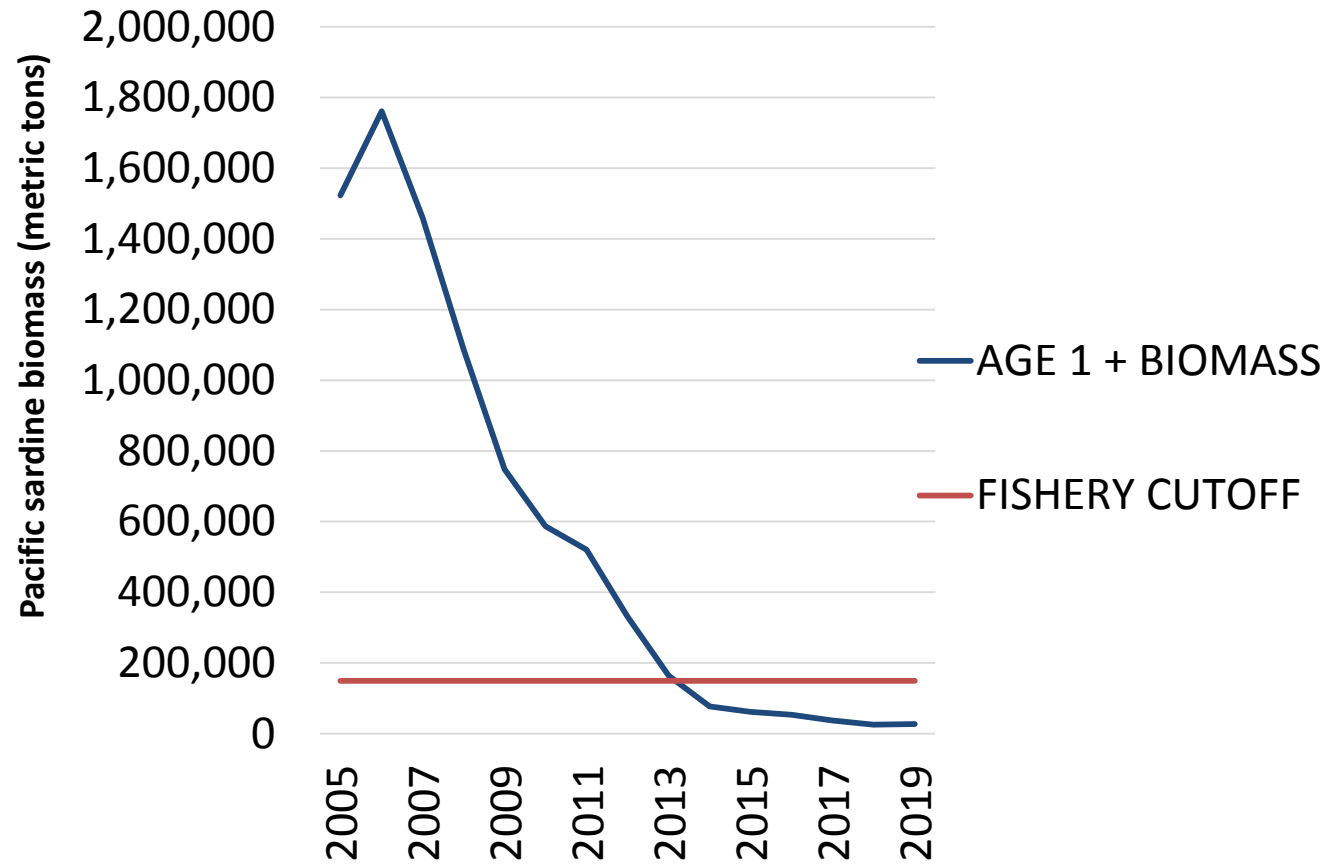


Who eats all the sardines?

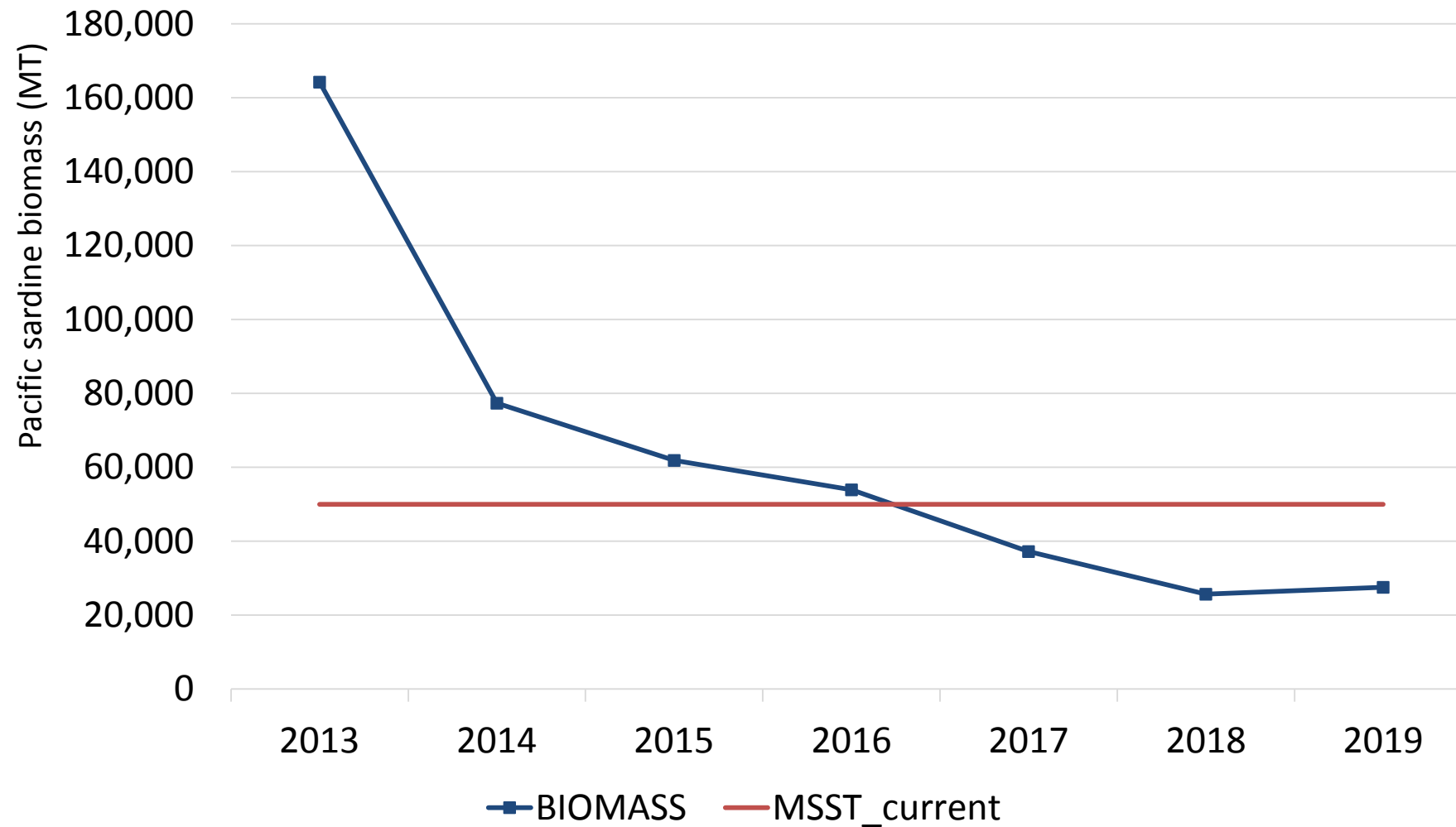


Source: Hannesson et al. 2010. "Shares of sardines eaten by predators." Ecological and economic considerations in the conservation and management of the Pacific sardine (*Sardinops sagax*). Can J. Fish Aqu Sci.

Pacific Sardine Biomass



Pacific Sardine are Overfished



Using Temperature to Set Fishing Rates

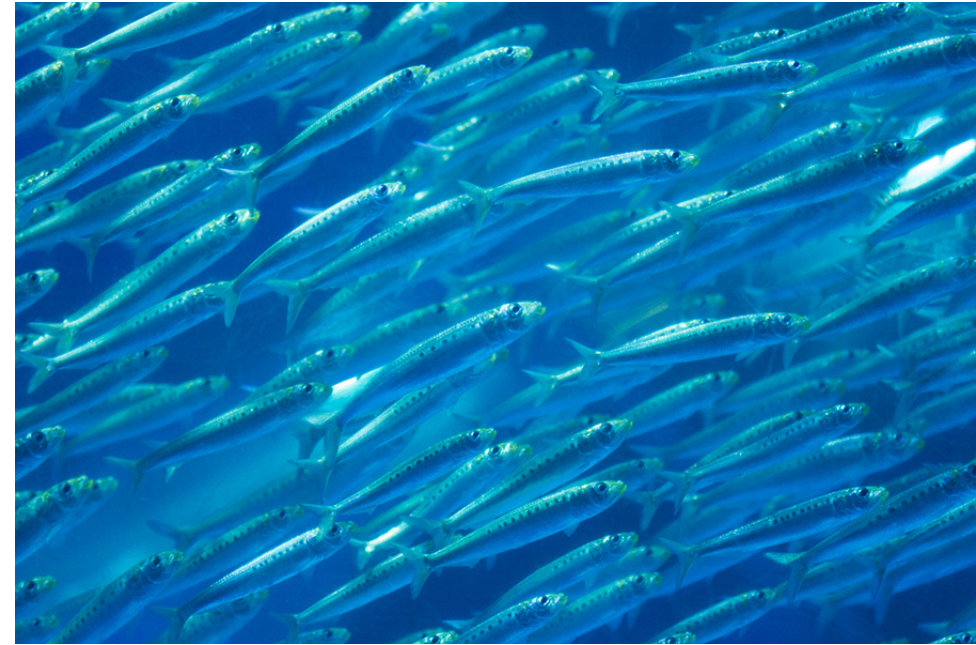
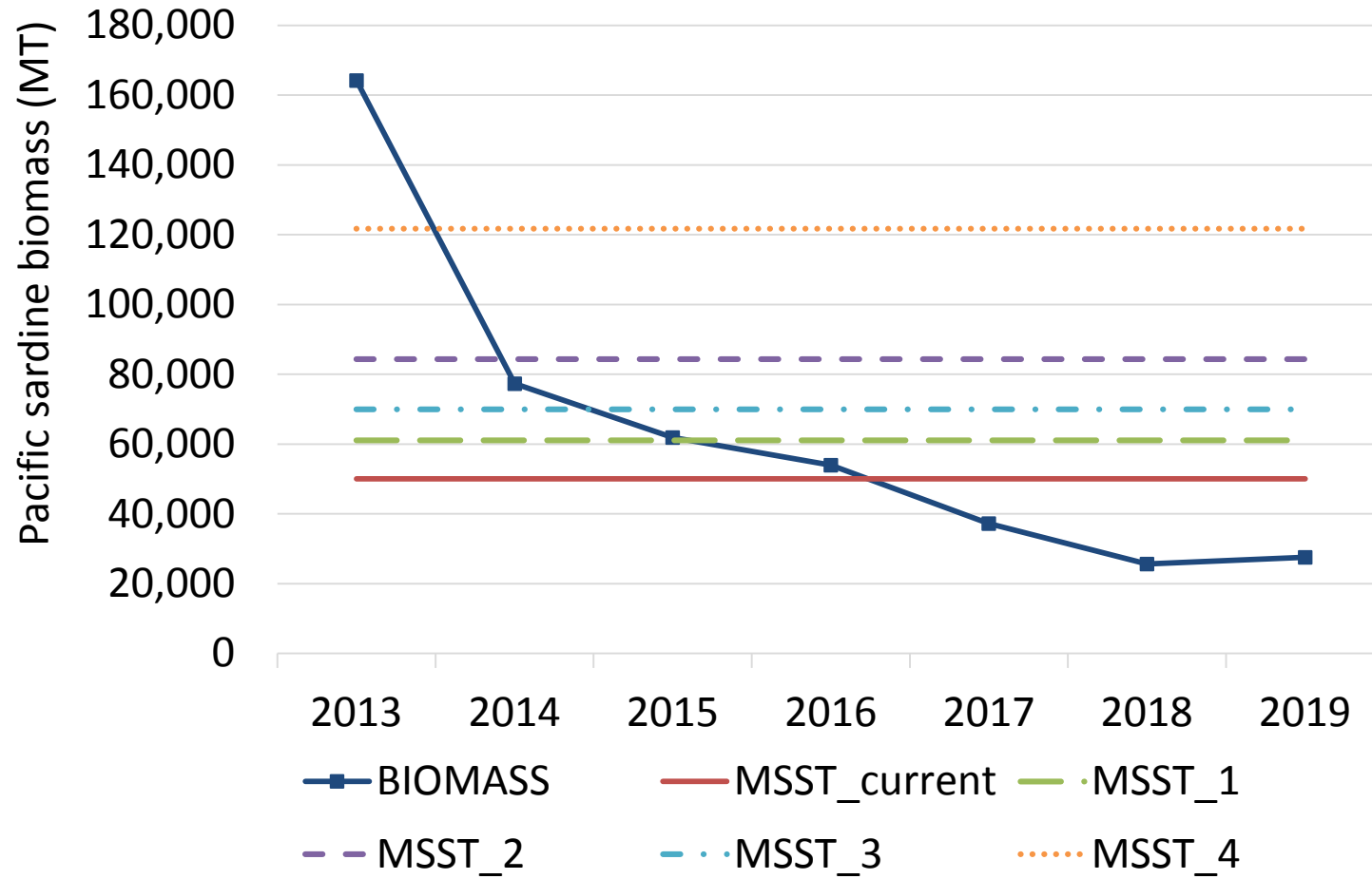
2019 Emsy set at max value 25% (range is 0-25%) based on CalCOFI SST is not based on based available science

Zwolinski & Demer 2019 (In Press):

“We confirm that recruitment to the northern stock of Pacific sardine does correlate to the environment as described by *PDO* combined but contrary to previous analyses, it *does not correlate to SST annual [CalCOFI index]*.”

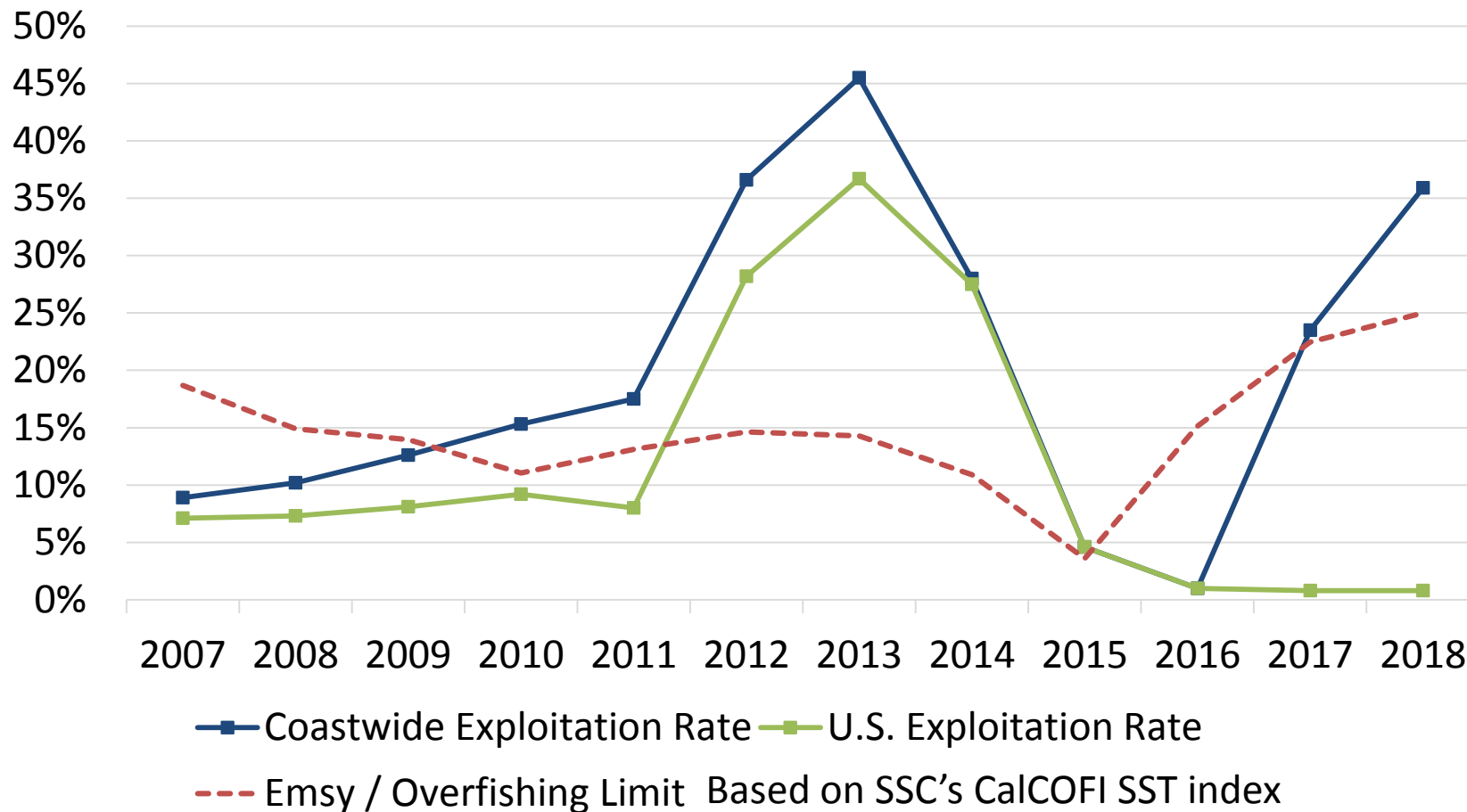
If low productivity and poor ocean conditions are preventing recovery in the absence of a fishery, why is the OFL being set based on maximum productivity?

Minimum Stock Size Threshold



Overfishing & International Management Concerns

CPS FMP 4.6.1 “Overfishing occurs whenever the total catch (U.S., Mexico, Canada, and international fisheries) exceeds ABC”.



2019-2020 Recommendations

- Keep the non-tribal directed fishery closed
- Pacific sardine must be declared overfished and PFMC must initiate a rebuilding plan
- NMFS must declare overfishing to be occurring on Pacific sardines based on coastwide catch exceeding MSY in 2017 and 2018; initiate efforts toward international coordination
- Establish conservative ACLs for the live bait fishery and bycatch in other fisheries that are lower than recent average landings to minimize further depletion
- Incidental catch allowance beginning at no more than 20%

Management Reform Is Needed

- Change the start date of the fishery and use the results of the acoustic trawl survey directly to set specifications as recommended by the STAR panel, STAT team, and assessment authors.
- Re-evaluate/revise the CalCOFI-based temperature index
- Update the MSST value for Pacific sardine to reflect the best available science as presented in the NMFS 2016 analysis.
- Increase CUTOFF to prevent future overfishing and reduced impacts on sardine predators
- Fix DISTRIBUTION using published methods or tri-national coordination
- Add the southern subpopulation of sardine to the CPS FMP

