Dr. Debra Murie  
Editor in Chief  
Marine and Coastal Fisheries

Dear Dr. Murie

Our paper is titled: “Climate-associated change in the abundance of Shrimp in Puget Sound, USA” and is being submitted for publication to Marine and Coastal Fisheries. In 2013 through 2016, a severe marine heatwave in the North Pacific, coupled with a strong El Niño event, caused widespread ecological changes along the Pacific coast of North America. Dubbed ‘The Blob’, the marine heatwave has allowed researchers to explore how marine communities change in response to a rapidly warming ocean surface. We used yearly trawl data from 1999–2019 in central Puget Sound to determine whether three species of shrimp, Pink Shrimp, Spot Shrimp, and Northern Crangon Shrimp showed an abrupt change in abundance during the 2013–2016 period. In contrast to past El Niño events and warm-phases of the Pacific Decadal Oscillation when Pink Shrimp abundance reportedly declined, shrimp abundance increased dramatically in 2013–2015 concurrent with strong El Niño conditions in 2014–2016. Time series analysis demonstrated that annual changes in the catch per unit effort of shrimp were related to a combination of PDO and El Niño signals, but that the relationship was weak, with other environmental factors such as upwelling and predation likely also controlling population dynamics. The cool-phase Pacific Decadal Oscillation immediately prior to the latest El Niño event may have mitigated the expected negative response of several species of shrimp to warmer surface waters in the Puget Sound from the El Niño and the warm Blob.

Pink and Spot Shrimp are an important resource for recreational and commercial fisheries. Interest in both the commercial and the recreational fishery is increasing as the value of shrimp has gone up, with catch quotas usually reached in recent years. Pink and Spot Shrimp in Puget Sound are understudied compared to coastal stocks in Washington and Oregon, which have been the focus of extensive research and monitoring. Currently there is almost no published literature on recreational or commercial Puget Sound shrimp stocks, with managers relying on small scale, sporadic, unpublished survey data. Given the increasing interest in Puget Sound shrimp stocks, these species are good candidates for future research efforts. Although the ultimate effect of climate change on these species is unclear, judging by the negative responses to increased average water temperatures during concurrent warm phase Pacific Decadal Oscillation periods and El Niño, a shift in abundance will likely occur in the coming decades as average sea surface temperatures begin to mirror what currently would be considered above average or extreme. This study provides a brief analysis of possible environmental drivers of shrimp abundance, as well as 21 years of time series data on abundance of several common shrimp species in Puget Sound in an area where previous survey data are limited or non-existent.

Sincerely, Karl Veggerby