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### The fishery for California market squid, *Loligo opalescens* (Cephalopoda: Myopsida), from 1981 - 2003

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#### ABSTRACT

The California market squid, *Loligo opalescens*, has been harvested since the 1860s and has become the largest fishery in California in terms of tonnage and dollars since 1993. The fishery began in Monterey Bay, then shifted to southern California, where effort has increased steadily since 1983. The California Department of Fish and Game (CDFG) collects information on landings of squid including tonnage, location, and date of capture. We compared landings data gathered by CDFG with sea surface temperature (SST), upwelling index (UI), the southern oscillation index (SOI) and their respective anomalies. We found that the squid fishery in Monterey Bay expends twice the effort of that in southern California. Squid landings decreased substantially following large El Niño events in 1982-1983 and 1997-1998, but not the smaller El Niño events of 1987 and 1992. Spectral analysis revealed autocorrelation at annual and 4.5-year intervals (similar to the time period between El Niño cycles). But this analysis did not reveal any fortnightly or monthly spawning peaks, thus squid spawning did not correlate with tides. A paralarvae density index (PDI) for February correlates well with catch per unit effort (CPUE) for the following November recruitment of adults to the spawning grounds. This stock-recruitment analysis was significant for 2000-2003 ( $CPUE = 8.42 + 0.41 * PDI$ , adjusted coefficient of determination,  $r^2 = 0.978$ ,  $p = 0.0074$ ). Surveys of squid paralarvae explain 97.8% of the variance for catches of adult squid nine months later. This predictive relationship could be used to manage the fishery adaptively, setting catch limits for adult recruitment based upon paralarvae abundance nine months earlier.

#### Full Text

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