



Upwelling and the condition and diet of juvenile rockfish: A study using ^{14}C , ^{13}C , and ^{15}N natural abundances

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ABSTRACT: Juvenile *Sebastes jordani* individuals sampled in late spring 1995, 1996, and 1997 near Monterey Bay, California, were analyzed for $\Delta^{14}\text{C}$, $\delta^{13}\text{C}$, and $\delta^{15}\text{N}$. As anticipated, a strong negative correlation was found between mean annual juvenile rockfish $\Delta^{14}\text{C}$ and the preceding 3-month average Bakun upwelling index for this region. The sensitivity of this isotopic response by juvenile rockfish to upwelling variations was similar to that previously observed in surface-water inorganic carbon in nearby Half Moon Bay (Robinson 1981). This indicates that the $\Delta^{14}\text{C}$ of surface-dwelling marine fish can be used as a measure of fish feeding in freshly upwelled ^{14}C -depleted water. However, we found no correlation between this parameter and fish somatic condition as measured by deviations in the regressions of individual fish (1) weight on length, (2) otolith size on fish length, or (3) total lipid content on dry weight. This questions the role upwelling plays in affecting juvenile rockfish condition. Also unrelated to fish condition were fish $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$, implying that the condition of juvenile *S. jordani* is unaffected by variation in the consumption of specific, isotopically discernible food resources.

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