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### Invaders in the open sea: Establishment of the New Zealand snail *Philine auriformis* in southern California coastal waters

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#### ABSTRACT

In late 1994, *Philine auriformis*, a clam predator from New Zealand, first appeared in Southern California Bight (SCB) coastal waters. This is one of a few documented exotic species introductions to shelf communities; most are reported from bays, harbors, or the intertidal zone. *P. auriformis* was first collected in California from San Francisco Bay in 1993, and spread within a year to Bodega Bay to the north. In the SCB, the *P. auriformis* invasion was tracked from its inception by outfall monitoring programs off the Palos Verdes Peninsula and San Diego, and regional monitoring programs that sampled throughout the Bight in 1994 and 1998. All four programs used trawls to indicate the occurrence and relative prevalence of larger individuals and benthic grabs to estimate population density, including small individuals. The first specimen in the SCB was collected in a trawl off Ventura in 1994. By the spring of 1995, specimens were abundant on the shelf off Los Angeles and were of very large size. Population density increased in 1995 and 1996, only to decline in 1997 and 1998. By 1998, the species was established at reduced density in much of the Bight and continues to date. The success of *P. auriformis* was likely due to its ability to efficiently feed on small bivalves, an underutilized resource, and switch readily to other prey in their absence. Declines in populations of small bivalves that are its preferred prey accompanied the invasion. The invasion was noticed and well documented because of the juxtaposition of monitoring programs and the size of the organism. Other coastal invasions are likely to pass unnoticed.

#### Full Text

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