

EXECUTIVE SUMMARY [NON-CONFIDENTIAL, NON-TECHNICAL ABSTRACT FOR PUBLIC INFORMATION OR PROGRAM PROMOTION]: The spread of non-native species is a costly by-product of global commerce. Once established, exotic organisms displace indigenous species causing ecological damage and ~\$137 billion in economic losses per year in the U.S. Estuaries are especially vulnerable to invaders transported as larvae in ballast water of freight ships, or introduced via oyster farming. Two major invasive pests in California are the Asian Date Mussel *Musculista senhousia* and the sea slugs *Philine* spp. The mussel *Musculista* forms dense mats of up to 150,000 mussels per m², reducing populations of native suspension feeders through competitive exclusion. Slugs in the genus *Philine* consume bivalves and spread rapidly across California after their appearance a decade ago. The number of invasive *Philine* species and their geographical origin remains unknown, however, due to unresolved taxonomy. Genetic data can be used to determine the origin and identity of cryptic invaders, and to estimate connectivity between sites by determining population structure. This grant will support one graduate student, who will use molecular methods to test three hypotheses: (1) *Musculista* shows a genetic break across central California due to a lack of suitable estuarine habitat; (2) *Philine* does not have a genetic break along the coast because it can persist subtidally, but there are multiple cryptic *Philine* spp. invading our coast; and (3) *Musculista* recruits after episodic mass spawning events, whereas native bivalves recruit steadily throughout the breeding season. These results will add to our understanding of how invasive species spread following introduction, and will aid management efforts to mitigate damage caused by non-native organisms.