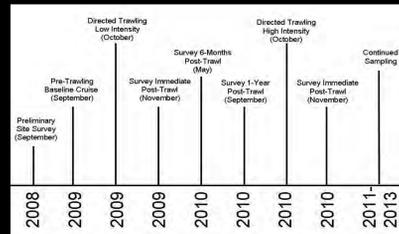
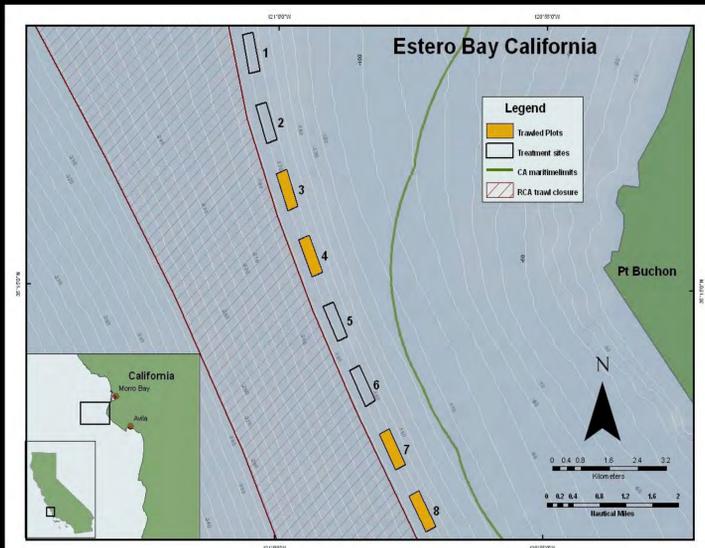


# The effects of trawling at “low” intensity in unconsolidated sediment: Year 1 of the Central Coast Trawl Impact and Recovery Study

LINDHOLM, J<sup>1</sup>, M GLEASON<sup>2</sup>, D KLINE<sup>1</sup>, L CLARY<sup>1</sup>

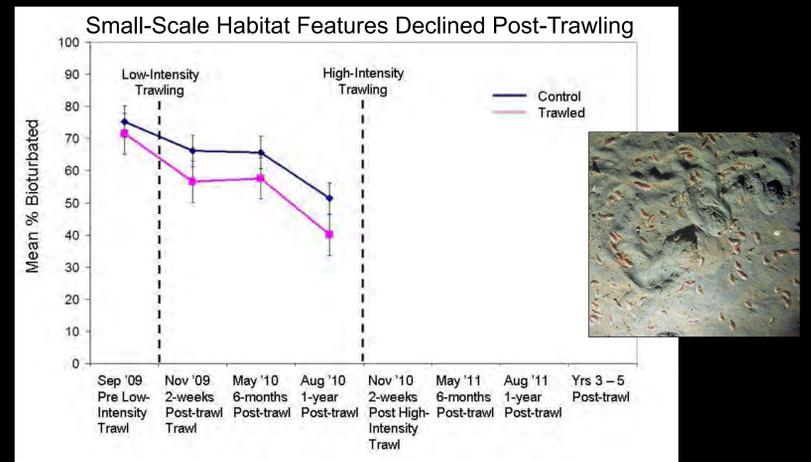
1 - Institute for Applied Marine Ecology at CSU Monterey Bay, Seaside, CA  
2 - The Nature Conservancy, Monterey, CA

## Study Area and Project Timeline



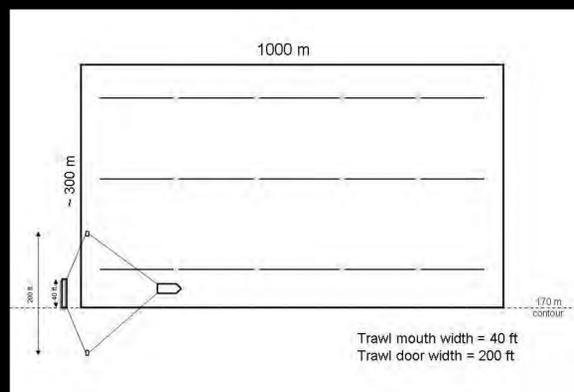
This is a 5-year project designed to evaluate the relative impacts of bottom trawling on seafloor habitats and associated organisms under varying levels of trawling intensity. The project is a highly collaborative effort involving academia, an NGO, private industry, and commercial fishermen. Here we present the results *to-date* of our first year of field operations (2009-2010).

## Analyses To-Date



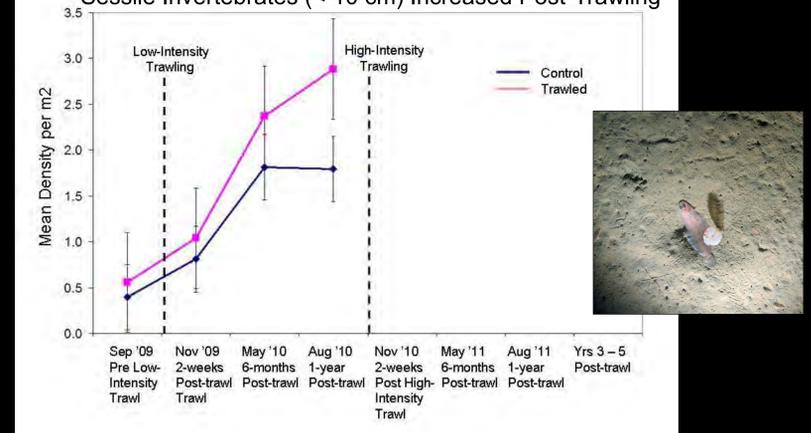
Overall, the topographic relief in the study area was low. However, small-scale features created by organisms as they interact with the sediment, or “bioturbation” (pictured above) declined post-trawling.

## Directed Trawling Activities



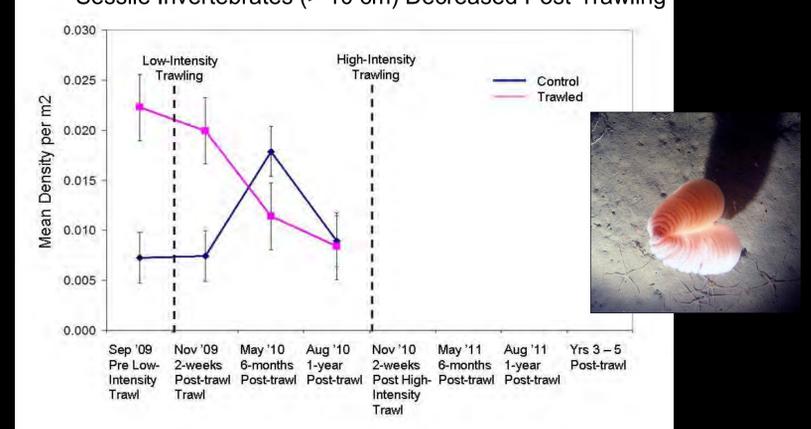
All directed trawling activities are conducted aboard the FV *South Bay* (pictured left). The project design requires that the *South Bay* “mow the lawn” in each of the study plots designated for trawling (above left). Trawling intensities for the study were selected after consultation with National Marine Fisheries Service and are intended to reflect the range of trawling intensity present in the vicinity of the study area historically. In October 2009 the “low” intensity trawling treatment was conducted, with the entirety of each trawled plot towed a total of two times by the *South Bay* (pictured left).

### Sessile Invertebrates (< 10 cm) Increased Post-Trawling



Sessile, erect macro-faunal invertebrates (such as the small sea pen picture above), were neither diverse nor abundant in the study area. However, there was a slight increase in the density of “small” sessile organisms post-trawling.

### Sessile Invertebrates (> 10 cm) Decreased Post-Trawling

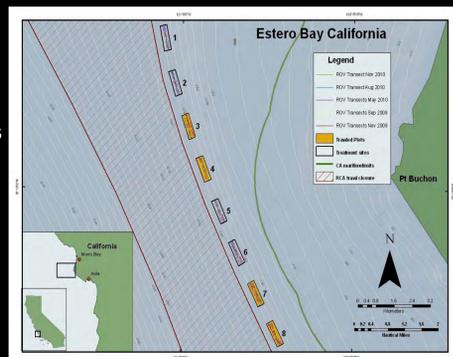


Larger sessile invertebrates (such as the sea pen picture above) were present in even lower densities in the study area and decreased post-trawling.

## ROV Operations



The Vector M4 ROV known as the “Beagle” (left) collects continuous video and still photographs along the seafloor using both down- and forward-looking cameras. In Year 1 we sampled before trawling and after at 2 weeks, 6 months, and 1 year (right).

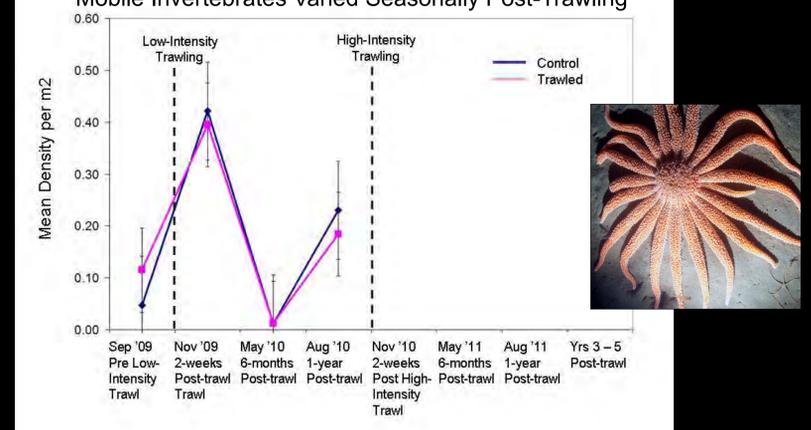


## Notable Observations To-Date



Over the first year of the project, the study area was characterized by extraordinary variation in the types and densities of organisms present. During one cruise to the area the bottom was covered with small worms. A return trip less than 2 months later found no worms but similarly large numbers of brittle stars.

### Mobile Invertebrates Varied Seasonally Post-Trawling



The density of mobile invertebrates (such as the sea slug pictured above) varied widely over the first year of the study in both the trawled and control plots.