



**MEMORANDUM**

Item 5b

**TO:** California Ocean Protection Council  
**FROM:** Valerie Termini  
**DATE:** November 21, 2013  
**RE:** Trawl Impact and Recovery Study  
**ATTACHMENTS:** [Final Report](#)

The Central Coast Trawl Impact and Recovery Study was part of a larger fisheries reform project, the Central Coast Groundfish Project (CCGP) the OPC helped to sponsor along with The Nature Conservancy. This project has led to some exciting advances in both the environmental and economic performance of the groundfish fishery along the central coast of California and is still underway.

The trawl impact study was a collaborative fisheries research project and the first controlled study that measured the impacts of bottom trawling in soft-bottom habitats along the West Coast of the United States. The results of this study were designed to help inform management decisions about the level of intensity of trawl effort and appropriate habitats for trawling to minimize impacts to the benthic habitat. Recently, the principal investigators shared the results with the Monterey Bay National Marine Sanctuary who incorporated the lessons learned into a successful collaborative Essential Fish Habitat proposal to the National Marine Fisheries Service earlier this Fall regarding possible changes to where trawling occurs along the West Coast.

The study objectives and design were reviewed by outside experts, fishermen, and the Ocean Science Trust. The study design was implemented as planned over 3 years (2009-2011), employed a “Before-After-Control-Impact” design, and focused on primarily muddy, soft bottom habitat along the continental shelf. The goal of the study aimed to compare any changes to the structural and biological attributes of the seafloor before and after bottom trawling at known levels of trawling effort, as well as to monitor the recovery of the seafloor post-trawling.

Fishermen partners conducted directed trawling at known levels of intensity in study plots on the continental shelf at 170meters depth in areas that had not been trawled for many years offshore of Morro Bay, California. Two levels of experimental trawling intensity (low and high) that matched historic trawl effort in the region were applied a year apart in time to four study plots of 1000x300meters in size. Researchers used visual surveys conducted with a remotely operated vehicle (ROV) and grab samples to assess the impact of bottom trawling in trawled plots in comparison to untrawled control plots. Over the course of the study, fifteen different research cruises were carried out aboard collaborative fishing vessels or federal research vessels to assess the research metrics, before, immediately, and at longer-time intervals after trawling.

**Results and Conclusions**

The results showed that the heavy trawl doors that hold the trawl net open leave persistent scour marks in the seafloor, but there were few other measurable effects that could be attributed to the experimental trawling in this habitat. The results of bottom trawling activity on the structural attributes of fish habitat in soft sediments of the outer continental shelf include:

- Trawl door scour marks can persist for up to a year in unconsolidated sediments.

Researchers found that tracks left in the seafloor by the heavy trawl doors scouring the seafloor, measuring as wide as 20 cm and as deep as 10 cm, persisted for at least a year following low-intensity trawling.

- There was minimal measurable impact to micro-topographic structure on the seafloor (mounts, holes, pits formed by bioturbating organisms) following both low- and high-intensity bottom trawling
- There were no measurable impacts of bottom trawling on macro-faunal invertebrate densities, which were low at the start of the experiment.
- There was high spatio-temporal variation in macro-faunal invertebrate densities reflecting the dynamic nature of this habitat
- There were no differences in the composition of infaunal invertebrates between trawled and control plots.

In conclusion, this study showed that bottom trawling with small footrope trawl gear impacted the unconsolidated sediments of the study area via the trawl door scour marks that persisted for up to a year following trawling. However, the small reductions in micro-topographic complexity observed in trawled plots relative to control plots were generally not significant, and there were no measurable effects of trawling on densities of invertebrates, including sessile and mobile epifauna and infauna. The study area was characterized by a high degree of patchiness in space and time in the invertebrate assemblage, particularly for opportunistic species such as polychaete worms and brittlestars.

### **Management Implications**

Trawling is still the primary way to catch flatfish and remains an important component of California's fisheries. It is important to reconcile our need for local seafood, fish landings, and fishermen's livelihoods with environmental impacts of trawling in different habitats, as well as bycatch and discard rates associated with the gear. The types of management measures this study could inform include trawl gear regulations, trawl effort controls, and spatial management of trawling to limit the footprint to avoid more sensitive habitats.

One of the great benefits of this project was the collaborative partnership that evolved among diverse stakeholders interested in moving toward a more quantitative evaluation of the impacts of bottom trawling on seafloor communities and a greater understanding of ecosystem dynamics and resilience to inform fishery management.