Methods

Description of Data sources

We used three data sets to examine fishing strategies in the US westcoast pink shrimp trawl fishery (hereafter shrimp trawl fishery): landing tickets, vessel monitoring system (VMS), and observer data. All data sets covered the period 2009-2013. Each dataset has different coverage of vessels which we describe below.

**Landing tickets**

We used landings tickets that record all commercial landings on the US west coast from the Pacific Fisheries Information Network (PacFIN) database ([www.psmfc.org](http://www.psmfc.org/)). Landings tickets provide species composition, price, date, and vessel identification information for all commercial landings on the US west coast during this time. Using a métier analysis (Fuller et al. 2016) we subset landings to those of the pink shrimp trawl fishery (n = **XXX**).

**VMS data**

We used VMS data from the Office of Law Enforcement (OLE). As of 2009, all vessels which participate in federal groundfish fisheries are required to carry a VMS, and GPS data for vessels all participating vessels is available at approximately hourly intervals with **XX** meter resolution. We filtered this data for coordinates in the US west coast exclusive economic zone (EEZ), and filtered to vessels for which we have pink shrimp landings data (n vessel = **XXX**).

**Observer data**

Federal observer data came from the Northwest Fisheries Science Center Observer Program. In the pink shrimp fishery, observers are required to be on **XX**% of shrimp trips, during which time they record haul locations, durations and species composition including bycatch.

Combining Data to get a full picture of fishing

Using these three datasets we matched landings, movement and fishing behavior to fully capture a pink shrimp fishing trip. Landing tickets and VMS data were matched by vessel ID and date of landing (see Appendix for details). Using these matched trips, we filter VMS data for trips linked to pink shrimp trawl fishery landings. With these landings we verify by linking them to observer data which provides vessel ID, fishery, and dates of departure and return for trips.

Appendix

Matching landing tickets and VMS

Matching of tickets and VMS was completed using a combination of spatial and temporal filters. VMS data was first filtered and any segment of > 2 continuous locations > 1.5 kilometers offshore. These segments were labelled as “fishing trips”. Using landing tickets for a given vessel we start from the last date and search back for VMS trips which occurred within a 36 hour window of this date. Any VMS trips that present in this time window are linked to the landing ticket. If more than one landing ticket or fishing trip occurred inthe prior 36 hour window we don’t try to disaggregate the trips and landings and instead group all landing tickets and VMS fishing trips. We also test the sensitivity of this window with 0, 24, 72 and 168 hour windows.