

ECS effort data

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DATA DESCRIPTION

License Dataset of 2019

Data source: from ZheJiang Government Public Dataset.

- N: 14839 vessels (16101 in yearbook of 2019).
- Gear name, operation type, min mesh size...
- Engine power, tonnage, length, shape, build time...
- Licence ID, vessel name, nationality, calling code, register code...
- Fishing sites, season, target species.

GFW dataset

Data description: predicted effort data using VMS data by Neural network.

- t: 2012 to 2016, daily or annual data
- mmsi code, flag
- fishing hours, lon_bin, lat_bin (10th degree)
- tonnage, engine power, length.

Exploratory dataset

Use MMSI/CC to match vessels in GWF annual effort data of 2016, conditional on:

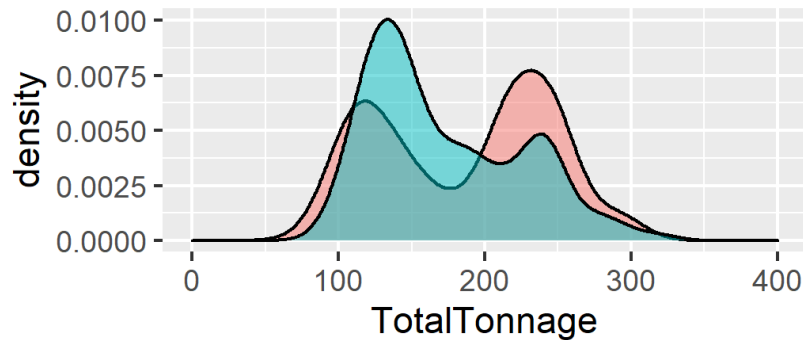
- Vessels' fishing method is licensed as single- or double-otter trawler.
- Vessels' annual fishing effort in ECS is positive.

Some of the gear type listed in GFW dataset is mismatched with that on license. Prediction/reporting error? License change? or Illicit gear usage?

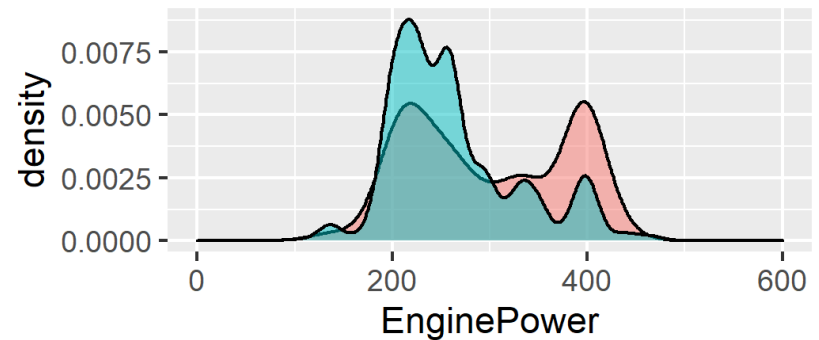
Matched sample vs. Full sample

FishingOperation2 ■ Doulbe-otter ■ Single-otter

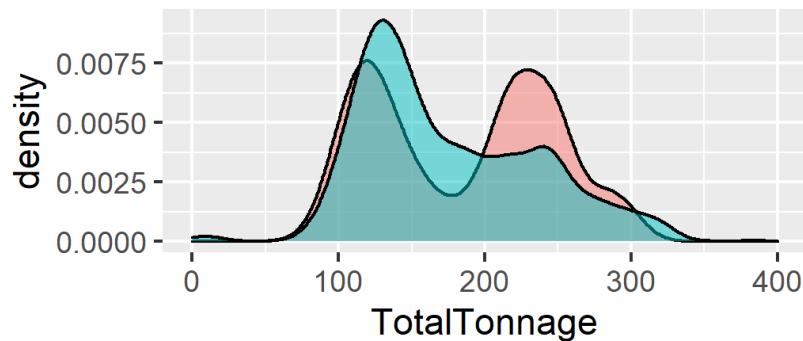
ECS effort sample, n = 1170



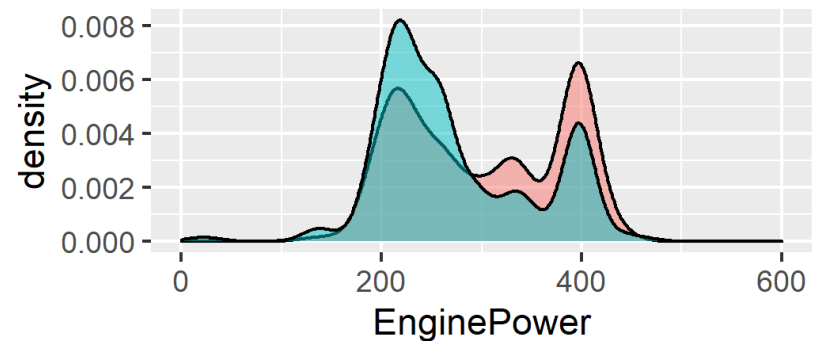
ECS effort sample, n = 1170



License full sample, n = 2827

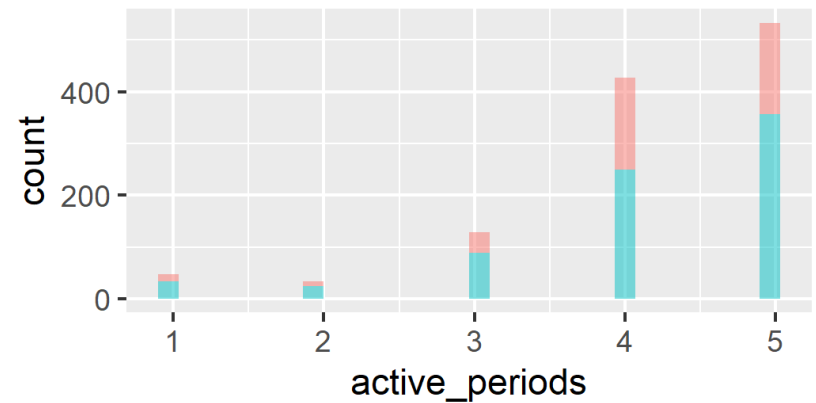
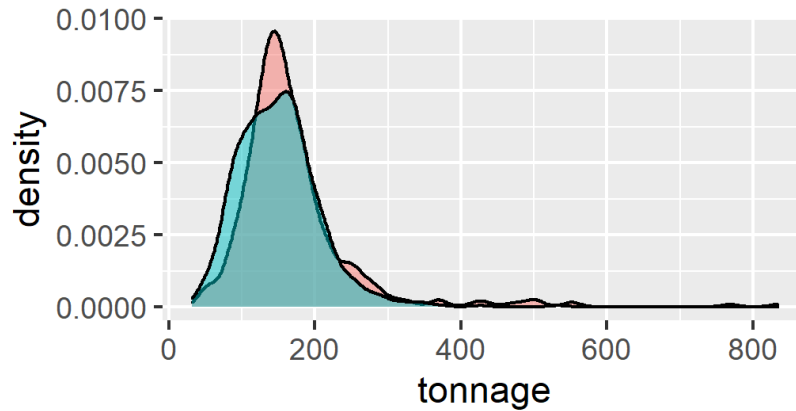
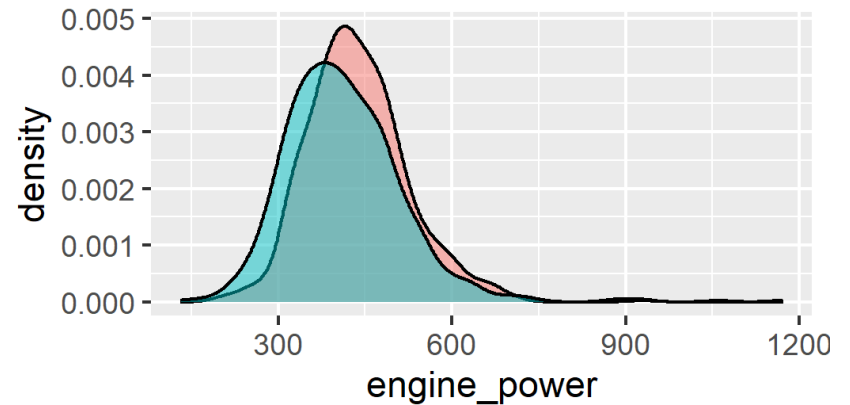
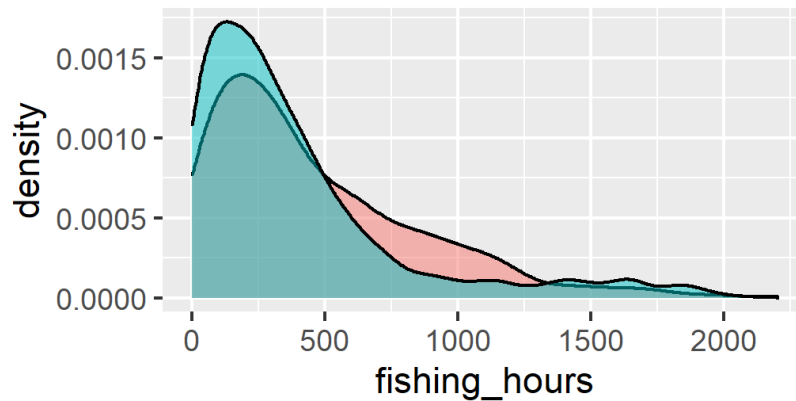


License full sample, n = 2827



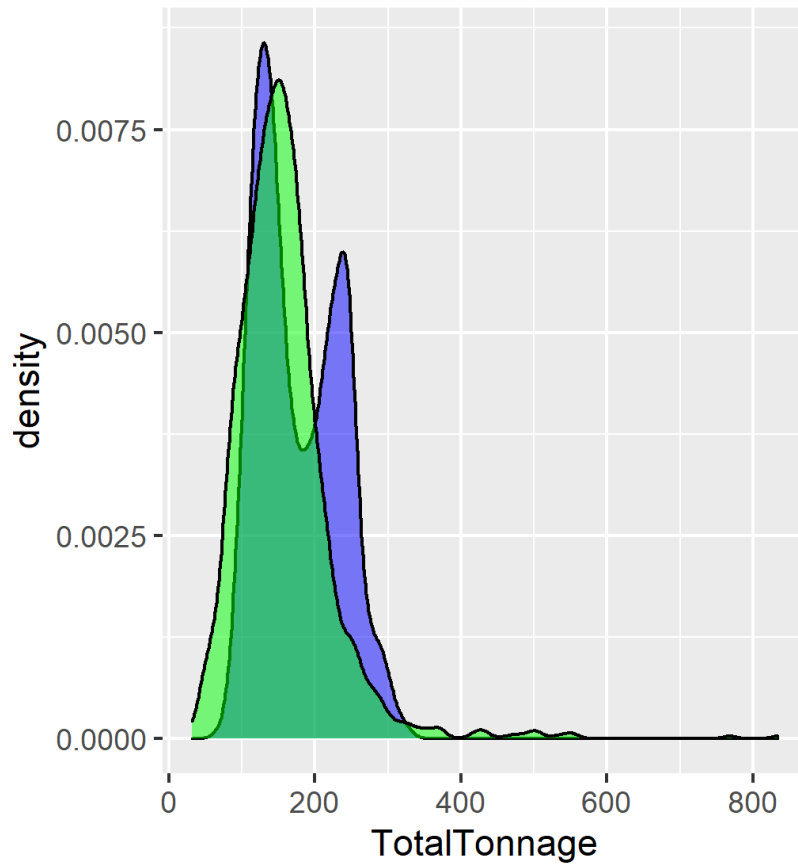
GFW data description

FishingOperation2 ■ Double-otter ■ Single-otter

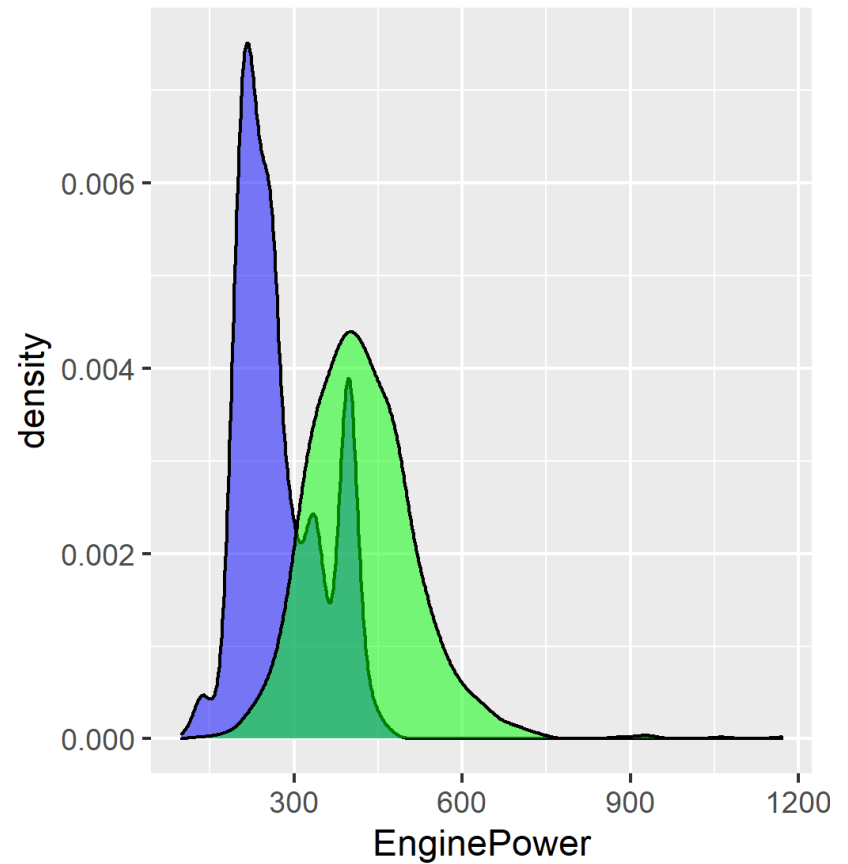


License data vs. GFW data

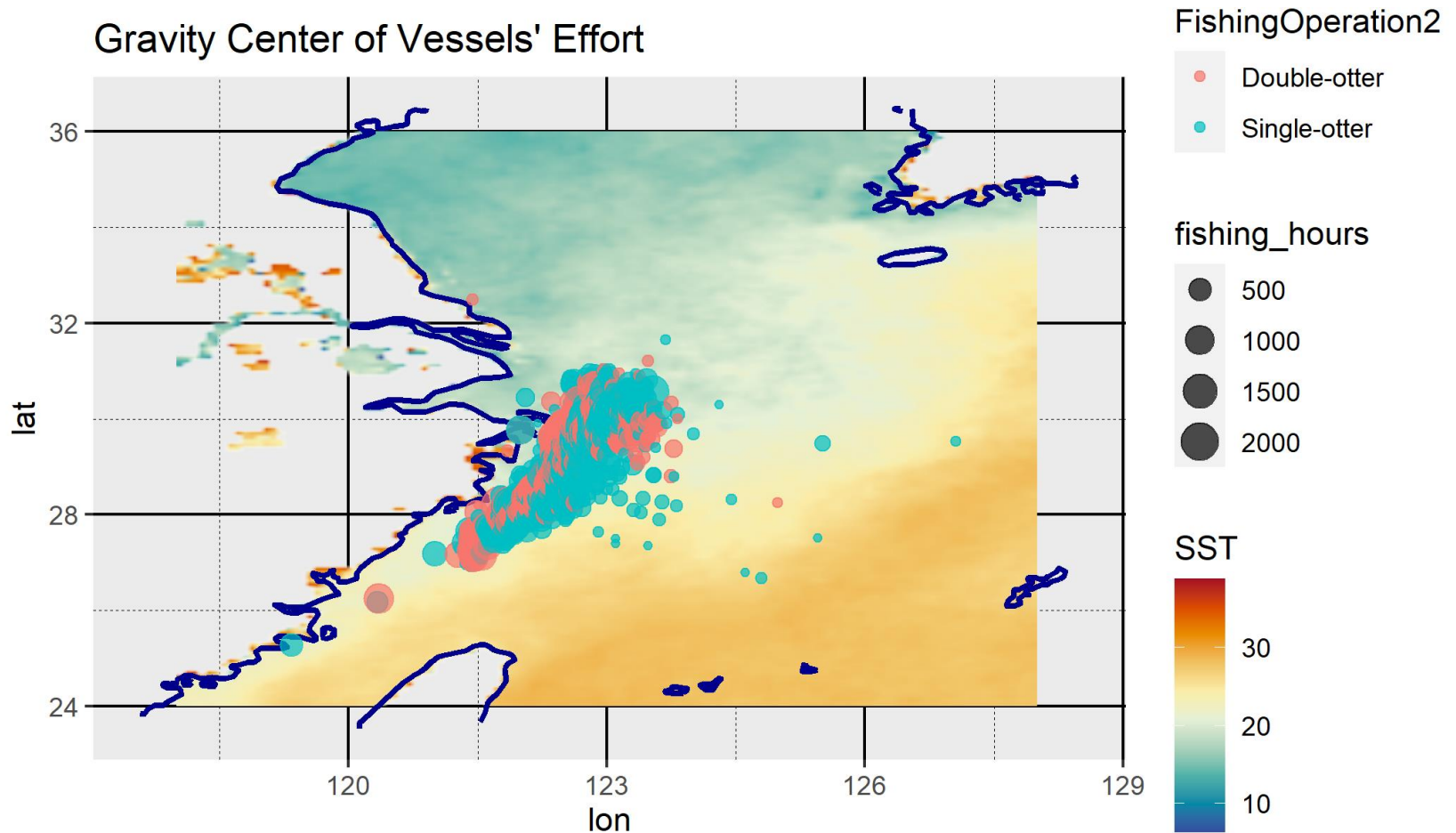
Blue: License | Green: GFW



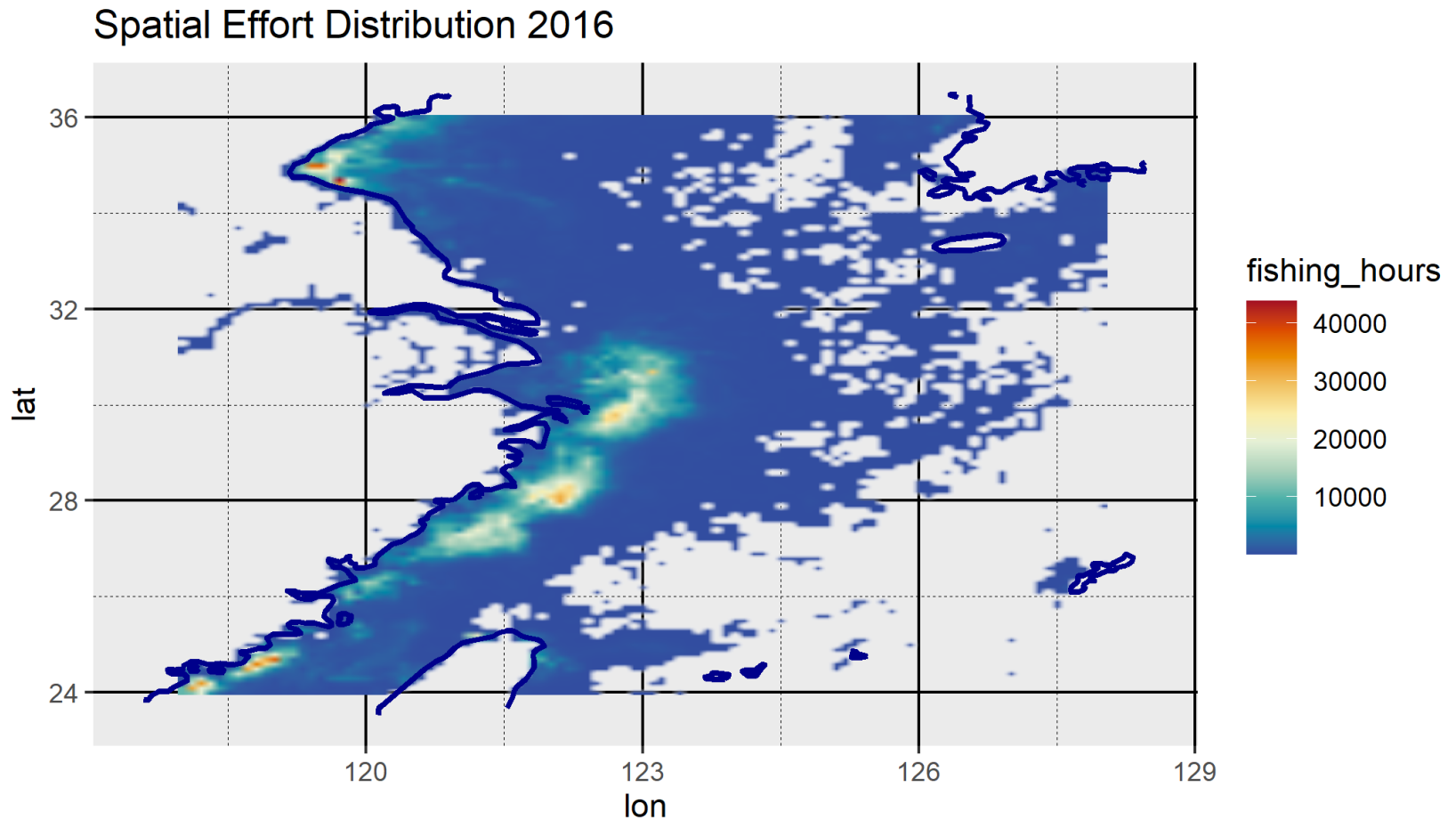
Blue: License | Green: GFW



Gravity of vessel fishing effort in ECS



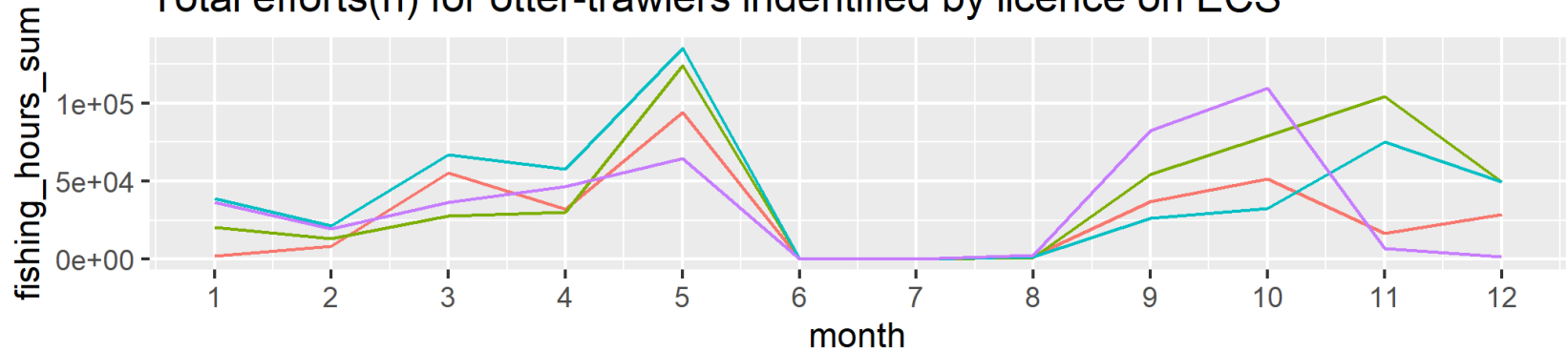
Spatial Effort distribution in ECS



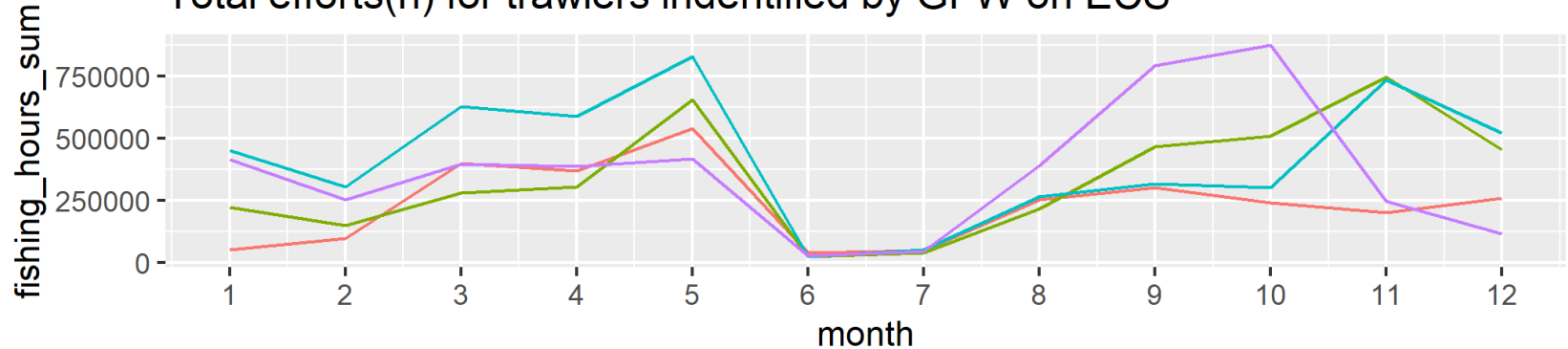
Temporal Effort distribution in ECS

factor(year) 2013 2014 2015 2016

Total efforts(h) for otter-trawlers indentified by licence on ECS



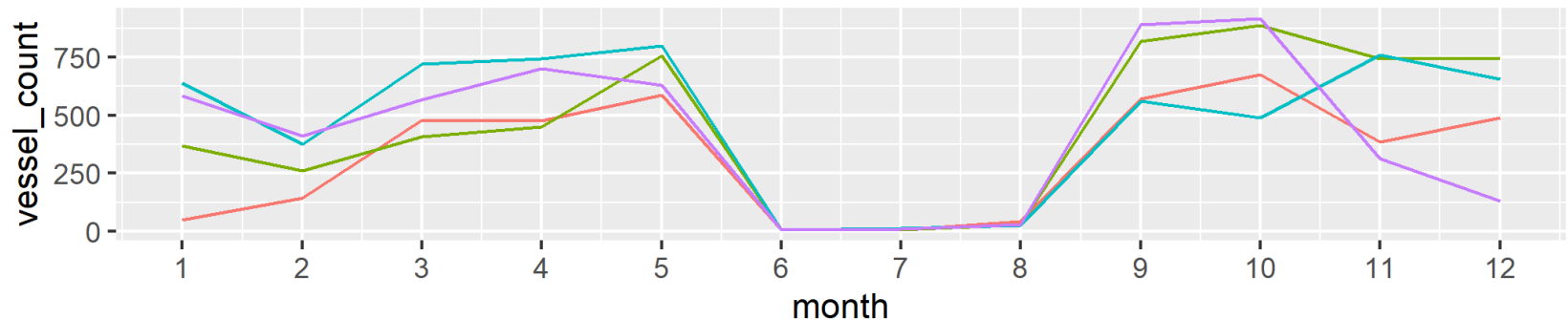
Total efforts(h) for trawlers indentified by GFW on ECS



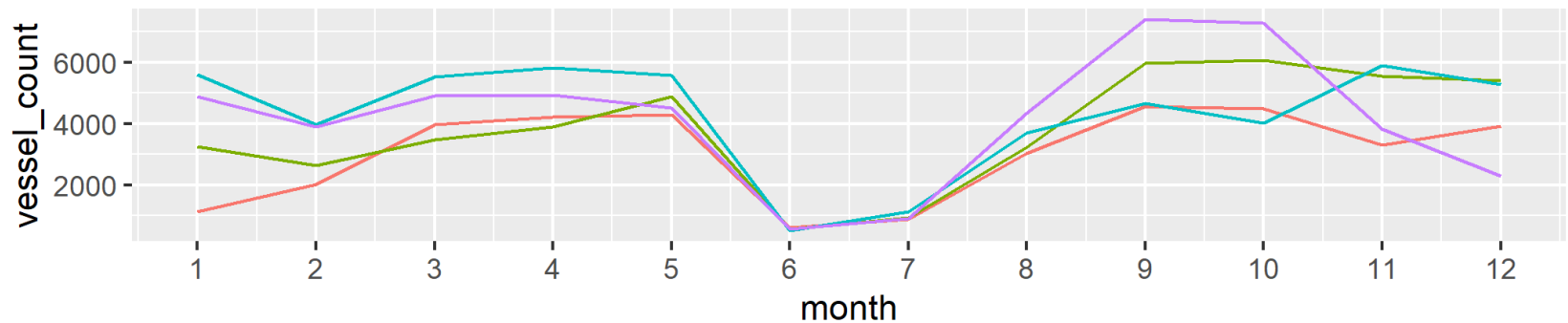
Temporal vessel distribution in ECS

factor(year) 2013 2014 2015 2016

Number of active otter-trawlers identified by licence on ECS



Number of active trawlers indentified by GFW on ECS



FISHERY SUBSIDY AND FISHING EFFORT

Fishery subsidy reform

- [2019 - 2014]. Fuel subsidy is issued annually to fishing vessels according to fishing operations and engine power:

$$\text{Subsidy} = \text{Subsidy coefficient of gear} \times \text{Engine power}$$

- [2015 - 2019]. Fuel subsidy is issued based on vessel length. Vessels are categorized as Large, medium, and small vessels and receives category-corresponding annual subsidy:

$$\text{Subsidy} = 1_A(\text{Length category}) \times \text{Subsidy limit}$$

- [2020]. Double-otters can no longer receive fishery subsidy.

Research goal: evaluate policy impact of fishery subsidy

Motivation: The fishery subsidy is based on vessel capacity rather than actual effort input. It is unclear how will subsidy as a revenue transfer impact fisher's production decision.

Identification strategy: There can be discontinuity in the distribution of vessel length after switching from capacity-based policy to length-based policy.