Monkfish CPUE for DAS

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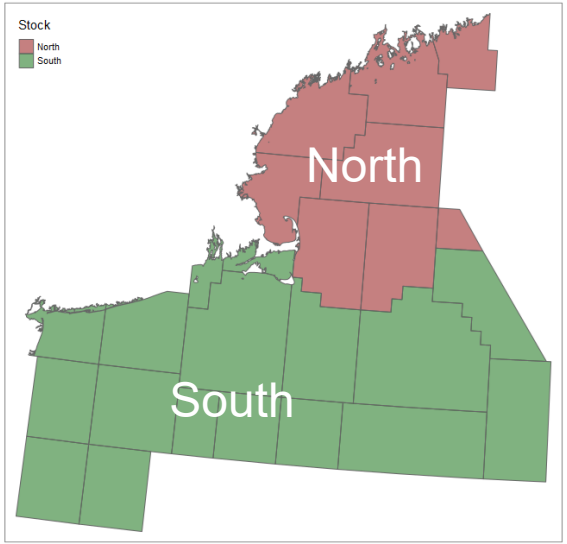
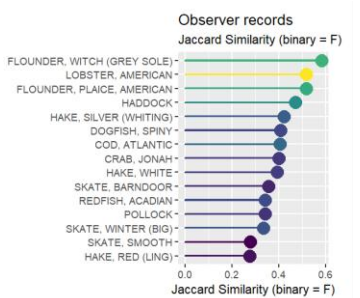
Refresher

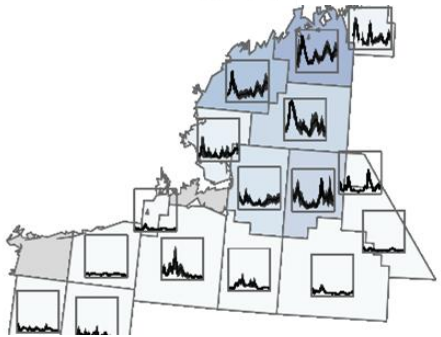
- I work for NEFSC Cooperative Research Branch focusing on fishery data applications
- Presented preliminary work in February
- Looked at catches of Monkfish in NEFSC Study Fleet and NE Fishery Observer Data
- Exploring catch rates in three gears now and comparing to trends in the NEFSC Bottom Trawl Survey
- Builds on methods used for Rec CPUE indices developed for MAFMC stocks (black sea bass and bluefish)

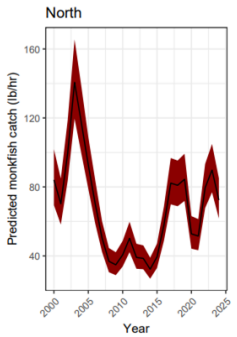


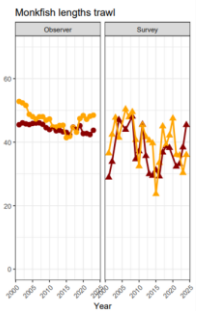
Refresher

- Collected and combined data sets for a given gear set (trawl, gillnet, scallop dredge)
    - Study Fleet and Observer data sets
- Identified ~ 5 species commonly caught with monkfish in each data set
- Filtered larger data set just to trips that either caught monkfish or the associated species
- Sampled from this data set based on the size of a given statistical area (similar to Survey random stratified sampling)
- Performed nominal CPUE (mean catch per hour)
- Explored CPUE in space (mean catch/hr for each stat area)
- Used statistical models to standardize the CPUE (just area and year for now)
- Explored Gini index (spatial aggregation of catch)
- Explored lengths in catch based on NEFOP data





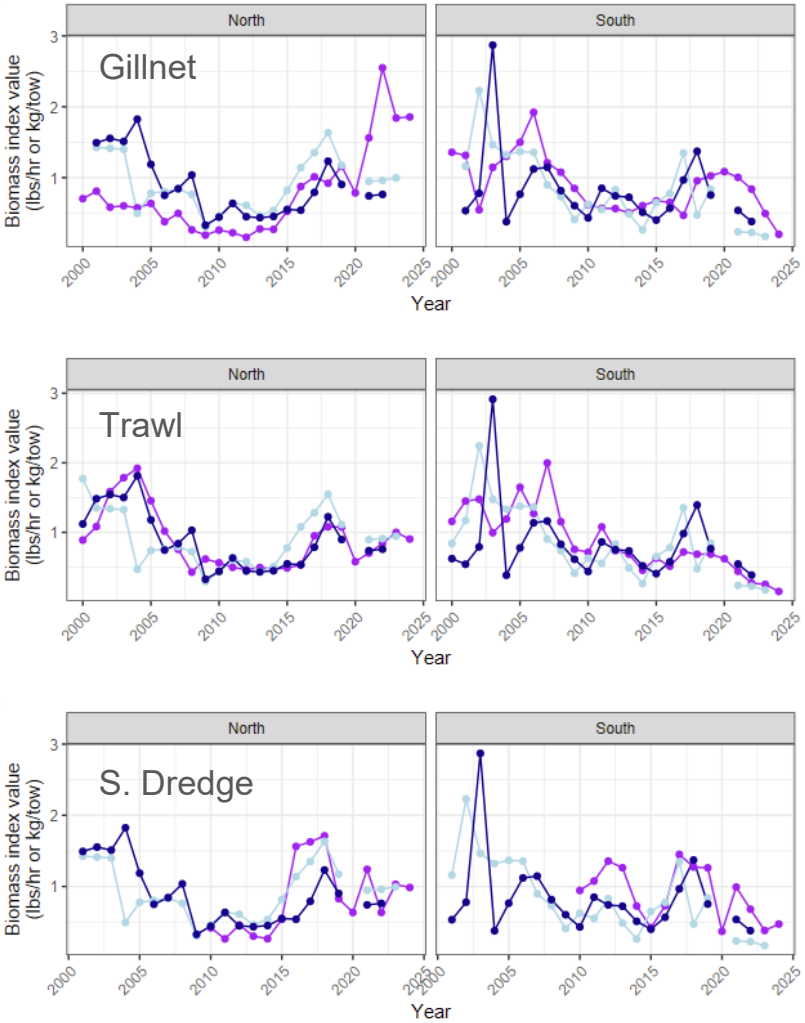




Brief results

Primary findings were:

- Spatially balancing the sampling in the fishery was useful (more representative indices)
- Trends in CPUE indices were fairly consistent between trawl gear and the NEFSC BTS
- Gillnet CPUE showed some consistency but likely is lagged (2-3 years) because of the larger size of fish the fishery samples
- Scallop dredge indices (new since Feb) also showed some agreement with BTS series
- Working on getting this written up as a working paper!

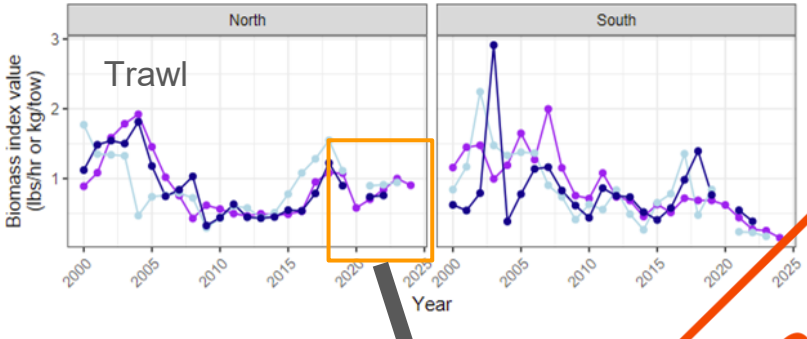


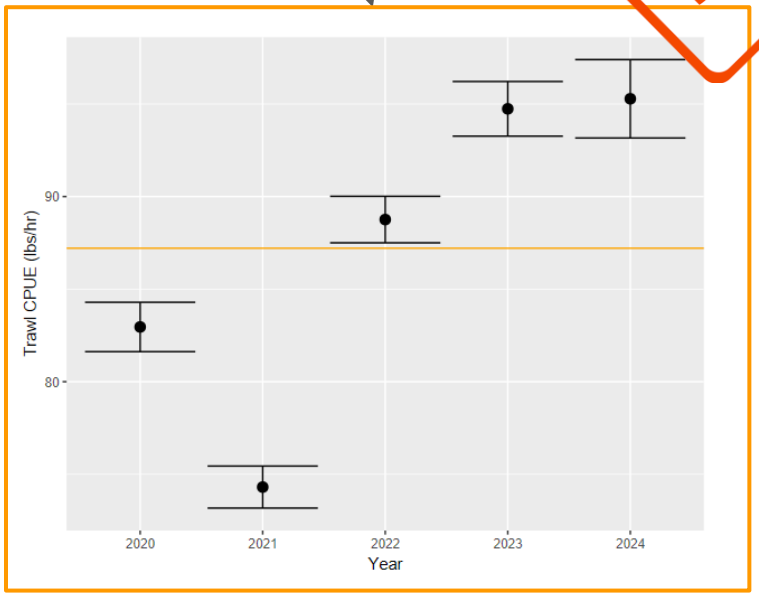
Application to DAS: Trawl

- What we have here is an estimated average catch rate from a primarily the groundfish fishery
- **Rates are catches (in live pounds) per hour but could be converted to catch per trip**
- Using the rates from the north for trawl gear as an example

Target species (haul-level)

target	percent
FISH, GADIFORM, NK	0.34
HADDOCK	0.20
REDFISH, ACADIAN	0.11
Other	0.10
POLLOCK	0.07
FLOUNDER, NK	0.06
MONKFISH (GOOSEFISH)	0.05
LOBSTER, AMERICAN	0.04
NA	0.02





DRAFT

87 lbs / hr

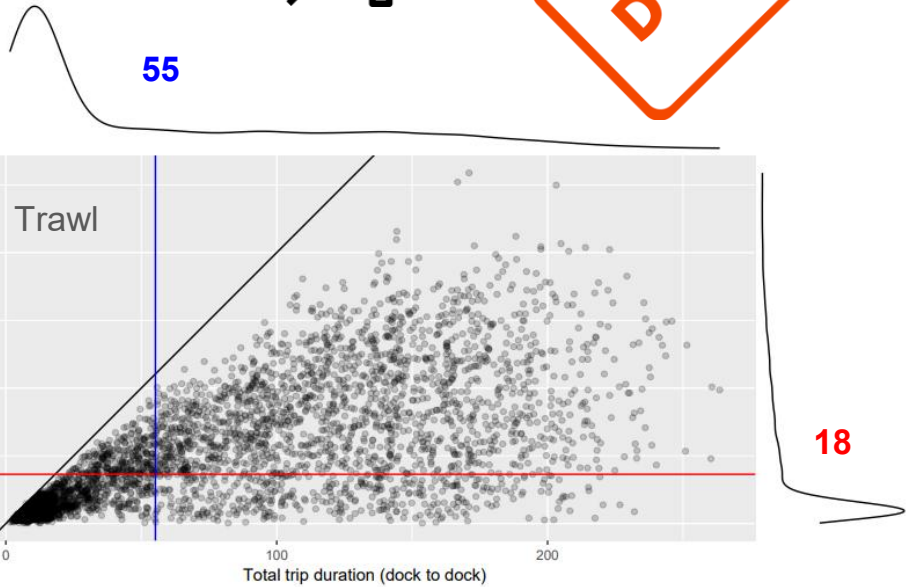
Straw man analysis: Trawl

We'd need to translate these rates into units per trip or per day

The number of hours fished in a trip is important to this

Here is what that looks like from the data set we used in the analysis:

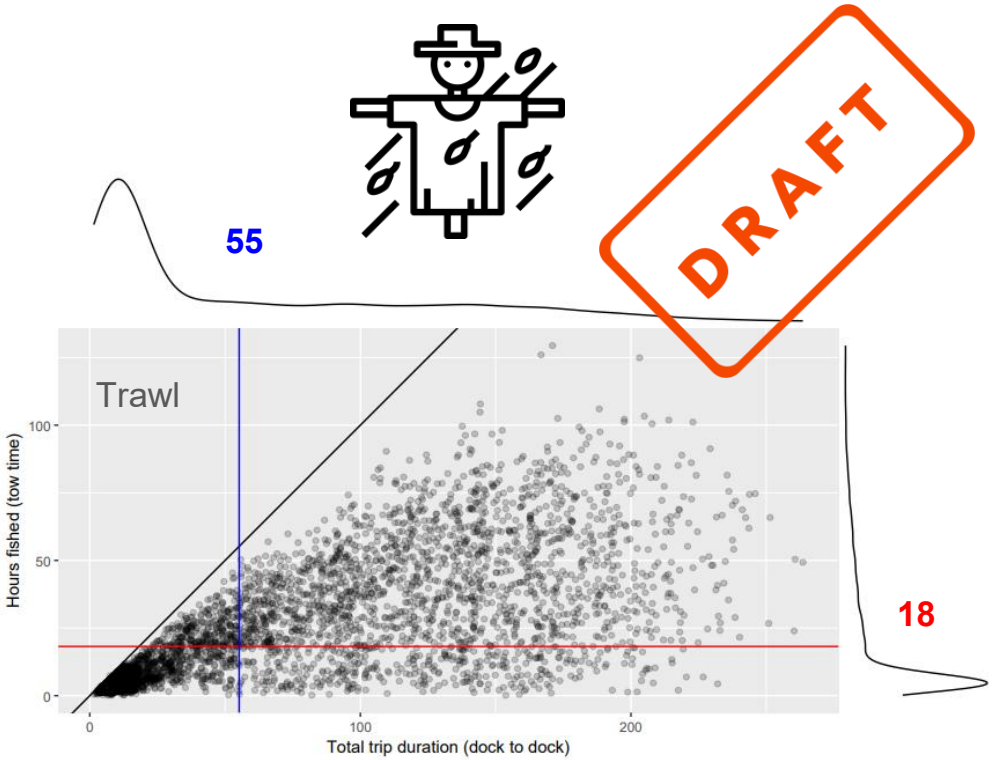
- Hours fished by trawlers (on the bottom fishing)
- Total trip duration
- **Average hours fished per trip ~ 18**
- **Average days per trip ~ 2.3 (55 hrs)**



Straw man analysis: Trawl

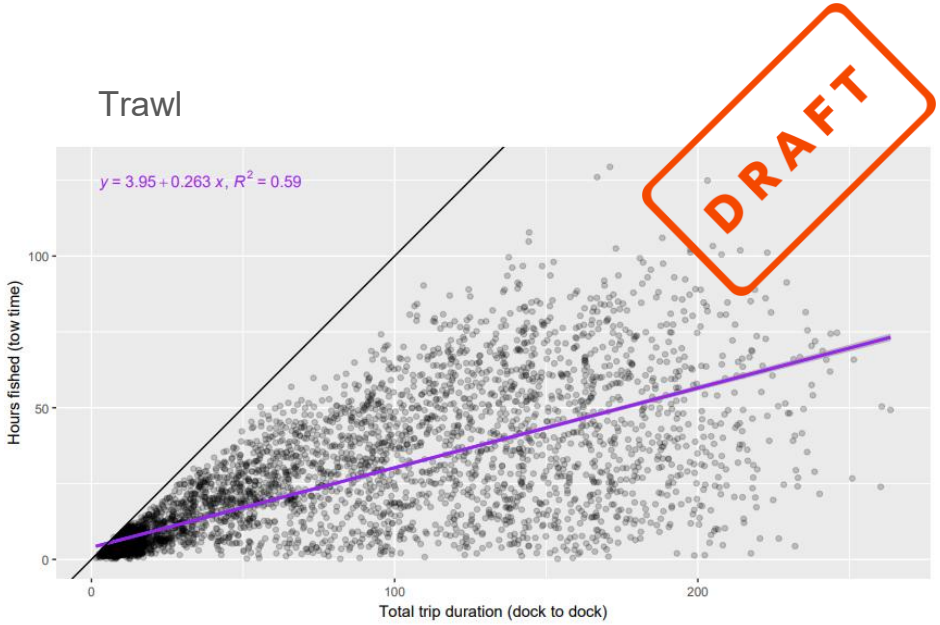
A couple quick calculations (**just preliminary examples**)

- Average catch * average hrs fished per trip / number of days per trip
  - **Average catch rate over the last 5 years: ~ 87 lbs/hr**
  - **Average hours fished per trip: 18**
  - So then 18 * 87 = 1566 lbs / trip
  - Units lbs/trip
  - **Average trip is = 2.3 days**
  - 1566 lbs / 2.3 days = 681 lbs / day



Straw man analysis: Trawl

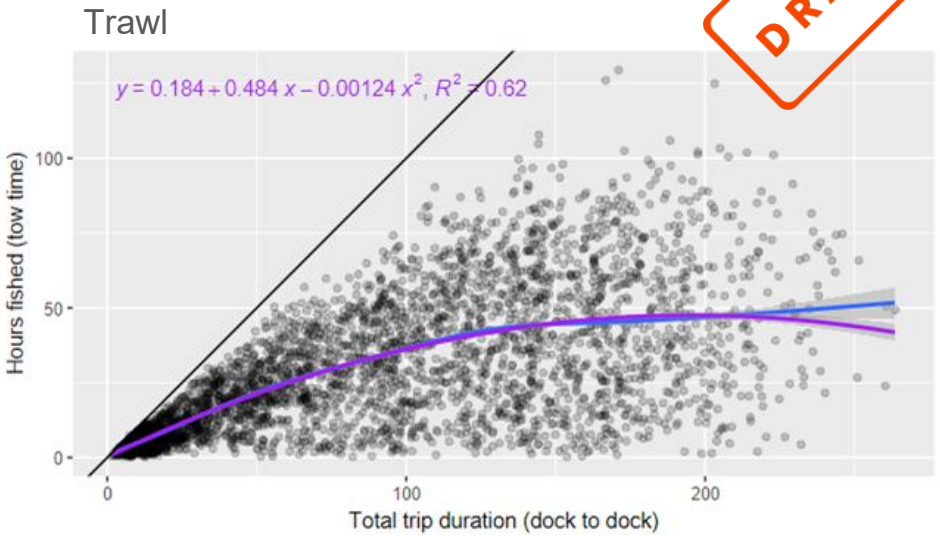
- Hours fished could alternatively be a function of trip length
  - **Average hours fished per day of trip length = 10.2**
- Average catch * average hours fished per day of trip duration
  - **Average catch rate over the last 5 years: = 87 lbs/hr**
  - So then 10.2 hr * 87 = 887.4 lbs / day



0.263 * 24 + 3.95 ~ 10.2

Summary: Trawl

- These are two different but potentially useful ways to utilize components of the data
- Other ways we could look at this too
- Happy to think though ways to divide this out, or think about some of the categories we've lumped together here
    - Year, Season, Stat Area, Target, etc
    - Using a non-linear fit between trip length and the hours of fishing



Application to DAS: Gillnet

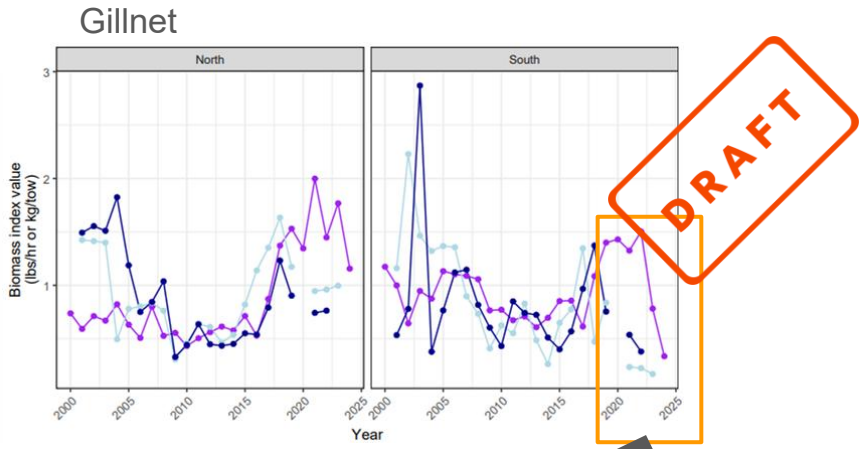
For gillnet we explored

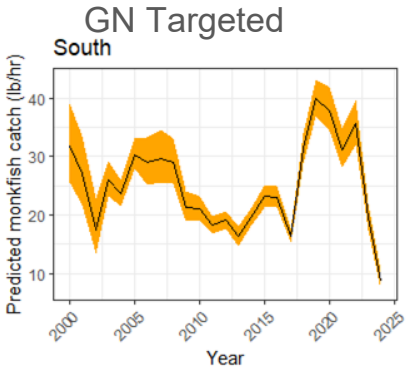
1. Incidental catches in the gear (same Jaccard approach as trawl)
2. Subsetting this down to trips which listed monkfish as a target species
3. The same targeted trips with skate catch as a covariate

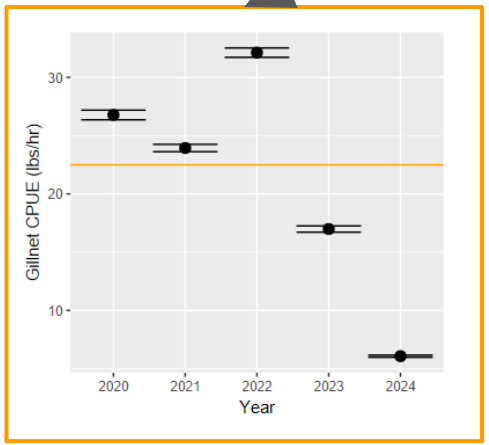
Similar patterns across the three

These could be used in the same way to estimate an rate over the last 5 years

Excluding 2024 ~ 26 (lbs / soak hr)







22 lbs / soak hr

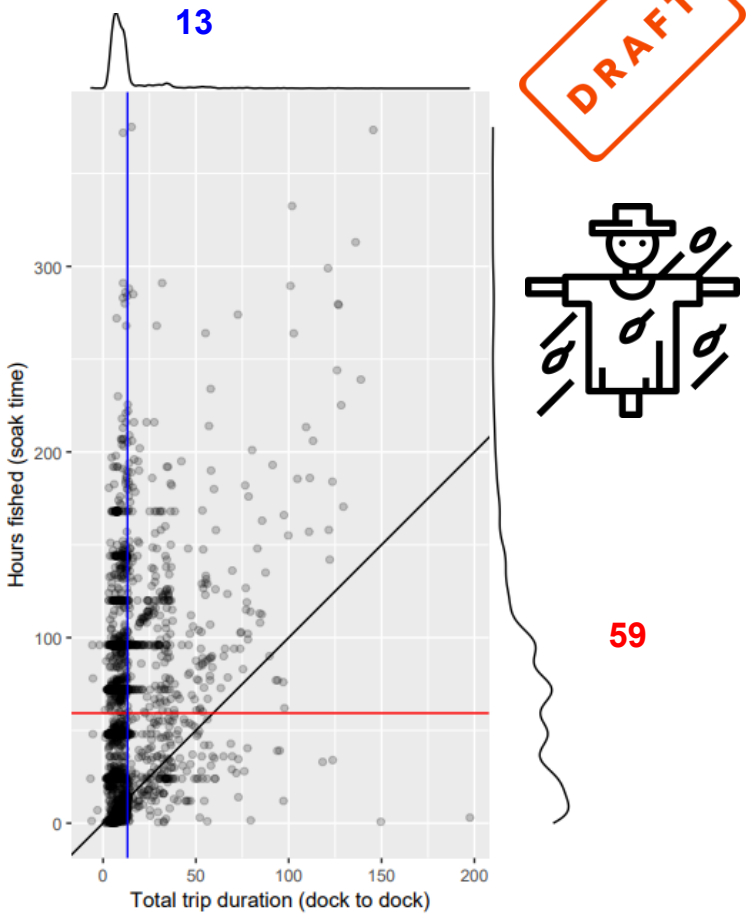
Straw man analysis: Gillnet

Again we'd need to translate these rates into units per trip or per day

The number of hours fished in a trip is important to this

Here is what that looks like from the data set we used in the analysis:

- Hours fished by gillnet (recorded soak time)
- Total trip duration
- **Average hours fished per trip ~ 59**
- **Average days per trip ~ 0.55 (13 hrs)**



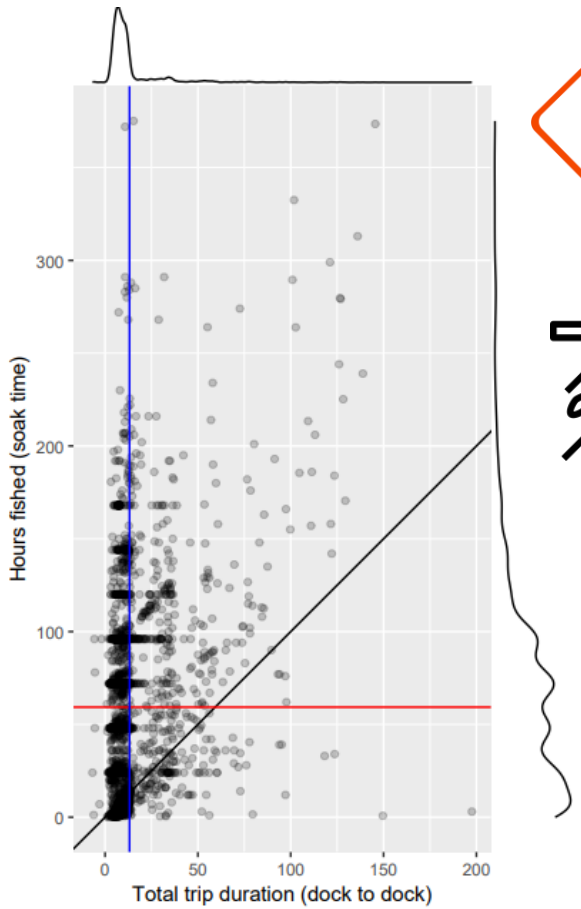
Straw man analysis: Gillnet

A couple quick calculations (**just preliminary examples**)

- Average catch * average hrs fished per trip / number of days per trip
  - **Average catch rate over the last 5 years: ~ 22 lbs/soak hr**
  - **Average hours fished per trip: 59**
  - So then 22 * 59 = 1298 lbs / trip
  - Units lbs/trip
  - **Average trip is = 0.55 days**
  - 1298 lbs / 0.55 days = 2360 lbs / day

Because of the lack of a relationship between trip length and soak time fitting a line to make a second version of the prediction is likely less helpful

‘High-resolution’ data less useful potentially because of this



Summary:

- Reviewed the high-resolution CPUEs for monkfish that are in development
- Discussed ways these could be applied to DAS
- Really just a sketch on a napkin of how you could use these CPUEs for DAS
- Any feedback is welcome!
- Also happy to go back to any of the CPUE work