

# Observer at-sea, sampling frame, 2019

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## 1 The procedure

Scripts: Q:/mynd/kibi/sampling/observer\_at\_sea/sampling\_frame

Output: Q:/dfad/data/Data/Lykkehjul/Listerne

Graphics: Q:/mynd/kibi/sampling/observer\_at\_sea/sampling\_frame/graphics

## 2 The concept

- Purpose: Sampling discard in an at-sea observer program, which covers seiners and bottom trawlers targeting demersal fish and crustaceans and beam trawlers targeting crustaceans in area 27.3 and 27.4.
- Target population: All fishing trips engaged in the above fisheries.

### 2.1 Sampling frame

The first step is to find the group of vessels mainly conducting the fishing trips in the target population, which are suitable for an at-sea observer program. These vessels will end up as the sampling units in the final sampling frame.

#### 2.1.1 Main activity

A lot of vessels spent all the time being engaged in fisheries within the target population and will therefore naturally be a part of the sampling frame. Other vessels will spent all the time targeting small pelagic or fishing with passive gear, never conducting a trip in the target population, and will therefore naturally not be a part of the sampling frame. Lastly some vessels are engaged in a lot of different fishing activities during the year e.g. fishing small pelagic in some months and dermersal fish the rest of the year and will have some, but not all, fishing trips in the target population. These latter vessels will be included in the sampling frame if they don't spent more than 95 % of their trips outside the target population.

Each trip is assign to one of the following activities (in the order specified):

1. Fishing outside area 27 -> outside area 27.3 and 27.4
2. Fishing mussels -> mussels
3. Fishing with passive gears -> passive
4. Targeting fish for reduction or small pelagic -> reduction\_SPF
5. Fishing with TBB  $\geq 120$  -> TBB $>120$
6. Fishing outside area 27.3 and 27.4 -> outside area 27.3 and 27.4

If a vessel spends more than 95 % of the trips in a single one of these category, then the vessel is excluded from the sampling frame. All other vessels are included.

### **2.1.2 Too small**

Some of the vessels selected in the step above are too small to have an observer on board, so vessels less than 9.5 meter are excluded from the sampling frame.

### **2.1.3 Inactive**

It is difficult to sample vessels with very low activity, so vessels earning less than 200,000 dkk or having less than 50 days at sea a year are also excluded from the sampling frame.

## **2.2 Stratification**

The sampling frame is stratified by fleet, main area and lab. The latter due to practicalities.

### **2.2.1 Fleet**

Each fishing trip conducted by the vessels in the sampling frame is assigned to one of the following fleets based on métier:

1. TBB\_CRU -> Hesterejer (Crangon crangon)
2. OTB\_CRU\_32-69\_0\_0 -> OTB\_CRU\_32-69\_0\_0
3. The rest -> "trawler / seiner"

If a vessel spends more than 50 % of the trips in a single one of these fleets, then the vessel is assigned to that fleet. All other vessels are grouped in "trawler / seiner".

### **2.2.2 Lab**

Each lab samples different ports. The vessel's home port is used to assign lab.

### **2.2.3 Main area**

One of the strata above are split into two areas to ensure that both areas will be sampled.

Each fishing trip conducted by the vessels in the sampling frame is assigned to the most fished. The area, which the vessels spends most trips in, is assigned to the vessel.



Figure 1: Selecting the vessels for the at-sea observer sampling frame. The size of the boxes are not proportional to the size of the number of vessels in a category

### 3 DFAD data

Fishing areas comes from dfadfvd\_ret and metier level 6 from metier\_level6\_ret. Deleting rows without catch and vessels id's starting with DNK. If days at sea NA e.g. for vessel without logbook, then 1.

#### 3.1 DFAD - Allocating vessel id to a single version

In 2018, the Danish fishing fleet had 1403 active vessels.

During the year a vessel id (fid) can cover more than one version / vessel. The id is allocated to a single version (homeport, oal, btbrt) - the one with most landings.

In 2018, 36 out of 1439 unique combinations were removed due to this rule.

#### 3.2 DFAD - Allocating a trip to a single area, metier and date

A fishing trip can cover more than one area, fishing with more than one metier and have more than one landing date - the whole trip is allocated to the combination with most landings. First looking at metier and area in combination - and then date.

#### 3.3 DFAD - Adding needed info

Area reference: Q:/mynd/SAS Library/Farvand/farvand.sas7bdat - ICES area codes.

lab reference: Q:/mynd/SAS Library/Lplads/lplads - Relating homeport to DTU Aqua labs.

Fleet reference: Q:/mynd/kibi/reference\_tables/fleet/fleet.rds - Relating metier level 6 to a fleet.

##### 3.3.1 Vessels without homeport

This is normally due to the fact that there are landings before/after the dates in the vessel regitre - **ask FST to check**

fid	oal_new
HM147	NA
K90	NA
RI120	NA

## 4 Sampling frame

### 4.1 Main activity

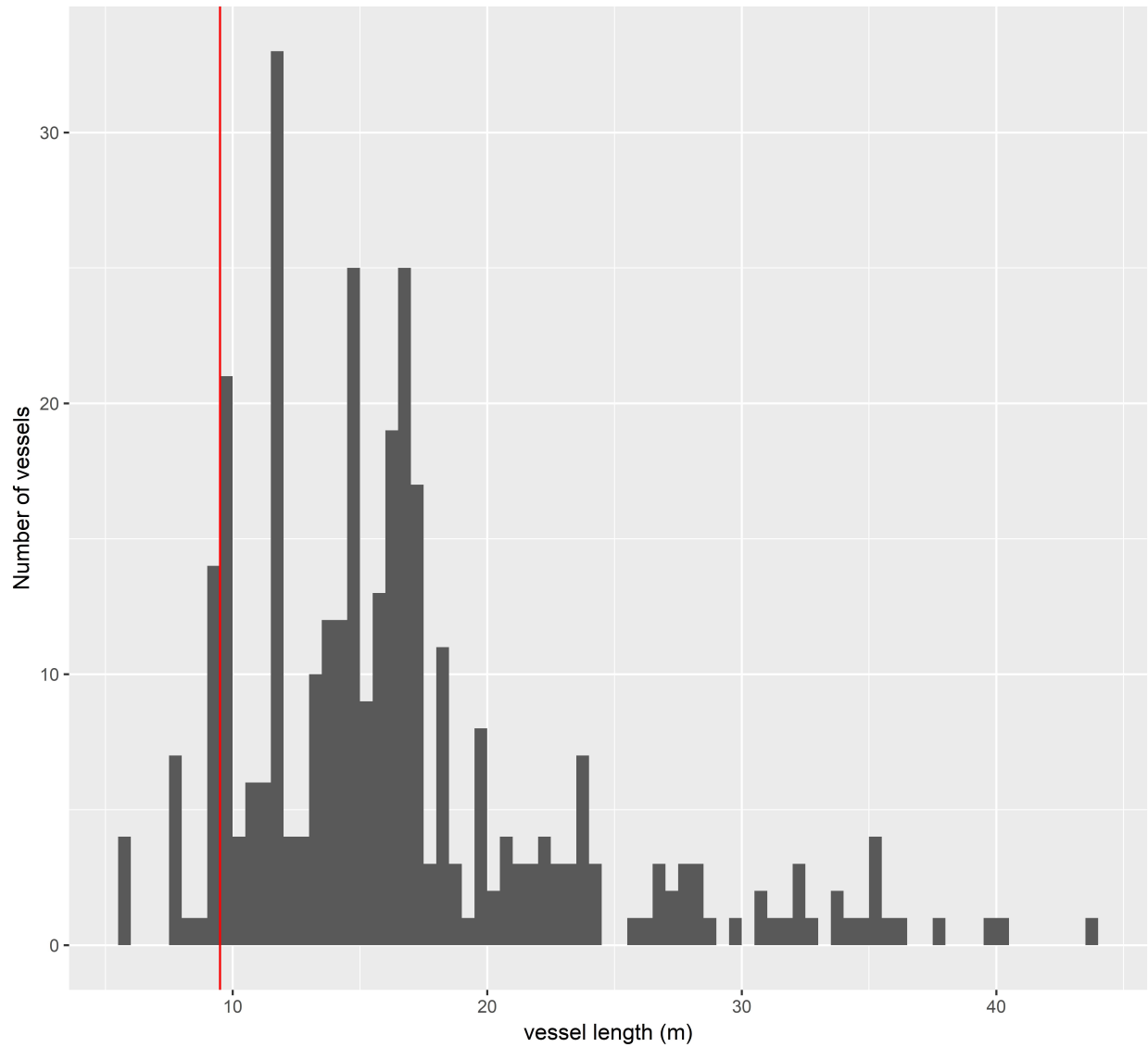
Following the rules specified in section 2.1.1

main_activity	sampling_frame	exclude_reason	no_vessels
mussels	no	main activity	51
outside_area_27.3-4	no	main activity	1
passive	no	main activity	976
reduction_SPF	no	main activity	32
rest	yes	NA	342
TBB>120	no	main activity	1

## 4.2 Too small

Vessels in sampling frame: Distribution of vessel length

Red line: present threshold (9.5 m)



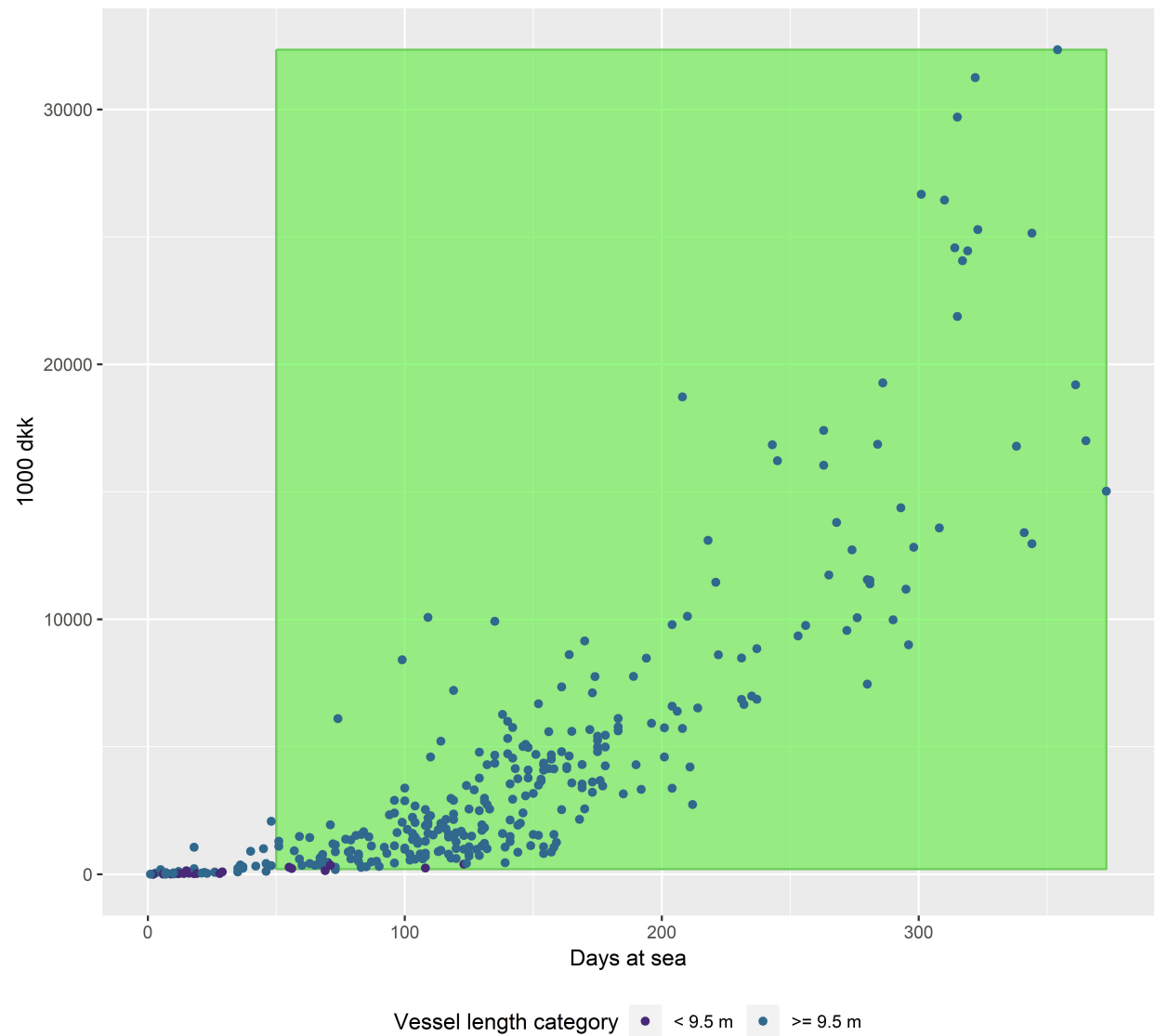
Before excluding small and inactive vessels

main_activity	sampling_frame	exclude_reason	no_vessels
mussels	no	main activity	51
outside_area_27.3-4	no	main activity	1
passive	no	main activity	976
reduction_SPF	no	main activity	32
rest	no	too small	25
rest	yes	NA	317
TBB>120	no	main activity	1

### 4.3 Inactive

Vessels in sampling frame: Active or not

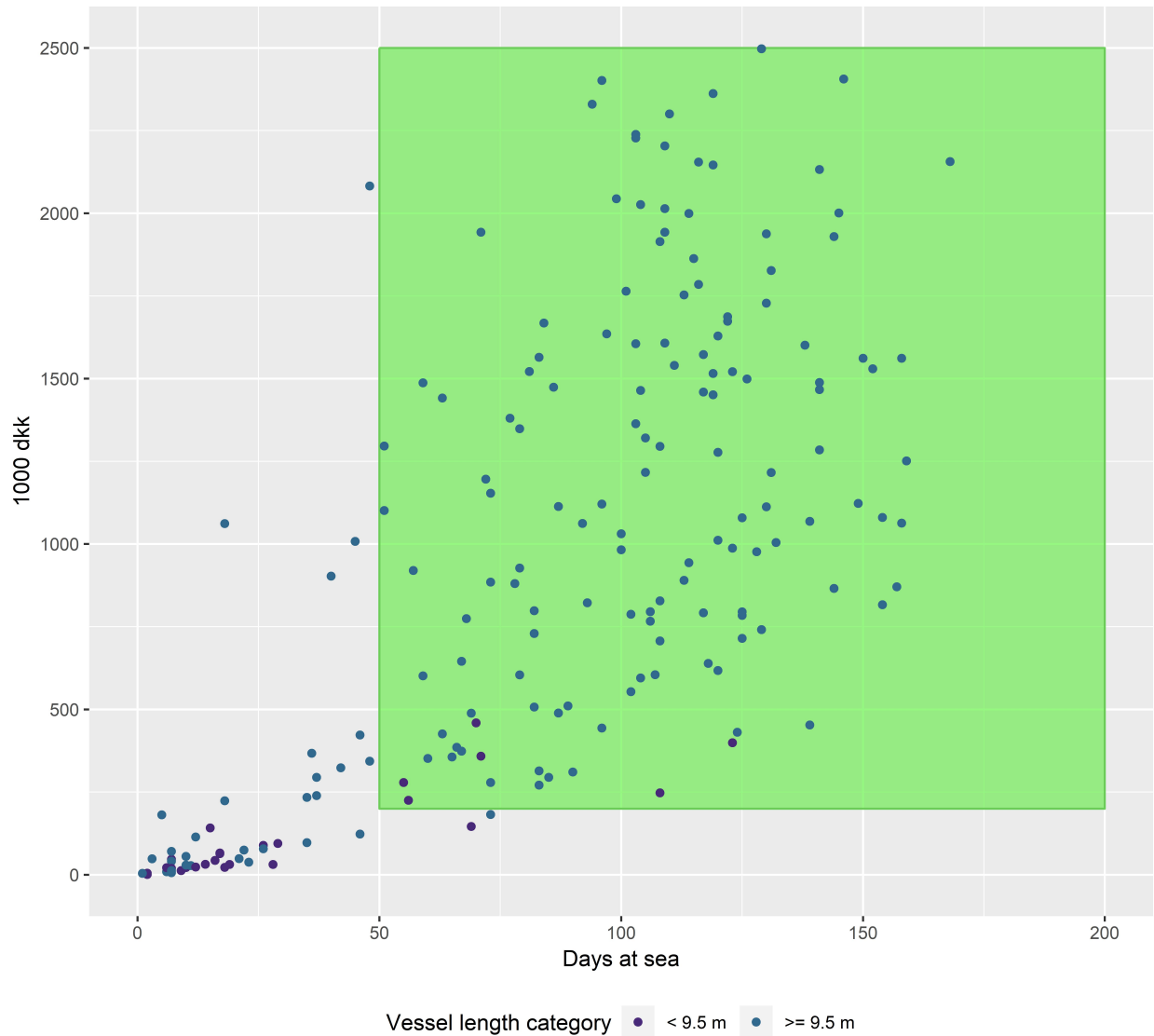
Green box: Present definition of active,  $\geq 50$  days at sea or 200.000 dkk



Before excluding small and inactive vessels

# Vessels in sampling frame: Active or not. Zoomed to least active

Green box: Present definition of active,  $\geq 50$  days at sea or 200.000 dkk



Before excluding small and inactive vessels

main_activity	sampling_frame	exclude_reason	no_vessels
mussels	no	main activity	51
outside_area_27.3-4	no	main activity	1
passive	no	main activity	976
reduction_SPF	no	main activity	32
rest	no	$< 200,000$ dkk a year	1
rest	no	$< 50$ days at sea	12
rest	no	$< 50$ days at sea & $200,000$ dkk a year	18
rest	no	too small	25
rest	yes	NA	286
TBB $>120$	no	main activity	1



## 5 Stratification

### 5.1 Fleet

Following the rules specified in section 2.2.1

### 5.2 Location

Following the rules specified in section 2.2.2

### 5.3 Area

Following the rules specified in section 2.2.3

strata_location	strata_fleet	strata_area	no_vessels
Bornholm	trawler / seiner		22
Hirtshals	OTB_CRU_32-69_0_0		8
Hirtshals	trawler / seiner	North Sea	44
Hirtshals	trawler / seiner	Skagerrak	111
Lyngby	Hesterejer		27
Lyngby	trawler / seiner		74

## 6 Output

### 6.1 Preparing the output

Added number of trips per quarter to sampling frame

Order and rename