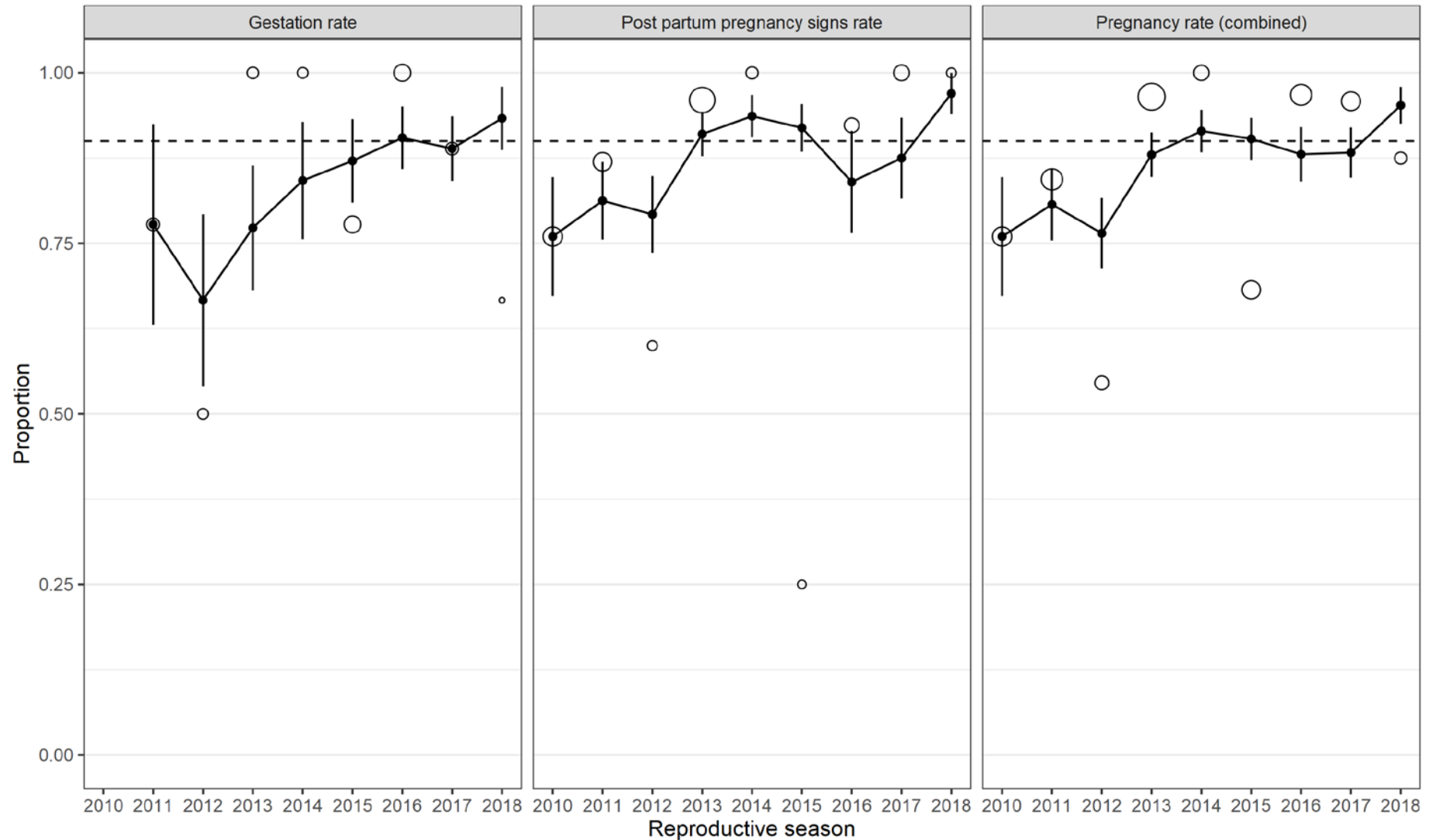


Development of reproduction/blubber thickness indicators

- Intersessional meeting cancelled due to the corona virus
- Discussions about GES for blubber thickness
 - How to develop the indicator is dependent on a good GES threshold
 - Proposal from Sweden has been put forward
- "Test run" of data reporting files (according the monitoring guidelines)
 - Data from Sweden and Finland
 - Preliminary update using these data (according to previous methods)
 - Agree upon data reporting files and timeline for reporting (November? December?)
 - The plan is to start with
 - Looking at the amount of data – data gaps for ringed seal, harbour seal and harbour porpoise/how much more data is needed
 - Starting point for finding GES for reproductive rate for these species – combination of using existing literature and modelling (and to revisit the 90% GES for grey seal)

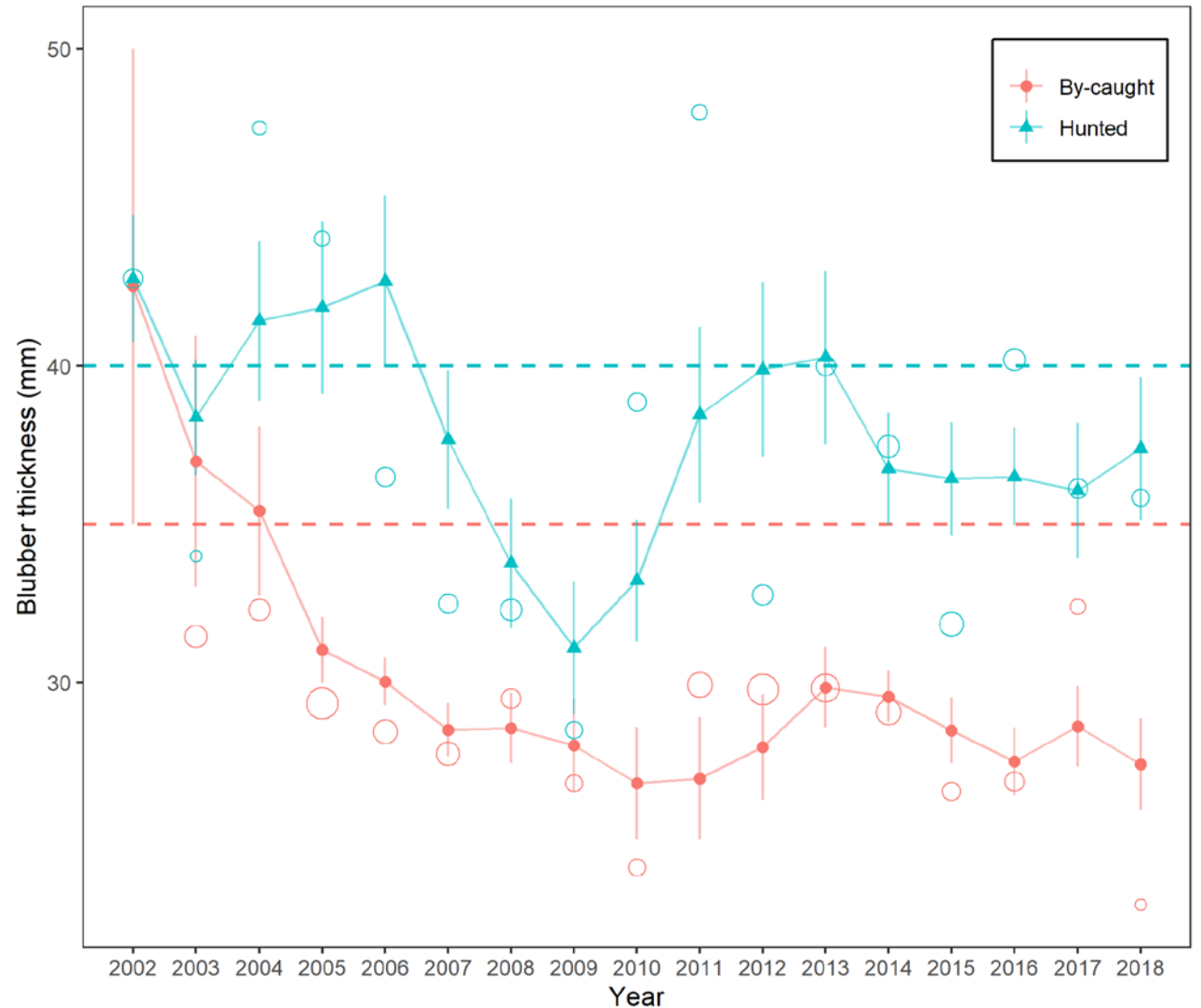
Reproductive rate, grey seal

- n=235
- Line: three-year moving averages
- Circles: the yearly proportions – the area is proportional to the number of observations
- Vertical lines are standard errors



Blubber thickness grey seals – preliminary data

- n=877 subadults and adults
- Line: three-year moving averages
- Circles: the yearly proportions – the area is proportional to the number of observations
- Vertical lines are standard errors



Current GES for blubber thickness

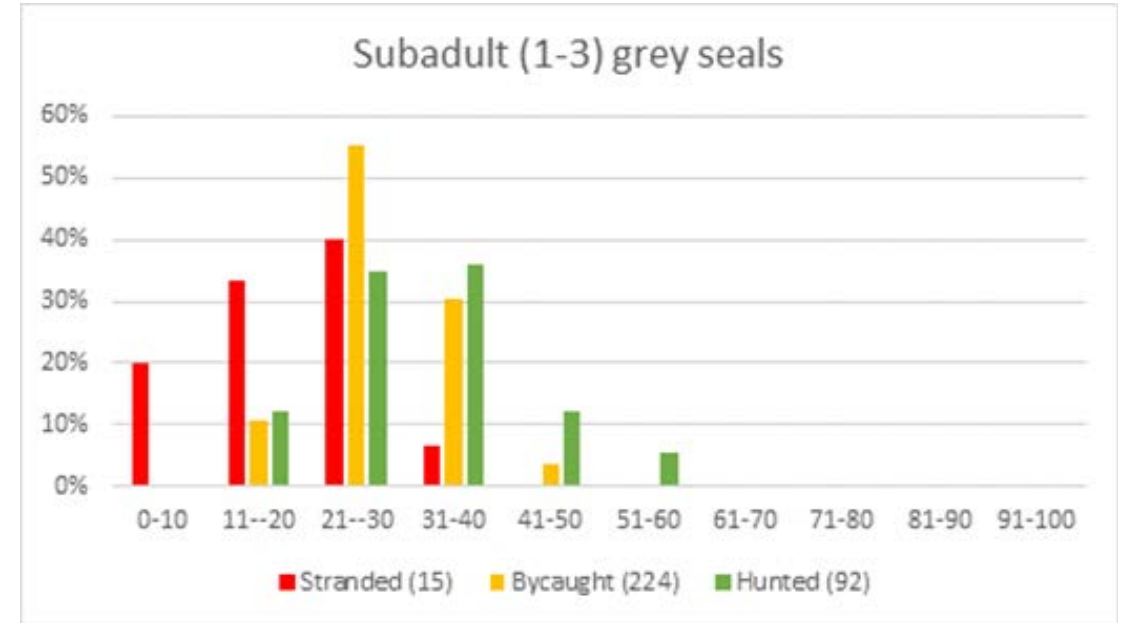
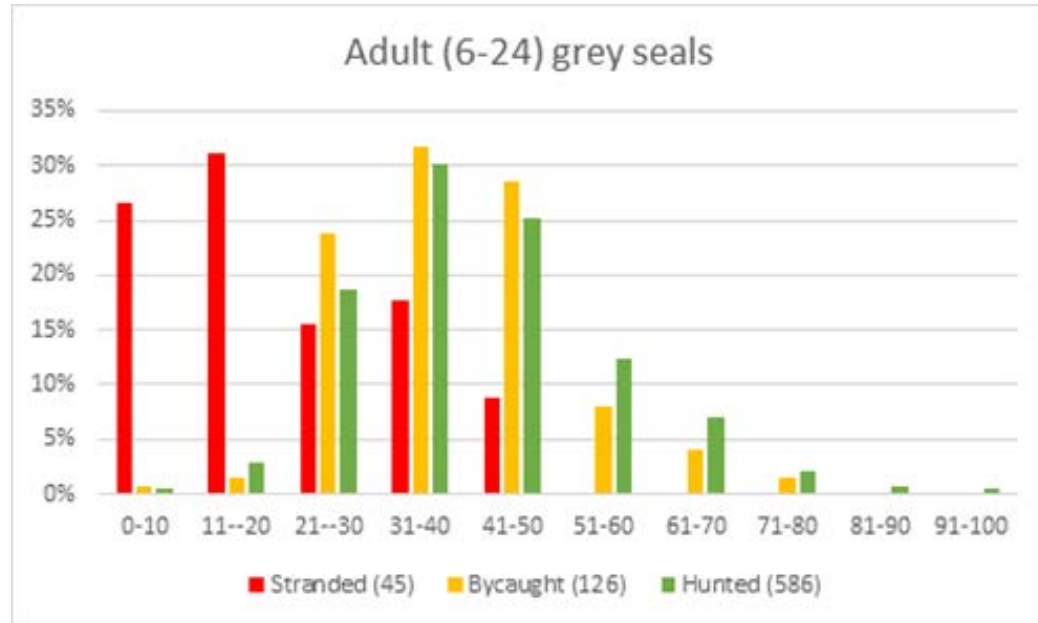
- GES is set as the average blubber thickness under pristine conditions for a subset of seals (1-3 year old during autumn)
- At carrying capacity the blubber thickness will fluctuate over time and adjust around a new average
 - What average?
 - Who decides if carrying capacity is reached, and how? Per region?
- There is not much literature to refer to

Difficulties in evaluating blubber thickness

- Varies with age, season, sex, disease, cause of death...
 - Region in Germany but not found in Swedish data
- The aim is to use data from all contracting parties
 - Mainly differences in cause of death (or alive)
- If put together into one model the result may have low confidence due to many influencing factors
 - Very large data sets needed for power in the analysis
 - One GES - what would that be??
 - Several GES will have to be set for parts of the dataset?

How to go forward?

- *“GES is achieved when the seal population attains a health status that secures the continued existence of the population” (based on HELCOM R 27-28/2)*
- The GES threshold should thus indicate that the population is at risk, *regardless of the reason* for the decline in blubber thickness
- There is a critical blubber thickness for survival and reproduction
 - Physiological threshold



Distribution of blubber thickness in stranded, bycaught and hunted adult or subadult grey seals in Sweden

There is a *risk zone* where the individual is at risk of not surviving (seems to be around 20-30 mm, Nota Bene: no correction for season etc, more work is needed).

GES suggestion:

- A GES could be that no less than xx% of hunted adult and subadult seals should have a blubber thickness within/below a defined risk zone
 - The exact percentage can be calculated from a population model
- Blubber thickness of bycaught and stranded animals could be assessed as **trends** for overall interpretation of the indicator results
 - These data would be crucial to confirm continuous validity of the GES (quality control)