

# Monitoring mussels Flakkeese Spuisluis

Results 2016 en 2017

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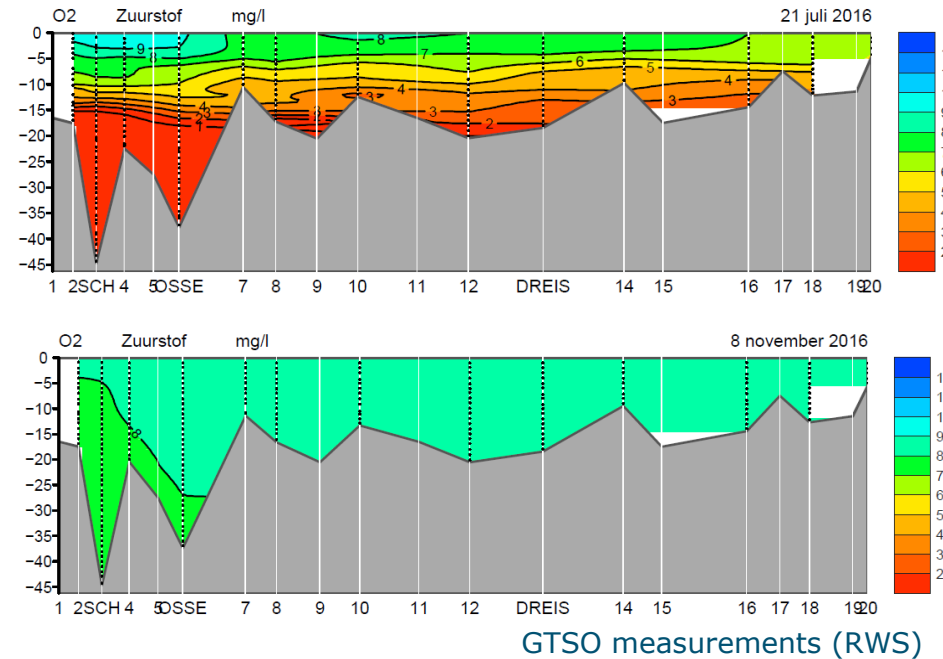


# Location



# Grevelingenmeer: saltwater lake

- Closed from North Sea 1971
- Water exchange diminished
- Stratification during summer
- Oxygen depletion deeper parts
- Mass mortality oysters on culture plots
- Development bacterial mats (*Beggiatoa*)
- Benthos community



Beggiatoa in Grevelingenmeer (Didderen et al 2017)

# Flakkeese Spuisluis

- Constructed in 1984 to maintain salinity in Northern branch Oosterschelde
- Transport water through 6 shafts
- After completion Oosterschelde works (1987) no function





# Flakkeese Spuisluis

- December 2016: re-installment
- Daily averaged Capacity 70 – 80 m<sup>3</sup> s<sup>-1</sup>
- Positive effect on water-quality
- Potential for shellfish culture Grevelingenmeer
- Impact on shellfish culture Oosterschelde



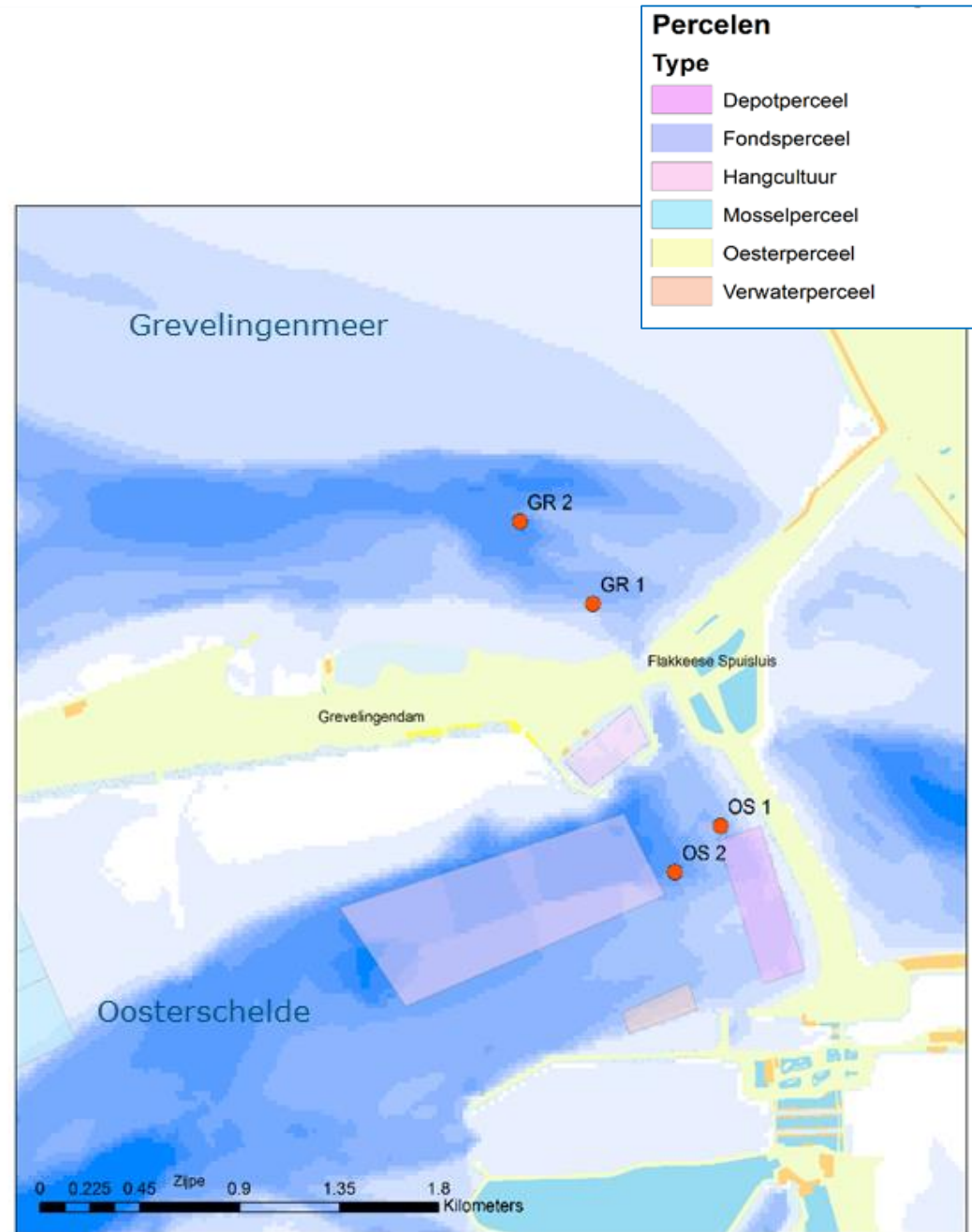
# Research questions

- What is the effect of the re-installment of the Flakkeese spuisluis on the water quality Grevelingenmeer?
- What is the effect on rope culture Oosterschelde?
- Potential for bottom culture shellfish?



# Method

- Growth and survival of mussels
- 4 locations
- Bottom and surface
- 2016 ( $T_0$ ), 2017 and 2018





# Measurements

- 4\*25 mussels per ring
- Monthly sampling
- Temperature and oxygen concentration continuous

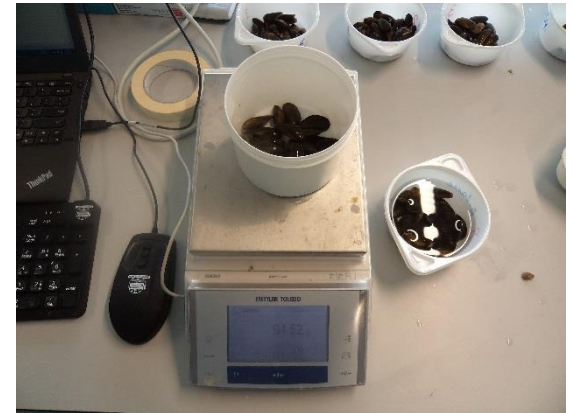


	apr	may	jun	jul	aug	sept	oct	nov
2016			9	12	8	6	6	8
2017	25	29	29	25	28	22	24	
2018								



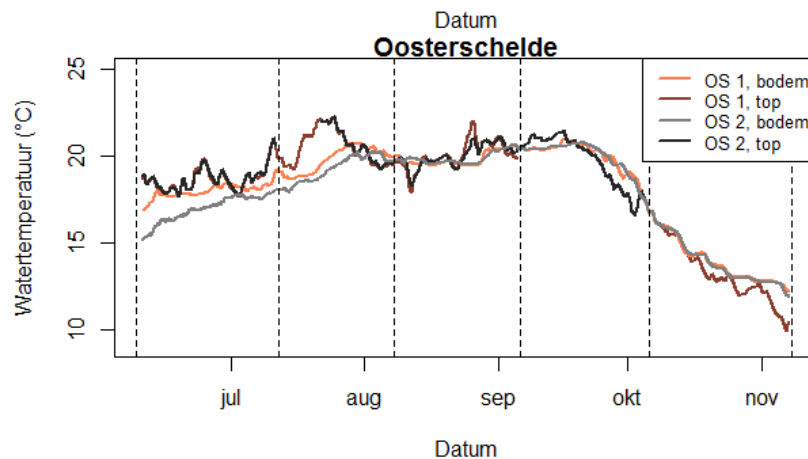
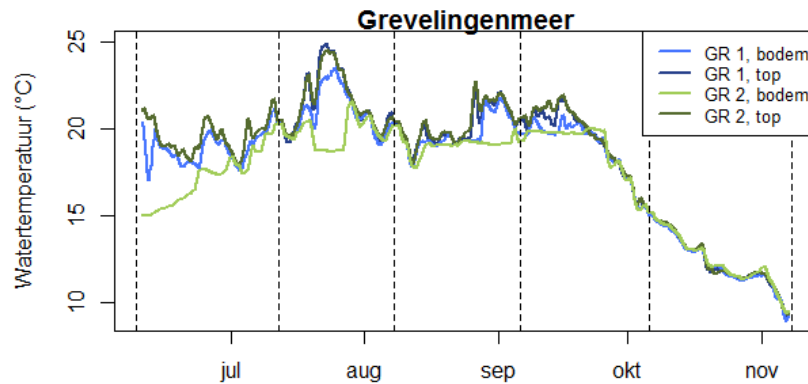
# Measurements

- Survival
- Length
- Fresh weight
- Cooked flesh weight
- (Ash-free)dry weight

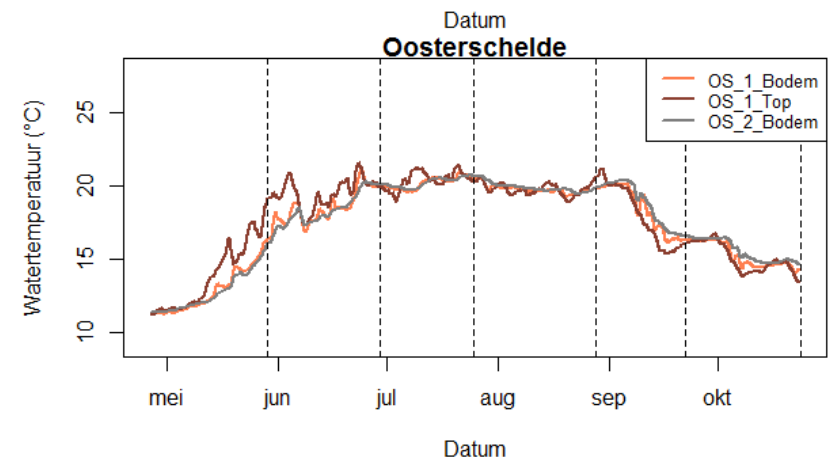
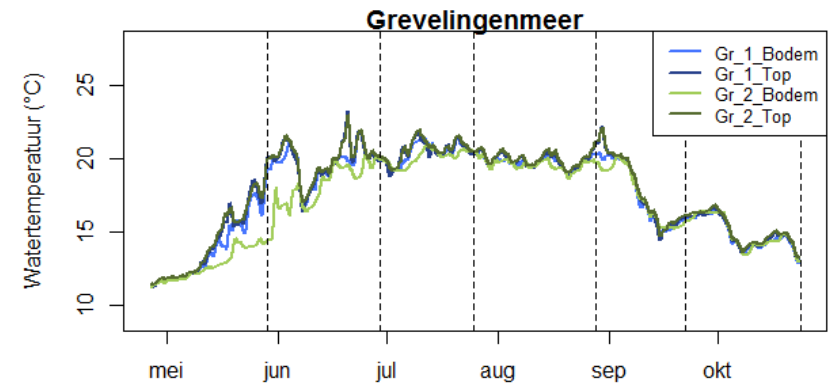


# Results water temperature

## 2016

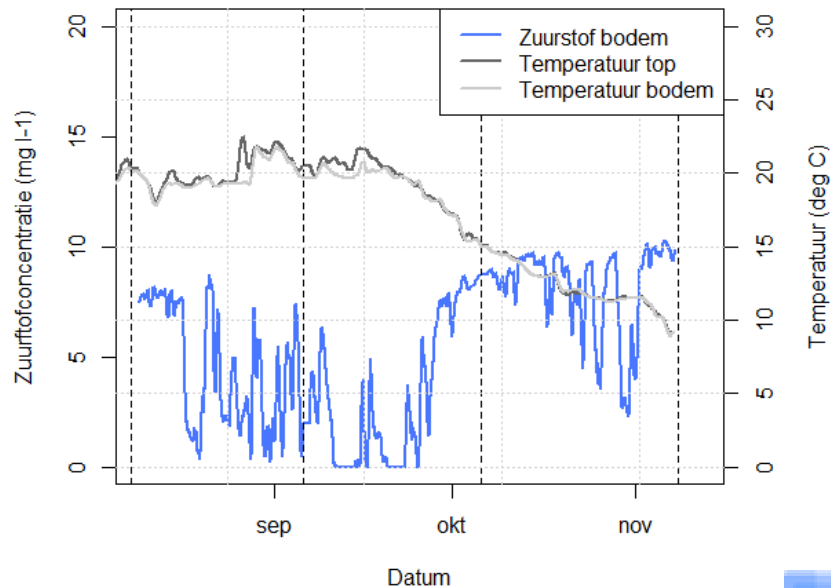


## 2017

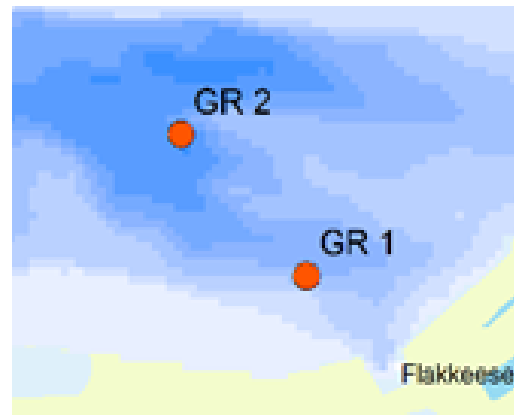
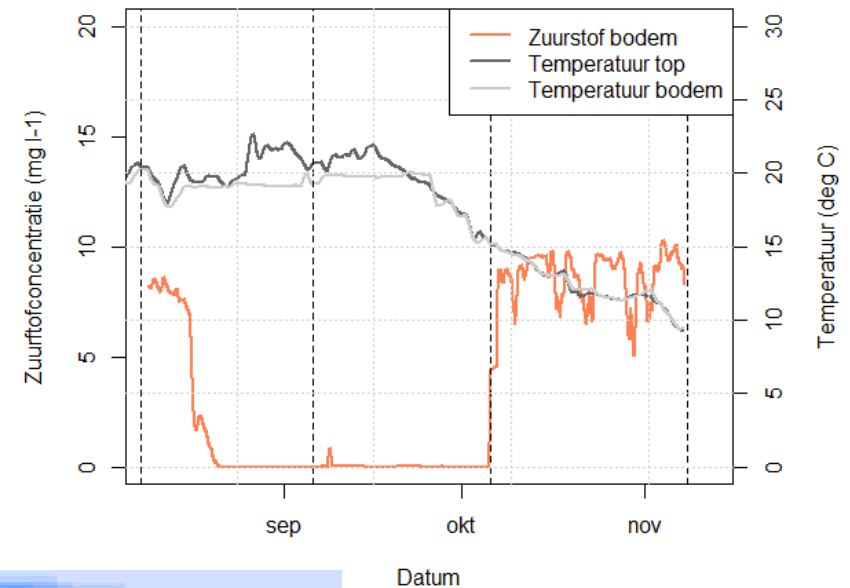


# Results oxygen concentration 2016

## GR1

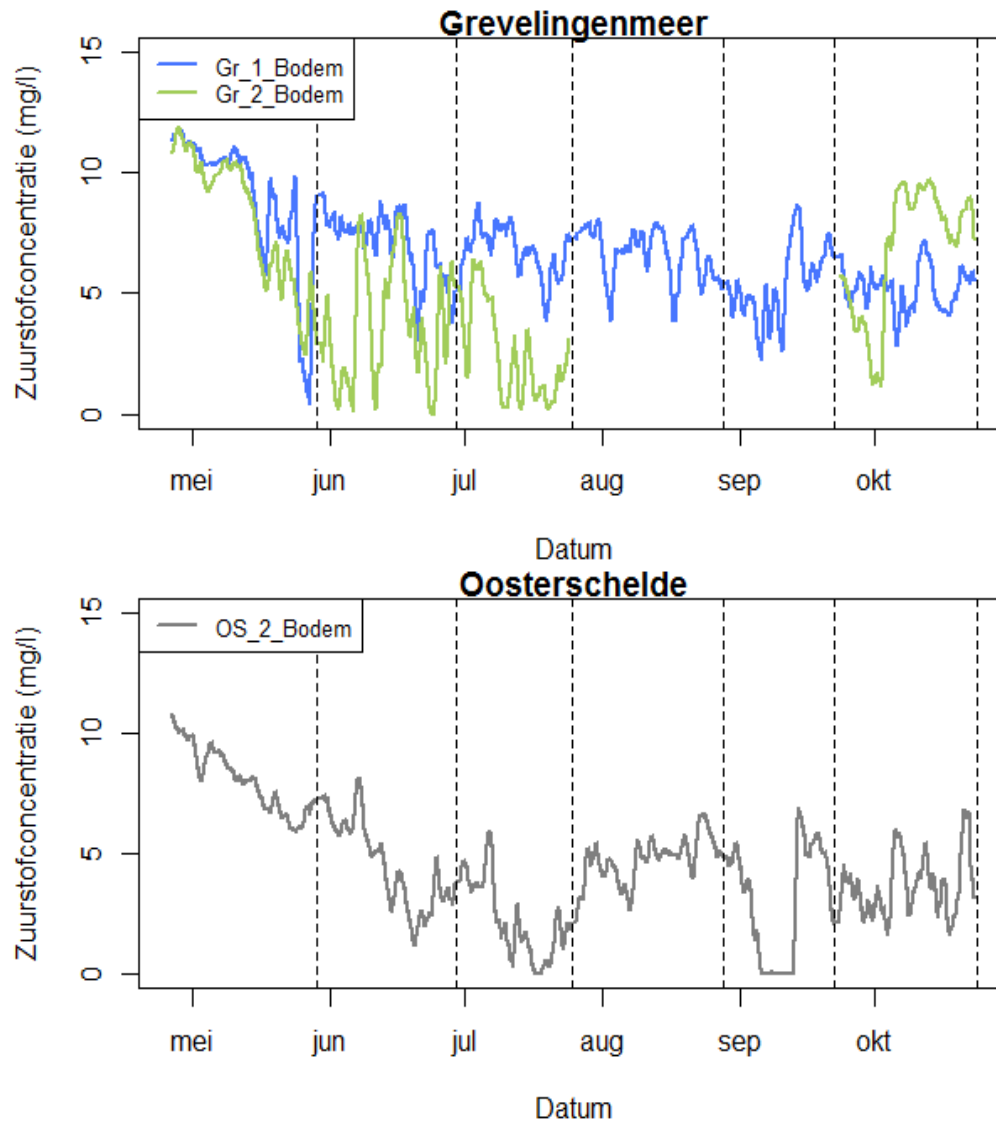


## GR2



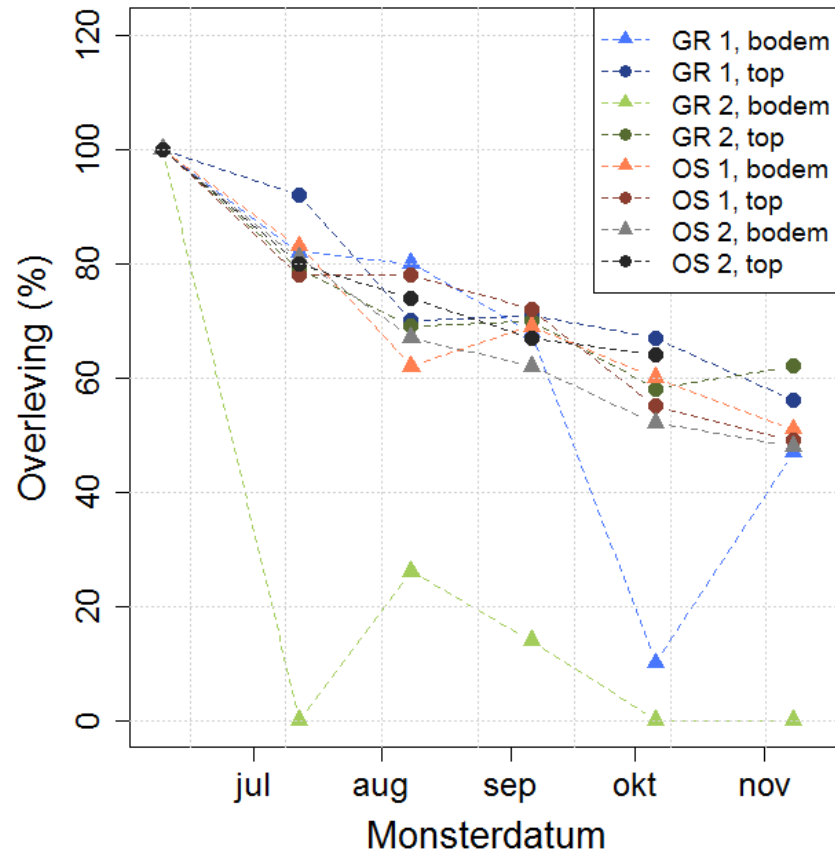


# Results Oxygen concentration 2017

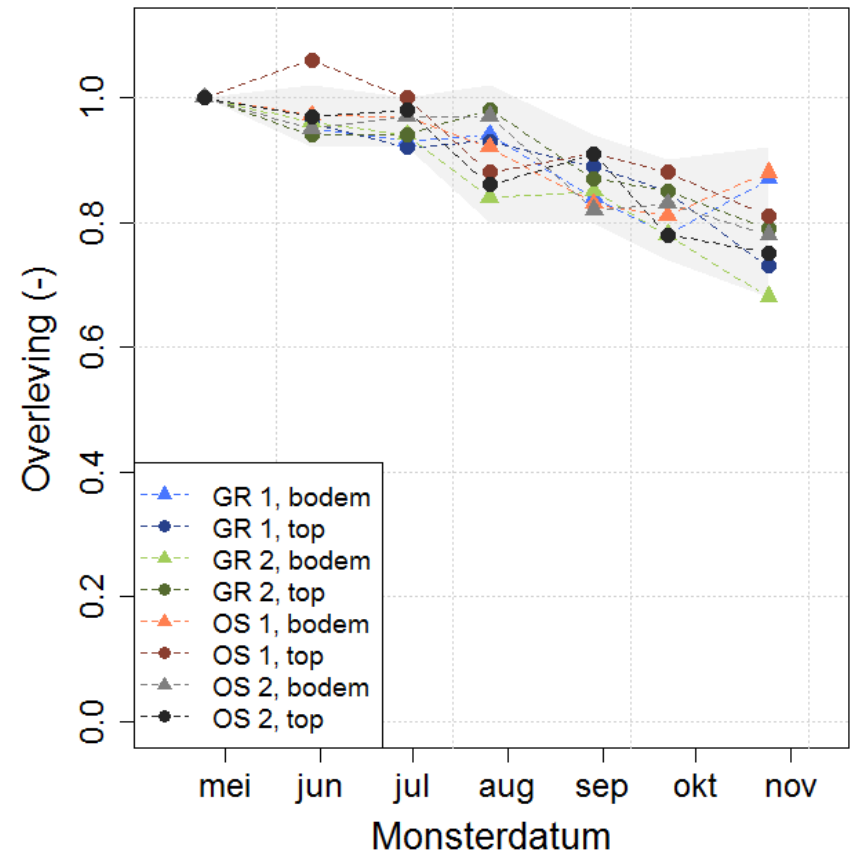


# Survival mussels

2016

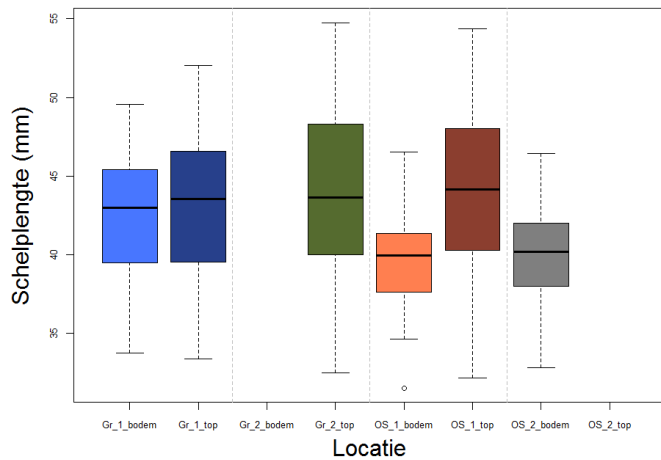
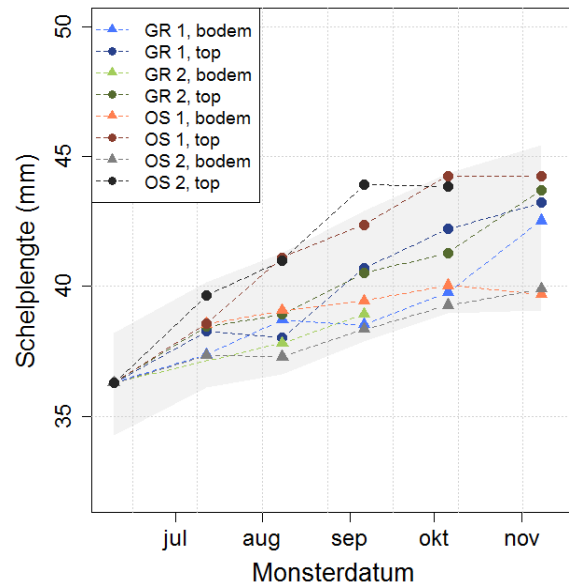


2017

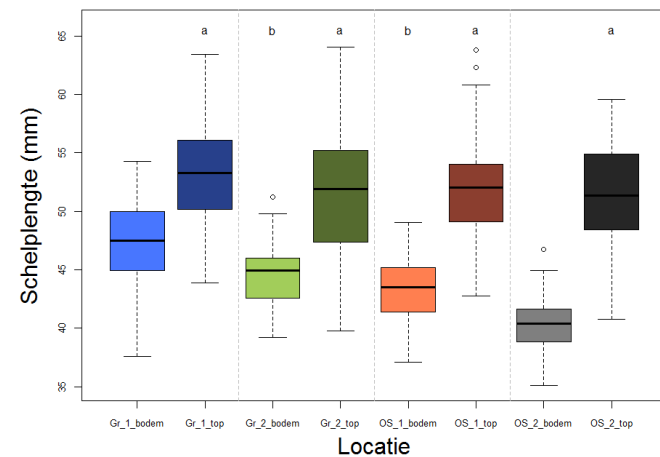
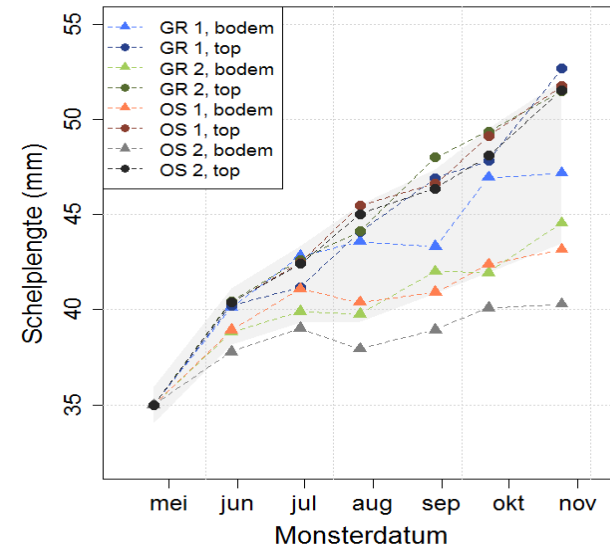


# Shell length mussels

2016



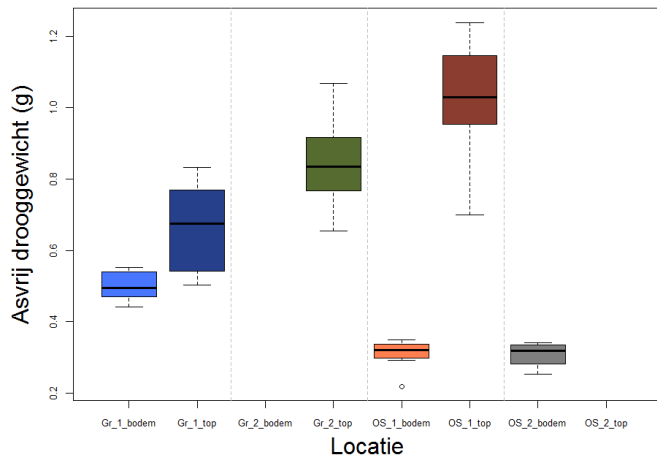
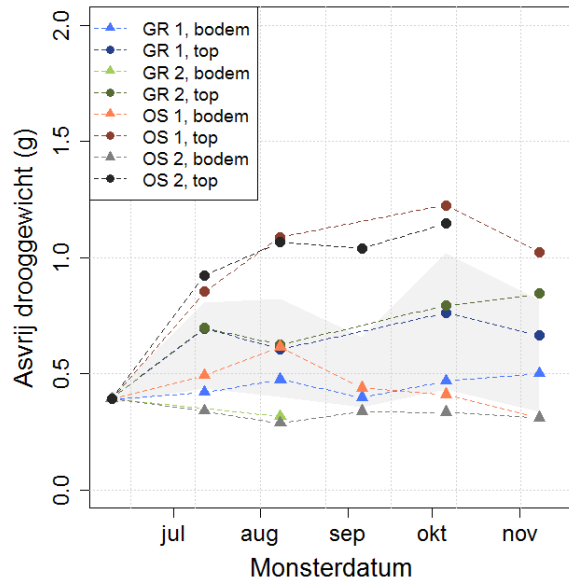
2017



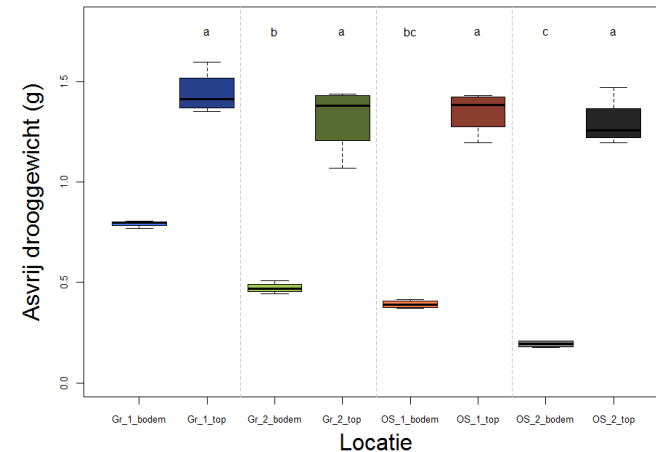
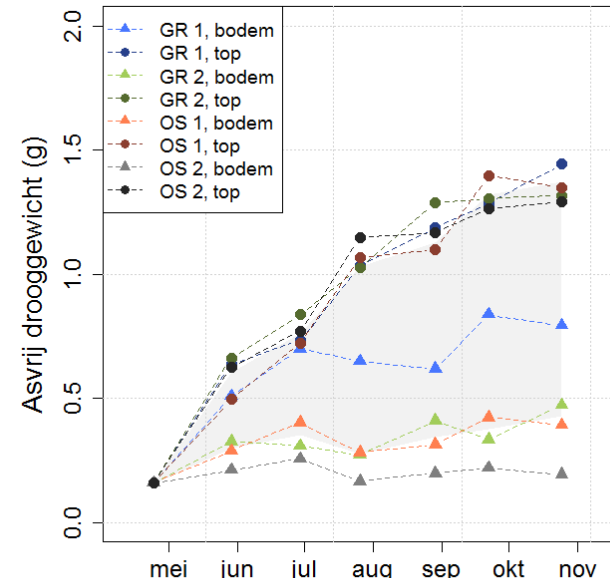


# Ash-free dry weight mussels

2016

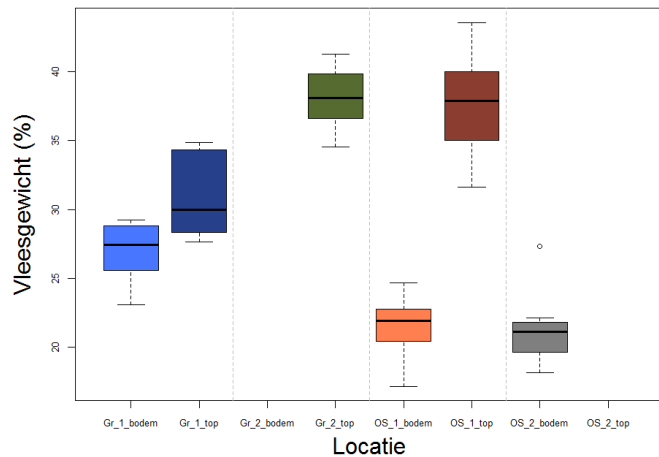
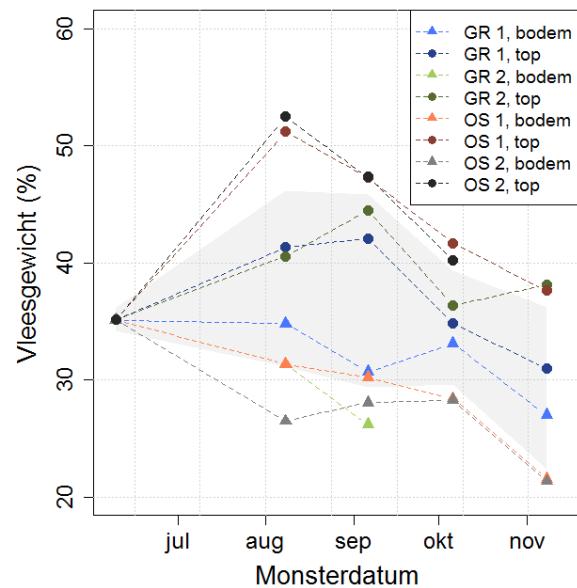


2017

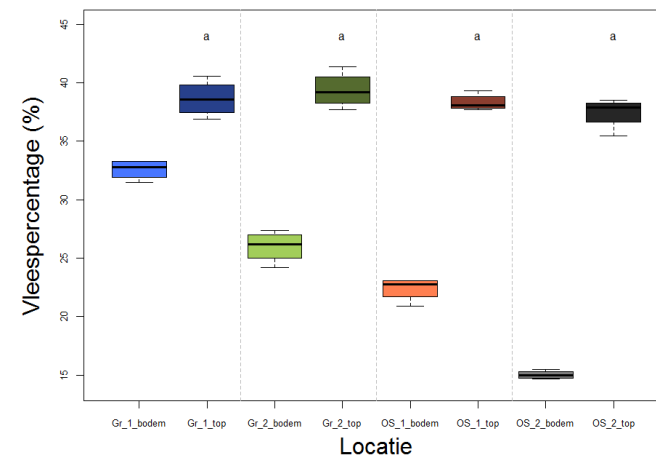
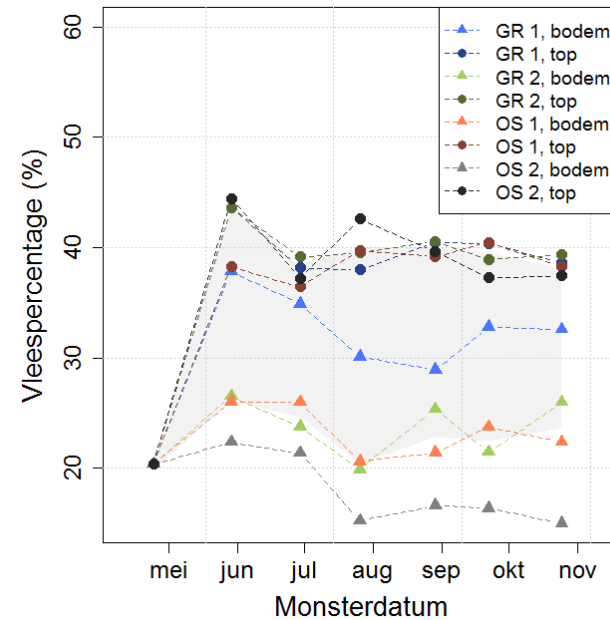


# Meat content mussels

2016



2017



# Conclusions

- Less oxygen depletion in 2017 in Gr
- Survival higher in 2017, both in Gr and OS
- Better growth in water column than on bottom
- In 2017 less difference in water column between OS and Gr
- Worst growth at bottom OS (both in 2016 and 2017)
  - Rope culture?
  - Food depletion?





# Continuation monitoring

- Continuation in 2018 (or 2019)
- Depending on construction tidal test center



# Thanks for your attention



# Flow Flakkeese Spuisluis 2017

