



Nature Coast

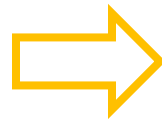
BUILDING WITH NATURE

Assessing the effects of the Sand Engine on essential nursery habitat conditions for juvenile plaice (*Pleuronectes platessa*) and sole (*Solea solea*)

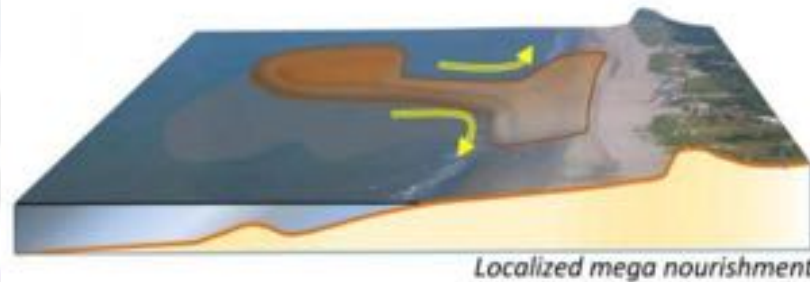
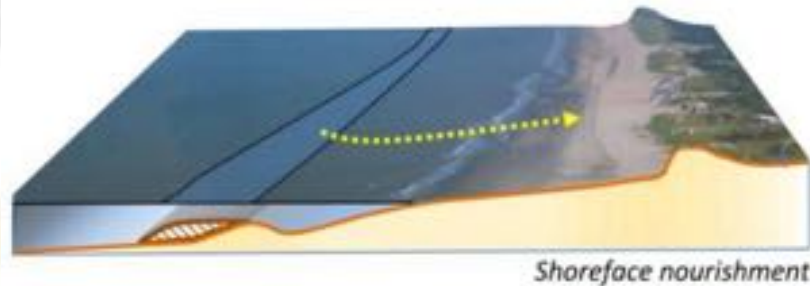
Marjolein Post , Ralf van Hal , Chen Chun, Martin Baptist

Introduction

- Coastal sea is an important flatfish nursery
- Increase in sand nourishments
- Direct effect on nursery habitat



Sand nourishment strategies



- Placing sand on the beach
- Sediment supply at 5-8m depth
- Concentrated mega-nourishment

Sand Engine: mega-nourishment

How does this affect important habitat conditions for juvenile flatfish?



Sand Engine

- 21.5 million m³ sand
- 1.5 km wide
- 2 km long



Fish in a Sand-box

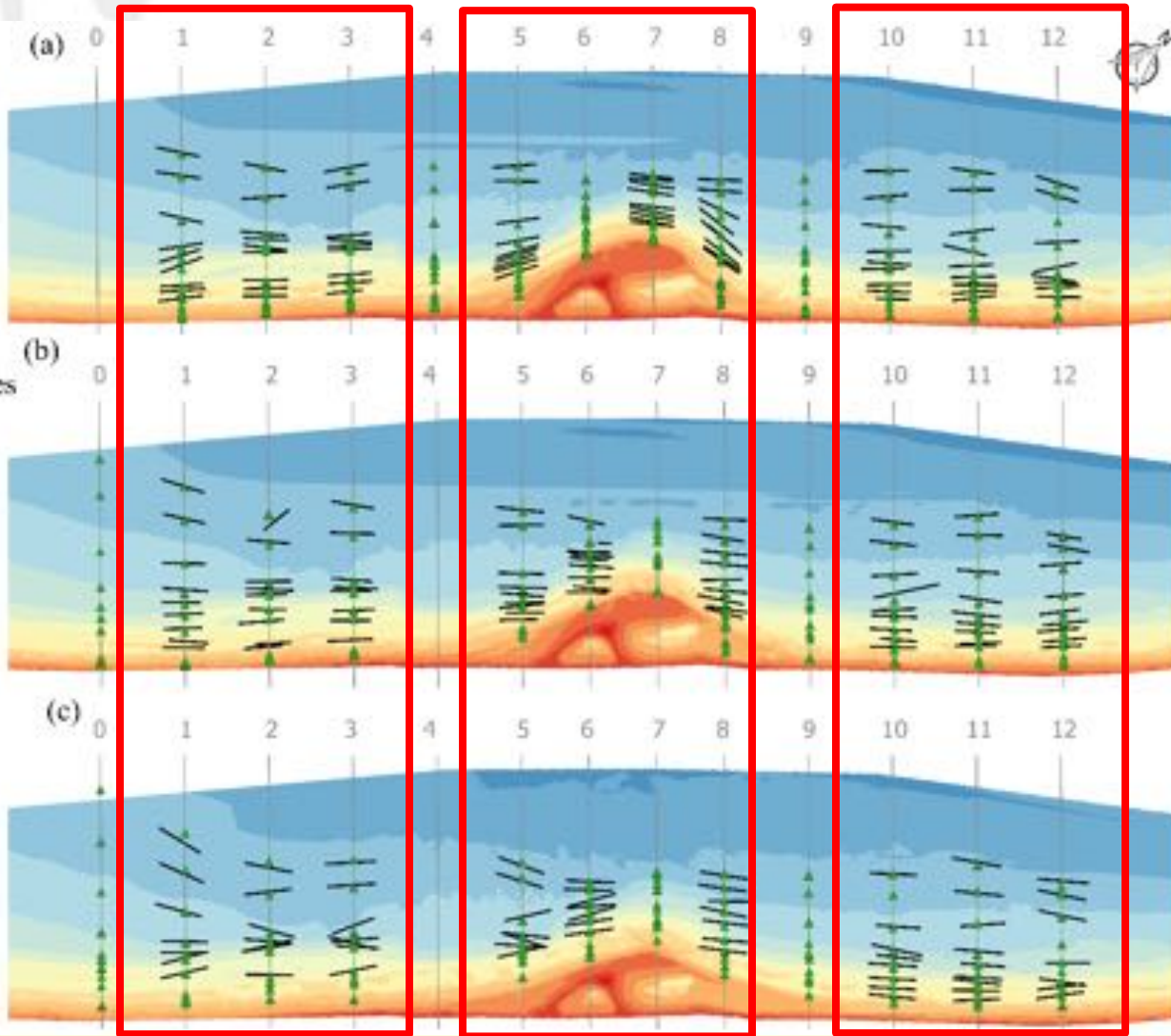
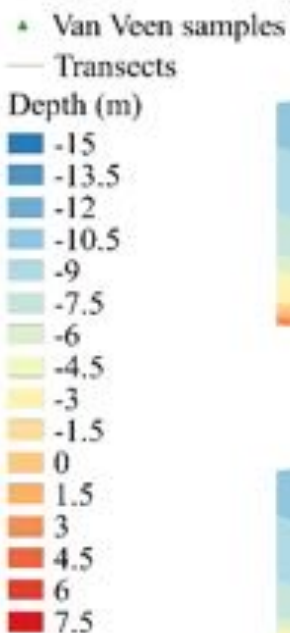


Sampling design

SOUTH

SAND ENGINE

NORTH



2012

2013

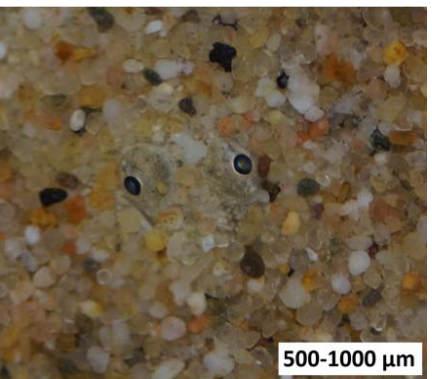
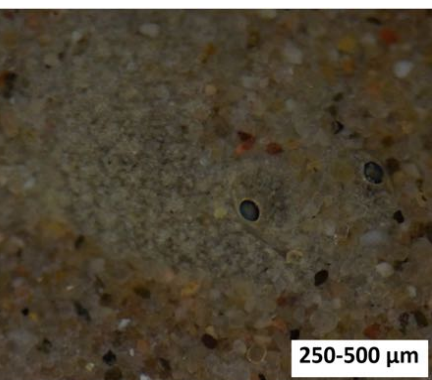
2015

Methods

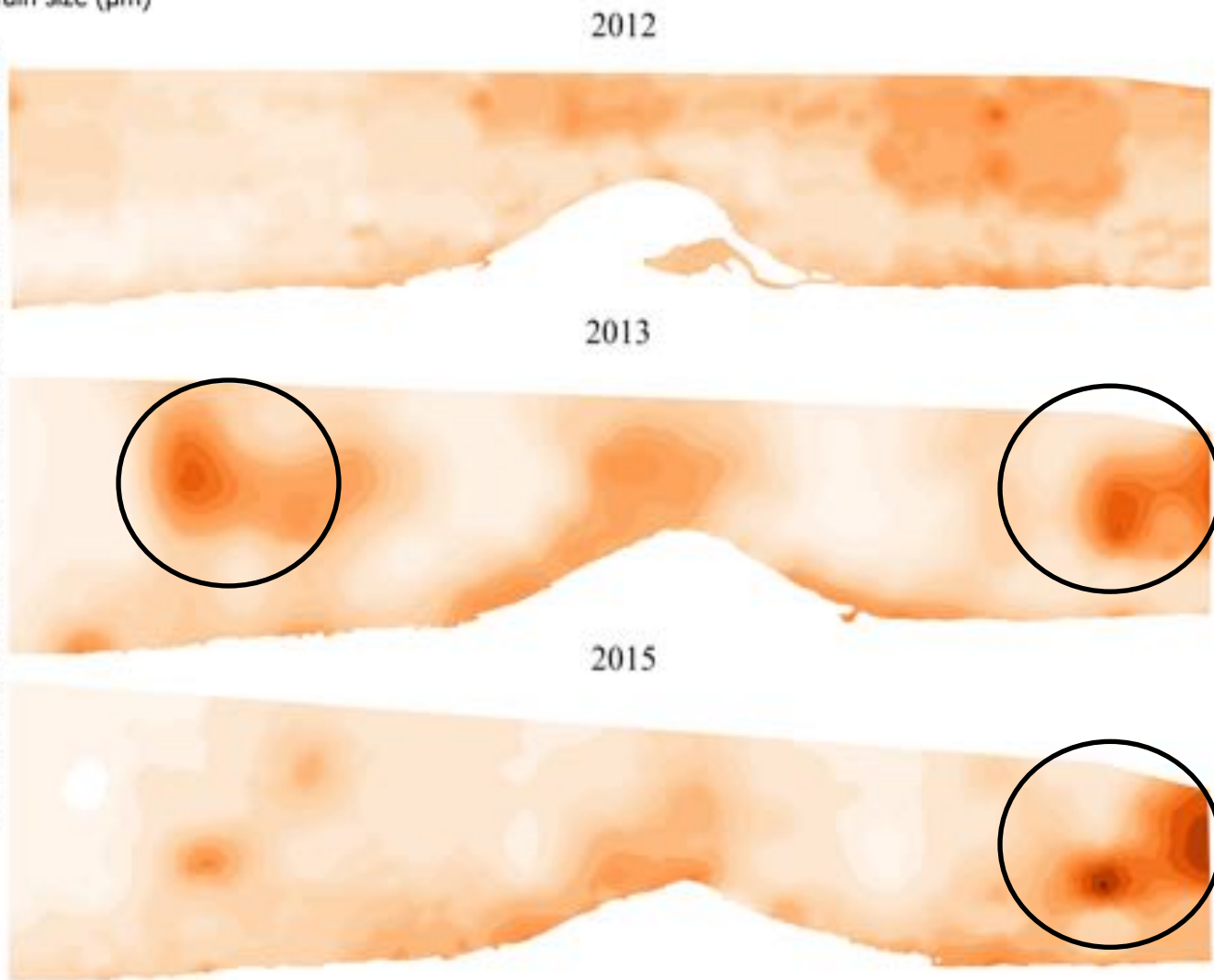
- 0-group plaice and sole
- Fish sampling season
 - 2012: August/September
 - 2013: October
 - 2015: October
- Selected prey species based on diet studies
- Percentage of medium sand (250-500 μ m)
- Depth
- Statistics
 - Zero inflated glmm's



Sediment grain size

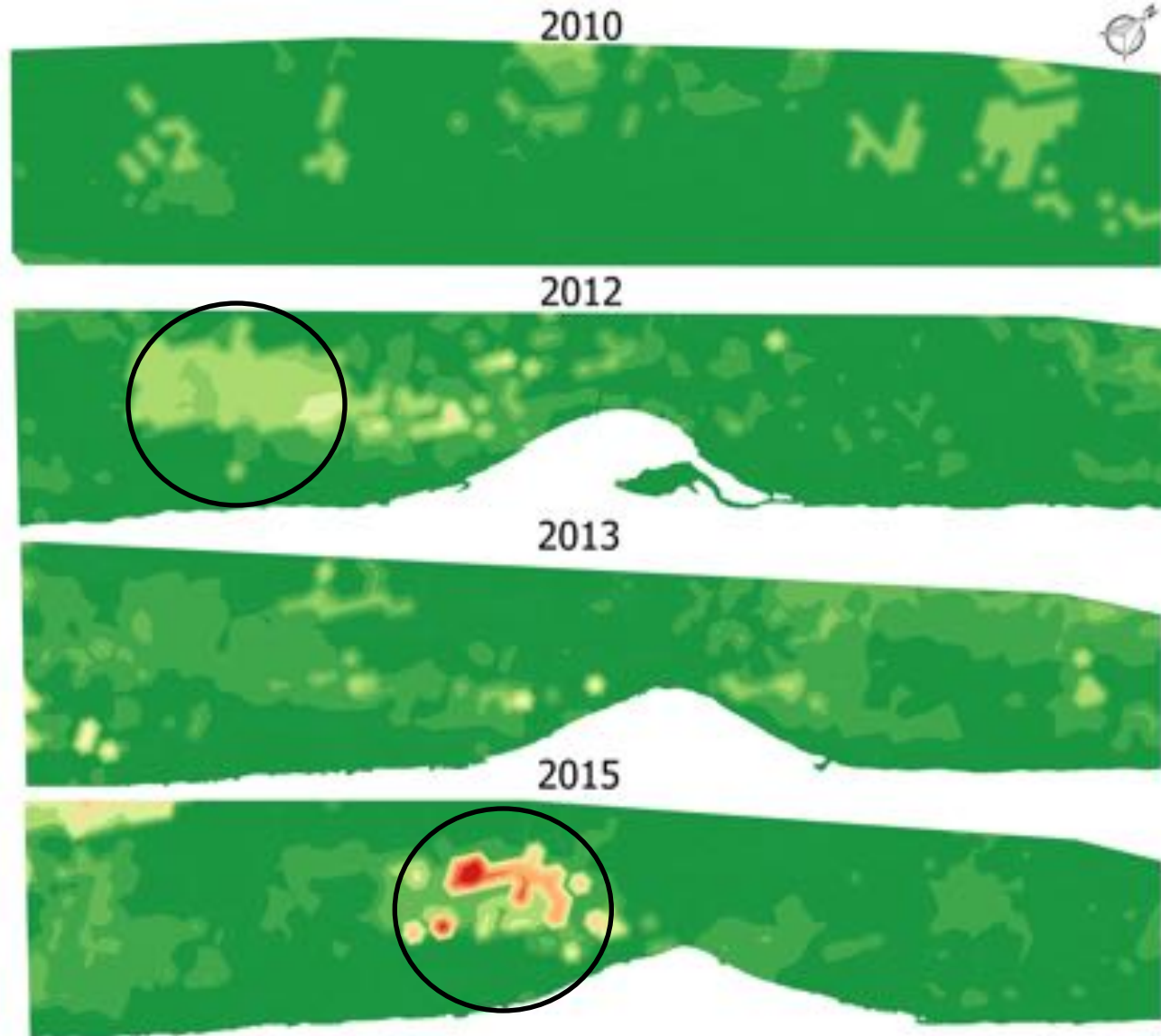


Sediment grain size (μm)



Benthic prey

AFDW g/m²



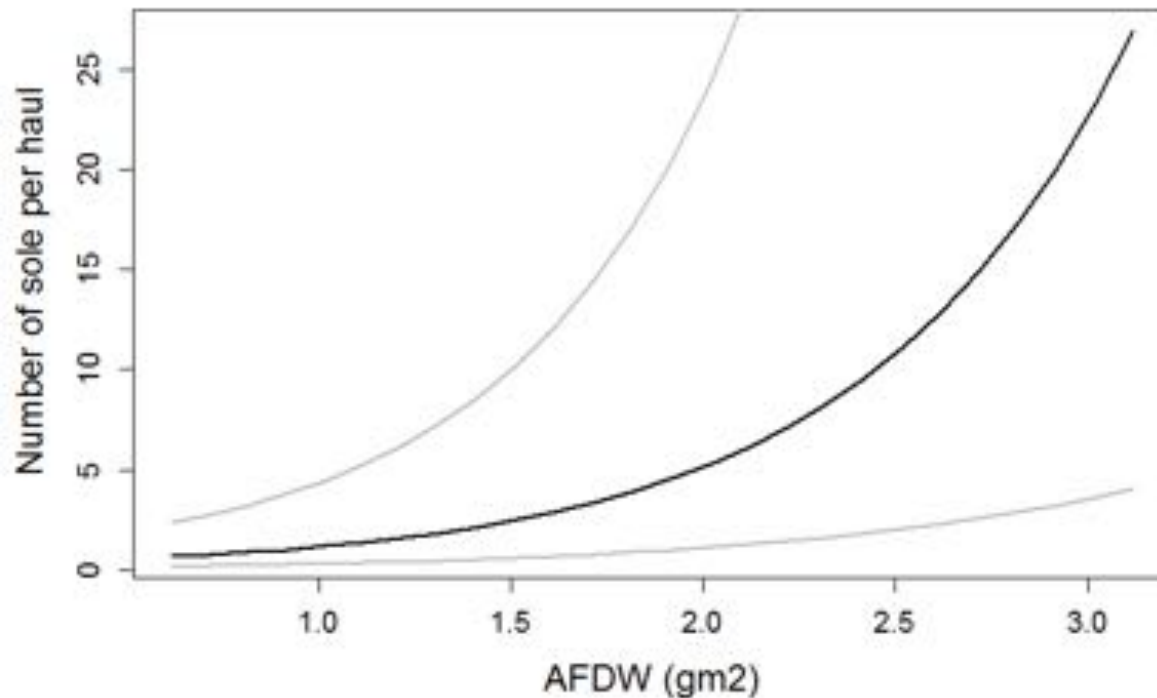
Fish abundance

- Annual difference in numbers
 - Substantially higher catch in 2012
- 638 plaice in 2012, 248 (2013) and 331 (2015)
790 sole in 2012, 138 (2013) and 132 (2015)
- Variation in distribution
 - Generally the highest numbers around the Sand Engine
 - Seemingly associated with prey abundance



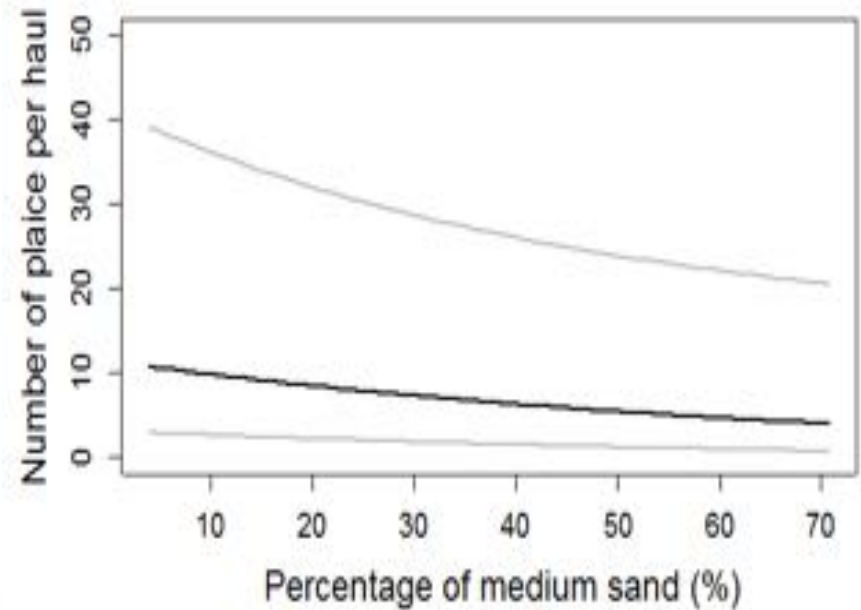
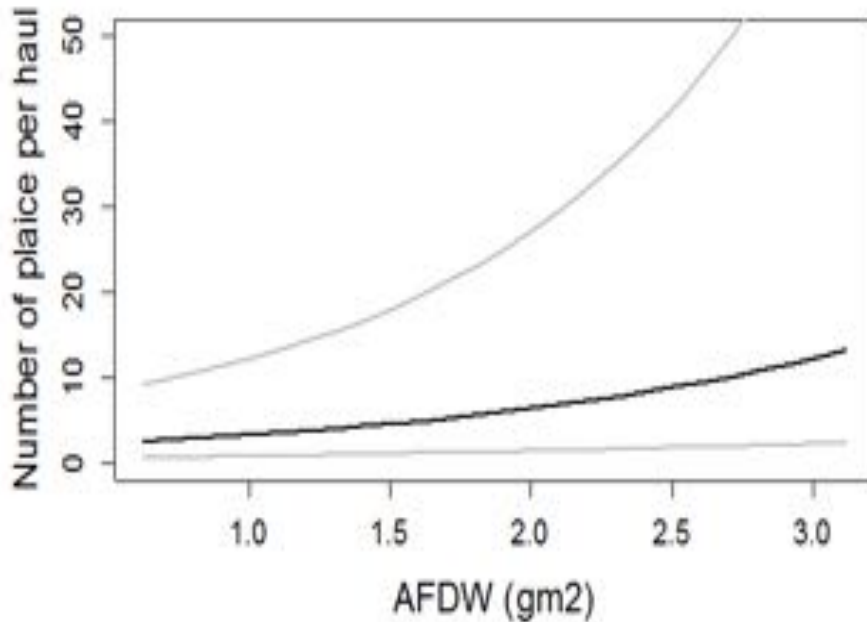
Analysis - Sole

- Annual and spatial variability
- Positive association with benthic abundance



Analysis - Plaice

- Annual and spatial variability
- Increased abundance with higher prey biomass
- Negative relation with medium sand



Discussion

- Sediment coarsening
 - Resulting in decreased abundance of plaice
- Local variability in prey biomass
 - Initial benefit for opportunistic species
 - Related to plaice and sole abundance
 - Indication of community recovery after 4 years
- Lack of seasonal data
 - Baseline is necessary





- Sediment grain size
 - Grain size of the Dutch coast went from 210 μm to 320 μm
- Seasonal timing of nourishment
 - Allow for recovery with a nourishment in winter

 **Theoretical modelling**

Nature Coast

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Any questions?

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