



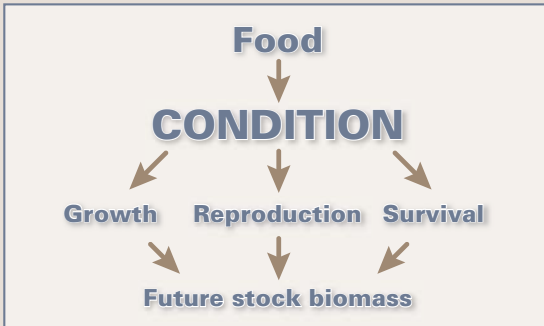
Industrial fishing, sandeels, and predatory fish condition

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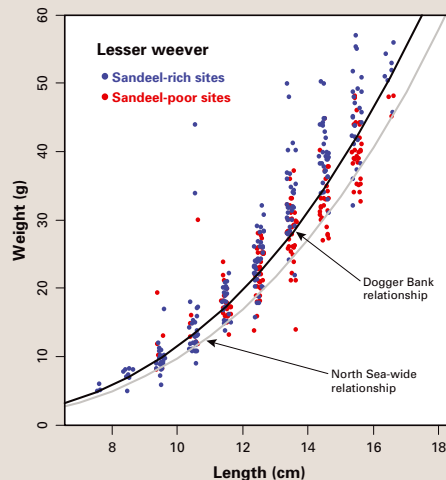
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Condition as indicator of ecosystem health



Le Cren's condition index

- Based on length and weight, which are routinely measured in surveys and market sampling
- Ratio of observed weight to weight predicted from the population-level (here: Dogger Bank) length-weight relationship

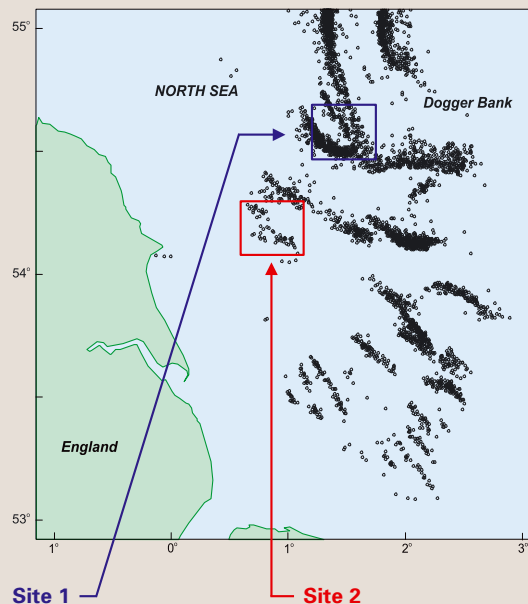


The problem

- Sandeels are eaten by a range of predatory fishes including species taken for human consumption, but —
- Sandeels are also taken by a substantial industrial fishery
- Might sandeel depletions deprive predatory fishes of food, so reducing their condition?

Study sites

- Dogger Bank, North Sea's prime industrial fishing grounds
- Small dots show patchy distribution of sandeel fishing effort (1 dot = 3h fished in 2005)



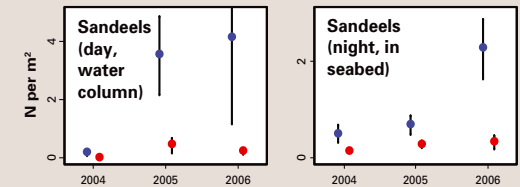
Site 1

- High sandeel abundance
- High and localised industrial fishing effort

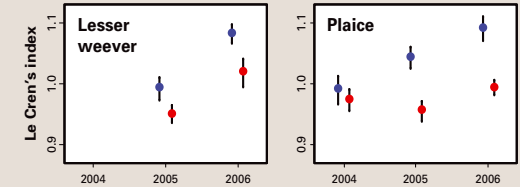
- Low sandeel abundance
- Low industrial fishing effort

Does sandeel abundance affect predatory fish condition?

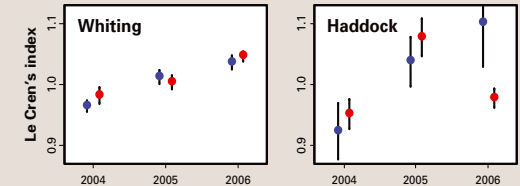
- Sandeel numbers, day and night:** far higher at site 1 than 2, far higher in 2005 and especially 2006 than in 2004



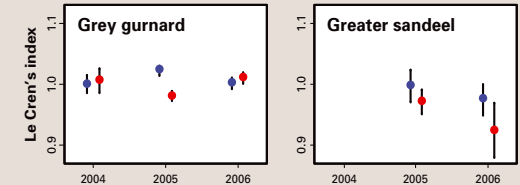
- Plaice and weever condition:** better in sandeel-rich years **and** at sandeel-rich site



- Whiting and haddock condition:** better in sandeel-rich years, but no site difference in these mobile species



- Gurnard and greater sandeel condition:** not significantly linked to sandeel numbers (but few data for greater sandeel)



Conclusions

- Various predatory fish species have better condition in years/sites of high sandeel numbers; hence better condition apparently linked to high sandeel consumption
- Sandeels are crucial prey to predatory fishes, including 'human consumption' species
- Condition – useful indicator for monitoring and managing fisheries in ecosystem context

Acknowledgement

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