

Proportion of large fish (LFI)  
in the offshore pelagic community

Maximum length (ML) of fish  
in the offshore pelagic community

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# LFI in the offshore pelagic community

- LFI: proportion in weight of fish above a certain size ( $W_{>size}/W_{total}$ )
- LFI tracks the size composition in the fish community
- Estimated in biomass (weight), to reduce the effect of recruitment fluctuations
- Community with relatively high biomass of large fish: higher functional diversity than community dominated by small fish
- Fishing has a direct effect on the structure of fish communities: decrease of relative abundance of large fish, decrease of mean body size in population → LFI maps the fishing pressure
- In the Baltic Sea, the main predatory fish (cod) is affected also by low oxygen levels at the bottom → LFI can also map eutrophication

# LFI in the offshore pelagic community

Stage of development	Indicator type
Core	State

## Legislative linkage:

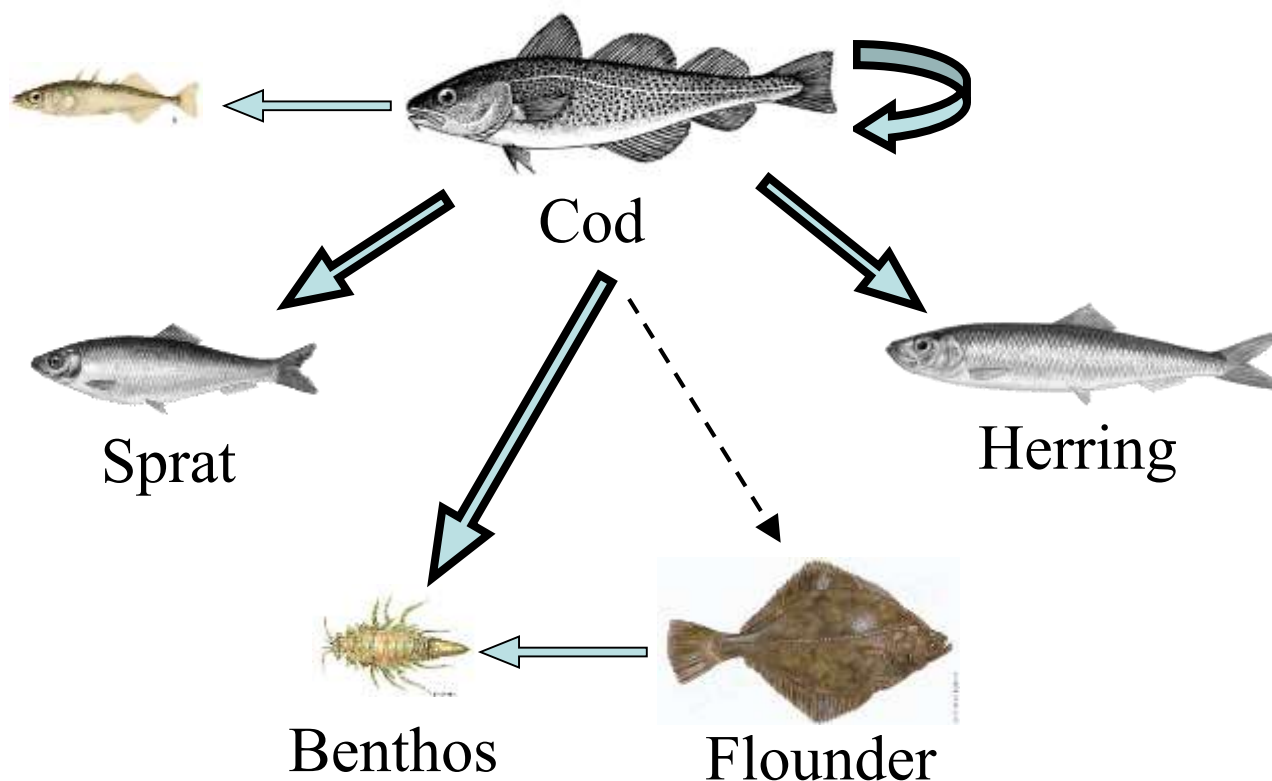
	Primary importance	Secondary importance
<b>BSAP</b> Segment and Objective	Viable populations of species	none stated
<b>MSFD</b> Descriptors and Criteria	4.2. Proportion of selected species at the top of food-webs.	none stated

Used in OSPAR

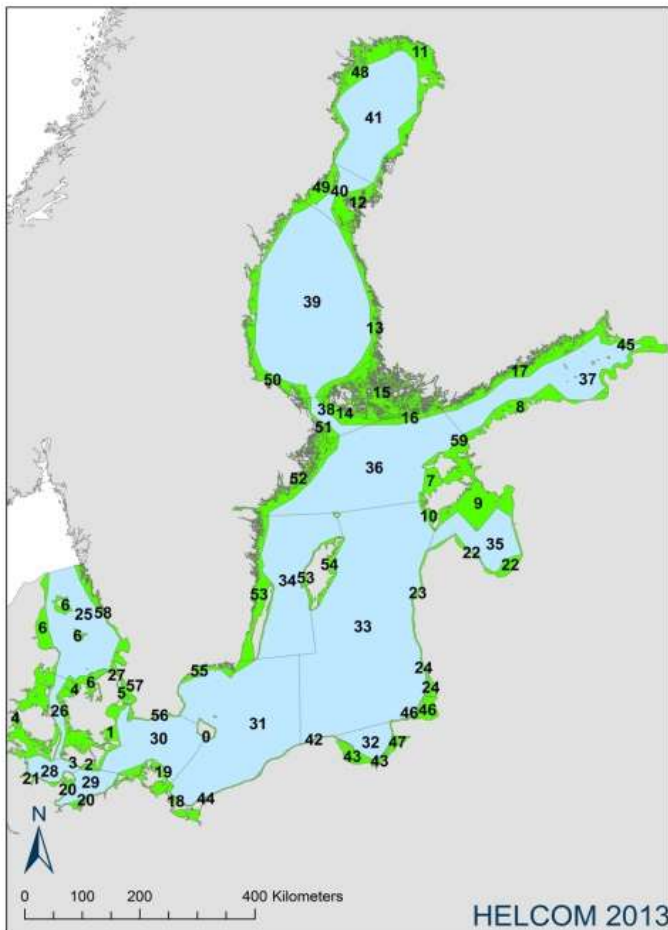
M Casini, N Larson, F Käll, J Olsson, H Wennhage (SWE)  
O Thurid, C Pusch, R Froese (GER)  
A Lappalainen, J Raitaniemi (FIN)

# Important points considering the offshore LFI

- LFI is a food-web indicator (at least in the MSFD)
- Strongest links in the Baltic Sea: cod, sprat and herring
- The fishery exploiting large species is mainly targetting cod

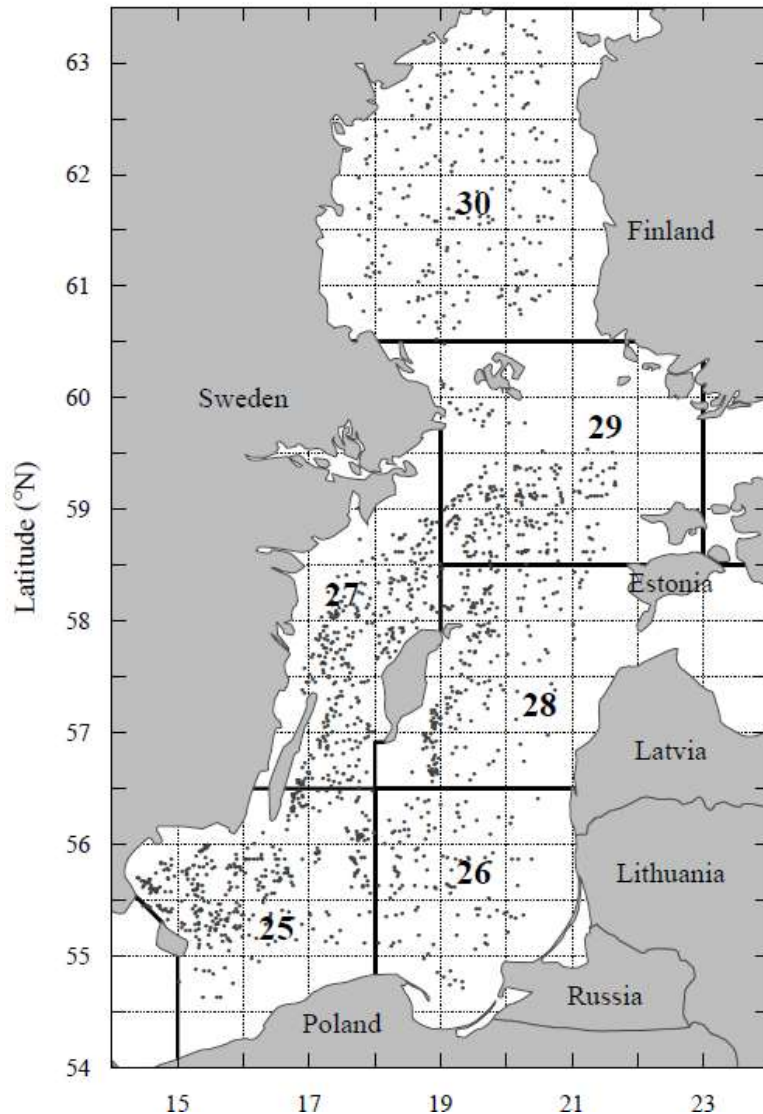


# Important points considering the offshore LFI

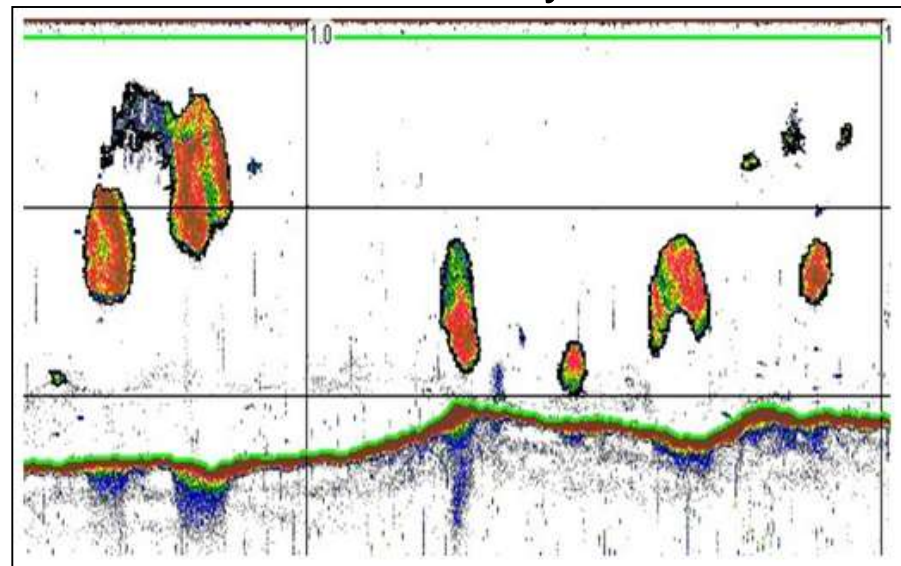


- The offshore communities are constituted by very motile species
- The indicator should not be estimated in too small areas (or within national boundaries)
- Particularly true for the pelagic LFI

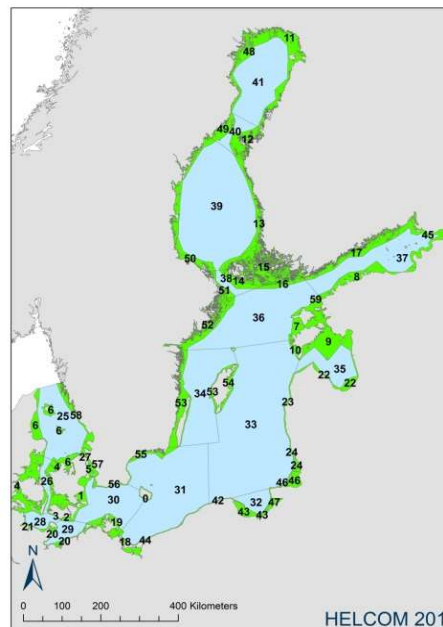
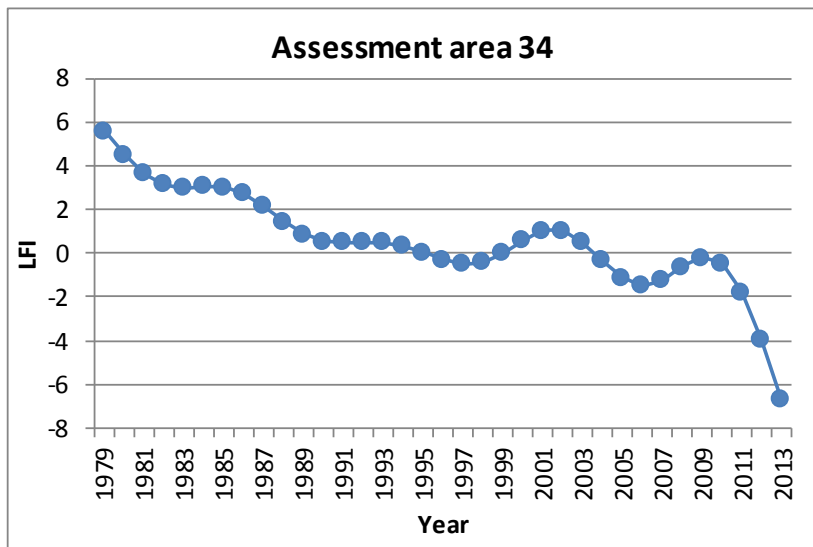
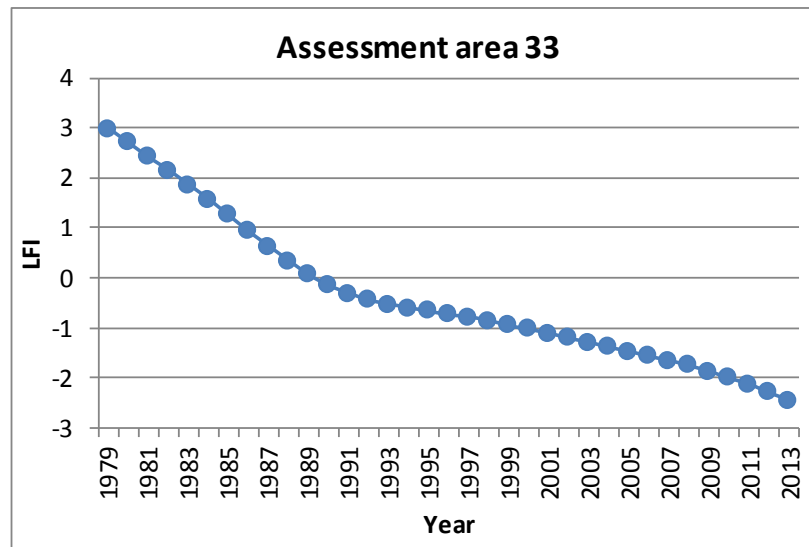
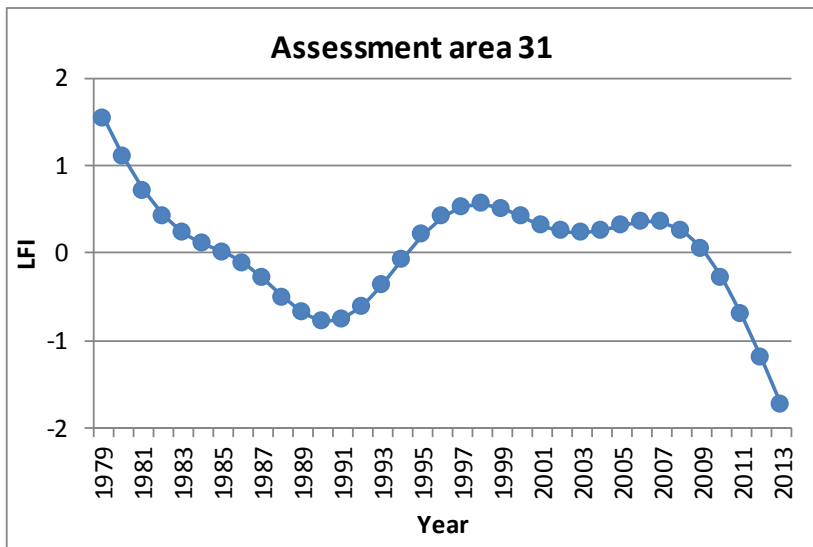
# LFI in the offshore pelagic community: estimation



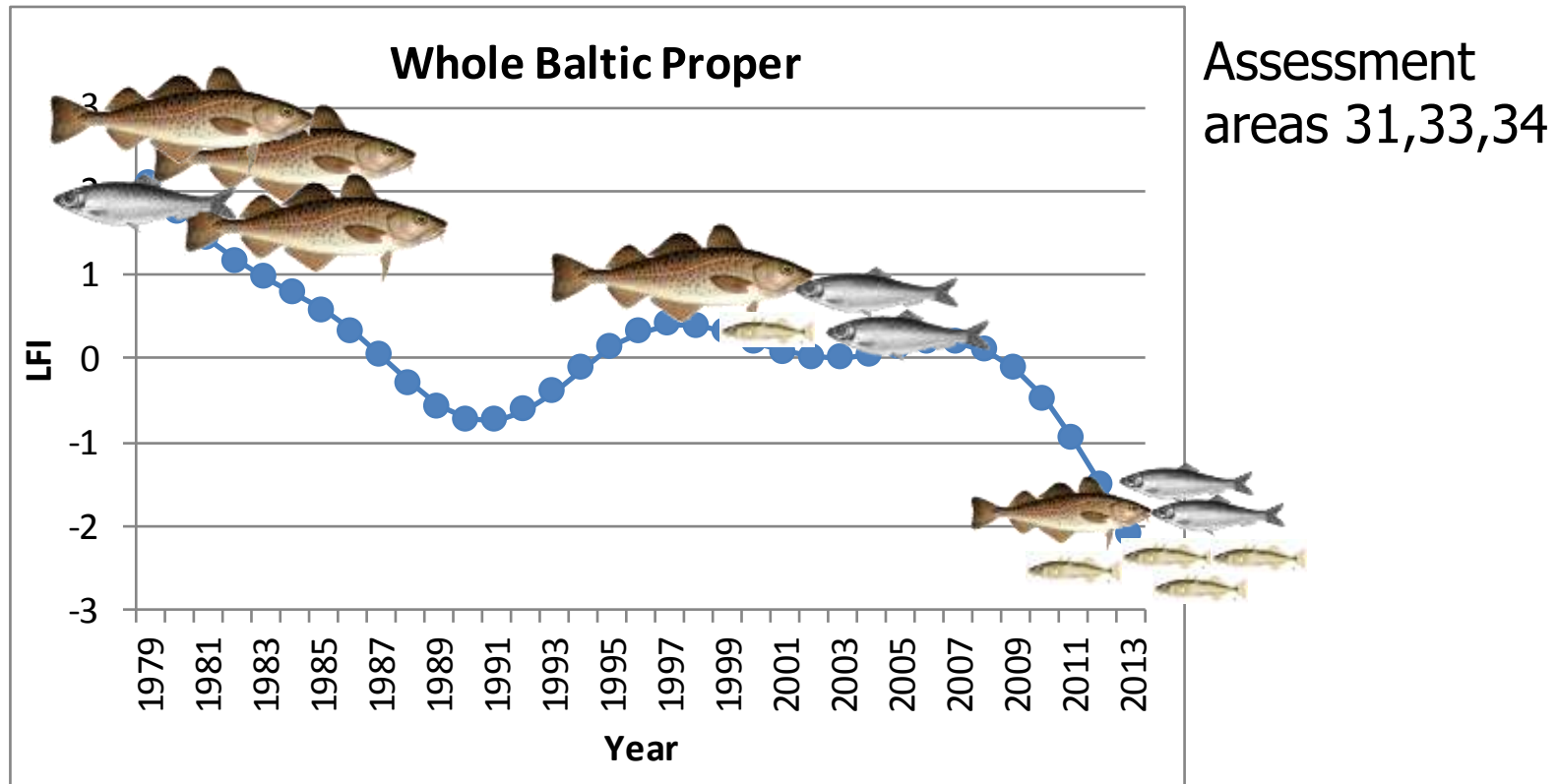
- Based on pelagic control hauls in acoustic surveys (BIAS)
- 4 species included: sprat, herring, sticklebacks and cod (> 99% of the biomass)
- CPUEs modelled by GAMs



# LFI in the offshore pelagic community: results



# LFI in the offshore pelagic community: results

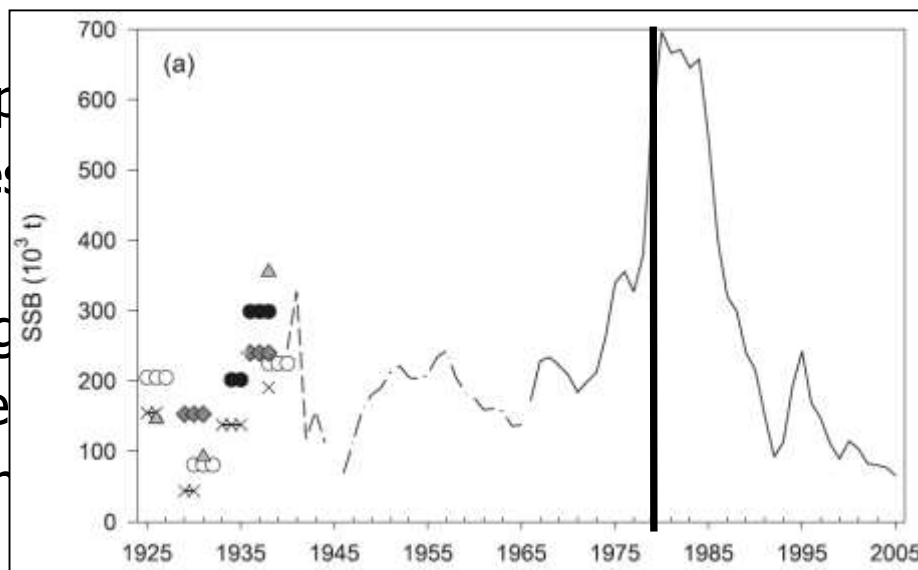


- Decrease in large species
- Decrease in the mean size of each species
- Increase in small species

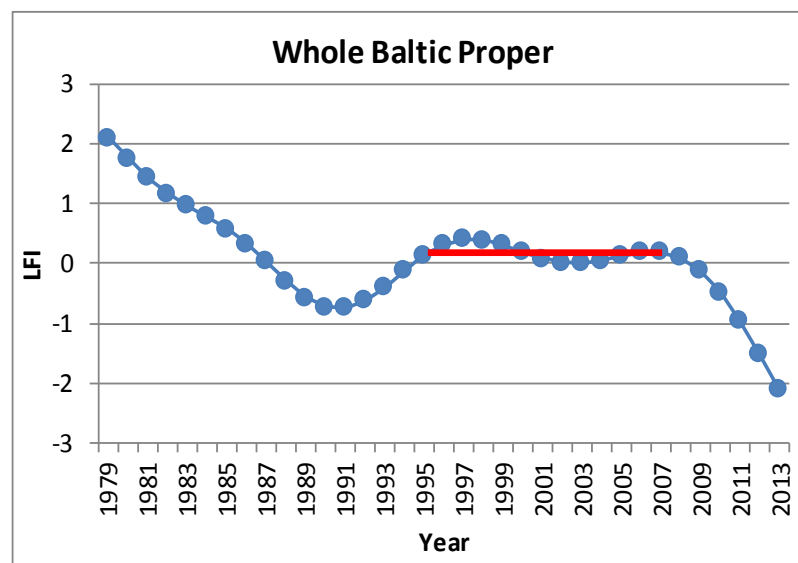


# LFI in the offshore pelagic community: GES

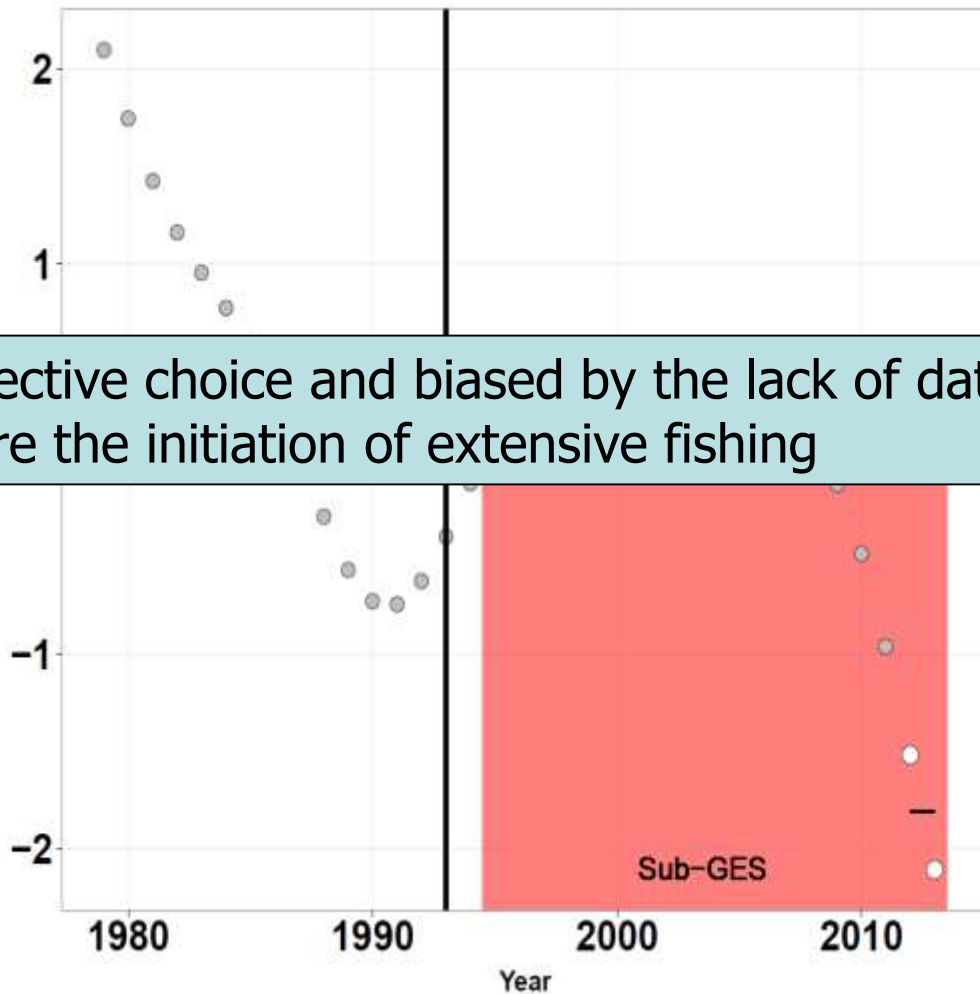
- Baseline app
- Prerequisites
  - stable
  - long enough
  - most repre
  - decide if th



*Eero et al. 2008*



# LFI in the offshore pelagic community: GES



Subjective choice and biased by the lack of data from before the initiation of extensive fishing



# Maximum length of fish in the pelagic community (ML)

- ML: largest fish in the community
- ML tracks the size-structure in the fish community
- Fish community with larger fish: higher functional diversity than fish community dominated by small fish
- Fishing has a direct effect on the structure of fish communities: decrease of relative abundance of large species → ML maps the fishing pressure
- Good complement of LFI

# ML in the offshore pelagic community

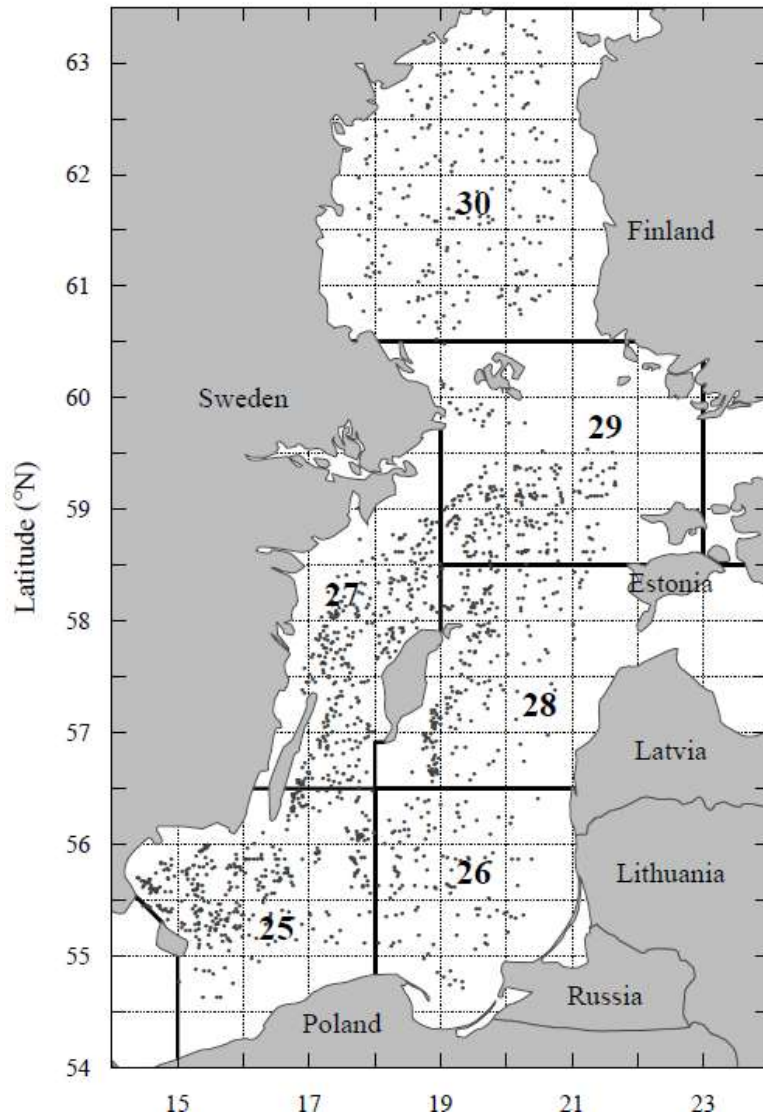
Stage of development	Indicator type
Candidate	State

## Legislative linkage:

	Primary importance	Secondary importance
<b>BSAP</b> Segment and Objective		
<b>MSFD</b> Descriptors and Criteria	3.3. Proportion age and size distribution 3.3.2 Mean maximum length across all species found in research vessel surveys (wrongly placed?)	none stated

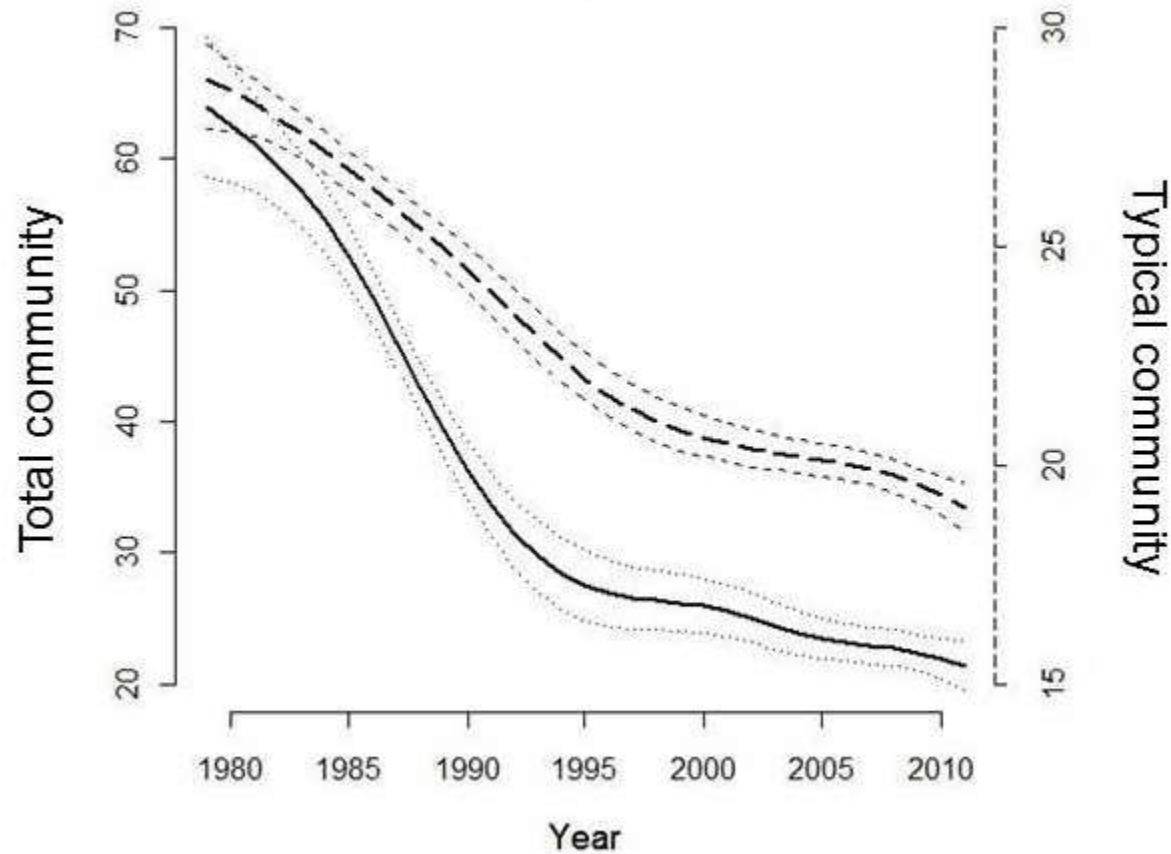
Used in OSPAR

# ML in the offshore pelagic community: estimation



- Based on pelagic control hauls in acoustic surveys (BIAS)
- CPUE modelled by GAMs
- 4 species included: sprat, herring, sticklebacks and cod (> 99% of the biomass)
- Currently limited to Swedish/German data (no international catch database available)

# ML in the offshore pelagic community: results



- No GES proposed so far

# How to move on

## Short-term goals (meet HOLAS\_II)

- Continue the development of the pelagic LFI
- Agree on the GES boundaries (or other methods of assessment)
- Include data from other countries performing the BIAS survey, if possible: Estonia, Finland, Latvia, Lithuania, Poland, Russia (process started)
- Hinder: lack of an international database

## Long-term goals

- Include data from all the other countries performing the BIAS survey
- Integrate the demersal habitat in the indicator (if considered necessary), using ICES DATRAS database
- Ensure data-flow from international databases to indicator processing, for both pelagic and demersal habitat (transparency and automatization)

# Discussion points

## Short-term goals

- Decide on GES
- Set of GES is problematic. Is the use of LFI as surveillance indicator an option (ex. for HOLAS\_II)?

## Long-term goals

- Do we need to integrate the demersal habitat?
- In this case, how?
- How to assure an efficient data-flow?



# THANK YOU!

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# Cod from pelagic and demersal surveys

