

West of Scotland haddock (Vla): the 2009 assessment

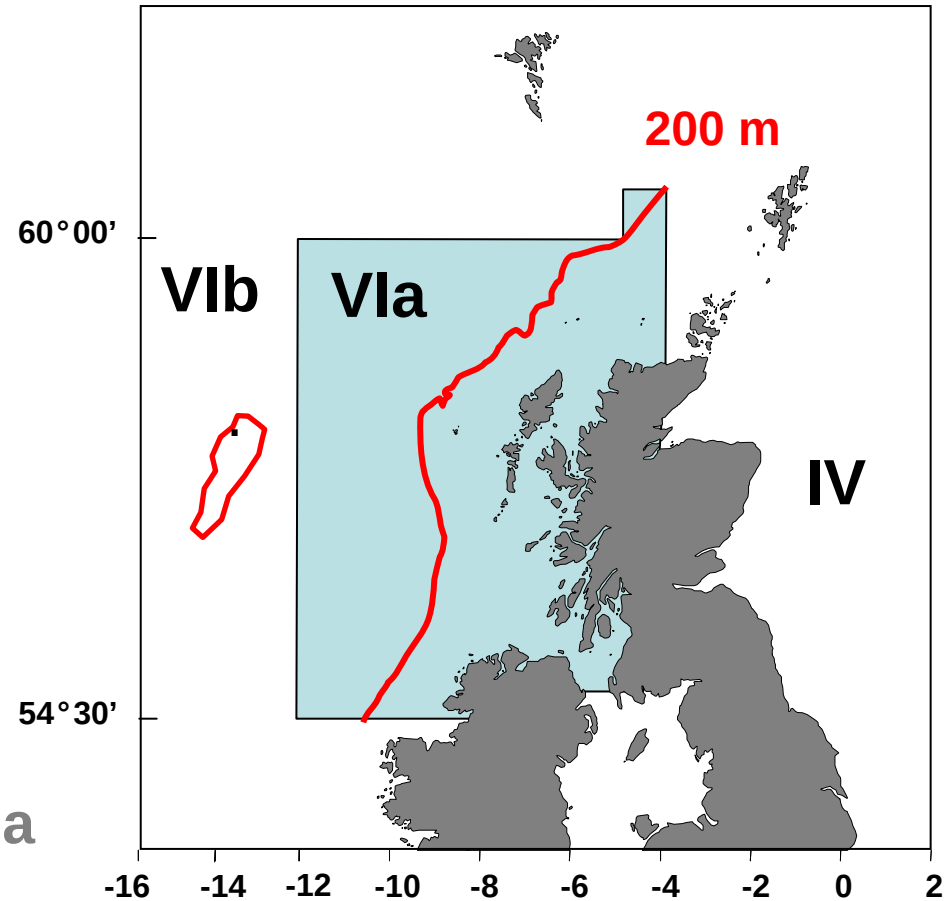


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Marine Laboratory Aberdeen

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Outline

- ICES - the assessment process
- West of Scotland haddock data
 - Scientific trawl surveys
 - Commercial Catch data
- The 2009 assessment
 - TSA
 - Stock trends
 - Stock status
- Features of the west of Scotland haddock stock pertinent to an evaluation of a management plan

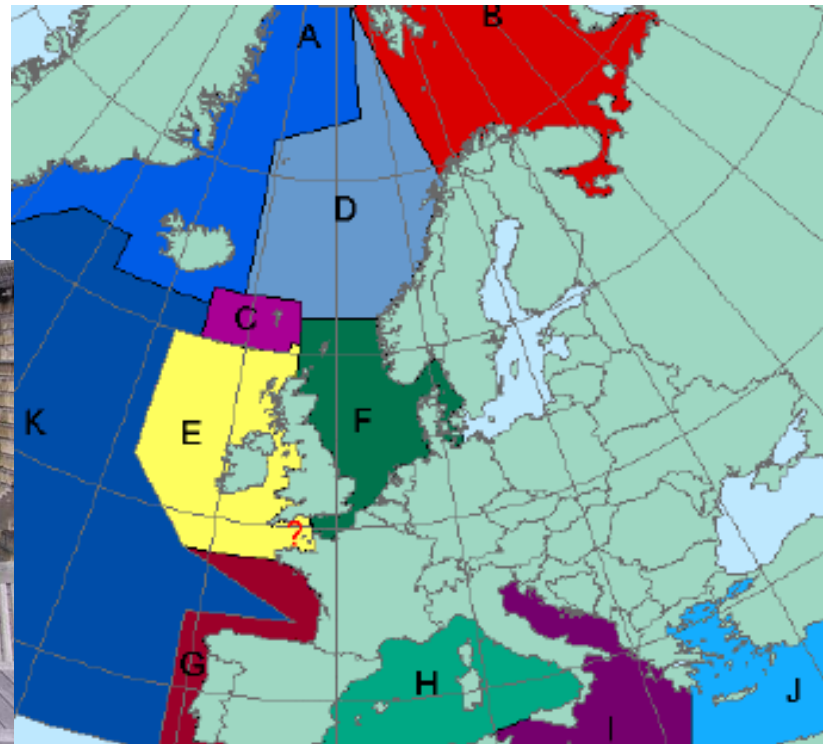


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International Council for the Exploration of the Sea



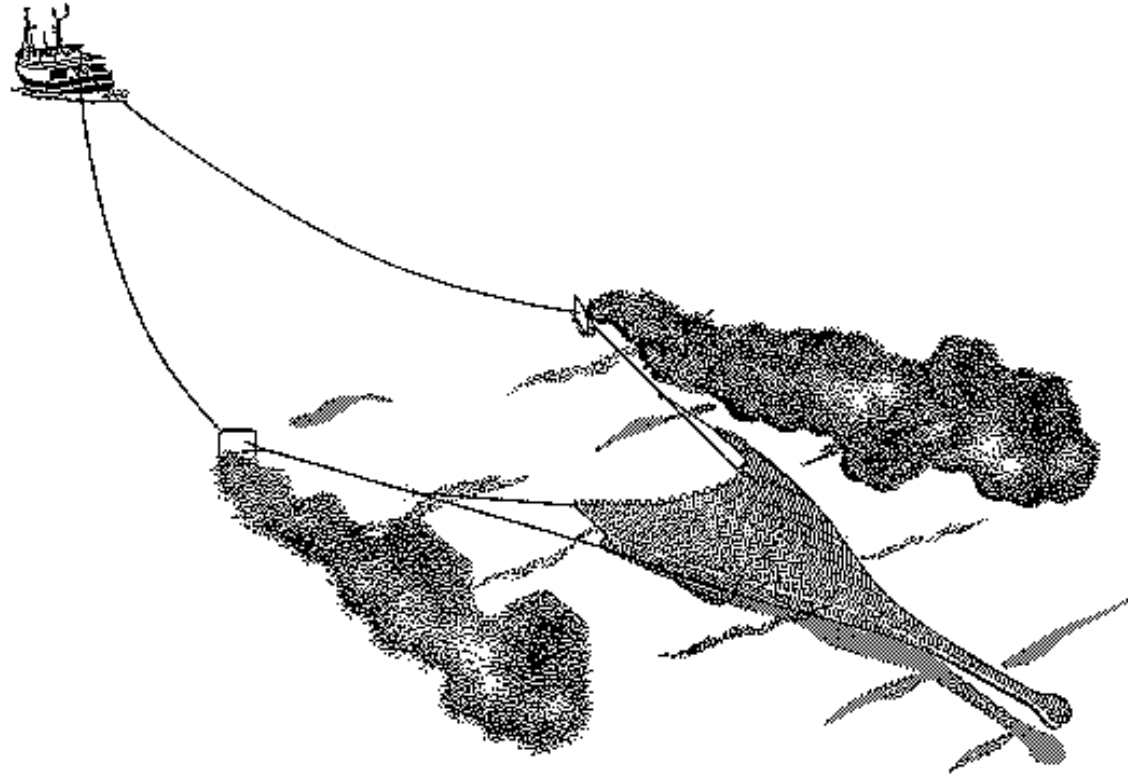
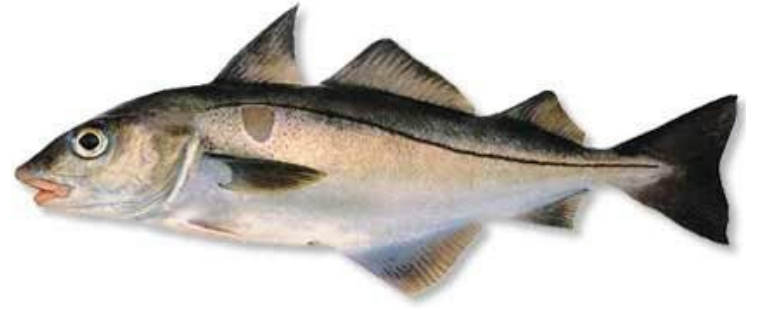
- Assessments carried out by expert Working Groups (WG)
- Celtic Seas Ecoregion (CSE) formerly Northern Shelf Demersal Stocks (NSDS)
- WGCSE – May 13-19 2009
- 34 stocks (fish & Nephrops)



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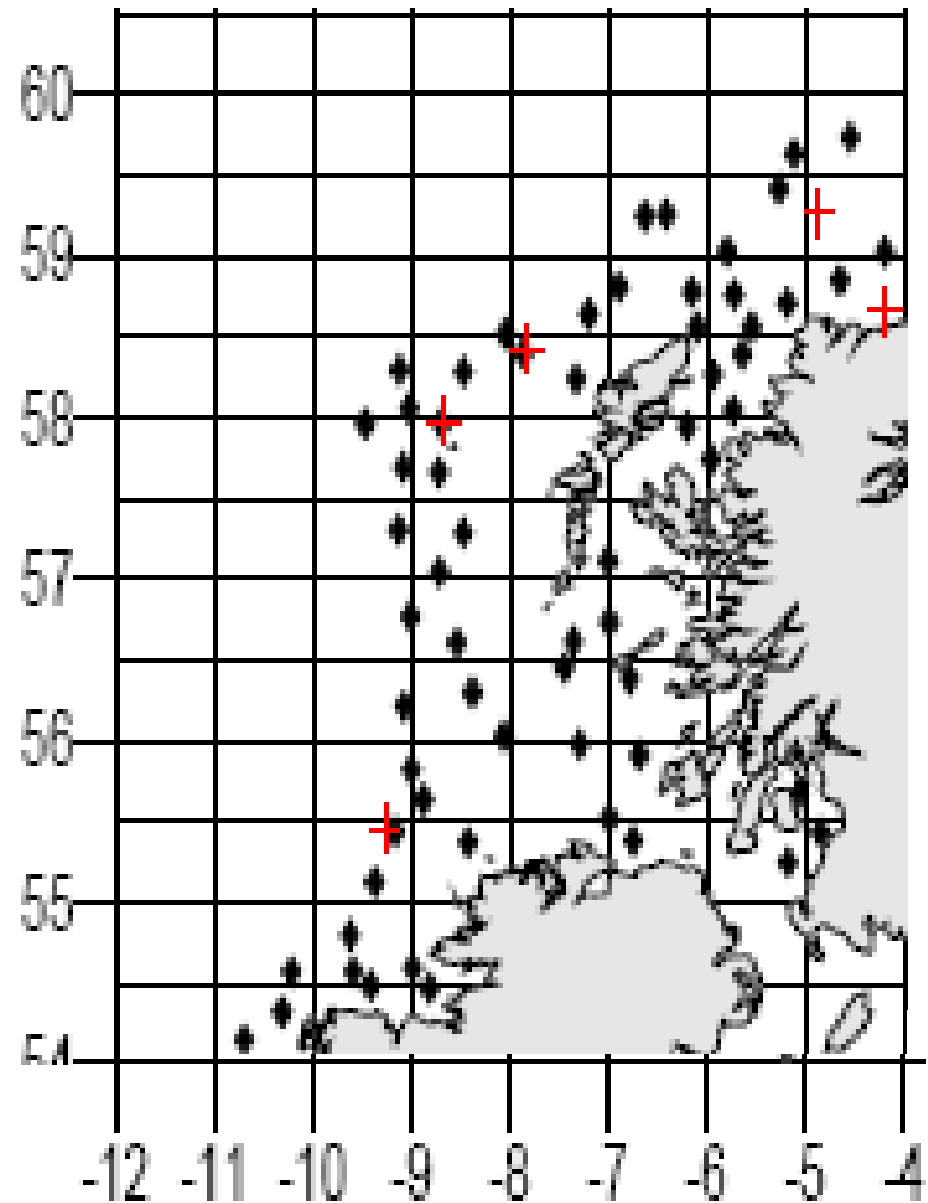
Haddock data

- Survey data
 - GOV trawl



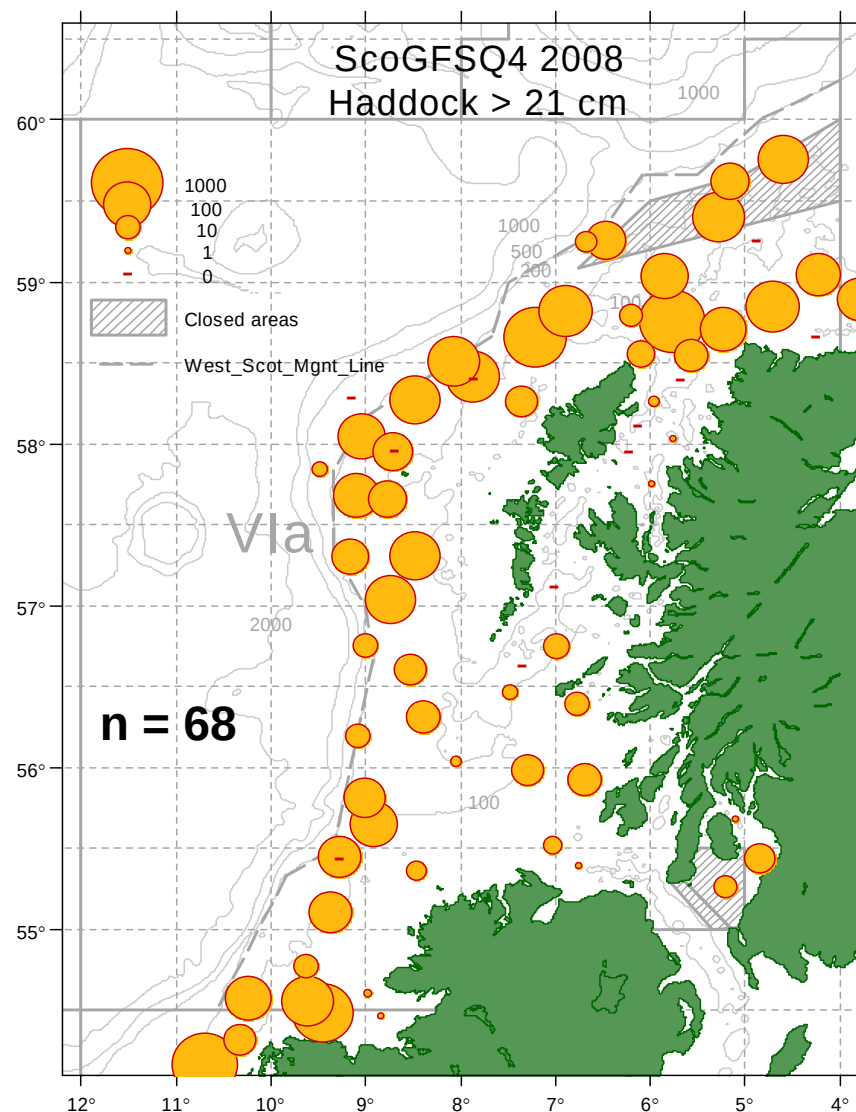
Haddock data

- Survey data
 - GOV trawl
 - 1 station per rectangle



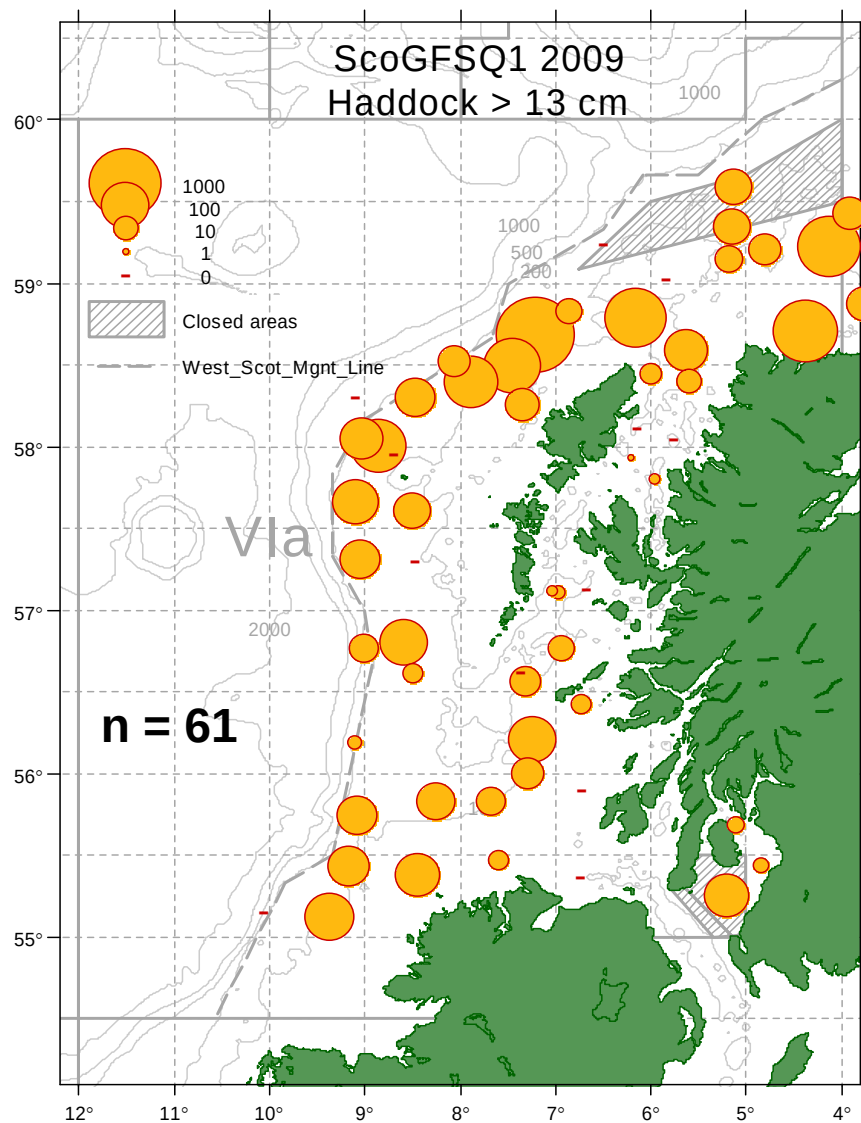
Haddock data

- Survey data
 - GOV trawl
 - 1 station per rectangle
 - Catch at age (1-7) per 30 mins fishing
 - 2 surveys:
 - 1) Q4 western groundfish survey
 - ScoGFSQ4 (1996-)



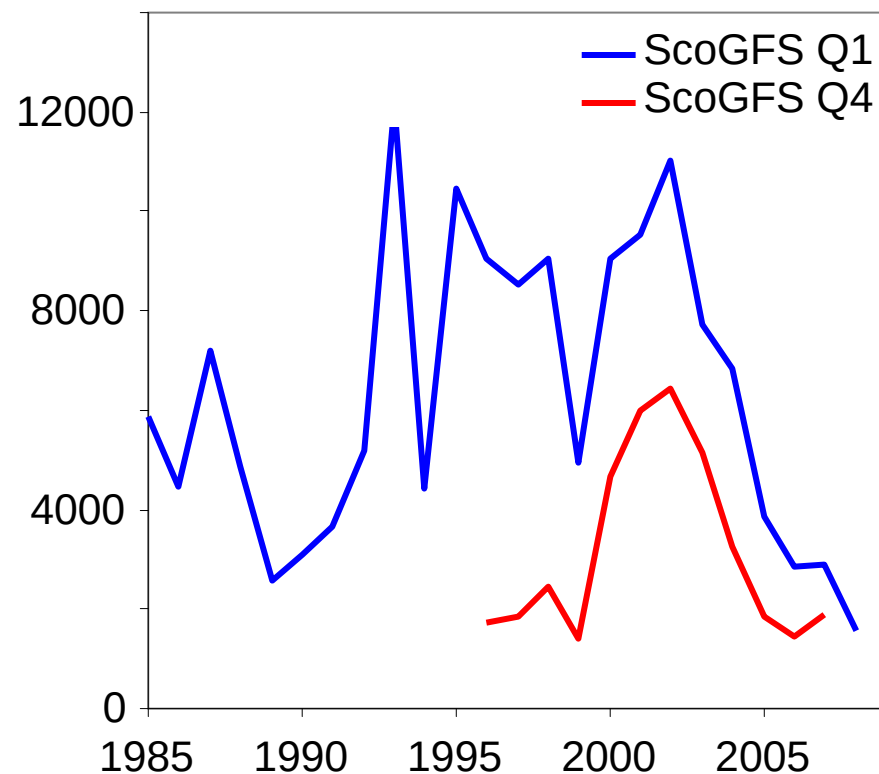
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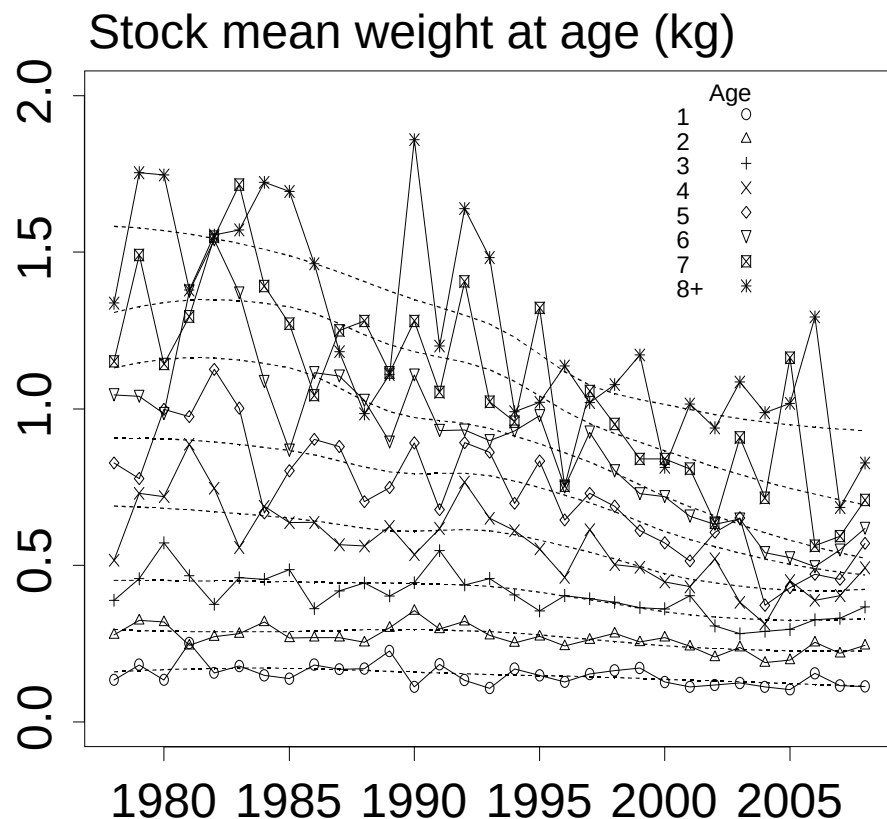
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Haddock data

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- Catch data
 - Mean weight at age in catch



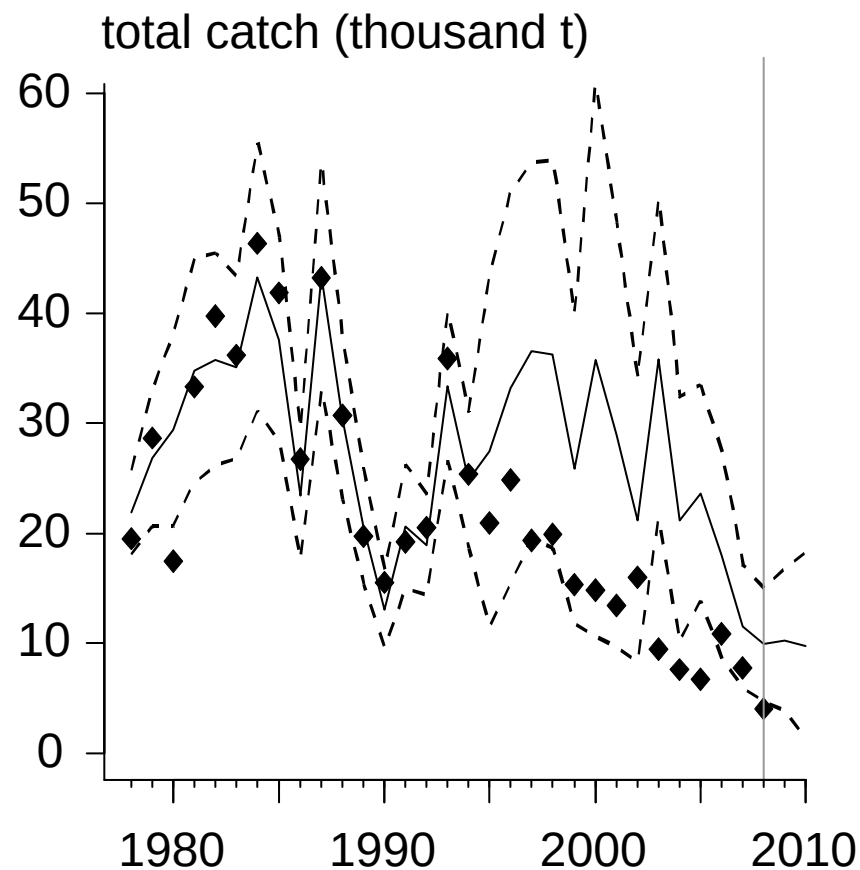
Haddock data

- Survey data

- GOV trawl
- 1 station per rectangle
- Catch at age (1-7) per 30 mins fishing
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 - 1) Q4 western groundfish survey
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- Catch data

- Mean weight at age in catch
- Catch at age 1978-1994
- Landings and discards



2009 assessment

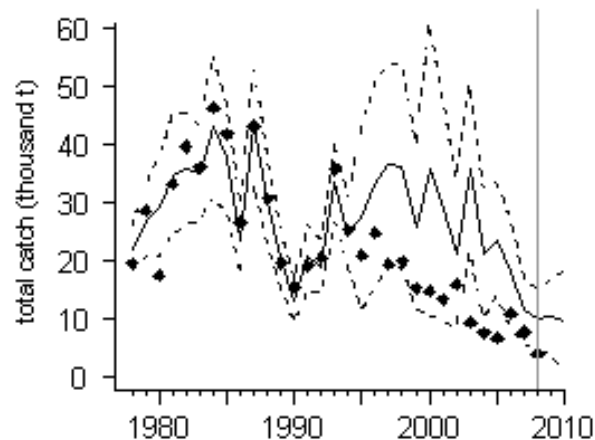
TSA

- Time Series Analysis
- State space model
- Uses a Kalman filter
- Developed by Gudmundsson (1994)
- Adapted by Fryer *et al.* (1998)
 - ✓ Estimates precision
 - ✓ Can omit catch and or survey data in any years
 - ✓ Allows catchability to evolve
 - ✗ Complex
 - ✗ Estimation takes time
 - ✗ May need intervention

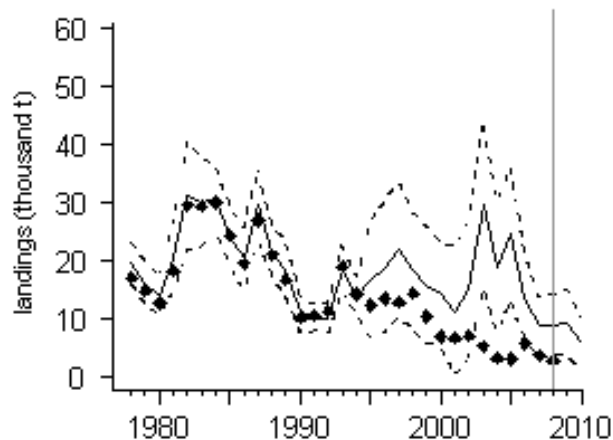


2009 assessment

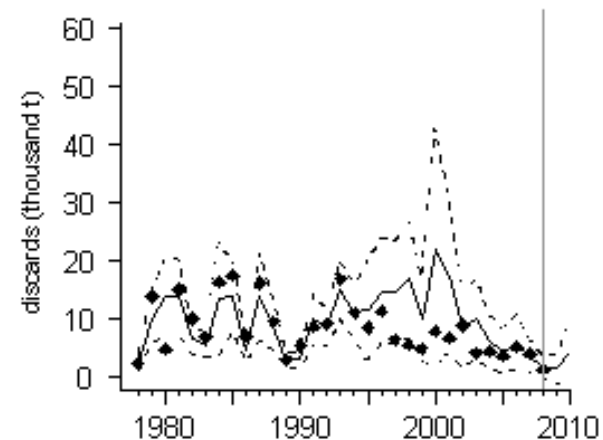
- Stock trends



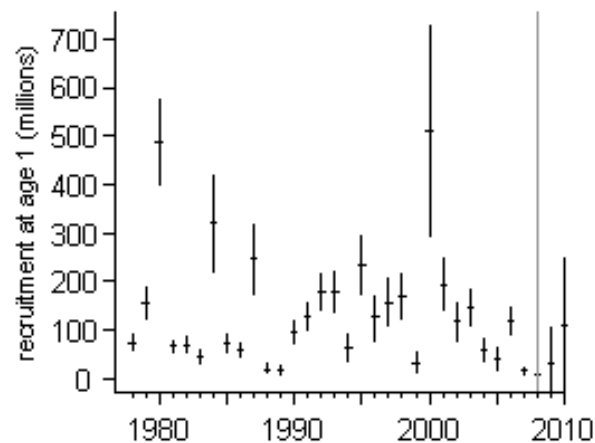
Landings



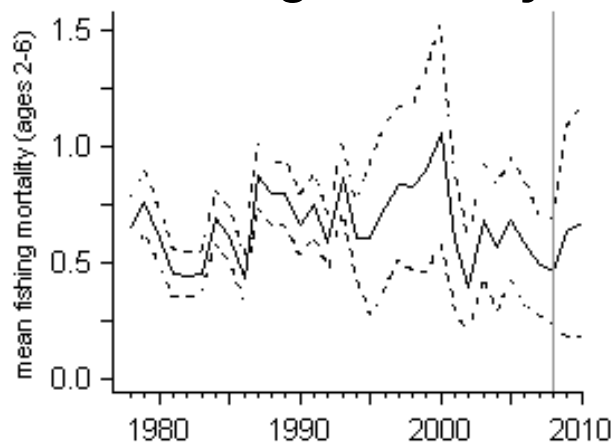
Discards



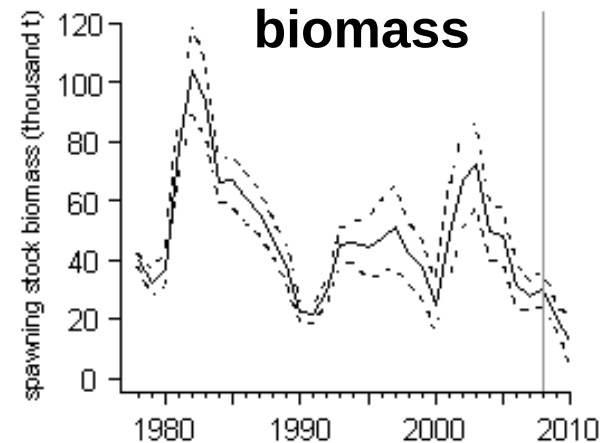
Recruits



Fishing mortality

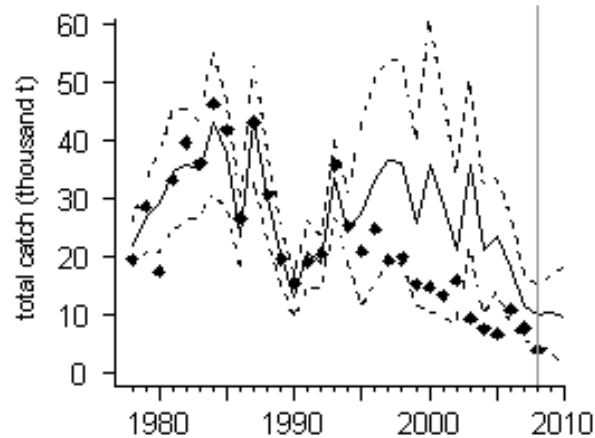


Spawning stock biomass



2009 assessment

- Stock status



Reduced reproductive capacity

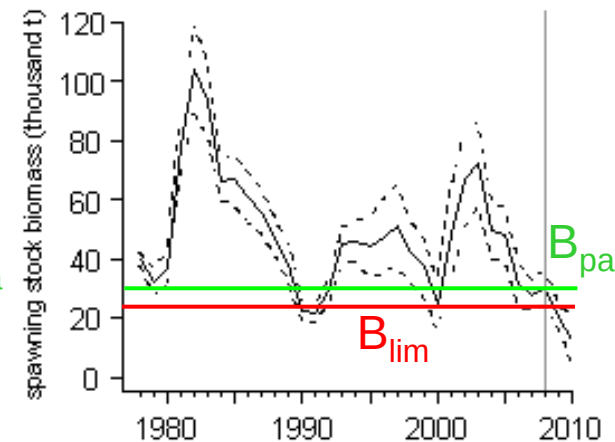
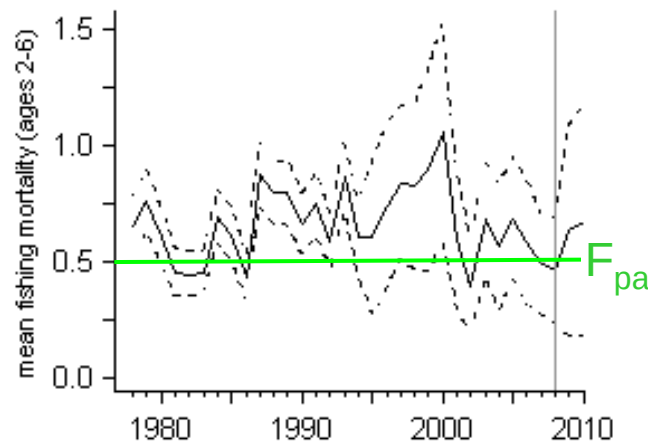
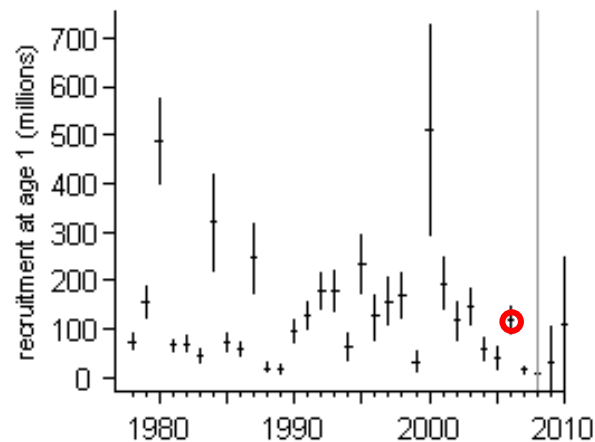
$$SSB_{2008} = 30,436 \text{ t}$$

$$SSB_{2009} = 20,271 \text{ t}$$

Harvested sustainably

$$F_{2008} = 0.46$$

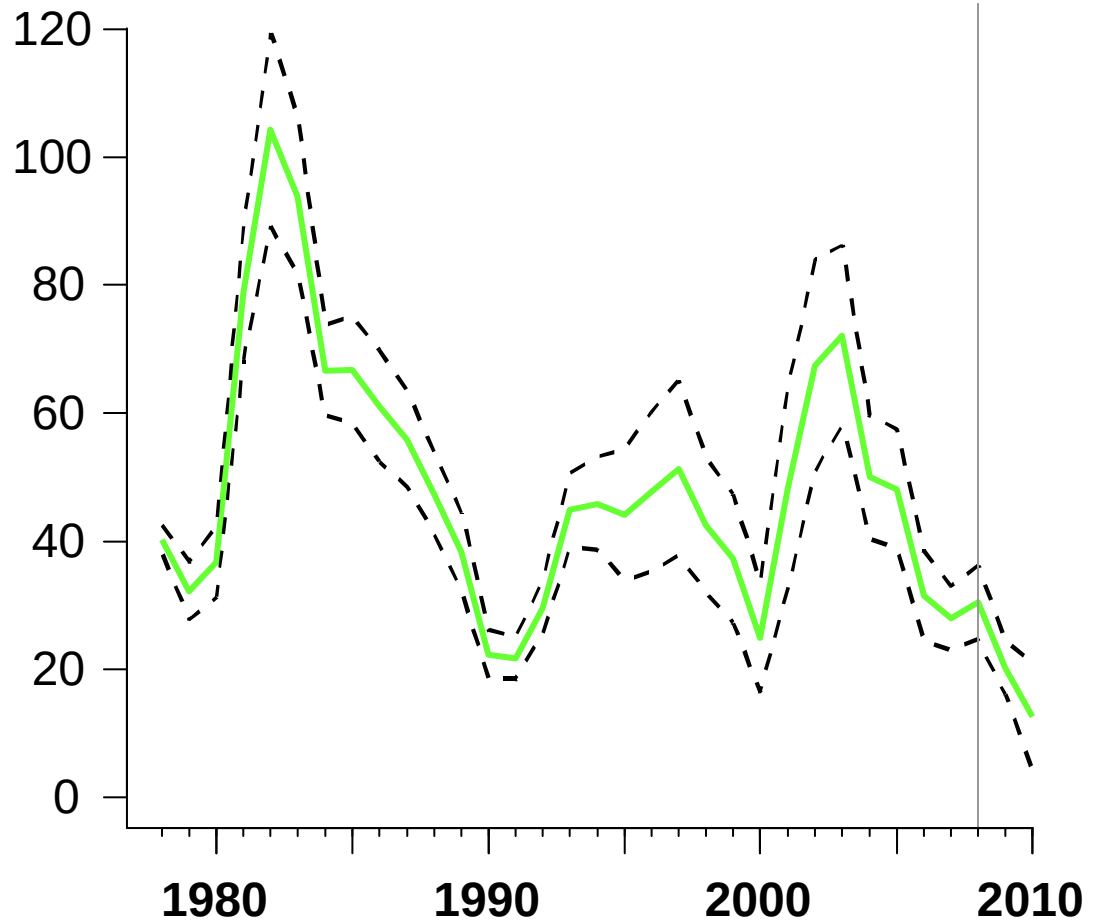
Advice is for NO fishing to take place in 2010



2009 assessment

- Stock trends

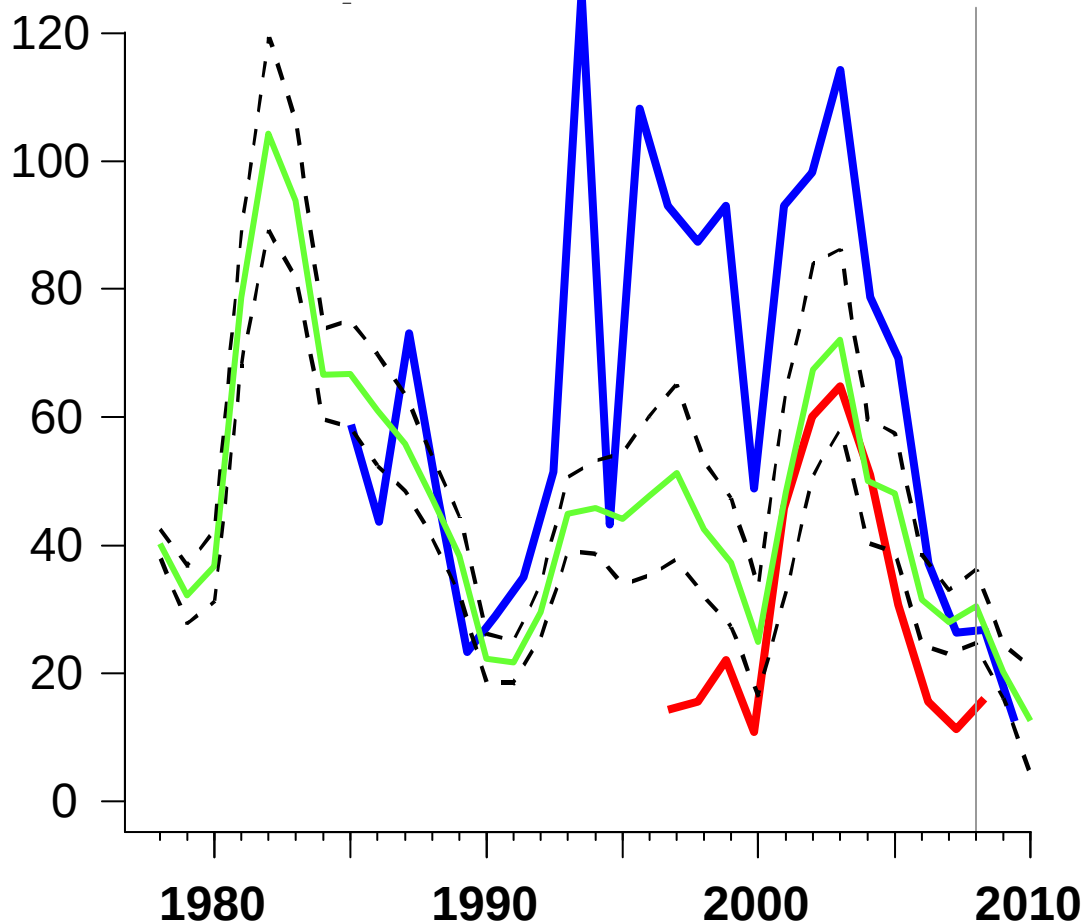
Spawning stock biomass ('000 t)



2009 assessment

- Stock trends
- Survey trends

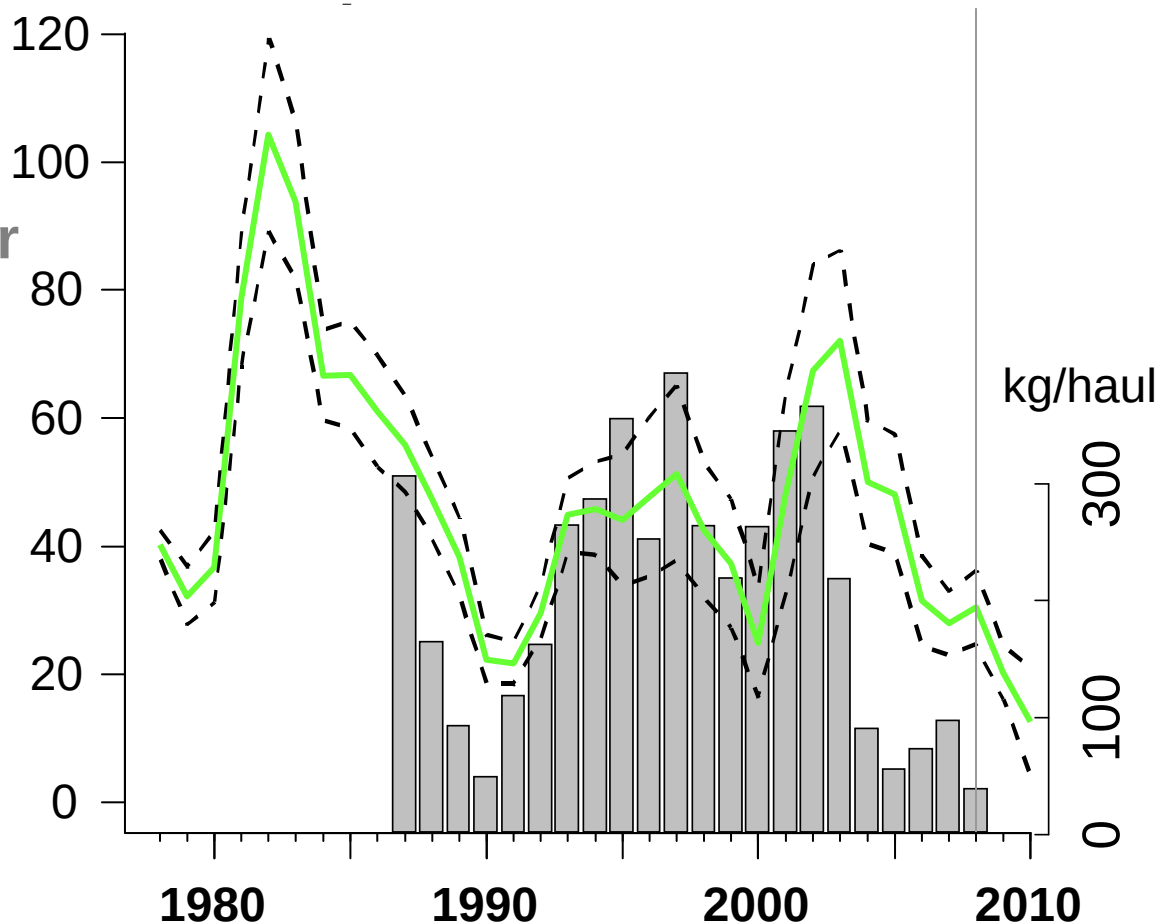
Spawning stock biomass ('000 t)



2009 assessment

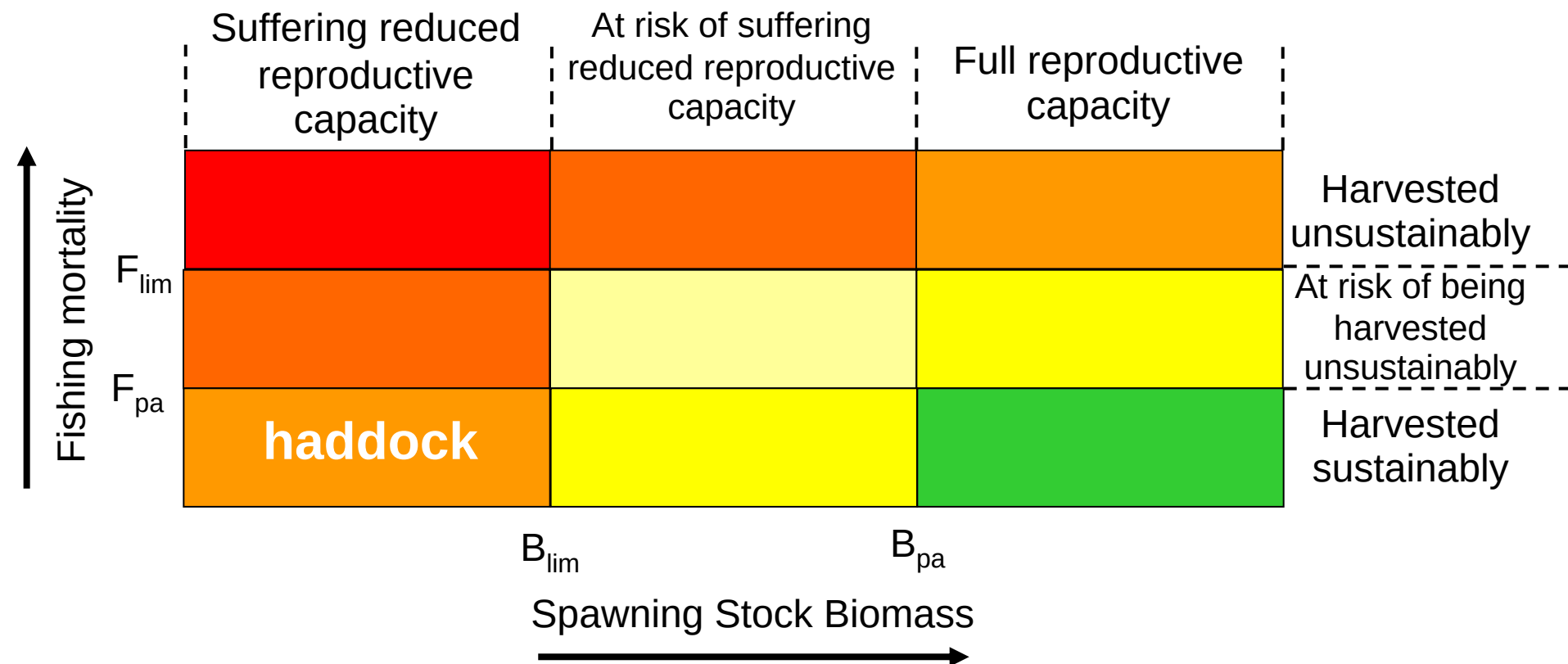
- Stock trends
- Survey trends
- Observed CCPUE
- Commercial Catch per Unit Effort

Spawning stock biomass ('000 t)



2009 assessment

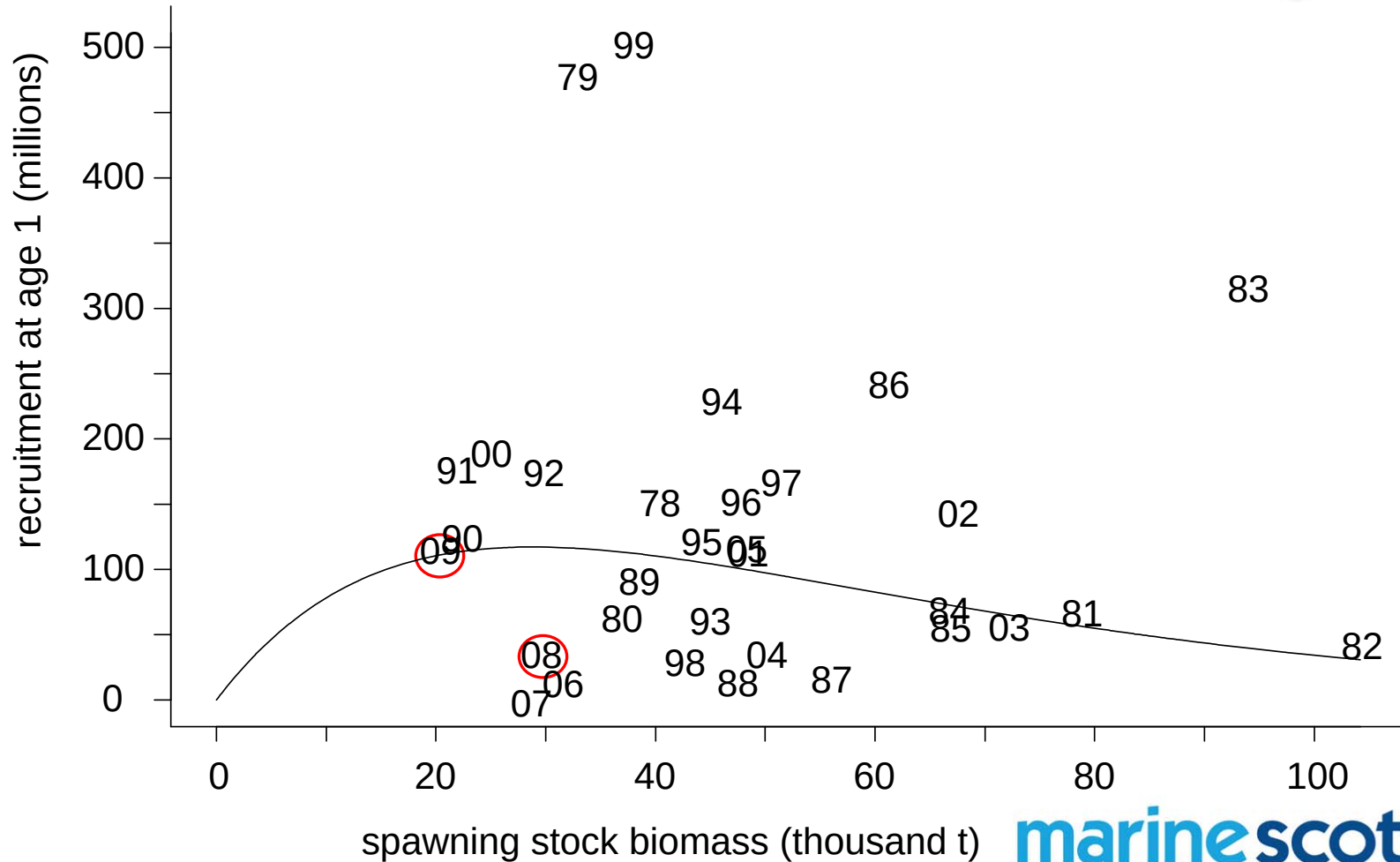
- Stock status



Haddock stock features



- Stock recruit relationship

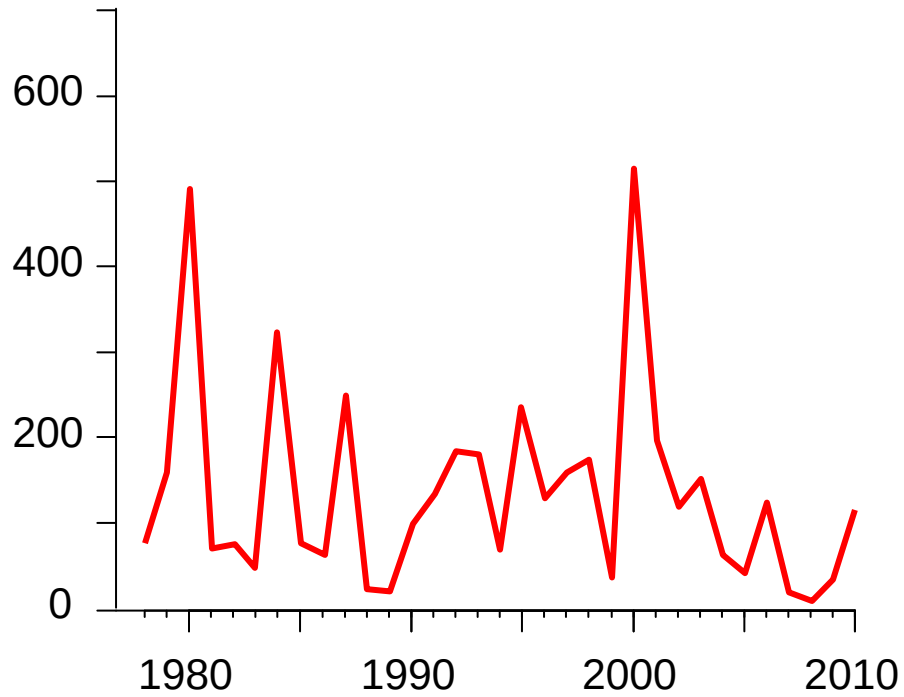


Haddock stock features

- Recruitment time series

Vla

Recruitment at age 1 (millions)

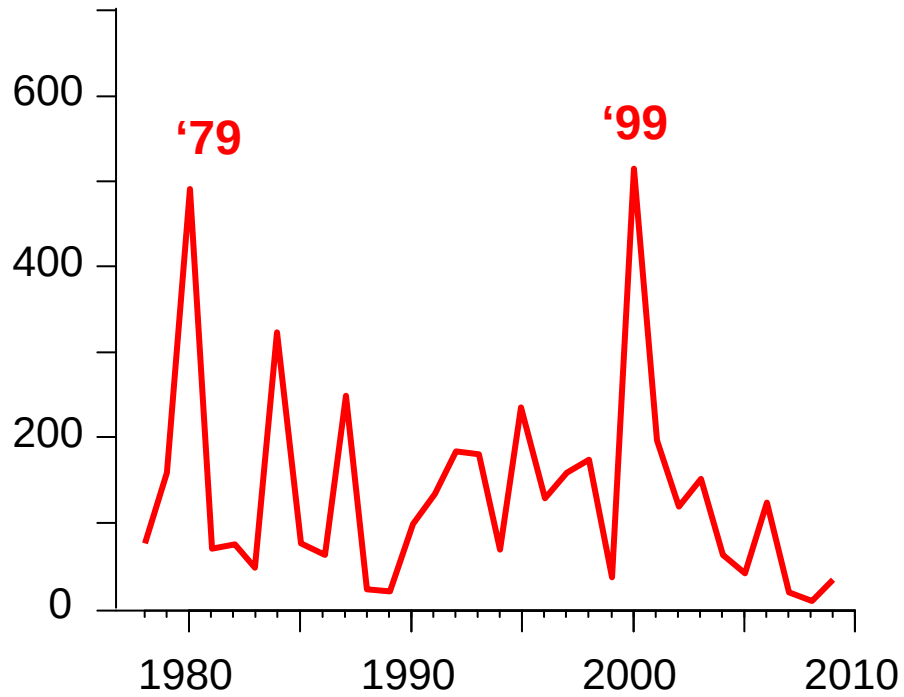


Haddock stock features

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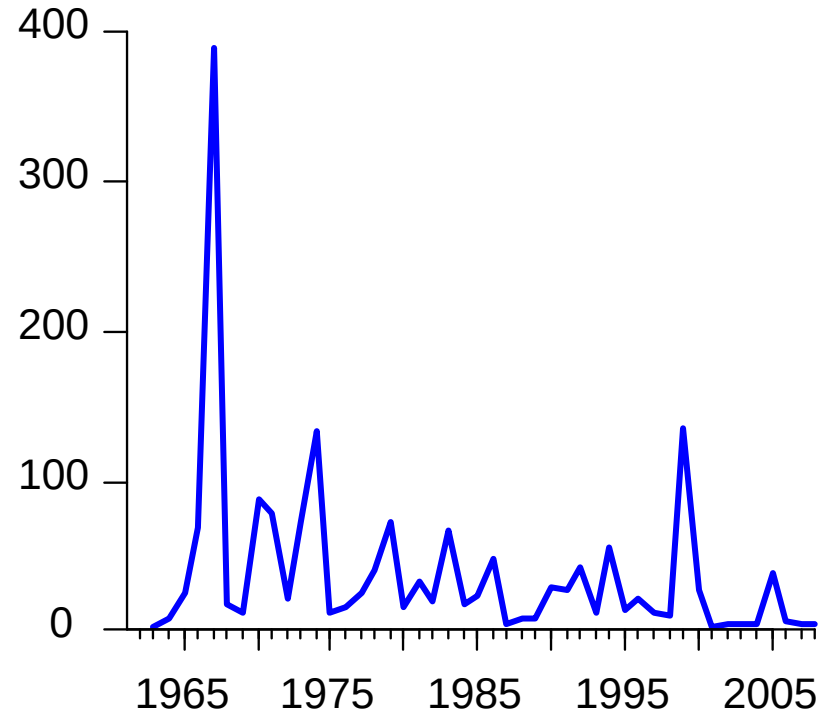
Vla

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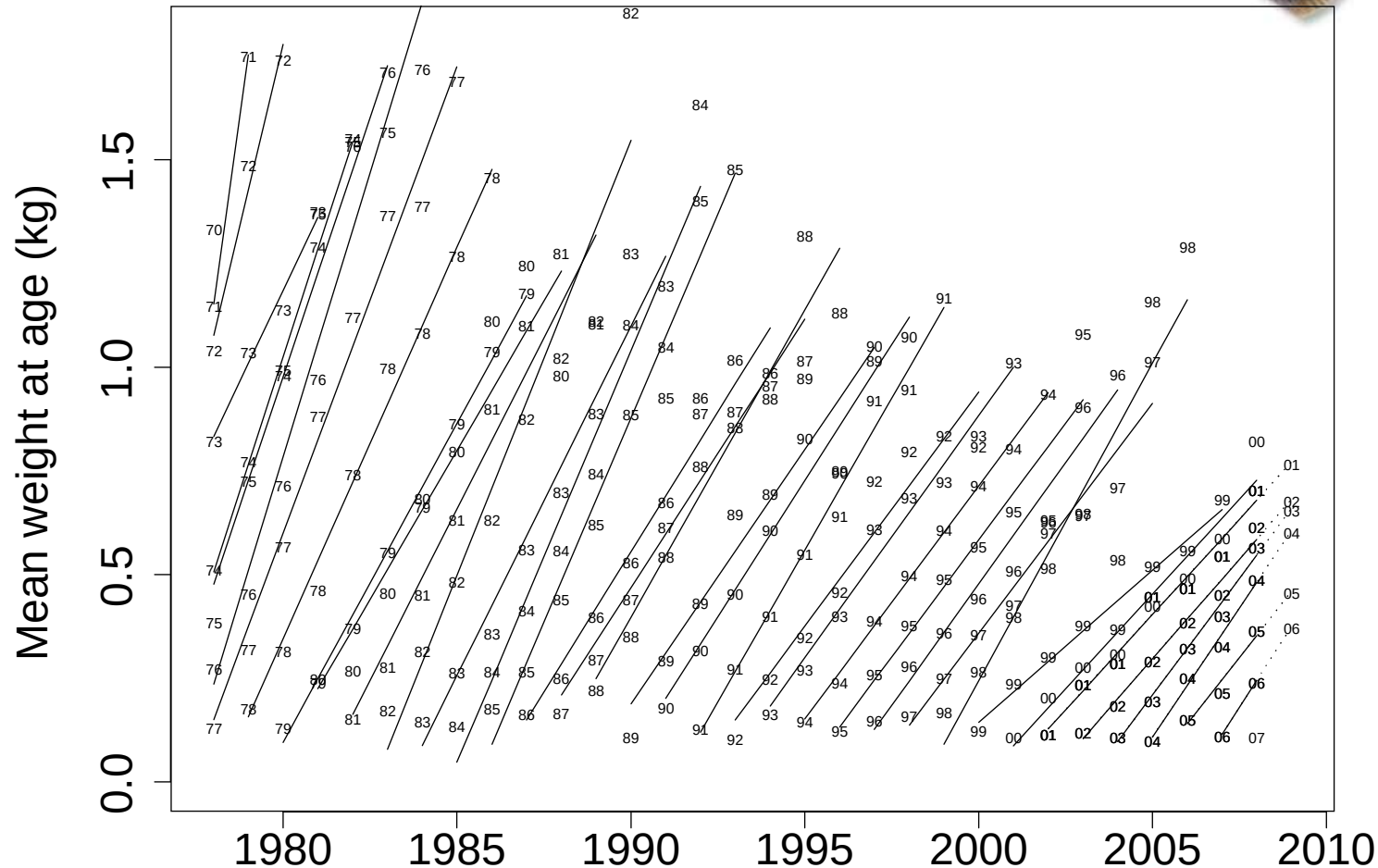
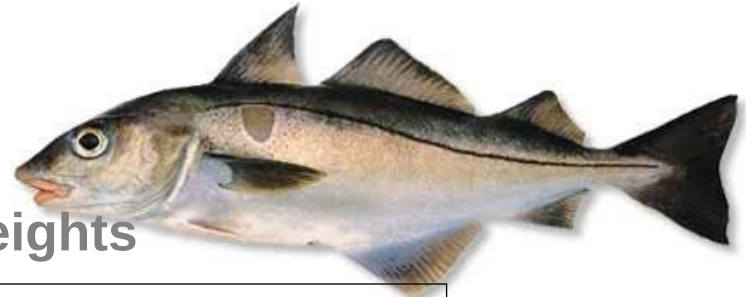
IV & IIIa

Recruitment at age 0 (000 millions)



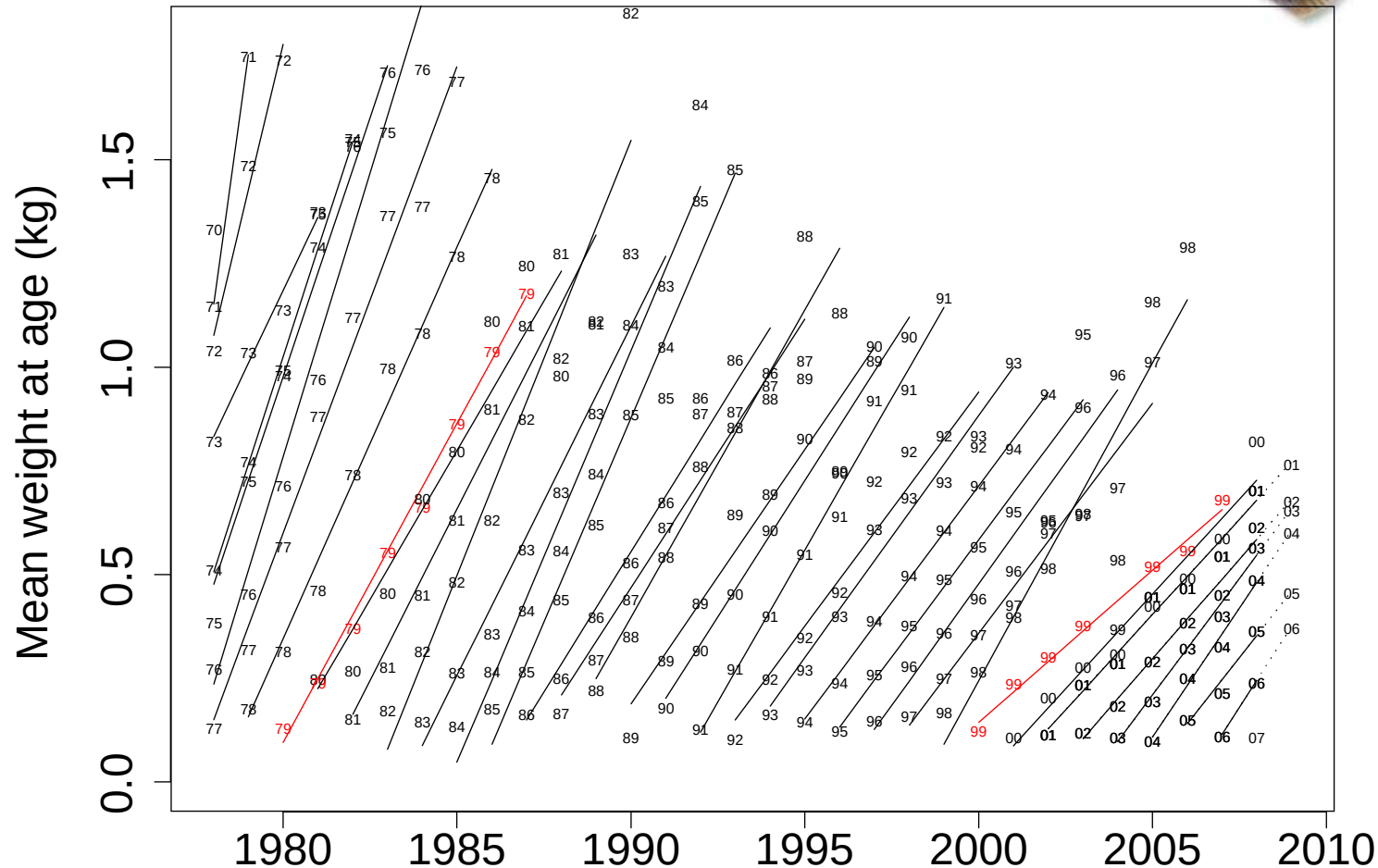
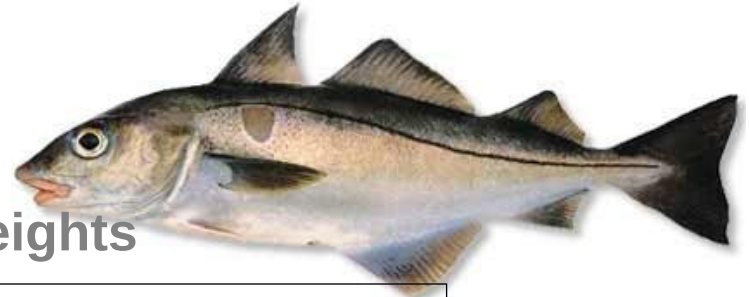
Haddock stock features

- Growth variability: Year class mean weights



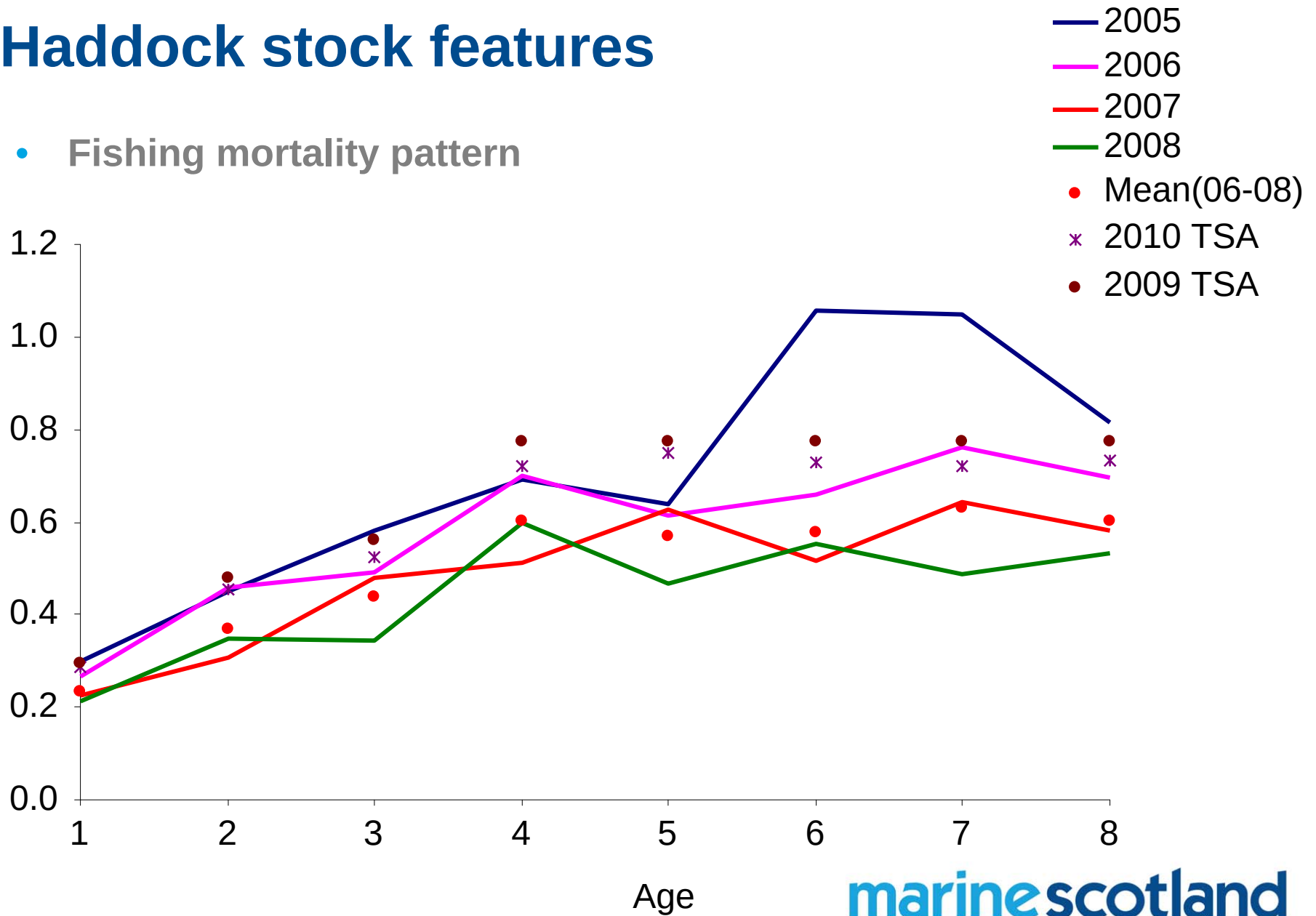
Haddock stock features

- Growth variability: Year class mean weights



Haddock stock features

- Fishing mortality pattern



West of Scotland haddock: 2009 assessment

- Survey driven assessment
- TSA assessment model
- **Reduced reproductive capacity**
 - $SSB_{2009} = 20,271 \text{ t} < B_{lim}$
- **Harvested sustainably**
 - $F_{2008} = 0.46 < F_{pa}$
- Advice is for NO fishing to take place in 2010
- Sporadic recruitment
- Variable (but predictable ?) growth

