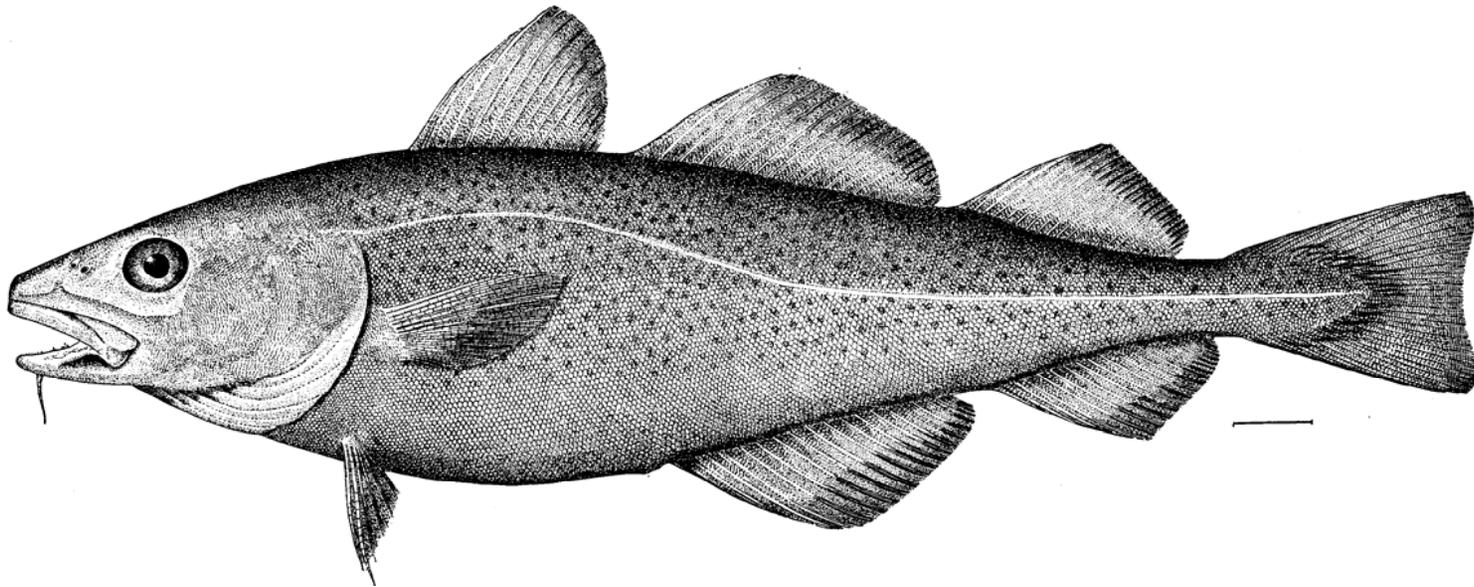


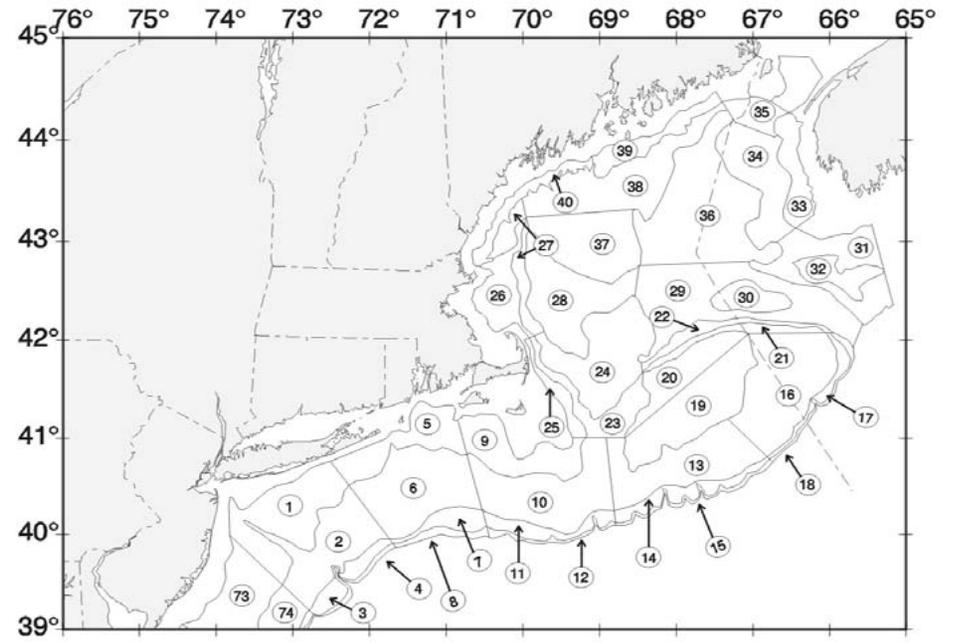
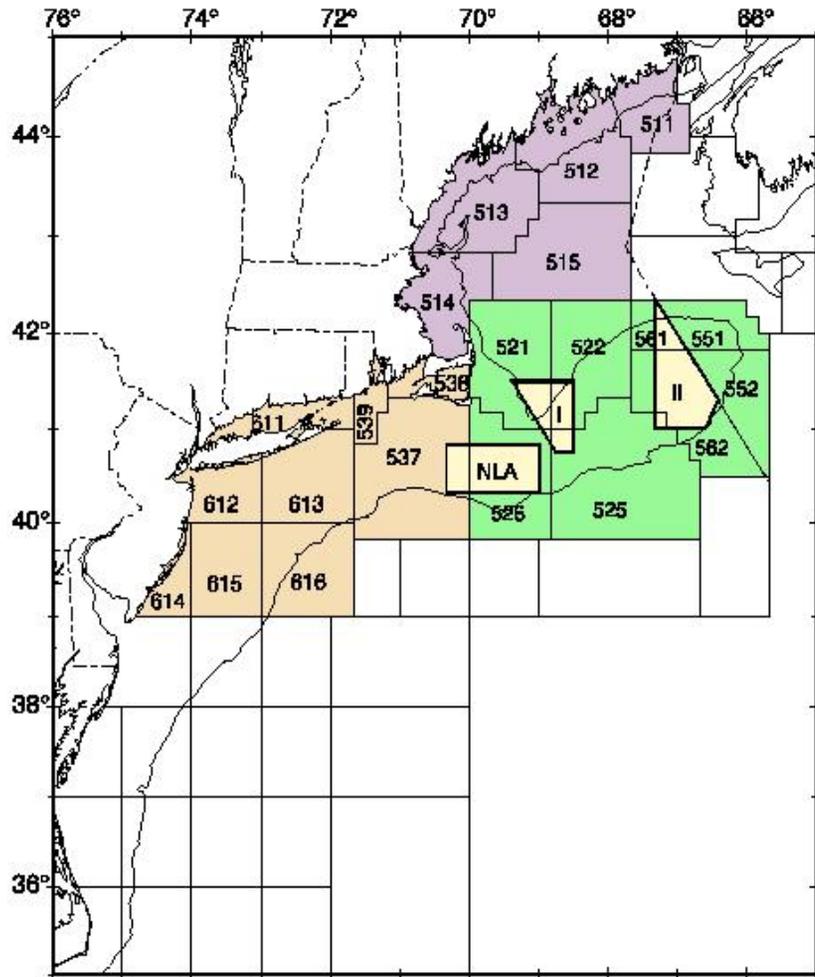
Georges Bank Atlantic Cod



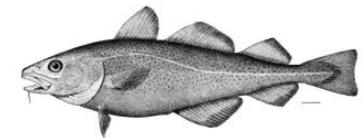
Gadus morhua

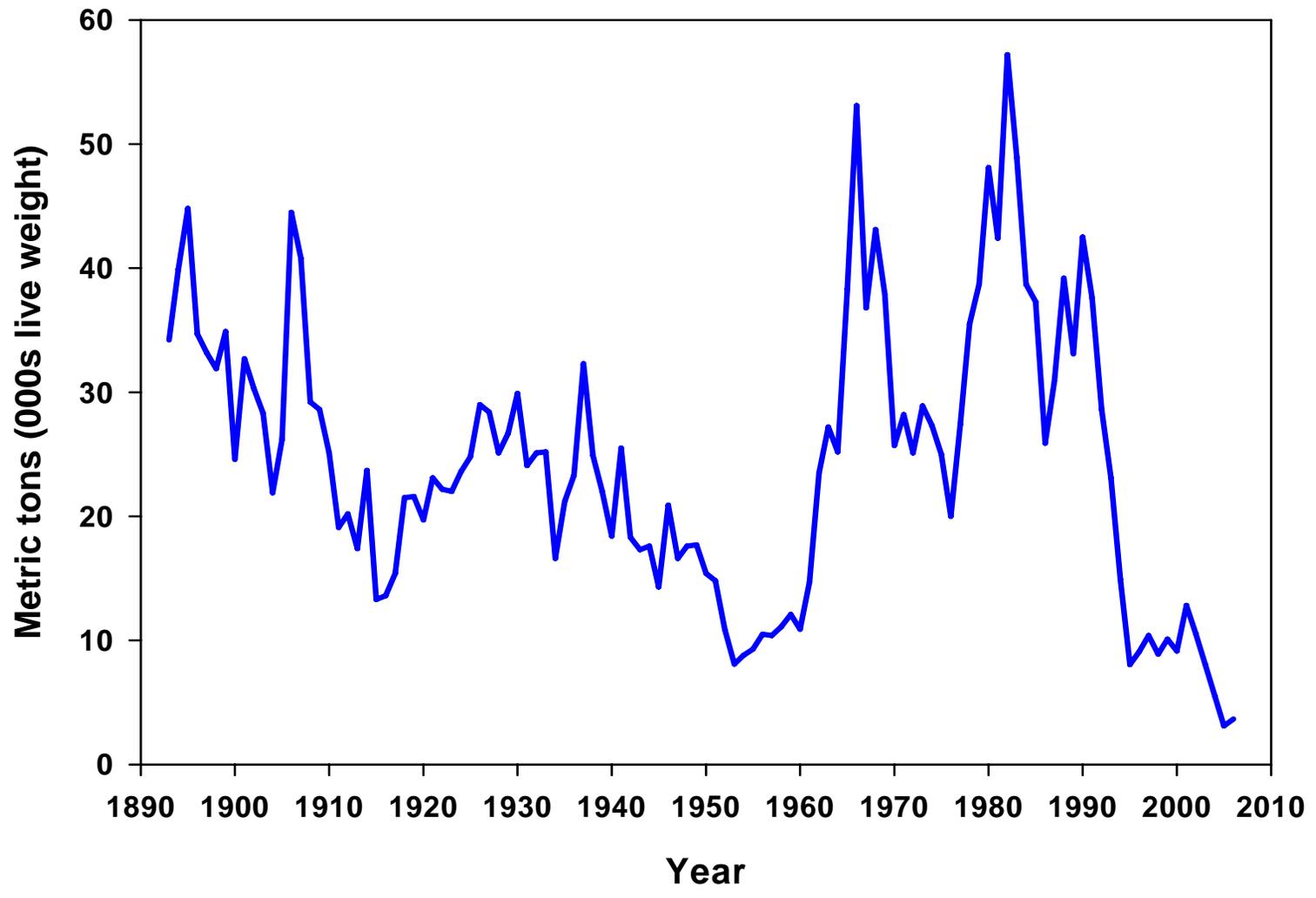
Loretta O'Brien
GARM III Models Meeting February 25-29, 2008
Woods Hole, Ma.

Atlantic Cod Assessment Area

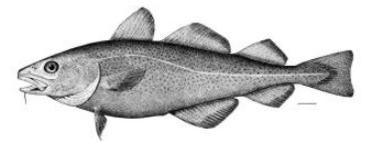


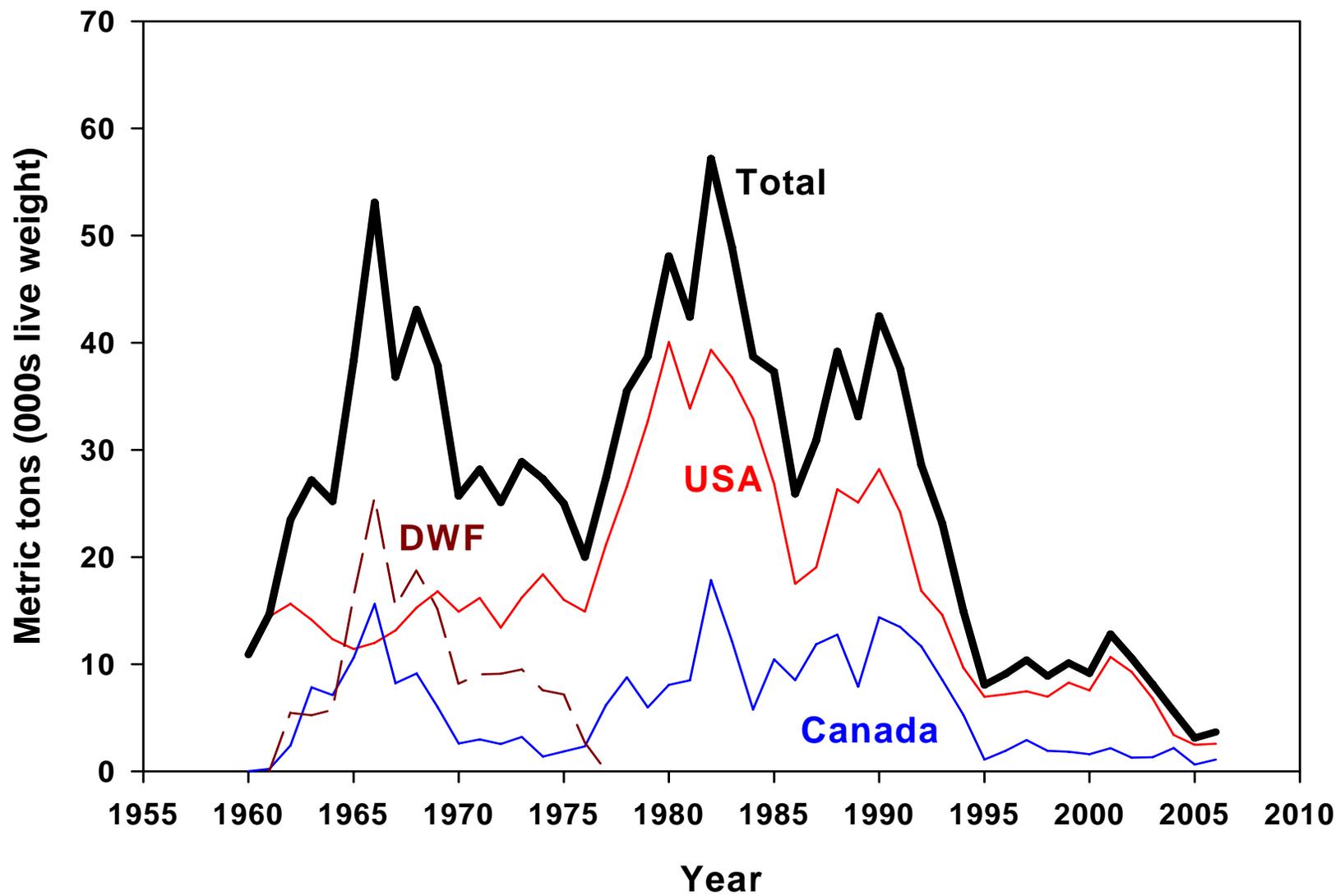
NEFSC Offshore Bottom Trawl Northern Survey Strata



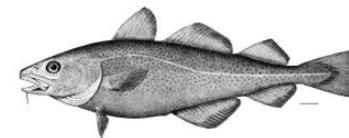


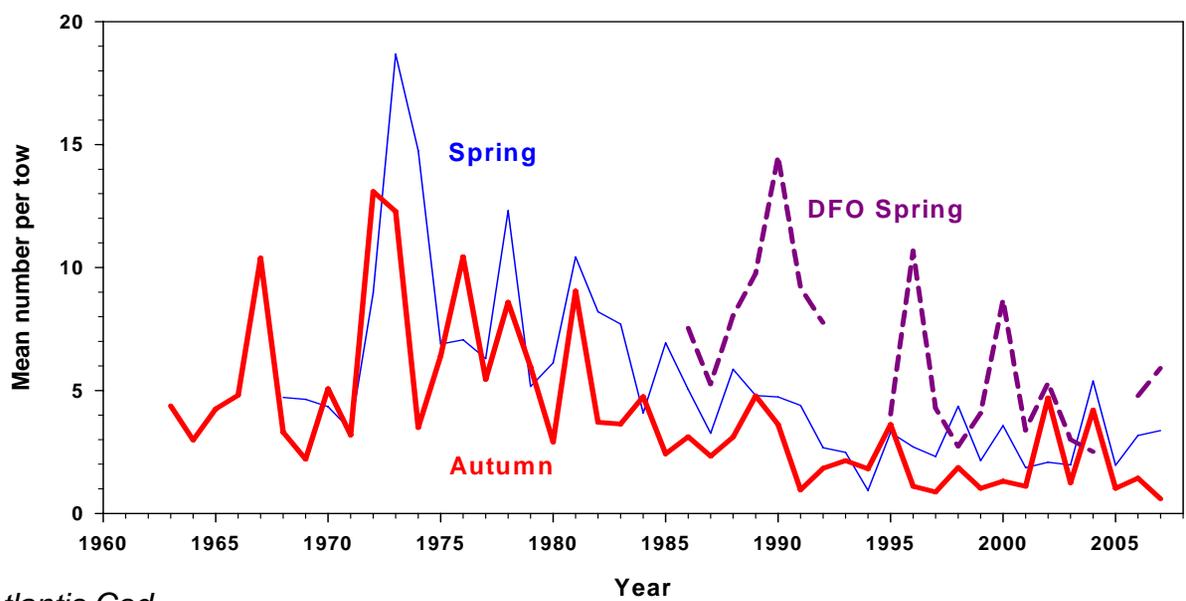
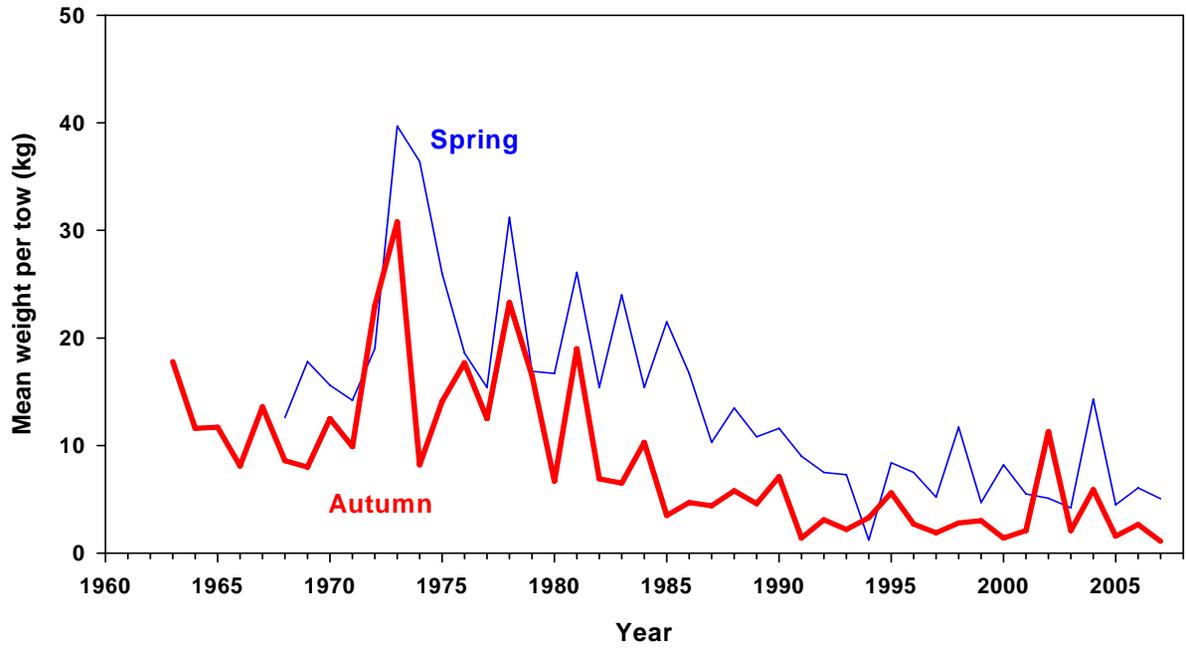
Georges Bank Atlantic Cod



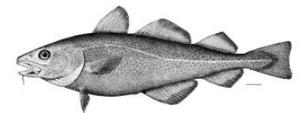


Georges Bank Atlantic Cod





Georges Bank Atlantic Cod



Current Status:

GB Atlantic cod are overfished and overfishing is occurring

Landings: 3,663 mt in 2006 (2,566 mt US, 1,097 mt Canada)

As of GARM II

Landings in 2004: 5,563 mt

F (ages 4-8) = 0.24

SSB= 22,564 mt

Reference Points

Yield and SSB/R

$$F_{0.1} = 0.17$$

$$F_{\max} = 0.33$$

$$F_{40\%} = 0.17$$

MSY-based Reference Points

$$MSY = 35,200 \text{ mt}$$

$$SSB_{MSY} = 217,000 \text{ mt}$$

$$F_{MSY} = 0.18$$

GB cod biomass sv indices remain below the long term average (43 yrs)

Fishing mortality declining since 1997 currently at the lowest level.

SSB reached record low in 1995, SSB in 2004 was 22,600 mt ,10% of SSB_{MSY} .

Current Model Approach

Age-structured model : VPA

1st assessed with VPA in 1986

Prior to 1994, CPUE and survey tuning indices, w/ moderate retrospective

Post 1994, retro flipped, and retro stronger for F (no CPUE, sampling/management change

Recent retro may be due to changes in selectivity -gear changes/closed areas

Strengths:

Applicable to available data:

Landings at age - USA and Canada ; CAA well sampled
(Discards at age - USA and Canada)

3 surveys for calibration -NEFSC spr,fall, DFO spr – all show similar trends

Performs well:

Moderate retro in recruits (age 1) and SSB

Tracks fleet and stock dynamics, trends in SSB, year class strength

Same model as used by DFO for 5Zjm cod in TRAC

Weaknesses:

Assumes no error in CAA

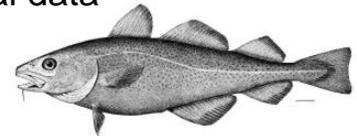
Stronger retrospective in F in recent years

- exploratory SS2 and simulation suggest VPA overest F with sudden chg in catch.

Changes in selectivity (PR) over time series cannot be directly parameterized in VPA

Does not utilize removals not characterized by age, i.e. historical landings, recreational data

Does not incorporate ancillary biological information



Feasibility of changing models

Forward projecting model is a feasible alternative to VPA
based on comparison of SS2 and VPA results

- Software and data both available
- Would be able to account for chgs in PR more easily in FPM

Proposed Model(s)

- re-formulate VPA
- FPM:
ASAP (or STATCAM ?) – local technical and software support vs.SS2

but....

- ...need to estimate BRPs
- ... Cod is Transboundary stock, need to consider implications re:TRAC

