

# **JULY 2010 TRAC RESULTS**

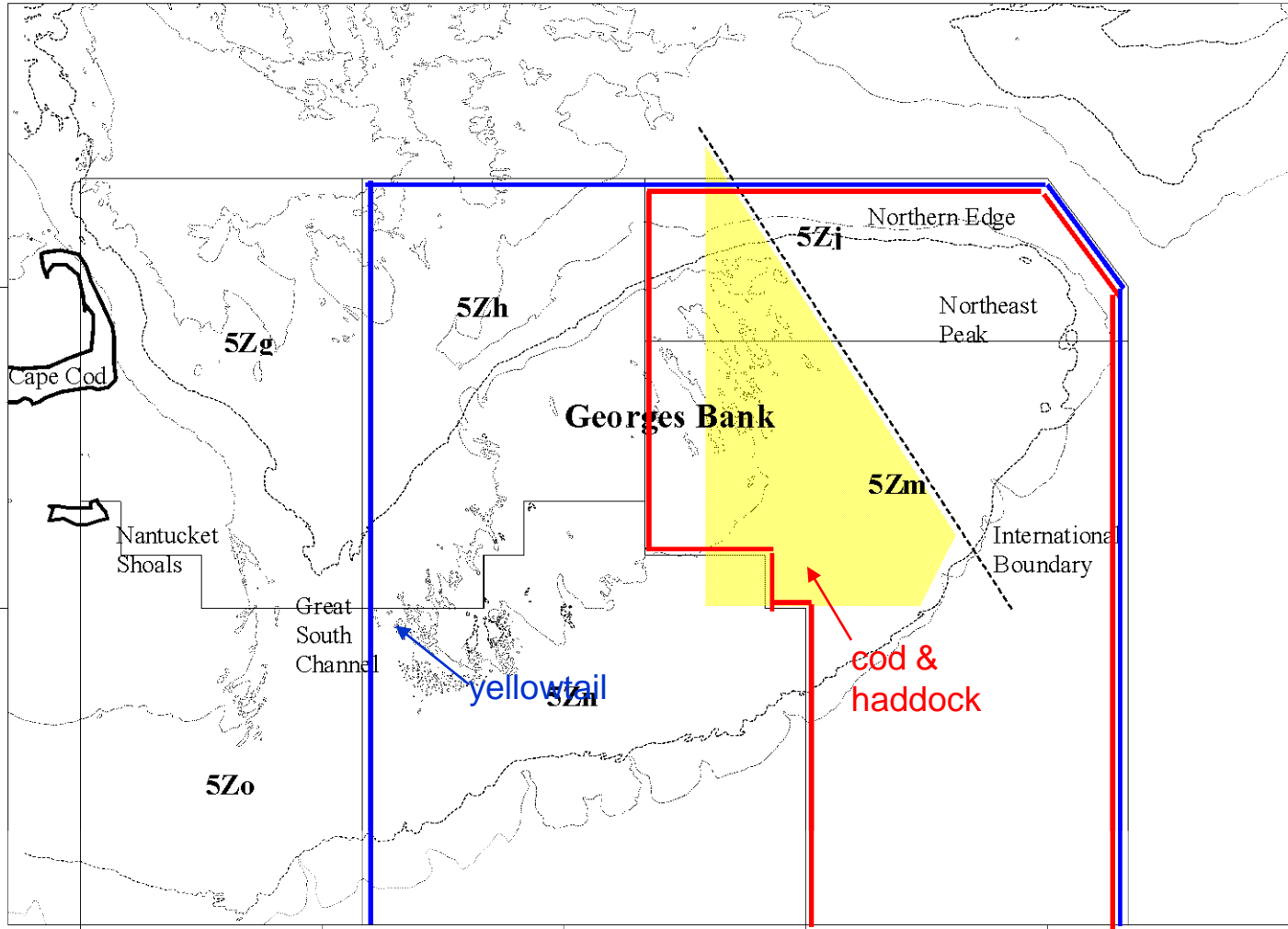
**Eastern GB cod & haddock and  
GB yellowtail flounder**

NEFMC

Newport , RI

September 30, 2010

# TRAC Management Units



# Allocation Shares

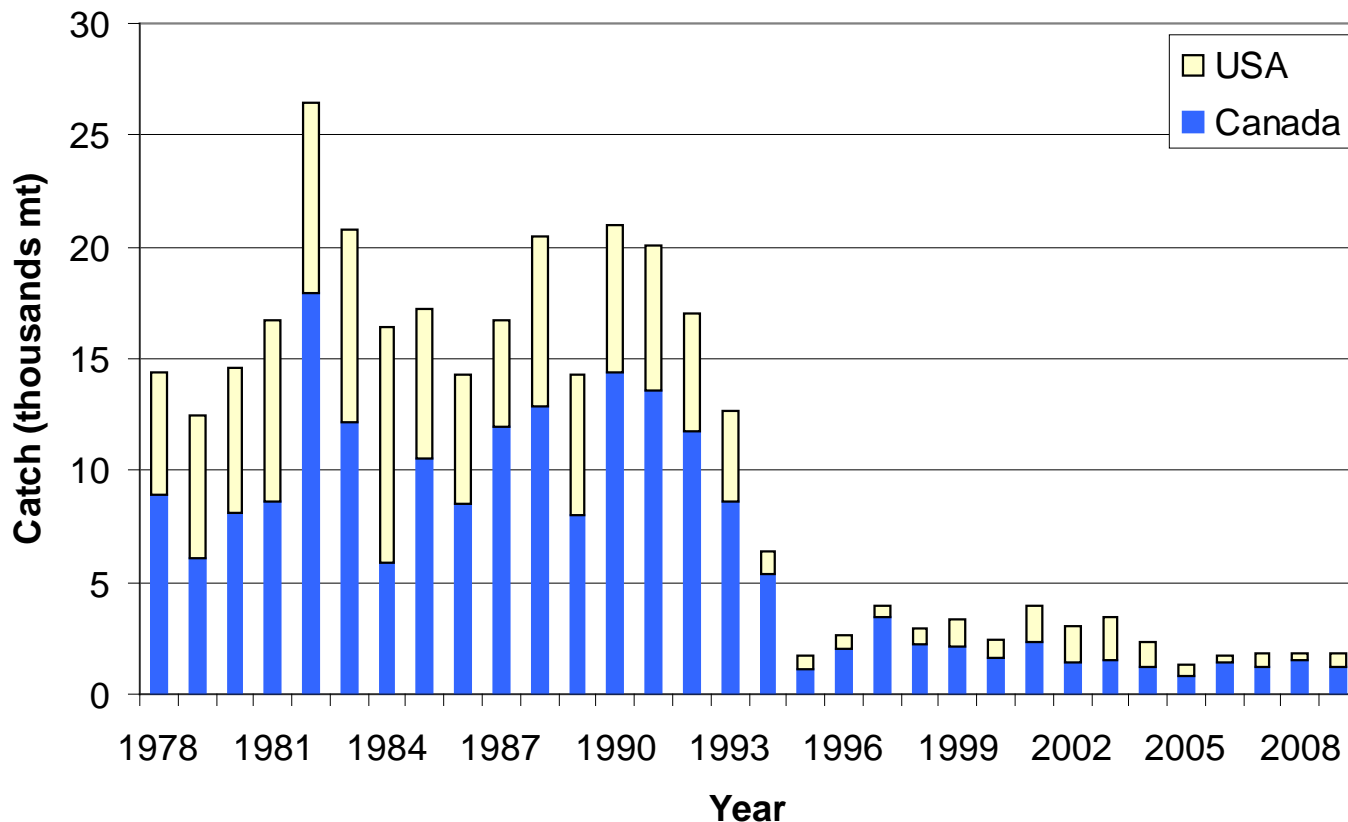
<i>Resource Utilization</i>				
		Cod	Haddock	Ytl
USA		40%	45%	98%
CANADA		60%	55%	2%

<i>Resource Distribution</i>				<i>Allocation Shares</i>						
	Survey	Cod	Haddock	Ytl	Fishing			Cod	Haddock	Ytl
	Year				Year	Utilization	Distribution			
USA	<b>2000</b>	18%	20%	54%	<b>2002</b>	40%	60%	27%	30%	72%
CANADA		82%	80%	46%				73%	70%	28%
USA	<b>2001</b>	14%	16%	64%	<b>2003</b>	40%	60%	24%	28%	78%
CANADA		86%	84%	36%				76%	72%	22%
USA	<b>2002</b>	12%	26%	62%	<b>2004</b>	40%	60%	23%	34%	76%
CANADA		88%	74%	38%				77%	66%	24%
USA	<b>2003</b>	18%	27%	56%	<b>2005</b>	35%	65%	26%	33%	71%
CANADA		82%	73%	44%				74%	67%	29%
USA	<b>2004</b>	14%	29%	56%	<b>2006</b>	30%	70%	22%	34%	69%
CANADA		86%	71%	44%				78%	66%	31%
USA	<b>2005</b>	21%	29%	63%	<b>2007</b>	25%	75%	26%	33%	72%
CANADA		79%	71%	37%				74%	67%	28%
USA	<b>2006</b>	26%	32%	73%	<b>2008</b>	20%	80%	29%	35%	78%
CANADA		74%	68%	27%				71%	65%	22%
USA	<b>2007</b>	29%	36%	73%	<b>2009</b>	15%	85%	31%	37%	77%
CANADA		71%	64%	27%				69%	63%	23%
USA	<b>2008</b>	23%	40%	60%	<b>2010</b>	10%	90%	25%	40.5%	64%
CANADA		77%	60%	40%				75%	59.5%	36%
USA	<b>2009</b>	17%	43%	50%	<b>2011</b>	10%	90%	19%	43%	55%
CANADA		83%	57%	50%				81%	57%	45%

# **Eastern GB Atlantic Cod**

## Canadian and USA Total Catch

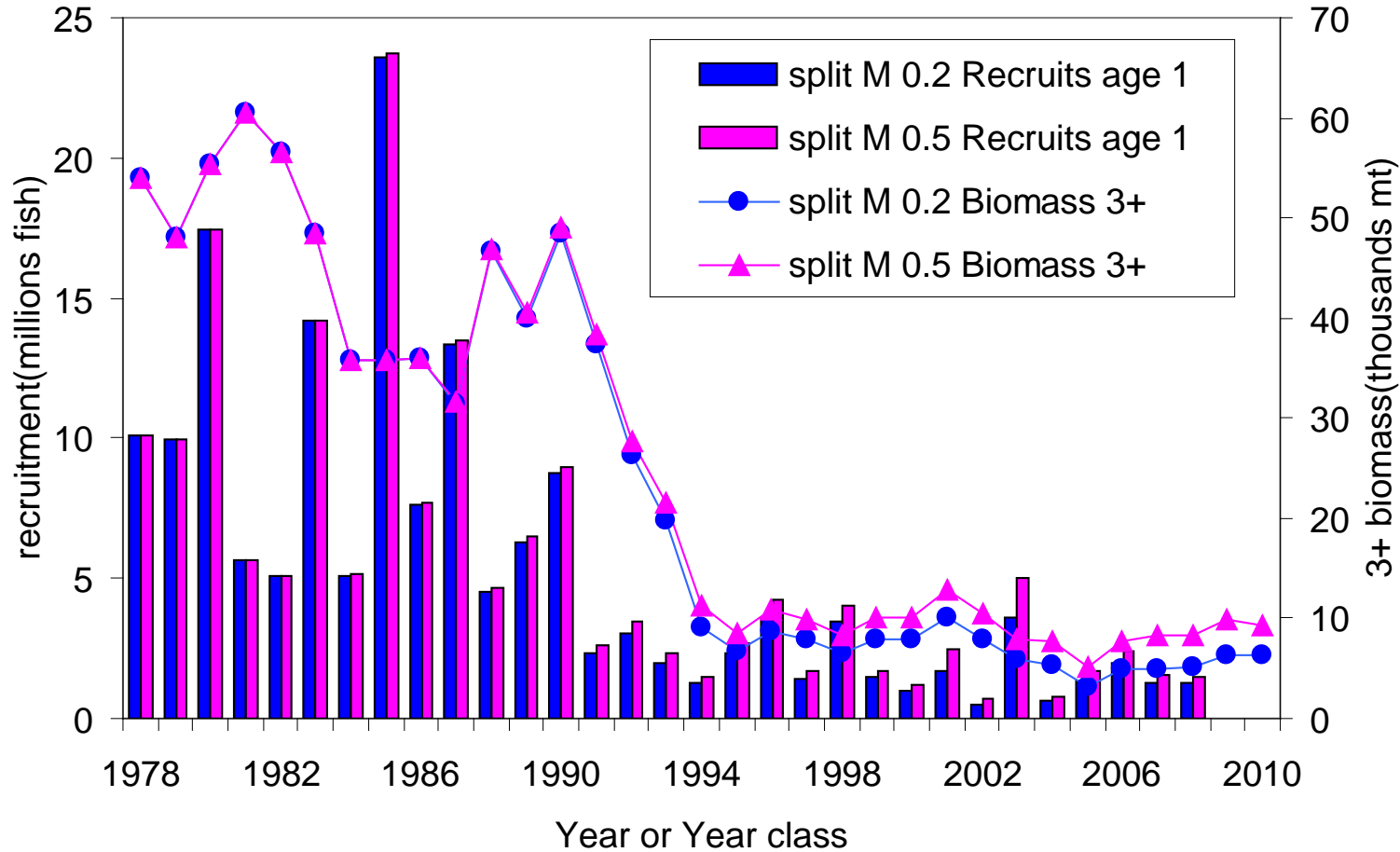


- Canadian + USA 2009 total catch **1,858** mt (Quota **1,700** mt)
- Canadian 2009 catch **1,209** mt (Quota **1,173** mt) ;both CY
- USA 2009 catch **649** mt (CY) (Quota **527** mt- FY)

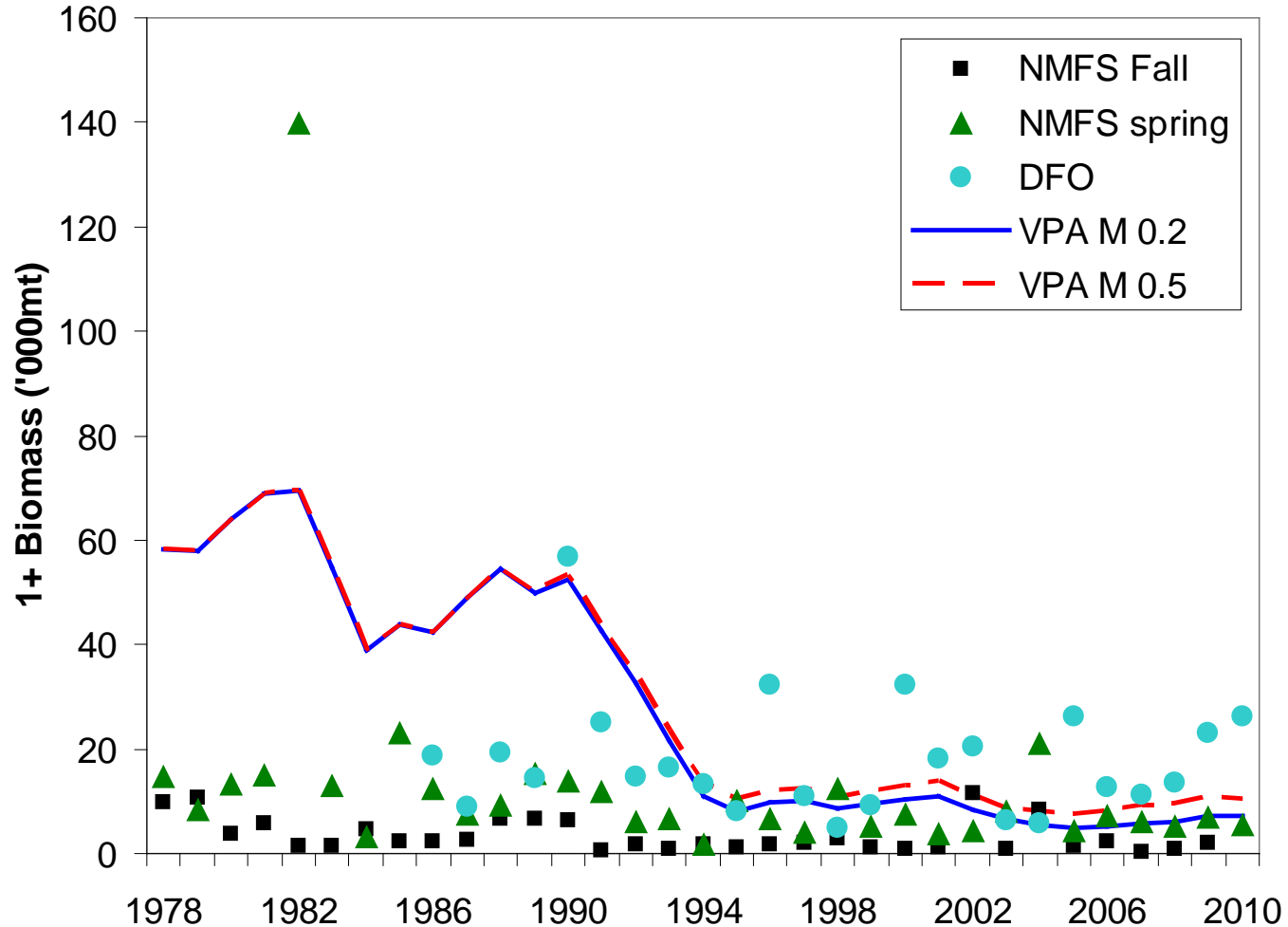
- **Two VPA formulations: split “M 0.2” & “M 0.5”**
- **Survey indices split in 1993-1994 for both models (unknown cause of retrospective aliased as change in sv catchability)**
- **Natural mortality (M) = 0.2 for all ages in “M 0.2”, increased M for ages 6+ in “M 0.5”**
- **Benchmark : consider both model formulations until the fate of the 2003 year class has been documented , thus providing information on M.**

# 3+ Biomass

# EGB Cod

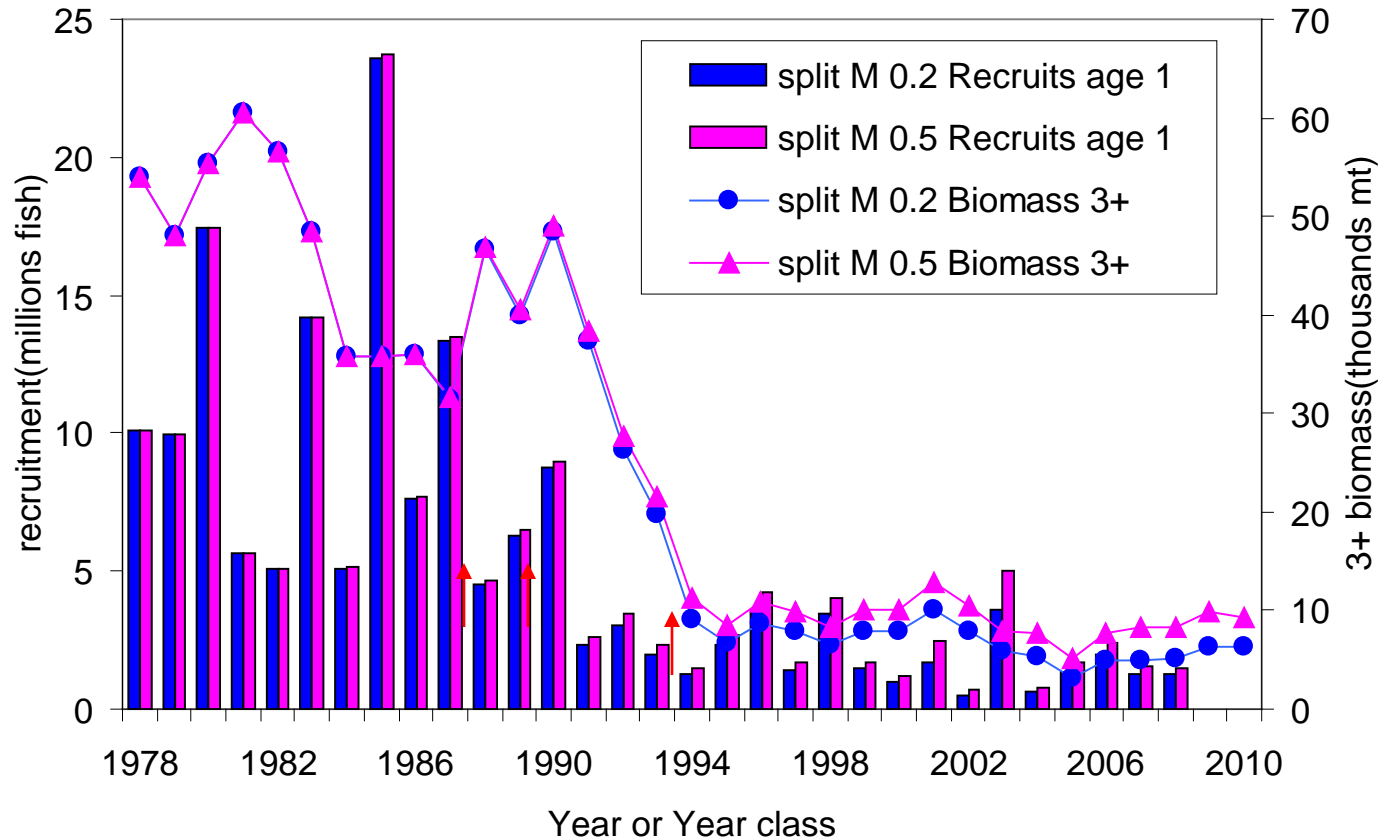


- **6,394 mt (split M 0.2) & 9,260 mt (split M 0.5) in 2010**
- **Increase since 2005 due to strong 2003 year class.**



- **1+ population biomass and SV biomass indices : fluctuating at low values since 1994**

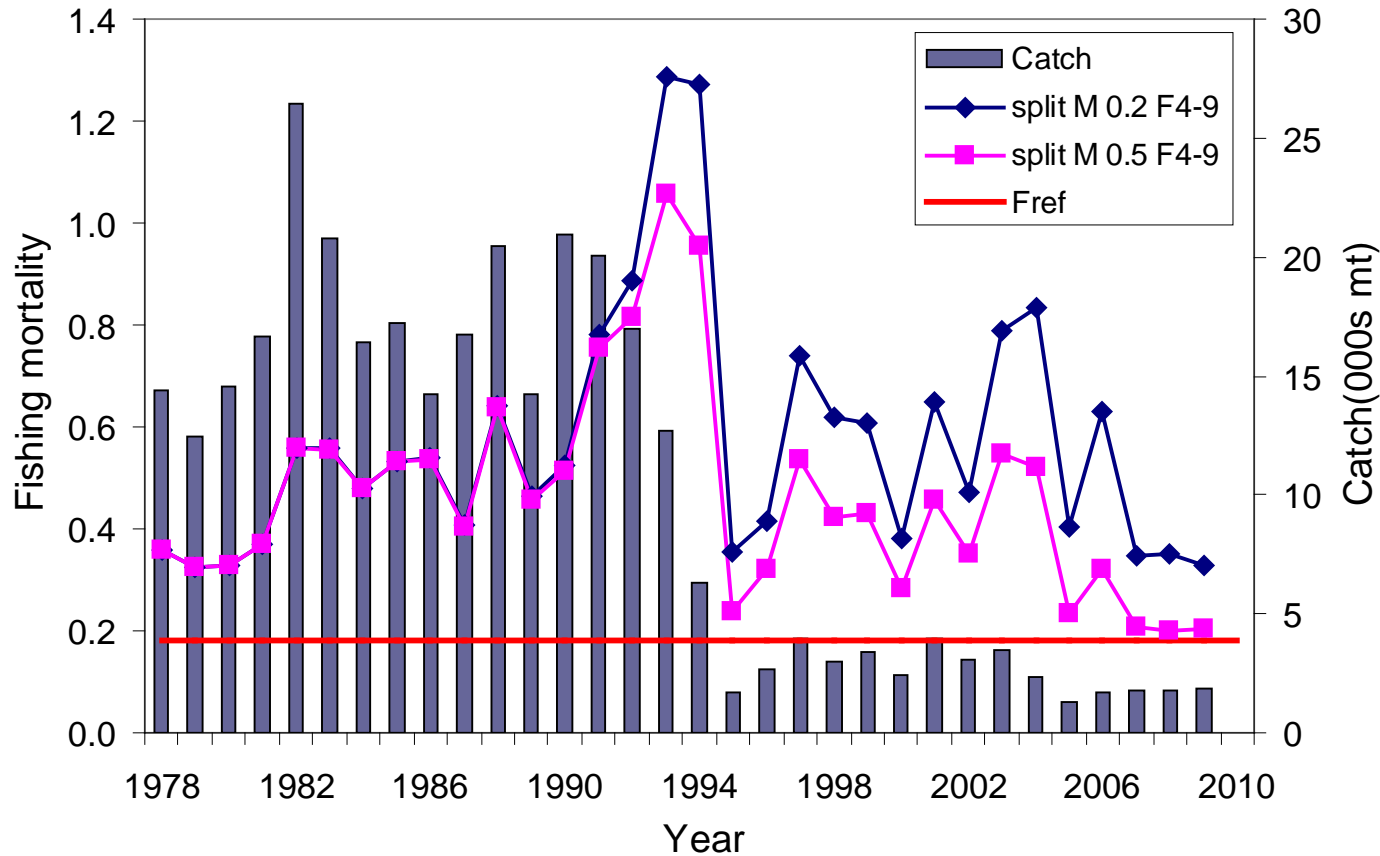




\* **2003 M.2 YC (3.6M) ~ 1996 YC; 2003 M.5 YC (5M)**  
**strongest since 1990 YC**

\* **2002 YC and 2004 YC weakest (0.5M-1M) on record**

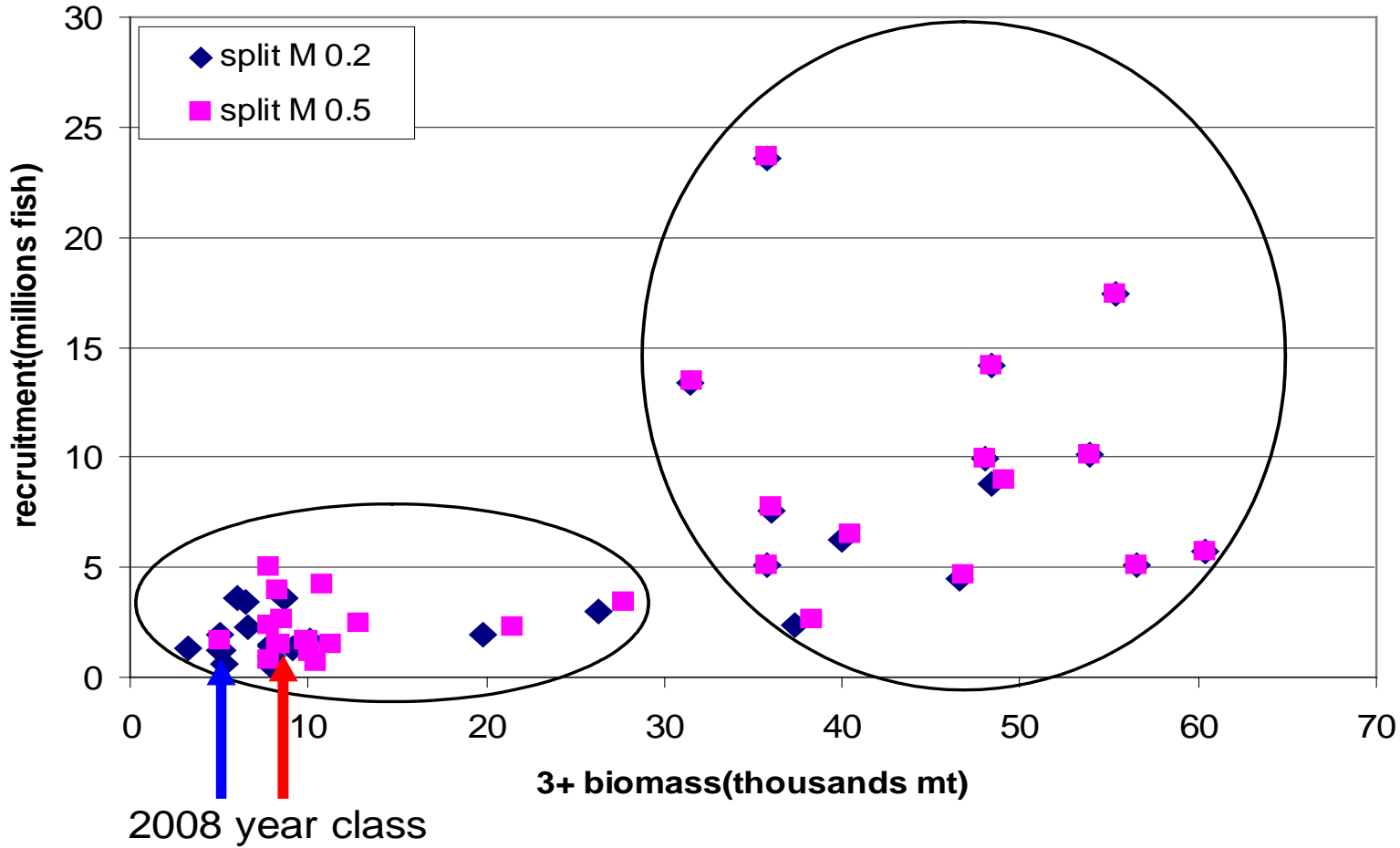
\* **2008 YC similar to 2007 YC and 2005 YC.**



- **2009  $F = 0.33$  (M0.2) &  $0.20$  (M0.5) 2009.**
- **Lowest  $F$  on record ; still above  $F_{ref}$**
- **$F > F_{ref} = 0.18$  for entire time series**

# Stock Recruitment

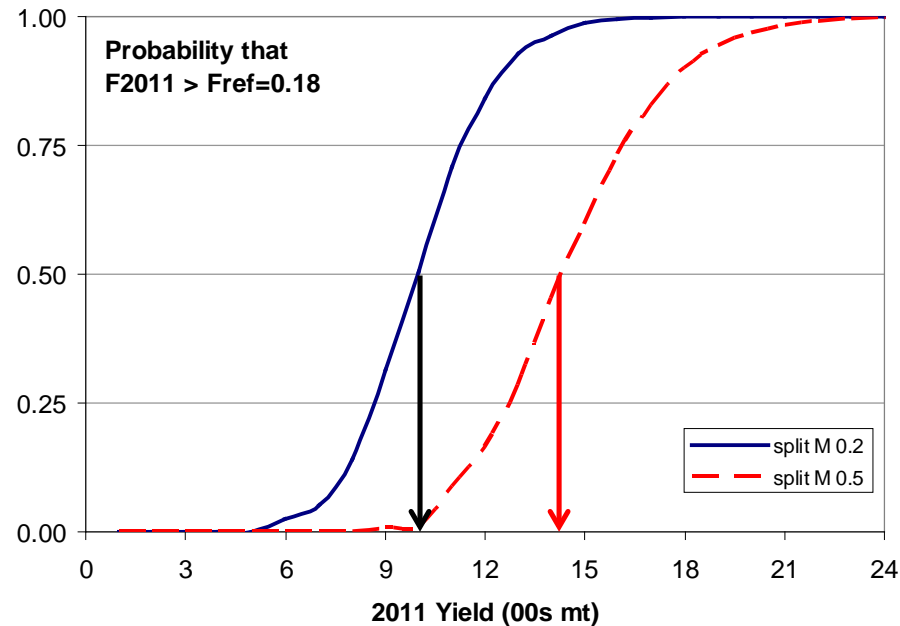
# EGB Cod



**Currently low productivity; low weights at age**  
**Rct event more likely > 30,000 mt SSB**

# 2011 Projection : Fref

# EGB Cod

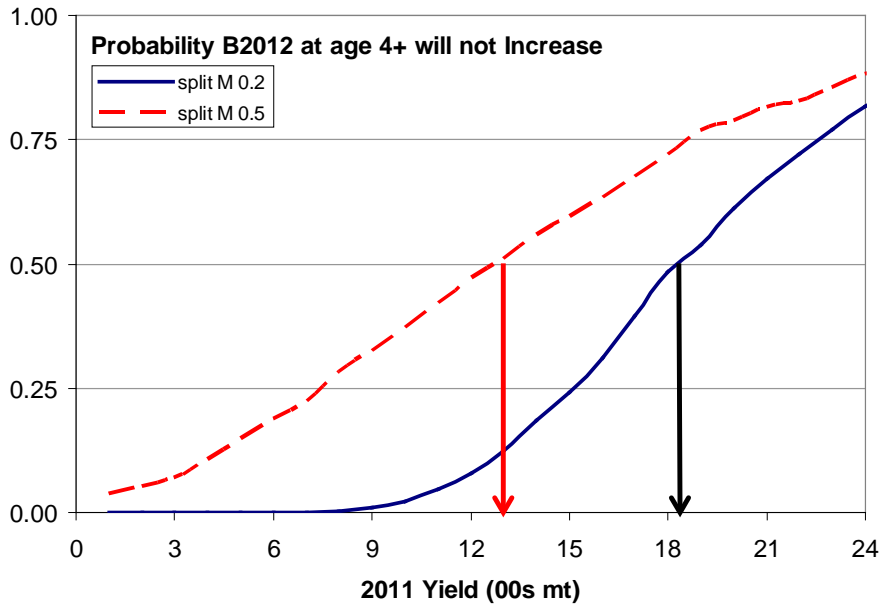


Probability of Exceeding Fref in 2011	25%	50%	75%
Split M 0.2	850 mt	1,000 mt	1,150 mt
Split M 0.5	1,250 mt	1,400 mt	1,600 mt

Split M 0.2 model: A catch of about **1,000 mt** in 2011 will result in a neutral risk (50%) that the fishing mortality rate in 2011 will exceed  $F_{ref}$

Split M 0.5 model: A catch of about **1,400 mt** in 2011 will result in a neutral risk (50%) that the fishing mortality rate in 2011 will exceed  $F_{ref}$

# 2011 Projection : Biomass EGB Cod

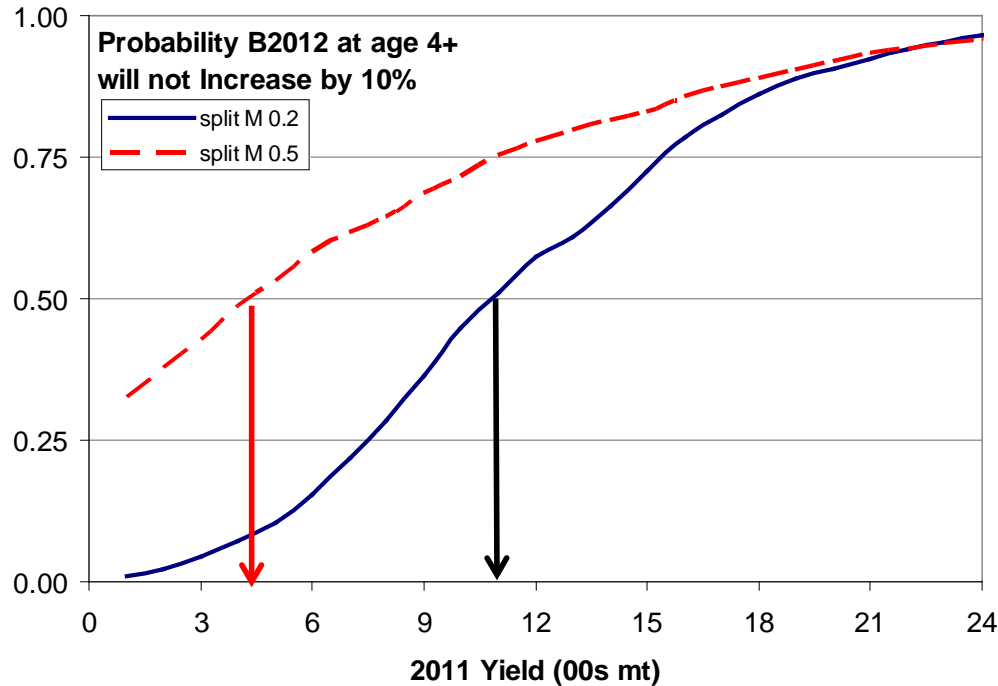


Risk that the 4+ adult biomass in 2012 will be lower than the 2011 biomass	25%	50%	75%
Split M 0.2	1,525 mt	1,850 mt	2,250 mt
Split M 0.5	750 mt	1,350 mt	1,850 mt

**Split M 0.2: 1,850 mt catch → results in 50% risk that 4+ biomass in 2012 < 2011**

**Split M 0.5: 1,350 mt catch → results 50% risk that 4+ biomass in 2012 < 2011**

# 2011 Projection : Biomass EGB Cod



Risk that the 4+ adult biomass in 2012 will not increase by 10%	25%	50%	75%
Split M 0.2	750 mt	1,100 mt	1,550 mt
Split M 0.5	-	450 mt	1,100 mt

**Split M 0.2: 1,100 mt catch results in 50% risk that 4+ biomass in 2012 will not increase by 10%**

**Split M 0.5: 450 mt catch results in 50% risk that 4+ biomass in 2012 will not increase by 10%**

# 2011 Projection

# EGB Cod

	"split M 0.2"			"split M 0.5"		
	25%	50%	75%	25%	50%	75%
Probability of Exceeding Fref in 2011	850 mt	1,000 mt	1,150 mt	1,250 mt	1,400 mt	1,600 mt
Risk that the 4+ adult biomass in 2012 will be lower than the 2011 biomass	1,525 mt	1,850 mt	2,250 mt	750 mt	1,350 mt	1,850 mt
Risk that the 4+ adult biomass in 2012 will not increase by 10%	750 mt	1,100 mt	1,550 mt	-	450 mt	1,100 mt
Risk that the 4+ adult biomass in 2012 will not increase by 20%	350 mt	750 mt	1,250 mt	-	-	350 mt

# *Summary*

# *EGB Cod*

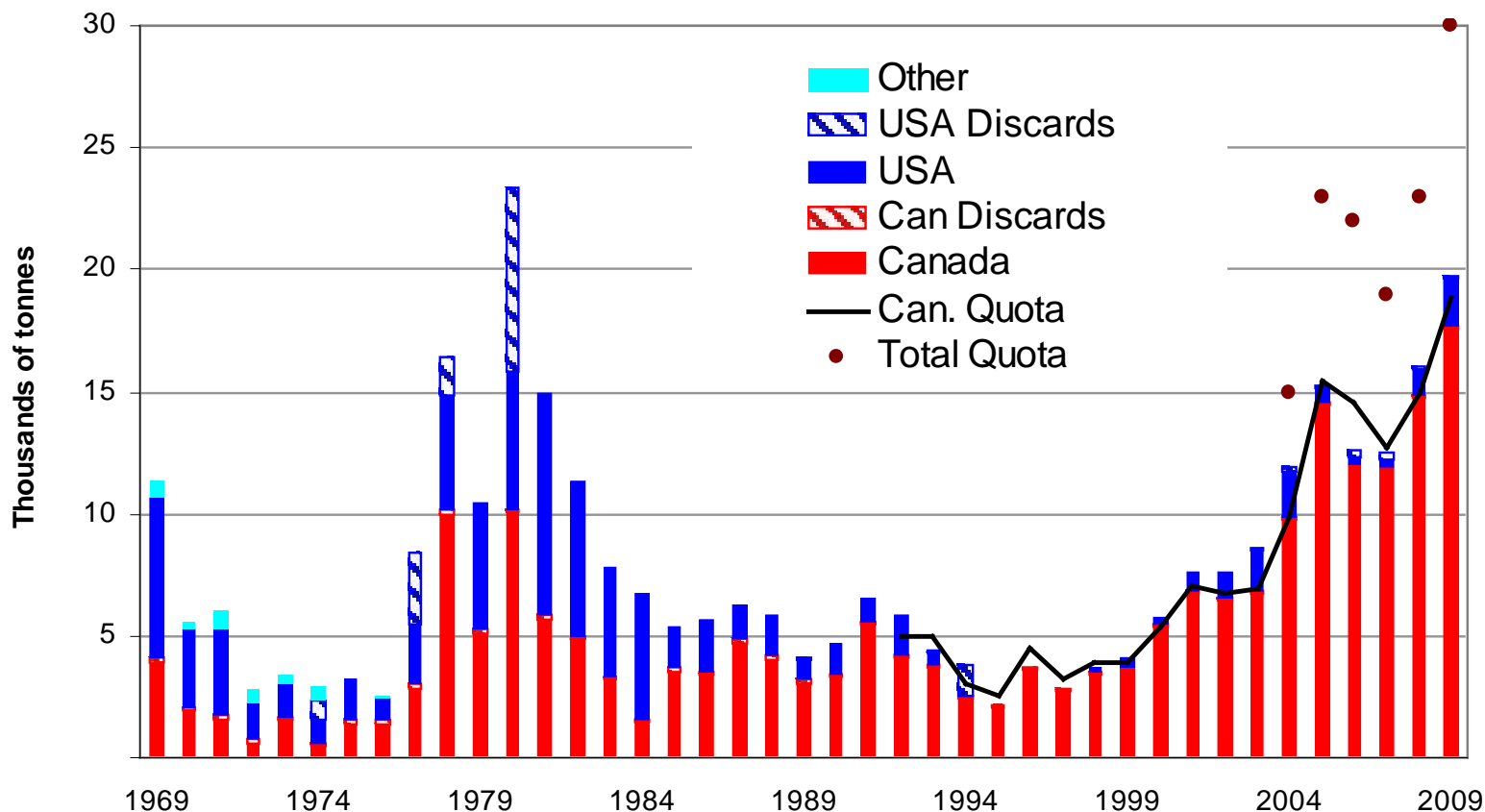
- F reduced but still above  $F_{ref}$
- Recent recruitment generally poor
- 2003 YC & 2006 YC dominate in 2009 fishery
- Low numbers: 7+ fish; reduced weights at age
- Low biomass ; Fishing below  $F_{ref}$  will maintain a higher biomass
- Rebuilding will not occur without improved recruitment
- 2 models equally viable & both should be considered



# **Eastern GB Haddock**

# Catch

# EGB Haddock



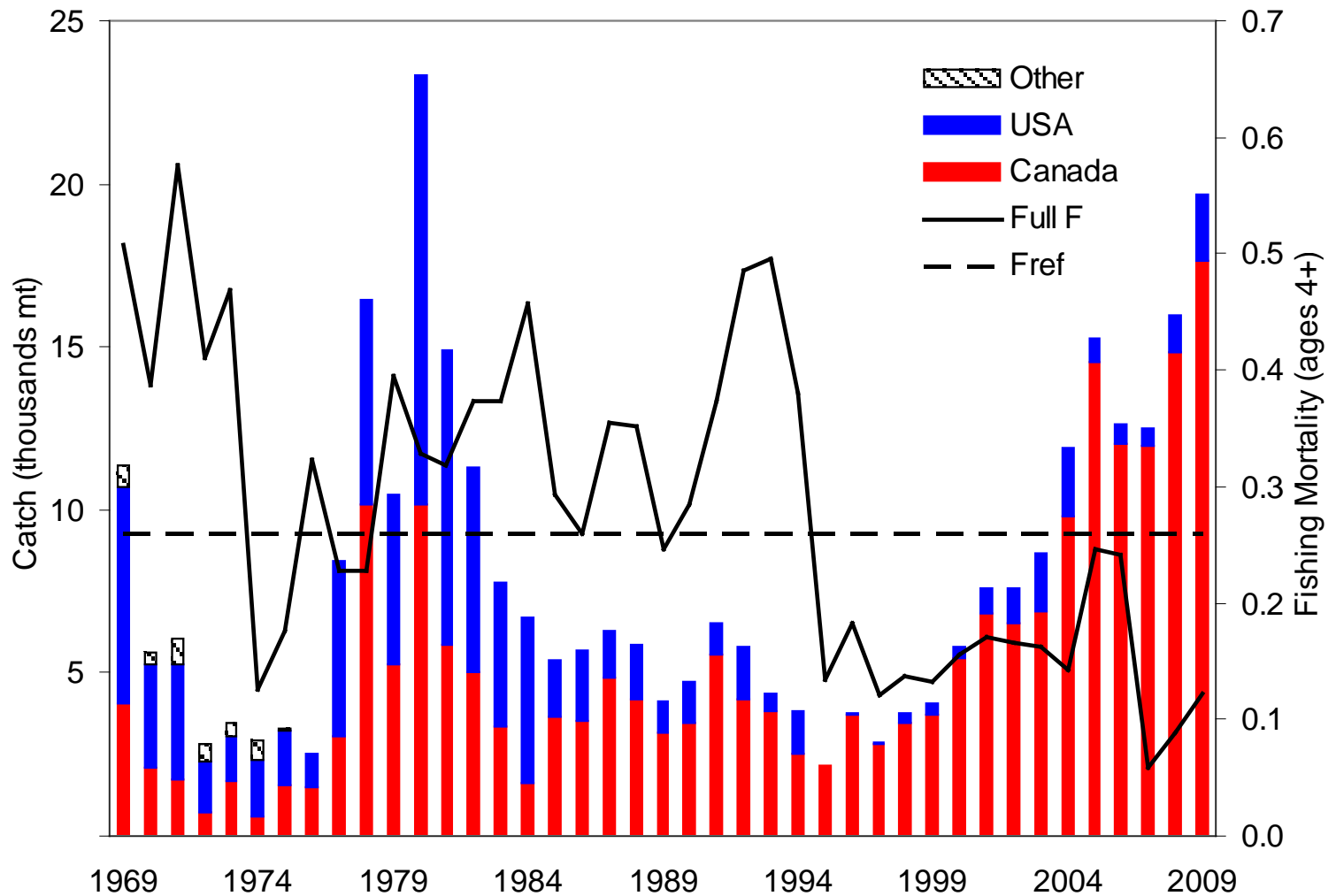
Total 2009 catch: 19,707 mt

Canada: 17,649 mt (18,900 mt quota)

US: 2,058 mt (11,000 mt quota)

# Fishing Mortality

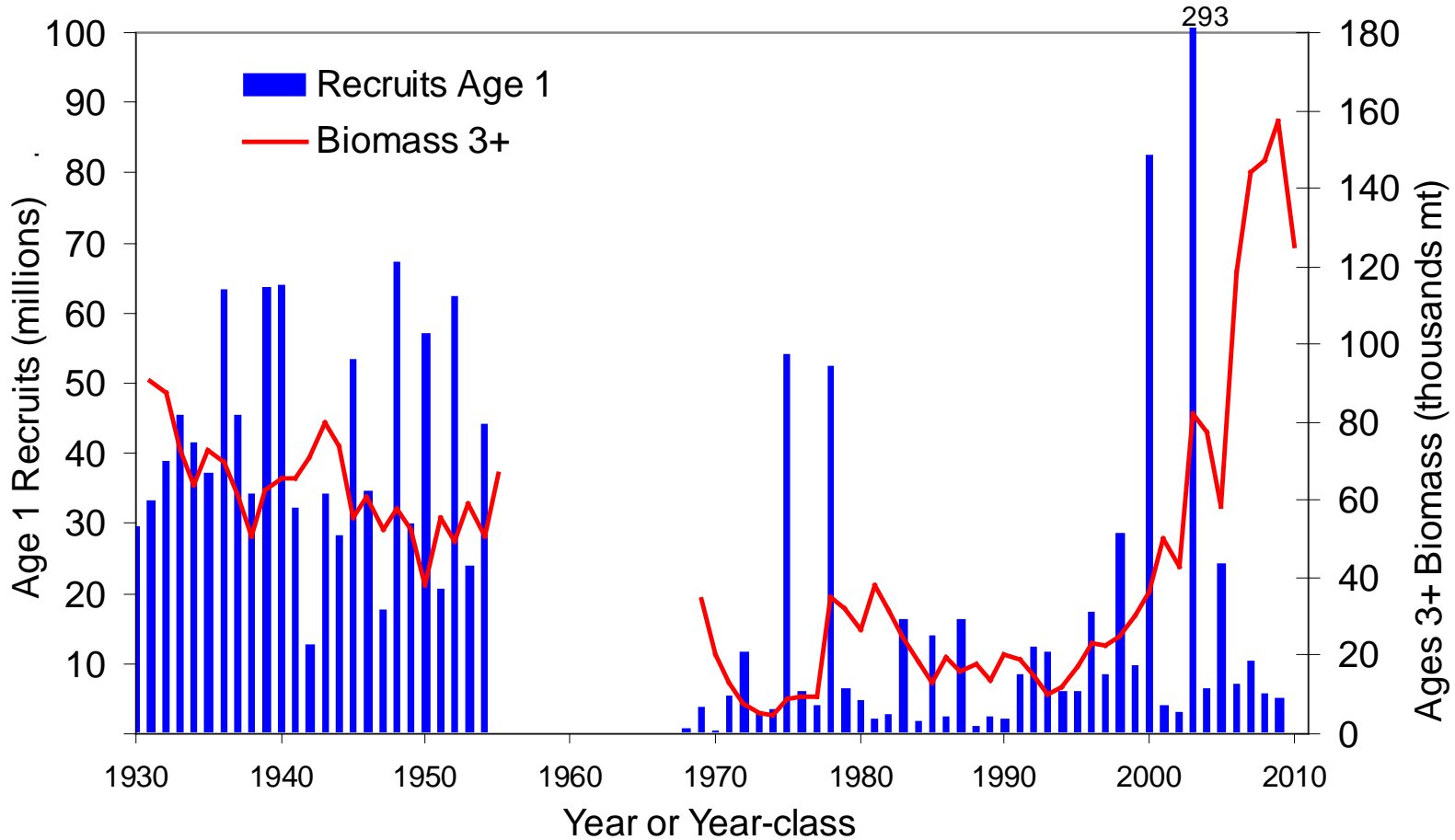
# EGB Haddock



2009  $F = 0.13$ ,  $F < F_{ref}$  since 1995

# Biomass

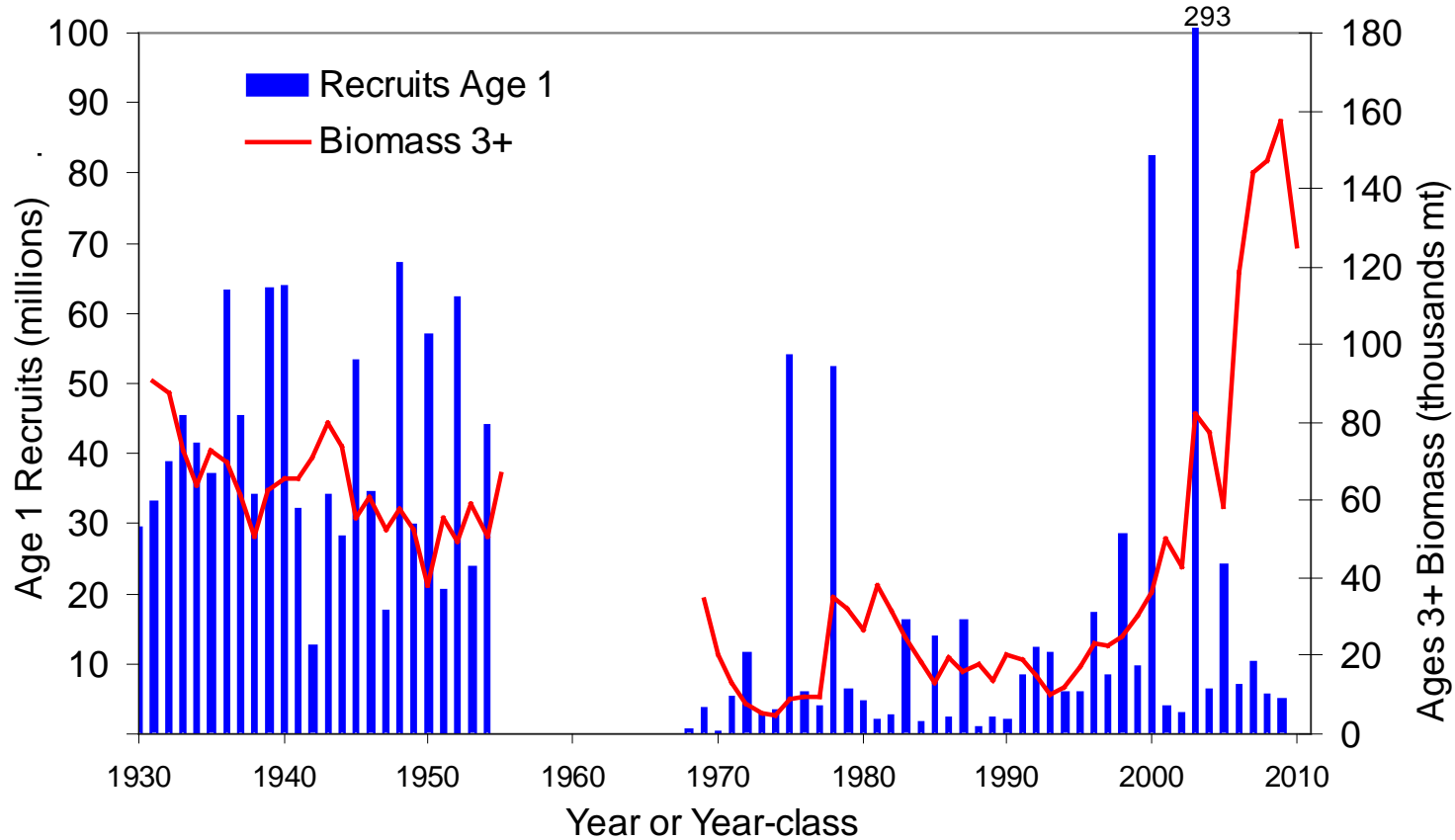
# EGB Haddock



- 2009 record-high 157,300 mt
- 2010 biomass = 125,100 mt

# Recruitment

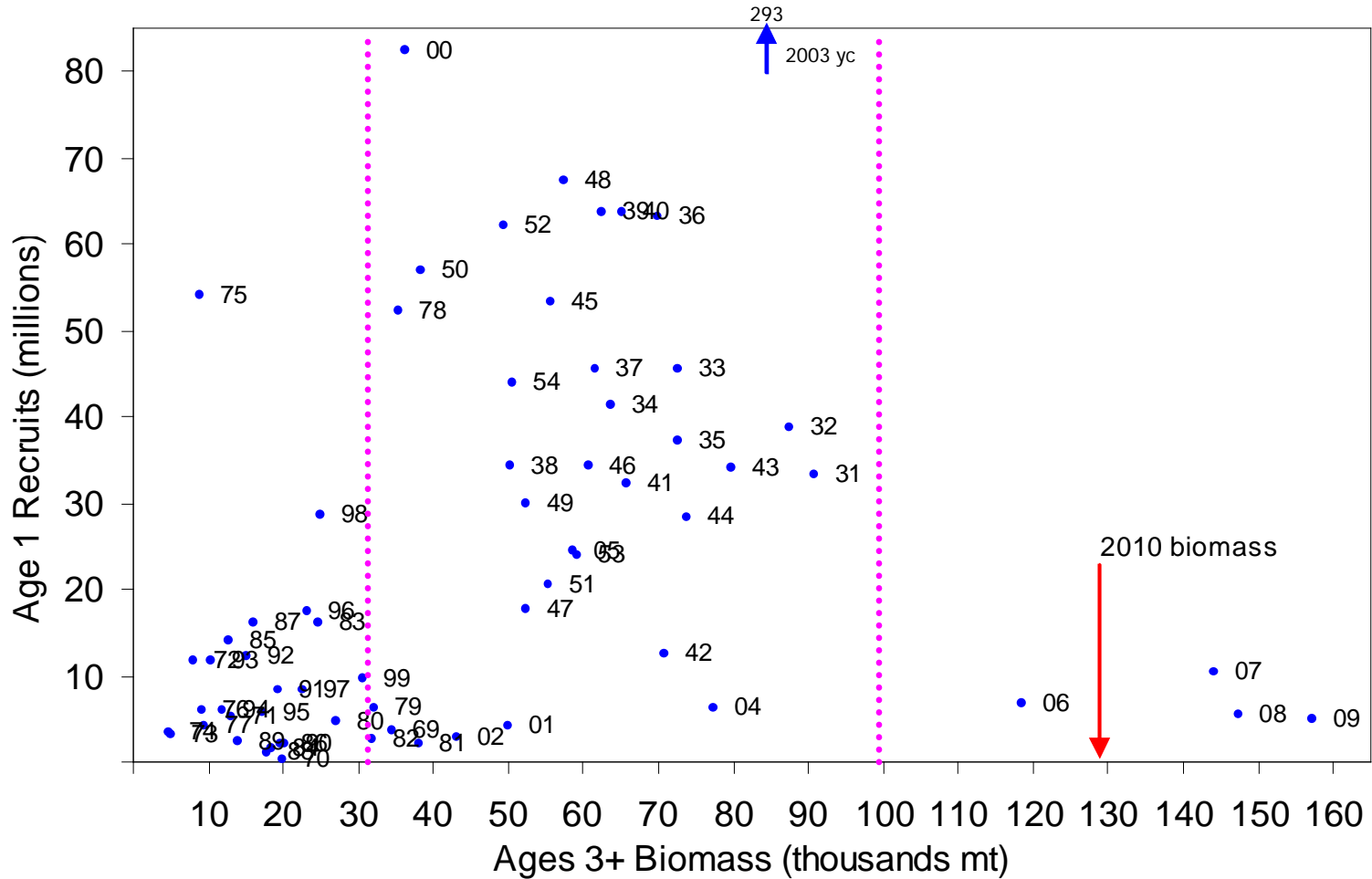
# EGB Haddock



- 2003 YC = 293 million age 1; record
- since 1990 ~ 9M w/exception '00 & '03
- 2005 YC (24.3 M) ~ ts average (26.5 M)
- 2009 YC ~ 5 Million

# Stock/Recruitment

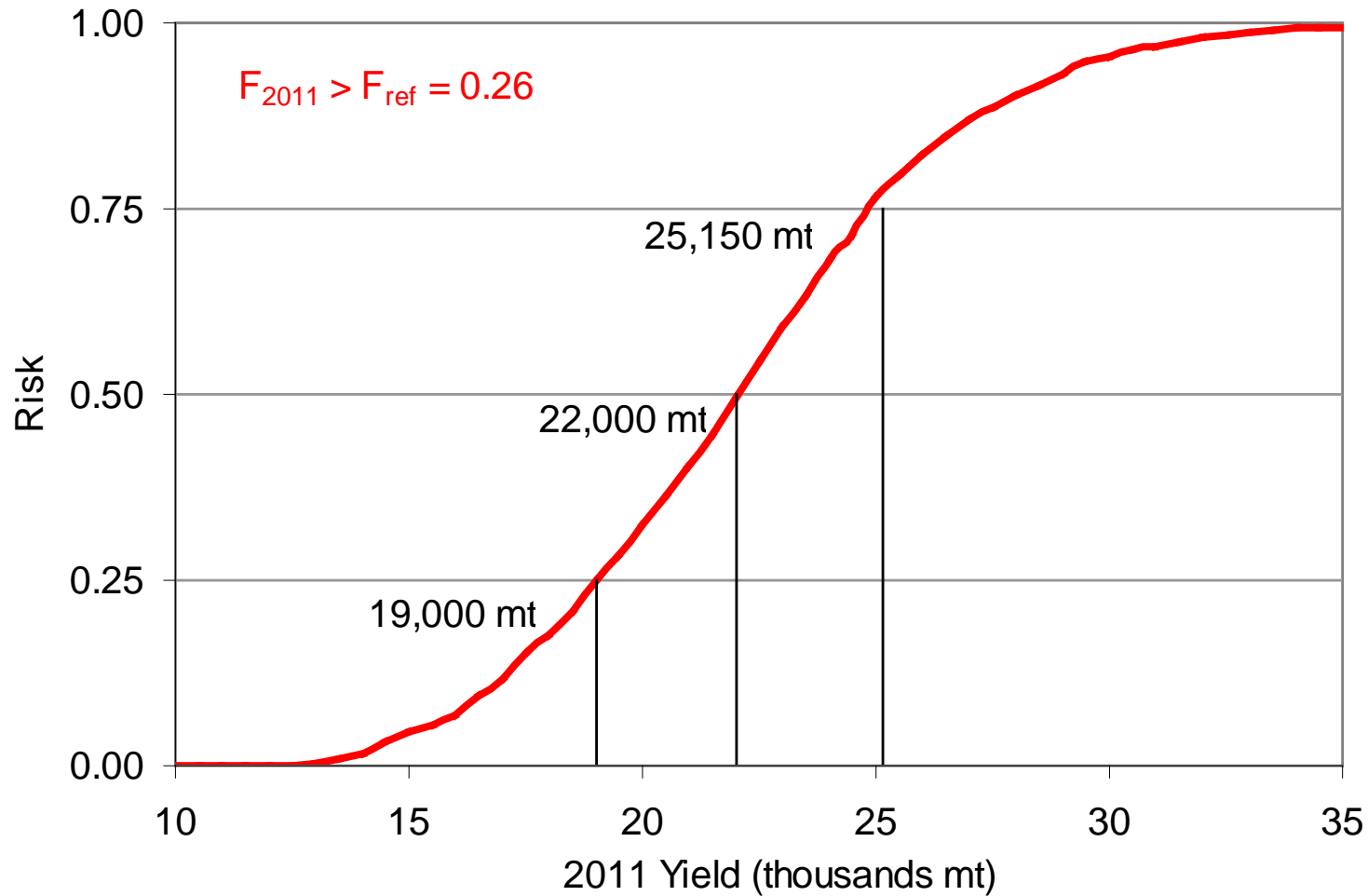
# EGB Haddock



- Higher rct when  $40K \leq SSB \leq 100K$  mt
- Stock will decrease in near future w/lower rct

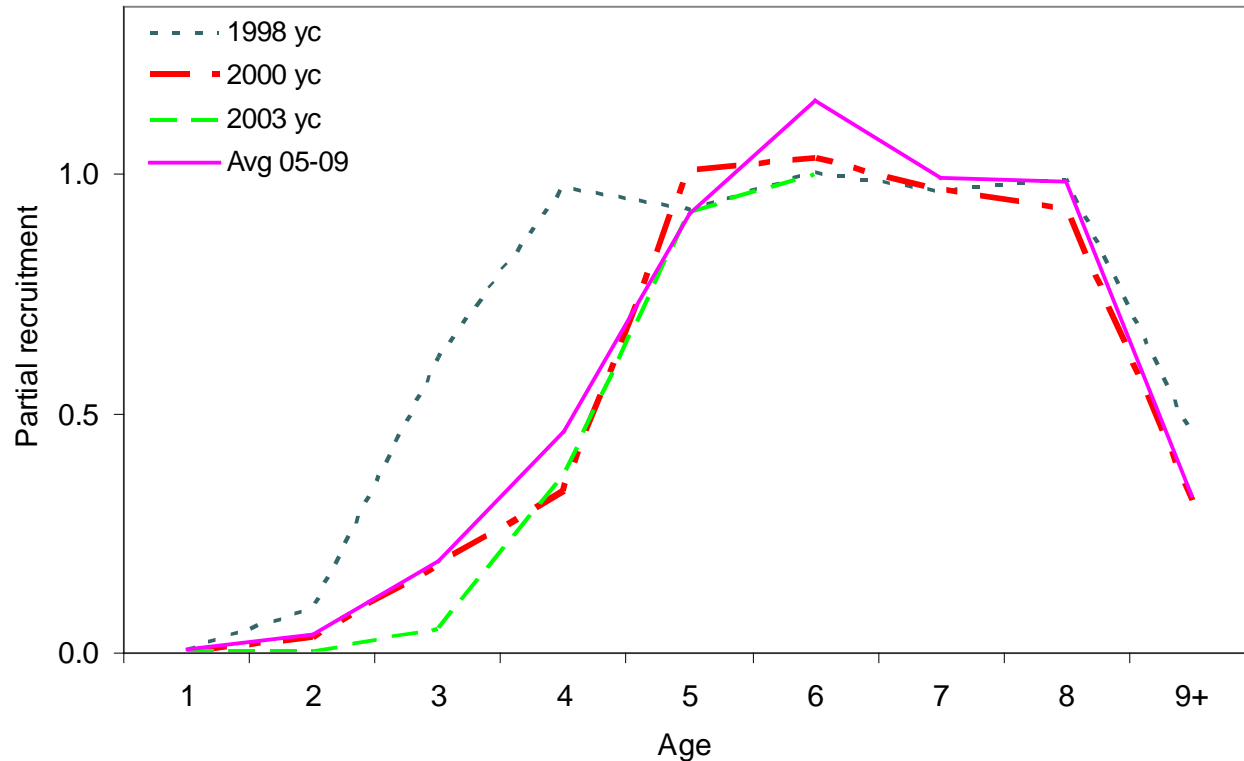
# Projection & TAC

# EGB Haddock



- 2011 catch = 22,000 mt  $\rightarrow$  50% risk  $F > F_{ref}$
- 2003 YC will be 75% of 2011 yield

# ***Fishery Partial Recruitment***      ***EGB Haddock*** ***(Proportion of population available to fishery, by age )***



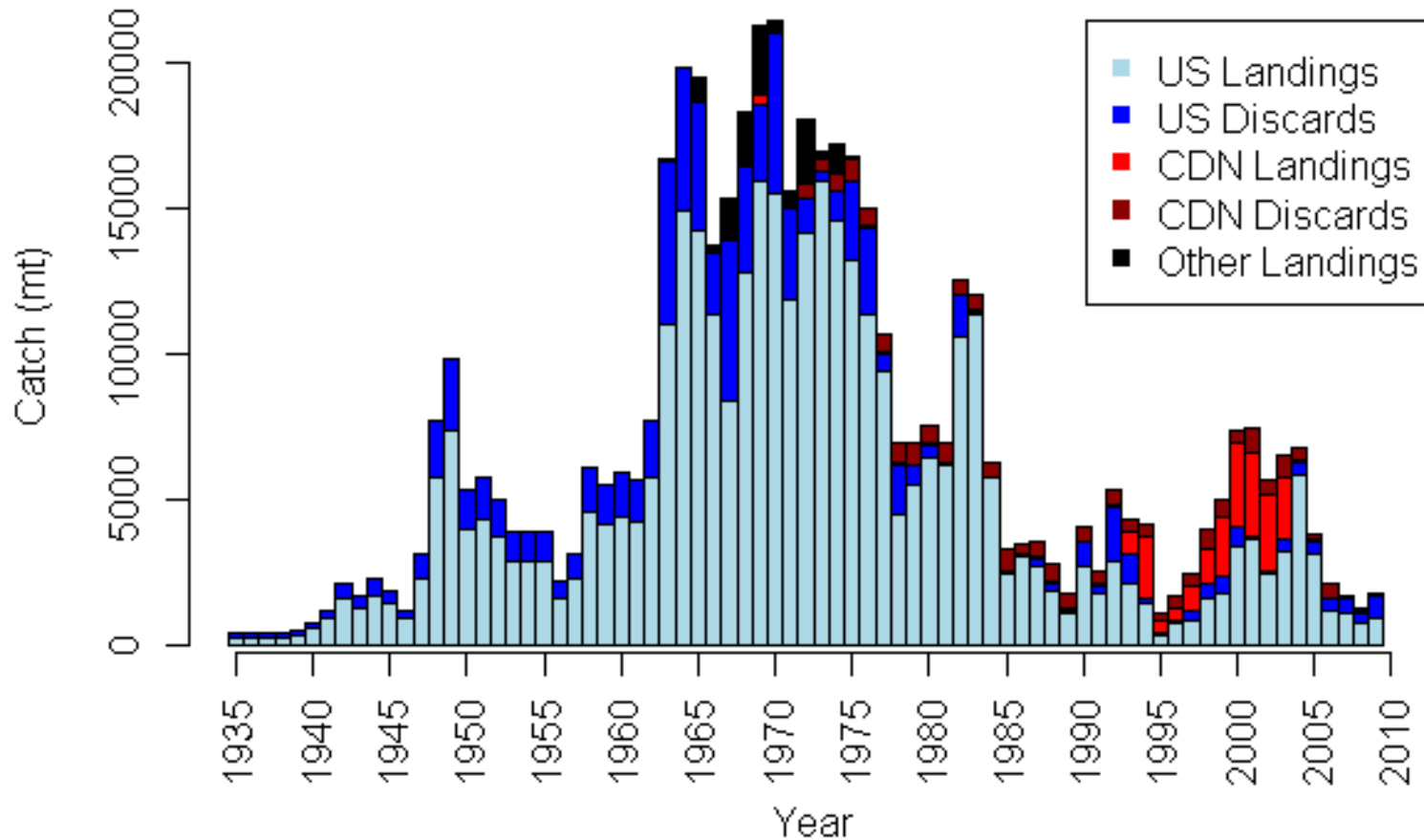
Catch will decline in 2012 as 2003 YC becomes age 9 and selectivity/vulnerability to gear decreases to 50%

This is in addition to declining population numbers (rct)



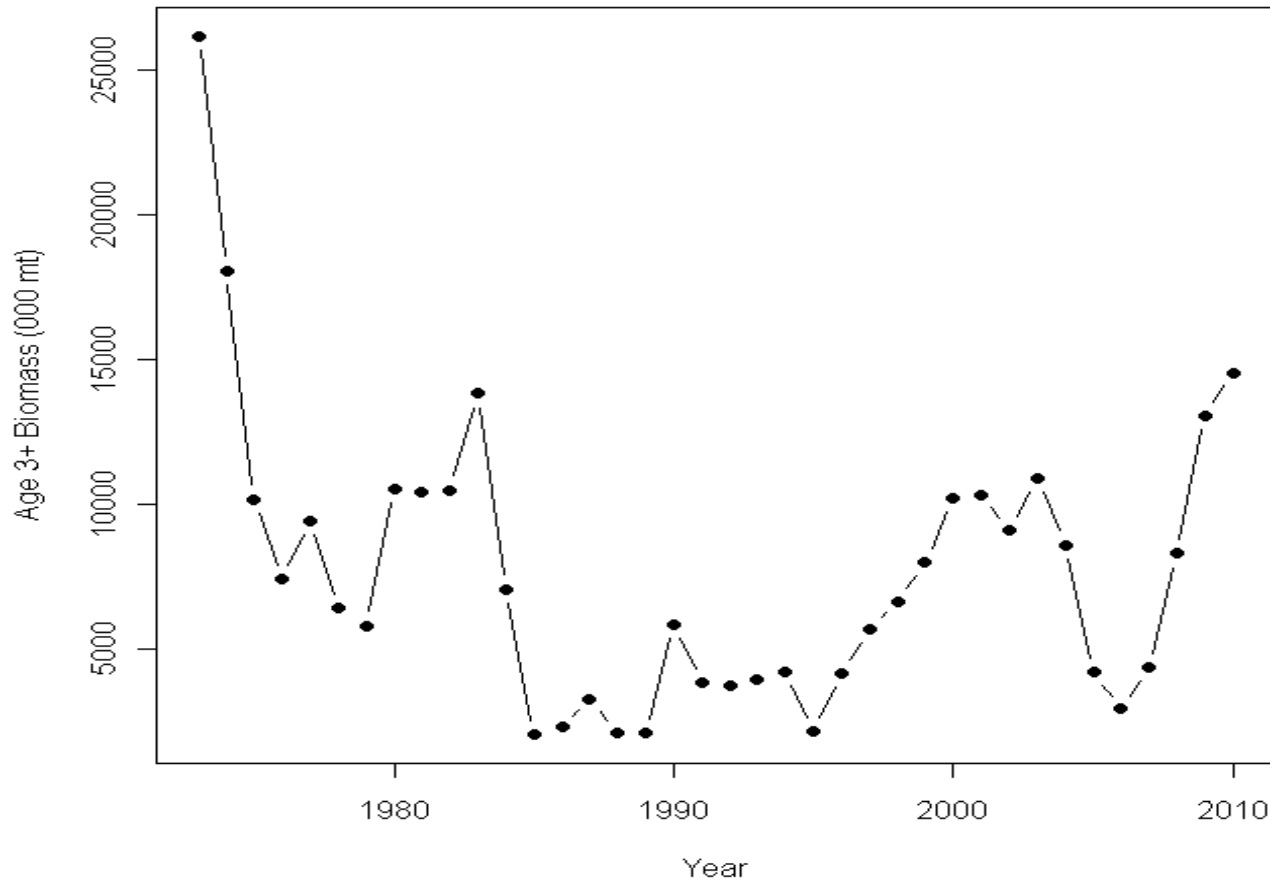
- **Low F in 2009 ;  $F < F_{ref}$  since 1995**
- **Except for the 2000 and 2003 YCs, recruitment has averaged 9 million fish at age 1 recently**
- **Biomass high; 2003 year class has reached its maximum biomass. Biomass expected to decline to 68,000 mt in 2012, fishing at  $F_{ref}$**
- **Fishing up to  $F_{ref}$  does not pose conservation concerns for haddock**

# **GB Yellowtail Flounder**



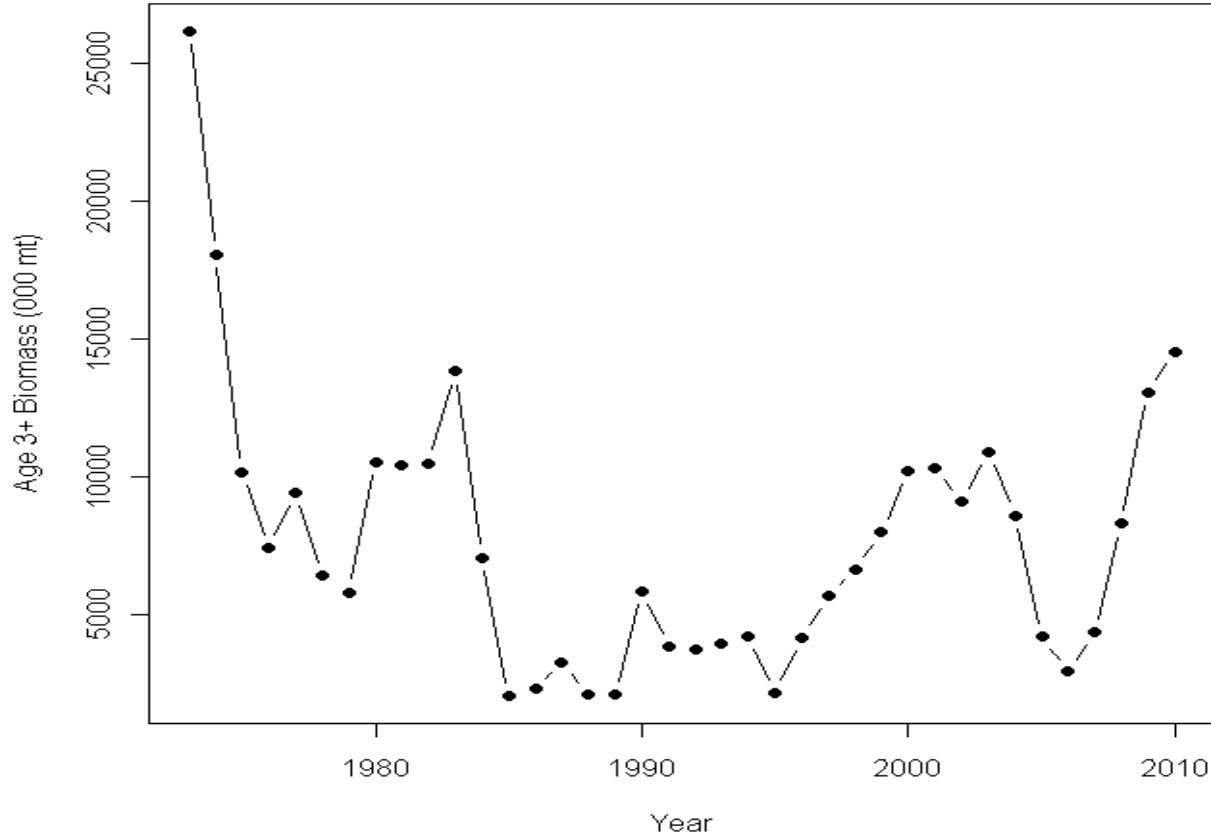
**Combined Canada and USA catches in 2009 were 1,778 mt**  
**USA: 1,689 mt , CA : 89 mt**

- **The 2008 & 2009 DFO surveys each had a very high catches of YT, these were treated in 2009 assessment by ‘including’ and ‘excluding’ models**
- **2010 assessment**
  - **has a single model formulation.**
  - **continues w/ split survey series**
  - **large tows ‘downweighted’ (by variance)**



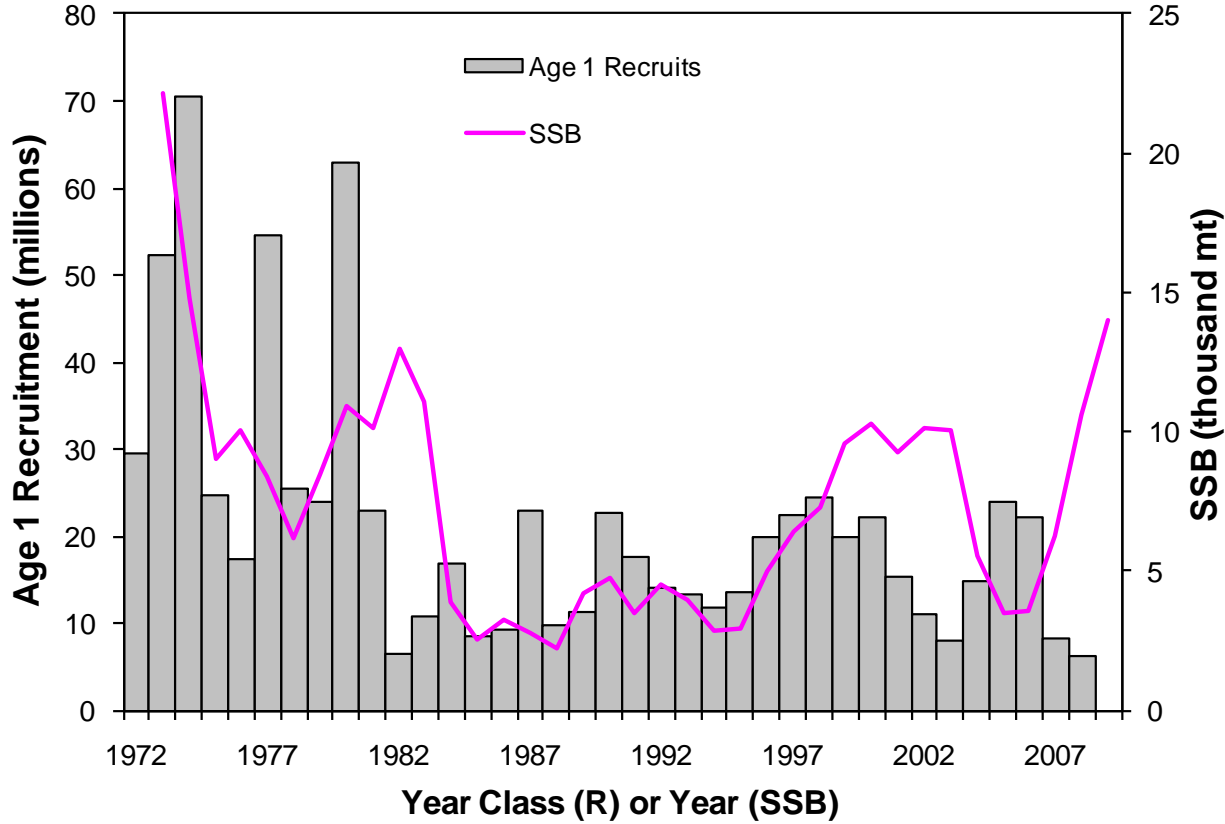
- **1995: 2,100 mt, 2003: 11,000 mt, 2006: 2,900 mt**  
**2009: 13,000 mt, 2010: 14,600**

- **2009 3+ highest since 1983; 2010 highest since '74**

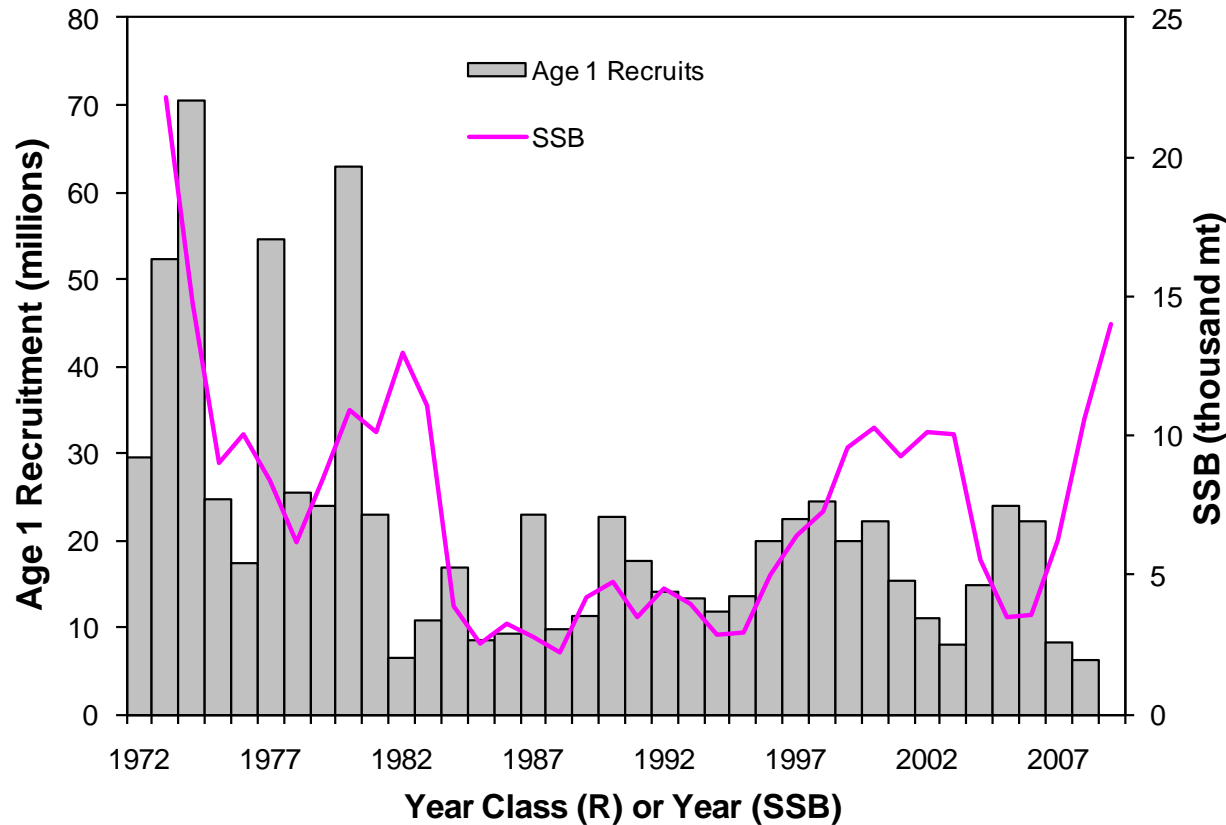


**Perception of stock shifted w/reduction of 2005 YC**

**Stock 36%-53% lower than 2009 assessment**

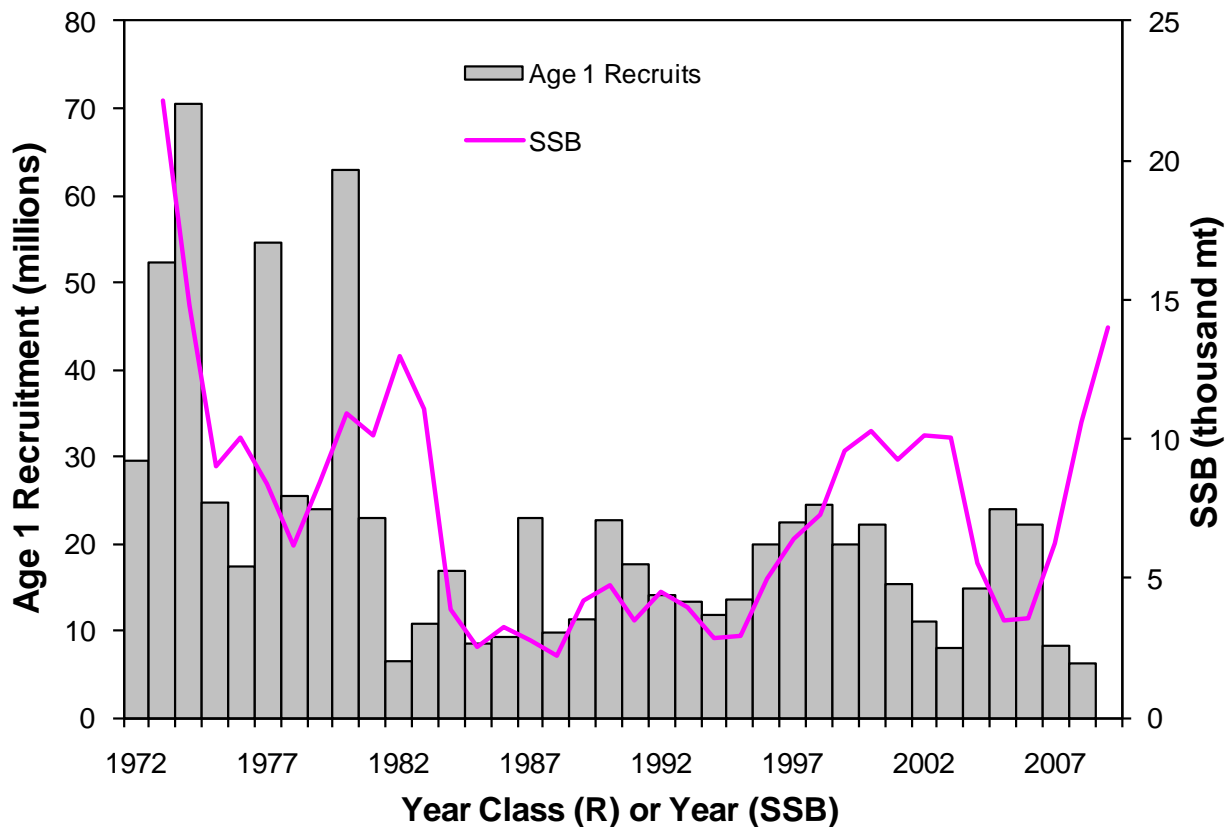


2009 SSB ~ 14,000 mt



- **During 1998-2001: average 22.2 million**
- **2005 YC (23.9) & 2006 YC (22.2 yc)**
- **2007 YC & 2008 YC (6-8 million) poorest**

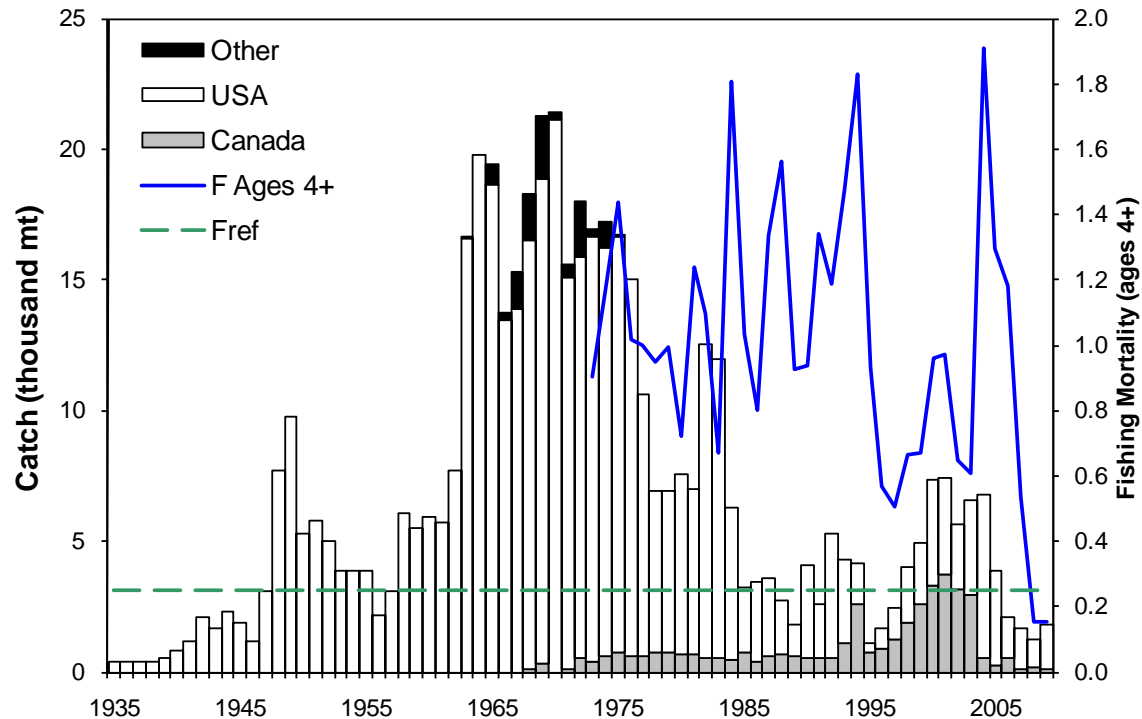




2007-2009 assessment: 2005 YC ~ 60 million  
2010 assessment: 2005 YC ~ 23.9 million  
'05 not seen in SVs or comm. catch as expected

# Fishing mortality

# YT FLD



1973-1995 :  $F > 1.0$  , 1996-2003: 0.51-0.97

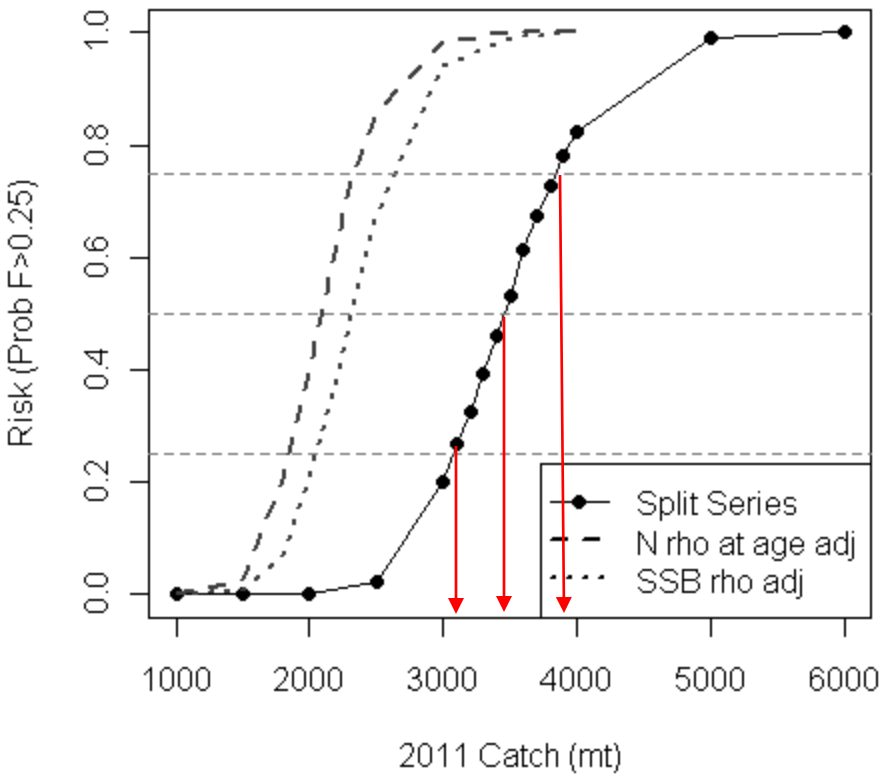
2004:  $F = 1.91$  , 2007:  $F = 0.53$

2008-2009  $F = 0.15 < F_{ref} (0.25)$

# Projection & 2011 TAC

# YT FLD

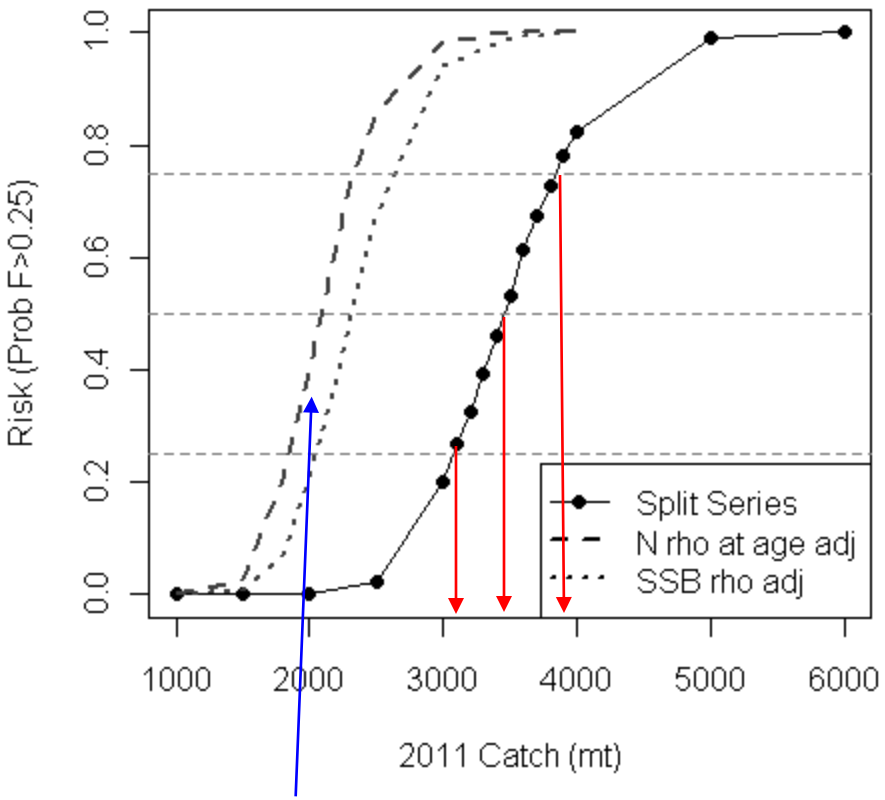
Probability of exceeding $F_{ref}$	25%	50%	75%
2011 quota	3,100 mt	3,400 mt	3,800 mt



# Projection & 2011 TAC

# YT FLD

Probability of exceeding $F_{ref}$	25%	50%	75%
2011 quota	3,100 mt	3,400 mt	3,800 mt

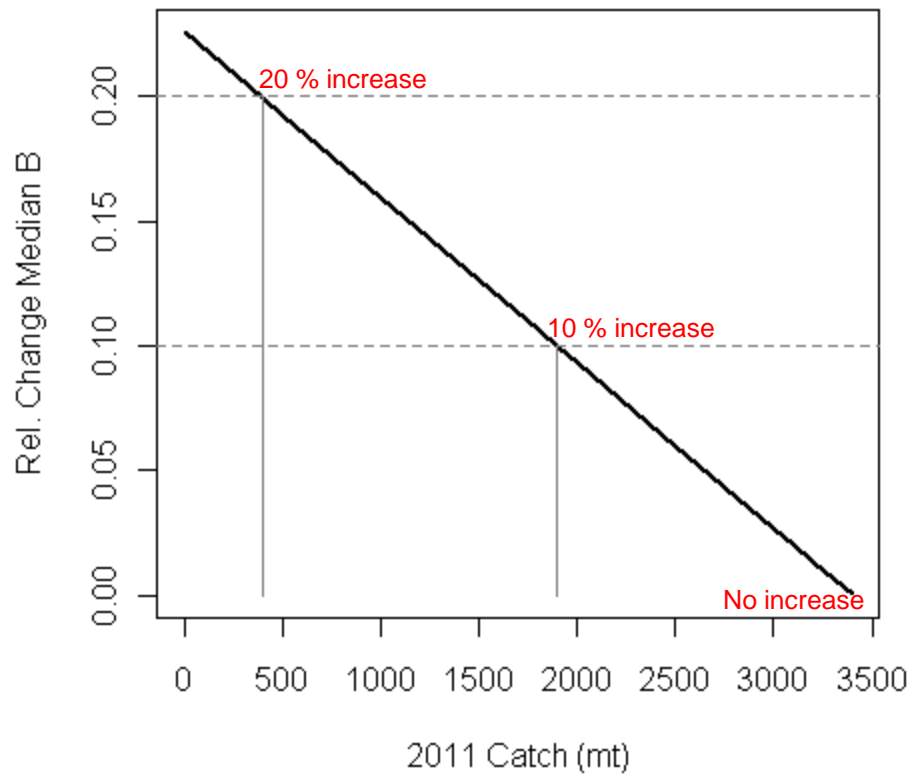
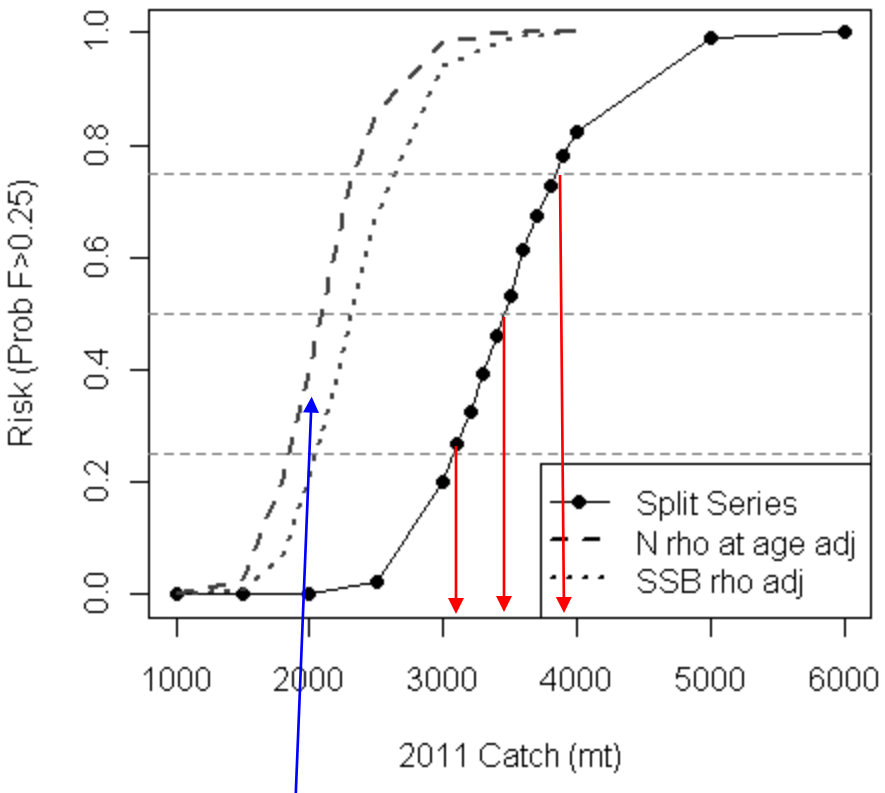


Adjustment for retrospective that tends to estimate higher biomass

# Projection & 2011 TAC

# YT FLD

Probability of exceeding $F_{ref}$	25%	50%	75%
2011 quota	3,100 mt	3,400 mt	3,800 mt



Adjusting for retrospective –  
tendency to overestimate biomass

% biomass increase	20%	10%	0%
2011 quota	400 mt	1,900 mt	3,400 mt

- Calculate  $F$  which results in a 75% Probability of reaching 43,200 mt by 2014
- Rebuilding target cannot be achieved by 2014 even with no fishing ( $P \sim 36\%$ )
- Using more realistic recruitment (lower), the probability of achieving US rebuilding targets was further reduced

- F was very high, below  $F_{ref}$  only in 2008 & 2009
- Highest adult biomass since 1974
- Change in perception of stock due to updated 2005 year class
- Increased uncertainty: retrospective re-emerging
- USA requirements for rebuilding –  
not attainable with current productivity

