Transboundary Management Guidance Committee

Guidance Document 2009/01

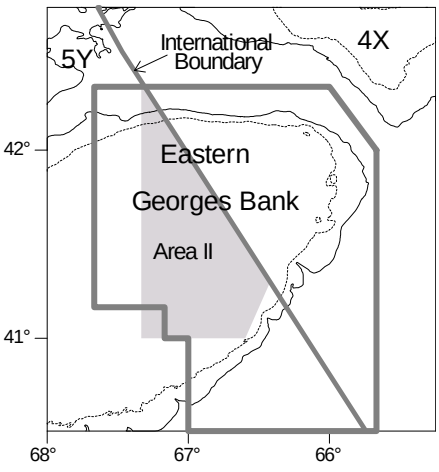
The Transboundary Management Guidance Committee (TMGC), established in 2000, is a government – industry committee comprised of representatives from Canada and the United States. The Committee's purpose is to develop guidance in the form of harvest strategies, resource sharing and management processes for Canadian and US management authorities for the cod, haddock and yellowtail flounder transboundary resources on Georges Bank. This document is a summary of the basis of the TMGC's guidance to both countries for the 2010 fishing year. Pertinent reference documents and consultations used in the TMGC deliberations are listed at the end of this document.

Since inception, the TMGC has successfully coordinated management of three trans-boundary groundfish resources. Annual harvest levels have been established, consistent with the legal and policy requirements of both countries. The benefits of this approach are worth noting: fishing mortality rates for the three management units considered by the TMGC have been reduced to low levels, Eastern Georges Bank haddock is presently at record high abundance, Georges Bank yellowtail flounder is growing, and declines in Eastern Georges Bank cod have been arrested.

The TMGC was unable to reach consensus on a 2010 TAC for Georges Bank yellowtail flounder. The inability to reach consensus threatens the future of the cooperative management through the TMGC process.

Eastern Georges Bank Cod [5Zjm; 551, 552, 561, 562]

Guidance



The TMGC concluded that the most appropriate combined Canada/USA TAC for Eastern Georges Bank cod for the 2010 fishing year is 1,350 mt. The TRAC was unable to settle on a preferred model and advised that the risk consequences of two models be considered when developing management guidance. A 2010 TAC of 1,350 mt corresponds to the average of the two models for a neutral (50%) risk of biomass decline. Recognizing the impediment to rebuilding caused by the recent poor recruitment, TMGC sought to at least reduce the risk of biomass decline. The annual allocation shares between countries for 2010 are based on a combination of historical catches (10% weighting) and resource distribution based on trawl surveys (90% weighting). Combining these factors entitles the USA to 25% and Canada to 75%, resulting in a national quota of 338 mt for the USA and 1012 mt for Canada.

Harvest Strategy & Reference Points

The strategy is to maintain a low to neutral risk of exceeding the fishing mortality limit reference, F_{ref}=0.18. When stock conditions are poor, fishing mortality rates should be further reduced to promote rebuilding.

Fishery Exploitation

Catches, Biomass (thousands mt); Recruits (millions)

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Avg[1]	Min[1]	Max[1]
Canada	Quota	1.6	2.1	1.2	1.3	1.0	0.7	1.3	1.4	1.6	1.2			
	Landed	1.6	2.1	1.3	1.3	1.1	0.6	1.1	1.1	1.4		6.2	0.6	17.8
	Discard	0.1	0.1	0.1	0.2	0.1	0.2	0.3	0.1	0.1		0.1	0.0	0.5
USA	Quota[2]					0.3	0.3	0.4	0.5	0.7	0.5			
	Catch[2]					0.2	0.2	0.3	0.3	0.7				
	Landed	0.8	1.5	1.7	1.9	1.0	0.2	0.1	0.2	0.2		3.8	0.1	10.6
	Discard	0.0	0.2	0.0	0.1	0.1	0.2	0.1	0.3	0.0		0.1	0.0	0.3
Total	Quota					1.3	1.0	1.7	1.9	2.3	1.7			
	Catch	2.4	4.0	3.1	3.5	2.3	1.3	1.7	1.8	1.8		10.3	1.3	26.5
From "split M 0.2" model														
	Adult Biomass[3]	7.9	10.2	8.1	6.3	5.9	3.8	6.2	6.6	7.4	8.7	24.9[4]	3. 8[4]	60.4[4]
	Age 1 Recruits	1.5	1.2	1.8	0.6	4.4	0.6	1.8	1.5	1.0		5.7	0.6	23.6
	Fishing mortality[5]	0.38	0.64	0.45	0.74	0.68	0.33	0.48	0.26	0.25		0.56	0.25	1.29
	Exploitation Rate[5]	29%	43%	33%	48%	45%	26%	35%	21%	20%		38%	20%	67%
From "split M 0.5" model														
	Adult Biomass[3]	10.4	13.5	11.2	8.8	8.9	6.0	9.1	9.8	10.3	12.0	26.4[4]	6.0[4]	60.4[4]
	Age 1 Recruits	1.7	1.5	2.5	0.7	5.8	0.8	2.2	1.9	1.2		6.0	0.7	23.7
	Fishing mortality[5]	0.27	0.44	0.32	0.49	0.40	0.20	0.28	0.18	0.17		0.46	0.17	1.06
	Exploitation Rate[6]	22%	31%	23%	35%	30%	15%	24%	14%	14%		32%	14%	59%
	Exploitation Rate[7]	21%	32%	25%	33%	32%	21%	18%	14%	12%		29%	12%	53%

[1]1978 – 2008
[2]for fishing year from May 1 – April 30
[3]Jan 1 ages 3+
[4]1978 – 2009
[5]ages 4-9
[6]ages 4-5
[7]ages 6-9

Combined Canada/USA catches, which averaged 17,508 mt between 1978 and 1992, peaked at 26,463 mt in 1982, and declined to 1,684 mt in 1995. Catches fluctuated around 3,000 mt until 2004, and subsequently declined again. Catches in 2008 were 1,782 mt, including 161 mt of discards.

Two model formulations were used for development of management advice. It is anticipated that this practice will continue until the progression of the 2003 year class through older ages has been documented, providing information on natural mortality at ages 6 and older. These model formulations are referred to as the “split M 0.2” and “split M 0.5”model. The survey abundance indices were split in 1993-1994 for both model formulations. Natural mortality (M) was fixed at 0.2 for all the ages in all years for the “split M 0.2” model and was fixed at 0.5 for ages 6+ in years after 1994 for the “split M 0.5” model.

Fishing mortality was high prior to 1994. Fishing mortality declined in 1995 to 0.36 for the "split M 0.2" model and to 0.24 for the "split M 0.5" model, due to restrictive management measures and then fluctuated. Fishing mortality in 2008 was 0.25 from the "split M 0.2" model and 0.17 from the "split M 0.5" model. While both models show recent reductions in fishing mortality, it has been above the F_{ref}=0.18 in the past. The model formulation used in previous assessments had indicated that F was below F_{ref} since 2005. The model formulations adopted after the benchmark review now indicate that F has been above F_{ref}.

State of Resource

From the "split M 0.2" model**,** adult population biomass (ages 3+) declined substantially from 48,400 mt in 1990 to 6,700 mt in 1995. Biomass subsequently fluctuated between 5,900 and 10,200 mt before decreasing to 3,800 mt in 2005 and increasing again to 8,700 mt at the beginning of 2009. From the "split M 0.5" model, adult population biomass declined substantially from 49,100 mt in 1990 to 8,500 mt in 1995. Biomass subsequently fluctuated between 8,400 and 13,500 mt before decreasing to 6,000 mt in 2005 and increasing again to 12,000 mt at the beginning of 2009. The increase in 2006 was largely due to recruitment of the 2003 year class, and the increases in 2007, 2008 and 2009 were due to growth of the 2003 year class.

Productivity

The 2003 year class, (4.4 million from "split M 0.2" model and 5.8 million from "split M 0.5" model), is the highest since the 1990 year class but is still lower than the pre-1990 average. The 2002 and 2004 year classes are the lowest on record. The 2005 and 2006 year classes are close to the post-1990 average. Initial indications are that the 2007 year class is weak. The population age structure displays a very low proportion of ages 7+ compared to the 1980s. Lower weights-at-age in the population in recent years and generally poor recruitment have contributed to the lack of sustained rebuilding, although improvement in size at some ages has been seen in the 2008 fishery and 2009 DFO survey.

2010 Catch Risk Assessment

A. "split M 0.2" model

Risk of exceeding F_{ref}	25% (risk averse)	50% (risk neutral)	75% (risk prone)
2010 Catch (mt)	1,100 mt	1,300 mt	1,600 mt
Risk of biomass decrease	25% (risk averse)	50% (risk neutral)	75% (risk prone)
2010 Catch (mt)	1,500 mt	1,800 mt	2,200 mt

As indicated in the above table, a combined Canada/USA catch of about 1,300 mt in 2010 will result in a neutral risk (50%) that the fishing mortality rate in 2010 will exceed F_{ref} whereas a catch of 1,800 mt will result in a neutral risk (50%) that the 2011 biomass (ages 4+) will be lower than the 2010 biomass.

B. "split M 0.5" model

Risk of exceeding F_{ref}	25% (risk averse)	50% (risk neutral)	75% (risk prone)
2010 Catch (mt)	1,450 mt	1,700 mt	1,900 mt
Risk of biomass decrease	25% (risk averse)	50% (risk neutral)	75% (risk prone)
2010 Catch (mt)	450 mt	900 mt	1,400 mt

As indicated in the above table, a combined Canada/USA catch of about 1,700 mt in 2010 will result in a neutral risk (50%) that the fishing mortality rate in 2010 will exceed F_{ref} whereas a catch of 900 mt will result in a neutral risk (50%) that the 2011 biomass (ages 4+) will be lower than the 2010 biomass.

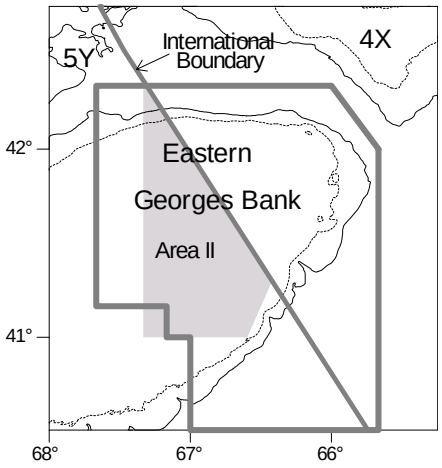
Special Considerations

The 2003 year class made a substantial contribution to the fishery and population biomass, and it is projected to continue to be an important component in the fishery catch biomass in 2009-2010 (around one third of the catch) and population biomass in 2010-2011. With the passing of the 2003 year class through the population, rebuilding will not occur without improved recruitment.

Cod and haddock are often caught together in groundfish fisheries, although they are not necessarily caught in proportion to their relative abundance because their catchabilities to the fisheries differ. Due to the higher haddock quota, discarding of cod may be high and should be monitored. Modifications to fishing gear and fishing practices, with enhanced monitoring, have mitigated this issue to some extent but concerns remain.

Eastern Georges Bank Haddock [5Zjm; 551, 552, 561, 562]

Guidance



The TMGC concluded that the most appropriate combined Canada/USA TAC for Eastern Georges Bank haddock for the 2010 fishing year is 29,600 mt. While this corresponds to the risk neutral level, which assumes the TAC will be taken in 2009, it represents a low to neutral risk (greater than 25% but less than 50%) of exceeding the F_{ref} of 0.26 because there will be an appreciable shortfall in the 2009 catch relative to the TAC. Adult biomass is projected to peak at 156,000 mt in 2009, reflecting the recruitment and growth of the exceptional 2003 year class, and decline to 95,000 mt by 2011. The annual allocation shares between countries for 2010 are based on a combination of historical catches (10% weighting) and resource distribution based on trawl surveys (90% weighting). Combining these factors entitles the USA to 40.5% and Canada to 59.5%, resulting in a national quota of 11,988 mt for the USA and 17,612 mt for Canada.

Harvest Strategy & Reference Points

The strategy is to maintain a low to neutral risk of exceeding the fishing mortality limit reference, F_{ref}=0.26. When stock conditions are poor, fishing mortality rates should be further reduced to promote rebuilding.

Fishery Exploitation

Catches, Biomass (thousands mt); Recruits (millions)

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Avg[1]	Min[1]	Max[1]
Canada	**Quota**	5.4	7.0	6.7	6.9	9.9	15.4	14.5	12.7	15.0	18.9			
	Landed	5.4	6.8	6.5	6.8	9.7	14.5	12.0	11.9	14.8		4.9	0.5	14.8
	Discard	<0.1	<0.1	<0.1	0.1	0.1	<0.1	0.1	0.1	<0.1		0.1	<0.1	0.2
USA	**Quota**[2]					5.1	7.6	7.5	6.3	8.1	11.1			
	Catch[2]					1.1	0.6	0.7	0.3	2.3				
	Landed	0.3	0.8	1.1	1.7	1.8	0.6	0.3	0.2	1.1		2.1	<0.1	9.1
	Discard	<0.1	<0.1	<0.1	0.1	0.2	0.1	0.3	0.3	<0.1		0.9	0.0	7.6
Total	**Quota**[3]					15.0	23.0	22.0	19.0	23.0	30.0			
	Catch[3,4]					10.9	15.1	12.7	12.3	17.1				
	Catch	5.8	7.6	7.6	8.6	11.9	15.3	12.6	12.5	16.0		7.6	2.1	23.3
Adult Biomass[5]		35.9	49.8	42.7	81.8	76.4	57.8	117.3	142.5	146.0	155.6	45.0[6]	4.9[6]	155.6[6]
Age 1 Recruits		9.3	82.1	3.3	2.7	291.0	6.0	24.6	6.6	11.8	8.8	26.8[6]	0.2[6]	291.0[6]
Fishing mortality[7]		0.16	0.17	0.17	0.19	0.27	0.25	0.26	0.13	0.09		0.29	0.09	0.58
Exploitation Rate[7]		13%	14%	14%	16%	22%	20%	21%	11%	8%		23%	8%	40%

[1]1969 - 2008
[2]for fishing year from May 1 – April 30
[3]for Canadian calendar year and USA fishing year May 1 – April 30
[4]sum of Canadian Landed, Canadian discard, and USA Catch (includes discards)
[5]Jan 1 ages 3+
[6]1931 - 1955, 1969 – 2009
[7]ages 4+ for 1969 - 2007; ages 5+ for 2003 - 2008

Combined Canada/USA catches declined from 6,504 mt in 1991 to a low of 2,150 mt in 1995, fluctuated about 3,000 mt to 4,000 mt until 1999, and since increased to 15,256 mt in 2005. Combined catches in 2006, 2007 and 2008 were 12,634 mt, 12,488 mt, and 15,995 mt respectively.

Fishing mortality for fully recruited ages fluctuated between 0.2 and 0.4 during the 1980s, and showed a marked increase between 1989 and 1993 to about 0.6, the highest observed. Fishing mortality was below F_{ref} = 0.26 during 1995 to 2003, fluctuated around F_{ref} during 2004 to 2006, and declined to 0.13 and 0.09 in 2007 and 2008 respectively

State of Resource

Adult population biomass (ages 3+) increased from near an historical low of 9,100 mt in 1993 to 81,800 mt in 2003. Adult biomass subsequently decreased to 57,800 mt in 2005, but increased to 155,600 mt at the beginning of 2009, the highest in the assessment time series (1931-1955 and 1969-2008). The tripling of the biomass after 2005 was due to recruitment and growth of the exceptional 2003 year class.

Productivity

Recruitment improved in the 1990s and the 2003 year class, estimated at 291 million, is the largest in the assessment time series. Except for the strong 2000 year class and the exceptional 2003 year class, recent recruitment has fluctuated without trend about 11 million, which is below the long term average of 27 million. The preliminary estimate for the 2008 year class is below-average at 9 million fish at age 1. Both length and weight at age have generally declined since about 2000. With expanded age structure, broad spatial distribution and improved recruitment, current resource productivity is currently high, hindered only by recent reductions in fish size at age.

2010 Catch Risk Assessment

Risk of exceeding F_{ref}	25% (risk averse)	50% (risk neutral)	75% (risk prone)
2010 Catch (mt)	25,900 mt	29,600 mt	33,200 mt

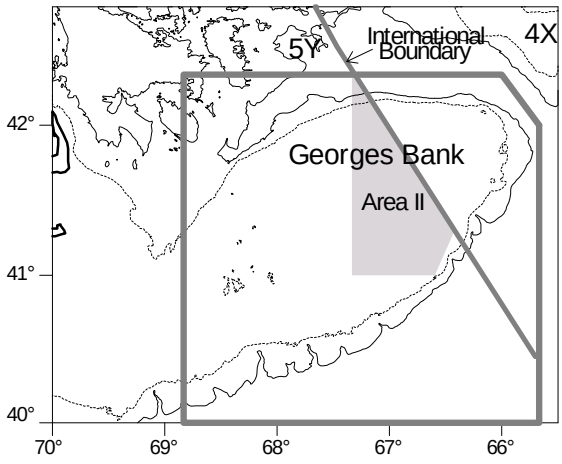
A combined Canada/USA catch of 29,600 mt results in a neutral risk (50%) of exceeding F_{ref}=0.26. The 2003 year class is expected to constitute 80% of the 2010 catch biomass. The risk of biomass decline is not pertinent because biomass is currently the highest in the assessment series.

Special Considerations

Cod and haddock are often caught together in groundfish fisheries, although their catchabilities to the fisheries differ and they are not necessarily caught in proportion to their relative abundance. With current fishing practices and catch ratios, the achievement of rebuilding objectives for cod may constrain the harvesting of haddock. Modifications to fishing gear and fishing practices, with enhanced monitoring, have mitigated this issue to some extent but concerns remain.

Georges Bank Yellowtail Flounder [5Zhjmn; 522,525, 551, 552, 561, 562]

Guidance



TMGC members recognize the need to respect Canadian and USA legislative constraints. However, Canadian TMGC members could not accept the impact of the unilateral prescriptive rebuilding plan for Georges Bank yellowtail flounder specified in the Northeast Multispecies Fishery Management Plan. This plan was developed without Canadian involvement and constrains TMGC ability to exercise the USA/Canadian Understanding. For these reasons the TMGC was unable to reach consensus on a 2010 TAC for Georges Bank yellowtail flounder. The inability to reach consensus threatens the future of the cooperative management through the TMGC process. Since inception, the TMGC has successfully coordinated management of three transboundary groundfish resources.

Canadian TMGC members consider that a TAC of 2,100 mt for 2010 for Georges Bank yellowtail flounder is warranted for the following reasons. The yellowtail flounder biomass is at the highest it has been since 1973, F is at the lowest and below F_{ref} and an exceptional year-class is recruiting followed by an average year-class. With such positive indicators, it is not reasonable to reduce the TAC from the 2009 level (2,100 mt). A 2010 TAC equal to that in 2009 results in virtually no risk of exceeding F_{ref} and in an appreciable biomass growth between 2010 and 2011. This TAC results in a fishing mortality less than 0.1. Continued fishing at this F results in appreciably greater than 50% probability of reaching B_{msy} by 2014, respecting the intent of the Magnuson-Stevens Fishery Conservation and Management Act.

The USA position was constrained to be no greater than 1,500 mt, consistent with current recommendations under the rebuilding plan for Georges Bank yellowtail flounder specified in the Northeast Multispecies Fishery Management Plan.

The annual allocation shares between countries for 2010 are based on a combination of historical catches (10% weighting) and resource distribution based on trawl surveys (90% weighting). Combining these factors entitles the USA to 64% and Canada to 36%.

Harvest Strategy & Reference Points

The strategy is to maintain a low to neutral risk of exceeding the fishing mortality limit reference, F_{ref}=0.25. When stock conditions are poor, fishing mortality rates should be further reduced to promote rebuilding.

Fishery Exploitation

Catches, Biomass (thousands mt); Recruits (millions)

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Avg[1]	Min[1]	Max[1]
Canada	**Quota**	3.0	3.4	2.9	2.3	1.9	1.7	0.9	0.4	0.6	0.5			
	Landed	2.9	2.9	2.6	2.1	0.1	<0.1	<0.1	<0.1	<0.1		0.5	<0.1	2.9
	Discard	0.4	0.8	0.5	0.8	0.4	0.2	0.5	0.1	0.1		0.5	0.1	0.8
USA	**Quota**[2]					6.0	4.3	2.1	0.9	1.9	1.6			
	Catch[2]					5.9	3.8	1.9	1.0	1.6				
	Landed	3.4	3.6	2.5	3.2	5.8	3.2	1.2	1.1	0.7		4.6	0.4	15.9
	Discard	0.7	0.1	0.1	0.4	0.5	0.4	0.4	0.5	0.4		0.6	<0.1	3.0
Total	**Quota**[3]					7.9	6.0	3.0	1.3	2.5	2.1			
	Catch[3,4]					6.4	4.1	2.5	1.1	1.7				
	Catch	7.3	7.4	5.7	6.6	6.8	3.9	2.1	1.7	1.3		6.3	1.1	17.2
Excluding DFO 2008/2009 survey														
	Adult Biomass[5]	10.2	10.4	9.2	11.0	8.7	4.3	3.3	5.8	15.2	20.6	8.0[6]	2.0[6]	26.2[6]
	SSB	10.3	9.3	10.2	10.2	5.7	3.7	4.4	10.0	17.8		7.6	2.2	22.2
	Age 1 Recruits	19.8	22.3	15.4	11.3	8.9	19.6	46.6	20.1	2.8		22.4	2.8	70.6
	Fishing mortality[7]	0.96	0.97	0.65	0.60	1.85	1.25	1.06	0.41	0.09		1.02	0.09	1.85
	Exploitation Rate[7]	57%	57%	44%	41%	79%	66%	60%	31%	8%		59%	8%	79%
Including DFO 2008/2009 survey														
	Adult Biomass[5]	10.2	10.4	9.2	11.0	8.7	4.4	3.4	6.3	18.4	28.0	8.3[6]	2.0[6]	28.0[6]
	SSB	10.3	9.3	10.2	10.2	5.7	3.8	4.7	11.7	22.9		7.8	2.2	22.9
	Age 1 Recruits	19.8	22.3	15.4	11.4	9.2	21.3	58.1	35.6	9.5		23.4	6.6	70.6
	Fishing mortality[7]	0.96	0.97	0.65	0.60	1.84	1.23	1.01	0.38	0.08		1.01	0.08	1.84
	Exploitation Rate[7]	57%	57%	44%	41%	79%	66%	59%	29%	7%		59%	7%	79%

[1]1973 – 2008
[2]for fishing year May 1 – April 30
[3]for Canadian calendar year and USA fishing year May 1 – April 30
[4]sum of Canadian Landed, Canadian Discard, and USA Catch (includes discards)
[5]Jan-1 Age 3+
[6]1973 - 2009
[7]Age 4+ for calendar year

Total catches of Georges Bank yellowtail flounder peaked at about 21,000 mt in both 1969 and 1970. The combined Canada/USA catch increased from 1995 through 2001, averaged 6,300 mt during 2002-2004, but declined to 1,275 mt in 2008.

The 2008 and 2009 DFO surveys encountered individual tows that were much larger than any seen previously in the time series and have a strong influence on the estimates for those years. The preferred approach to deal with these indices would be to down-weight their importance by about half relative to other values in the time series, consistent with the increased uncertainty for these observations. It was not possible to do this during the assessment meeting, therefore, two options were considered as a means to bracket the preferred approach: "Excluding", which does not include the DFO 2008 or 2009 indices in the fitting process, and "Including", which includes the indices with the same weight as all the other observations in the time series. Preliminary investigations confirmed that down-weighting the DFO survey indices, the preferred approach, gave results between the "Including" and "Excluding" options.

Fishing mortality for fully recruited ages 4+ was close to or above 1.0 between 1973 and 1995, fluctuated between 0.51 and 0.97 during 1996-2003, increased in 2004 to 1.85, and then declined to 0.41 (Excluding) or 0.38 (Including) in 2007 and 0.09 (Excluding) or 0.08 (Including) in 2008, below the reference point of F_{ref} = 0.25. Fishing mortality was well above F_{ref} for the entire time series, except in 2008.

State of Resource

Adult population biomass (ages 3+) increased from a low of 2,100 mt in 1995 to 11,000 mt in 2003, declined to about 3,300 mt in 2006, and increased to 20,600 mt (Excluding) or 28,000 mt (Including) at the beginning of 2009, the highest adult biomass since 1973. Spawning stock biomass in 2008 was 17,800 mt (Excluding) or 22,900 mt (Including).

Productivity

During 1998-2001 recruitment averaged 22.3 million fish at age 1, but has since been below 20 million fish, with the exception of the above average 2005 year class estimated at 46.6 million (Excluding) or 58.1 million (Including), the strongest year class since the 1980 cohort. The 2006 year class is about average while the 2007 year class is estimated to be one of the lowest in the time series at 2.8 million (Excluding) or 9.5 million (Including), although this estimate is uncertain. Truncated age structure in the bottom trawl surveys and changes in distribution indicate current resource productivity is lower than historical levels.

2010 Catch Risk Assessment

A combined Canada/USA catch of about 5,000 mt (Excluding) or 7,000 mt (Including) in 2010 would result in a neutral risk (~50%) that the fishing mortality rate in 2010 will exceed F_{ref}. Fishing at F_{ref} in 2010 will generate a 3% increase in ages 3+ biomass from 21,400 mt in 2010 to 22,000 mt in 2011 (Excluding) or a 2% increase in ages 3+ biomass from 31,300 mt in 2010 to 31,700 mt in 2011 (Including). The 2005 year class is expected to account for 58-59% of the 2009 catch, 47-51% of the 2010 catch, and 40-44% of the 2010 ages 3+ biomass.

Special Considerations

Two VPA formulations were examined based on recommendations from the 2005 benchmark assessment review: 1) Base Case, the same formulation as used in the 2004 assessment, and 2) Major Change. The Base Case formulation has not been used for management advice for the past few years due to a strong retrospective pattern and a lack of fit to recent indices. The Base Case model formulation will not be carried forward in 2010. Only the Major Change formulation was used to determine stock status.

There is more uncertainty in this assessment than previous assessments due to the survey data. Specifically, the NMFS spring 2009 survey was conducted with a new vessel and net which does not have conversion coefficients available yet to allow its inclusion in the time series. Additionally, the 2008 and 2009 DFO surveys encountered individual tows that were much larger than any seen previously in the time series (7.5 mt in 2008 and 5.2

mt in 2009) and have a strong influence on the estimates for those years. The uncertainty associated with these values also approximately doubled.

Source Documents

Gavaris S, O'Brien L and Van Eeckhaute L. 2009. Update of allocation shares for Canada and the USA of the transboundary resources of Atlantic cod, haddock and yellowtail flounder on Georges Bank through fishing year 2010. TRAC Reference Document 2009/05 .

TRAC. 2009. Eastern Georges Bank cod. TRAC Status Report 2009/01.

TRAC. 2009. Eastern Georges Bank haddock. TRAC Status Report 2009/02.

TRAC. 2009. Georges Bank yellowtail flounder. TRAC Status Report 2009/03.

Consultations

Transboundary Resources Assessment Committee (TRAC), St. Andrews, New Brunswick, 8-12 June 2009.

Transboundary Management Guidance Committee public consultation in Canada, Yarmouth, Nova Scotia, 29 July 2009.