



Transboundary Management Guidance Committee

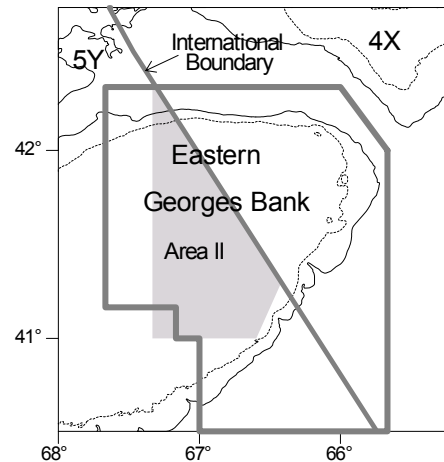
Guidance Document 2004/01

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 2005 fishing year. Pertinent reference documents and consultations used in the TMGC deliberations are listed at the end of this document.

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 2005 fishing year is 1,000 mt. This corresponds to an F less than 0.18 in 2005 and represents a low risk of exceeding the F_{ref} of 0.18. At this level of harvest there is a neutral chance, 50%, that stock biomass will decrease from 2005 to 2006. The annual allocation shares for 2005 between countries are based on a combination of historical catches (35% weighting) and resource distribution based on trawl surveys (65% weighting). Combining these factors entitles the USA to 26% and Canada to 74%, resulting in a national quota of 260 mt for the USA and 740 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)

		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Avg ¹	Min ¹	Max ¹
Canada	Quota	1	2	3	1.9	1.8	1.6	2.1	1.2	1.3	1.0			
	Landed	1.1	1.9	2.9	1.9	1.9	1.6	2.1	1.4	1.3		7.2	1.1	17.8
	Discard ²	<0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2		<0.1	<0.1	0.2
USA	Quota										0.3			
	Landed	0.7	0.8	0.6	0.8	1.2	0.7	1.4	1.4	1.8		4.5	0.6	10.6
	Discard	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1
Total	Quota										1.3			
	Catch	1.8	2.8	3.7	2.8	3.1	2.3	3.6	2.8	3.4		11.8	1.7	28.6
	Adult Biomass ⁴	8.5	12.3	13.0	11.9	16.5	16.0	18.7	16.7	14.3	13.9	25.1 ³	8.5 ³	45.3 ³



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Avg ¹	Min ¹	Max ¹
Age 1 Recruits	1.5	2.7	4.4	1.7	4.1	2.4	1.9	0.7	0.2		6.3	0.2	21.1
Fishing mortality⁵	0.19	0.25	0.37	0.27	0.26	0.19	0.29	0.23	0.28		0.48	0.18	0.96
Exploitation Rate⁵	16%	20%	28%	22%	21%	15%	23%	19%	22%		33%	15%	57%

¹1978 – 2003

²estimates for discards from Canadian scallop fishery prior to 1996 were not available

³1978-2004

⁴ages 3+

⁵ages 4-6

Combined Canada and USA catches averaged about 17,900 mt between 1978 and 1992, peaked at 26,000 mt in 1982 and declined to a low of 1,800 mt in 1995. Landings since 1999 have been about 3,000 mt. Catches in 2003 (3,400 mt) increased by 600 mt from 2002, due primarily to increased catches by the USA.

Fishing mortality rate for fully recruited ages (4-6) increased rapidly between 1989 and 1993 to over $F = 0.9$, well above the fishing mortality reference, $F_{ref} = 0.18$. In 1995, fishing mortality declined to near F_{ref} and since 1995, fishing mortalities have been greater than F_{ref} ($F_{2003} = 0.28$).

State of Resource:

There was a substantial decline in adult (3+) stock biomass from about 45,000 mt in 1990 to about 8,500 mt in 1995, the lowest observed. The biomass subsequently increased to 18,700 mt in 2001 but has since declined to 13,900 mt at the beginning of 2004. Most of the increase since the mid 1990s has been the result of growth and increased survival of the 1992, 1995 and 1996 year-classes. Lower weights-at-age in the population and the continuing low recruitment have contributed to the recent decline.

Productivity:

Recruitment has been below the 1978-2003 average of 6.3 million since the 1990 year-class. The 1996 and 1998 year-classes, at about 4 million each, appear to be the strongest since the 1990 year-class. Recruitment since the 1998 year-class has been less than 2 million and the 2002 year class is the lowest on record. Early indications from research surveys suggest that the 2003 year class strength may be above the recent average. Age structure continues to expand, but overall productivity for this stock is currently poor, largely due to low recruits per spawner (an index of survivorship of young fish) and declines in weight at age.

2005 Catch Risk Assessment:

Risk of exceeding F_{ref}	25% (risk averse)	50% (risk neutral)	75% (risk prone)
2005 Catch (mt)	1,000 mt	1,100 mt	1,300 mt
Risk of Biomass decline	25% (risk averse)	50% (risk neutral)	75% (risk prone)
2005 Catch (mt)	500 mt	1,000 mt	1,400 mt

As indicated in the above table a combined Canada/USA catch of about 1,100 mt in 2005 has a neutral risk, about 50%, of exceeding F_{ref} . At a yield of 1,100 mt in 2005, there is a greater than 50% chance, of a decrease in biomass from the beginning of year 2005 to the

beginning of year 2006. At a yield of 1,000 mt in 2005, there is a neutral risk, about 50%, of a decrease in biomass from the beginning of year 2005 to the beginning of year 2006. Even in the absence of a fishery, a 10% increase in biomass is not expected. Although not used in the forecast, the potential above average recruitment of the 2003 year class at age 3 in 2006 may result in some rebuilding.

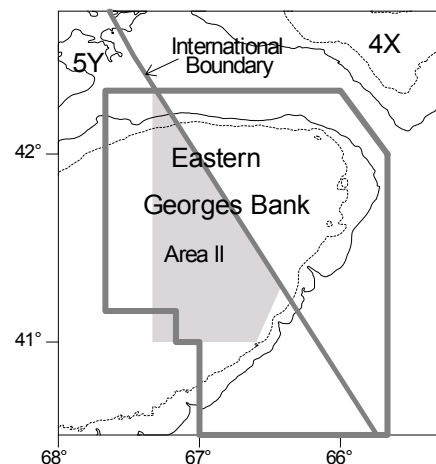
Special Considerations:

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 practices, with enhanced monitoring, can mitigate these concerns.

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 2005 fishing year is 23,000 mt. This corresponds to an F of less than 0.26 in 2005 and represents a low risk of exceeding the F_{ref} of 0.26. Adult biomass will increase substantially from 2005 to 2006 due to recruitment of the exceptional 2003 year class. The annual allocation shares for 2005 between countries are based on a combination of historical catches (35% weighting) and resource distribution based on trawl surveys (65% weighting). Combining these factors entitles the USA to 33% and Canada to 67%, resulting in a national quota of 7,590 mt for the USA and 15,410 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)

		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Avg ¹	Min ¹	Max ¹
Canada	Quota	2.5	4.5	3.2	3.9	3.9	5.4	7.0	6.7	6.9	9.9			
	Landed	2.1	3.7	2.7	3.4	3.7	5.4	6.8	6.5	6.8		3.8	0.5	10.0
	Discard ²	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
USA	Quota										5.1			
	Landed	<0.1	<0.1	<0.1	0.3	0.4	0.2	0.6	0.9	1.6		2.3	<0.1	9.1
	Discard ³	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		1.5	<0.1	7.6

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Avg ¹	Min ¹	Max ¹
Total Quota										15.0			
Catch	2.1	3.8	2.9	3.8	4.1	5.6	7.4	7.4	8.4		6.6	2.1	23.2
Adult Biomass⁵	15.5	22.2	21.2	23.8	26.9	32.4	46.0	41.3	79.9	75.7	40.8 ⁴	8.5 ⁴	90.9 ⁴
Age 1 Recruits	4.7	6.3	13.1	9.3	27.8	12.9	80.8	3.9	1.9	904.9	38.0 ⁴	0.5 ⁴	904.9 ⁴
Fishing mortality⁶	0.15	0.21	0.13	0.15	0.14	0.19	0.20	0.18	0.16		0.28	0.06	0.58
Exploitation Rate	12%	17%	11%	13%	12%	16%	16%	15%	14%		22%	5%	40%

¹1969 - 2003

²estimates for discards from Canadian scallop fishery prior to 1996 were not available

³discards not estimated in 1999-2003 but assumed negligible

⁴1931 - 1955, 1969 - 2004

⁵ages 3+

⁶ages 4+

Combined Canada and USA catches in 2003 were about 8,400 mt, increasing from a low of about 2,100 mt in 1995. Recent catches have been above the 1969-2003 average but are below the level of catches observed during the 1930s to 1950s.

Fishing mortality rate for fully recruited ages 4+ has been below $F_{ref} = 0.26$ since 1995 ($F_{2003}=0.16$). Fishing mortality fluctuated between 0.2 and 0.4 during the 1980s followed by a marked increase between 1989 and 1993 to its maximum of about 0.6, before declining to below the fishing mortality reference, $F_{ref} = 0.26$.

State of Resource:

Adult biomass (ages 3+) increased from a low of about 9,000 mt in 1993 to about 76,000 mt at the beginning of 2004. The recent increase has been due to more consistent and improved recruitment and has been enhanced by lower exploitation and by reduced catches of small fish. Biomass is the highest it has been in about 30 years and is within the range of the 1931-1955 biomass.

Productivity:

Recruitment improved in the 1990s and the 2003 year class, estimated at 905 million at age 1 may be comparable to the outstanding 1963 year class. The 2000 year class (81 million at age 1) is estimated to be larger than the strong 1975 and 1978 year classes. The 1998 year class (28 million at age 1) is the second strongest since that of 1978. The 1996 and 1999 year classes were estimated to be about 13 million, comparable to the 1983, 1985 and 1987 year classes, which were the strongest 3 year classes over about a 20 year time span. Two recent year classes, 2001 and 2002, are weak, at about 4 and 2 million fish, respectively. Productivity has increased since the 1980s due to improved production of recruits per spawner (an index of survivorship of young fish) and increases in the number of larger and older fish in the population.

2005 Catch Risk Assessment:

Risk of exceeding F_{ref}	25% (risk averse)	50% (risk neutral)	75% (risk prone)
2005 Catch (mt)	23,000 mt	26,000 mt	30,000 mt

A combined Canada/USA catch of 23,000 mt in 2005 is risk averse with respect to exceeding $F_{ref} = 0.26$. The risk of biomass decline is not pertinent because stock condition

is not considered poor (biomass is currently approaching a record high level) and rebuilding is well underway.

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 practices, with enhanced monitoring, can mitigate these concerns.

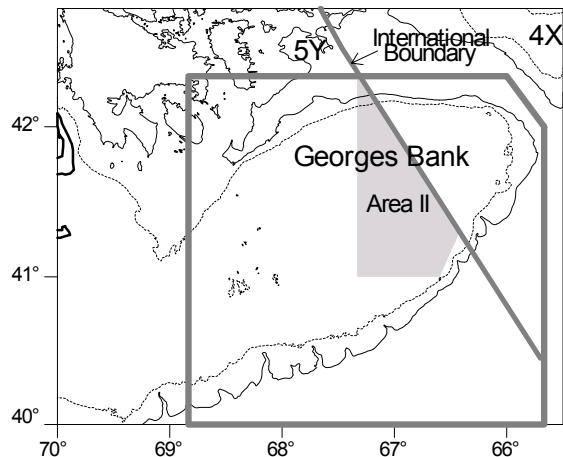
The outstanding 2003 year class will dominate the catch in 2006 and continue to dominate it to 2008, the last year that was forecast. It will increase the F_{ref} catch by an order of magnitude starting in about 2006. Alternative analyses confirmed that the 2003 year class is exceptional but its magnitude may be somewhat smaller than the VPA estimate. This note of caution should be considered when evaluating the projection risk analysis. Measures should be considered to avoid wastage of the 2003 year class due to discarding in all fisheries.

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

Guidance:

The TMGC concluded that the most appropriate combined Canada/USA TAC for the 2005 fishing year is 6,000 mt. A catch of about 4,000 mt in 2005 corresponds to an F equal to F_{ref} of 0.25. Alternative analyses, which make different assumptions about selectivity, indicate higher projected catch at F_{ref} in 2005, but still lower than the 2004 quota of 7,900 mt. The trend in stock biomass is increasing and recent recruitment has improved but fishing mortality remains substantially above F_{ref} . A reduced catch of 6,000 mt in 2005 should result in moving towards F_{ref} . The annual allocation shares for 2005

between countries are based on a combination of historical catches (35% weighting) and resource distribution based on trawl surveys (65% weighting). Combining these factors entitles the USA to 71% and Canada to 29%, resulting in a national quota of 4,260 mt for the USA and 1,740 mt for Canada.



Harvest Strategy & Reference Points:

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

Fishery Exploitation:

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

		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Avg ¹	Min ¹	Max ¹
Canada	Quota		0.4	0.4	0.8	1.2	2.0	3.0	3.4	2.9	2.2	1.9			
	Landed	2.1	0.5	0.5	0.8	1.2	2.0	2.9	2.9	2.6	2.1		1.7	0.5	2.9
	Discard²			0.2	0.2	0.3	0.2	0.1	0.8	0.5	1.1		0.4	0.2	1.1
USA	Quota											6.0			
	Landed	1.6	0.3	0.8	1.0	1.8	2.0	3.7	3.8	2.5	3.3		5.1	0.3	16.0
	Discard	0.2	<0.1	<0.1	<0.1	0.1	0.4	0.3	0.5	0.5	0.3		0.6	<0.1	3.0
Total	Quota											7.9			
	Catch	3.9	0.8	1.3	1.8	3.1	4.4	6.9	7.8	6.1	6.8		6.4	0.8	16.6
	Adult Biomass⁴	4.4	1.6	2.8	4.2	5.5	7.2	9.6	9.7	7.9	11.9	16.2	7.3 ³	1.5 ³	25.7 ³
	Spawning Biomass	2.4	2.0	3.6	4.8	6.3	9.0	10.0	9.3	10.8	15.5		7.4	2.0	21.2
	Age 1 Recruits	8.7	9.6	11.7	16.3	22.4	23.7	19.0	29.1	35.2	21.2		22.1	5.8	67.3
	Fishing mortality⁵	2.33	0.96	0.63	0.70	0.73	0.64	0.86	0.90	0.69	0.64		1.06	0.64	2.33
	Exploitation Rate⁵	85%	57%	43%	46%	48%	43%	53%	55%	46%	43%		58%	43%	85%

¹1973 - 2003

²estimates for discards from Canadian scallop fishery prior to 1996 are not available

³1973 – 2004

⁴ages 3+ from VPA(ADAPT)

⁵ages 4+ from VPA(ADAPT)

Combined Canada and USA catches in 2003 were about 6,800 mt, increasing from a low of 800 mt in 1995.

Fishing mortality for fully recruited ages 4+ fluctuated about 0.7 since 1996 and has not been below the reference point of $F_{ref}=0.25$ since at least 1973.

State of Resource:

Adult biomass (ages 3+) has generally increased since the mid 1990s. However, the retrospective pattern in the population analysis has resulted in updated biomass estimates that are lower than previously estimated.

Productivity:

Recruitment has improved since the mid 1990s, averaging 27 million age-1 fish during the past five years. Recent year classes are larger than year classes in the mid 1980s. Previous assessments had indicated the presence of some large year classes, but their magnitudes have subsequently been estimated to be much smaller. Truncated age structure in the surveys and change in distribution indicate current productivity may be limited relative to historical levels, although this may be confounded by spatial differences in management.

2005 Catch Risk Assessment:

A catch of about 4,000 mt in 2005 corresponds to an F equal to F_{ref} of 0.26. Alternative analyses, which make different assumptions about selectivity, indicate higher projected catch at F_{ref} in 2005, but still lower than the 2004 quota of 7,900 mt. A reduced catch of 6,000 mt in 2005 should result in moving towards F_{ref} . A risk assessment table was not included due to the uncertainty in the assessment (Note: Special Considerations below).

Special Considerations:

The presence of a severe retrospective pattern has limited evaluation of consequences for alternative management options. A benchmark assessment will be conducted prior to the next assessment and should aim to reconcile the retrospective pattern.

Discards appear to be a large source of catch. Efforts should be made to quantify the level and age structure of these discards through consistent and credible monitoring of the scallop fisheries.

Source Documents

Hunt, J.J., B. Hatt and L. O'Brien. 2004. Population status of Eastern Georges Bank cod (unit areas 5Zjm) for 1978-2005. TRAC Reference Document 2004/01.

Legault, C.M. and H.H. Stone. 2004. Stock assessment of Georges Bank (5Zhjmn) yellowtail flounder. TRAC Reference Document 2004/03.

Van Eeckhaute, L., J. Brodziak. 2003. Assessment of haddock on Eastern Georges Bank. TRAC Reference Document 2004/02.

TRAC. 2004. Eastern Georges Bank cod. TRAC Status Report 2004/01.

TRAC. 2004. Eastern Georges Bank haddock. TRAC Status Report 2004/02.

TRAC. 2004. Georges Bank yellowtail flounder. TRAC Status Report 2004/03.

TRAC. 2004. Report of meeting held 15-17 June 2004. TRAC Proceedings 2004/01.

Consultations

Transboundary Resources Assessment Committee (TRAC), St. Andrews, New Brunswick, 15-17 June 2004.

Transboundary Management Guidance Committee public consultation in Canada, Yarmouth, Nova Scotia, 29 July 2004.