PINNGORTITALERIFFIK
GRØNLANDS NATURINSTITUT
GREENLAND INSTITUTE OF NATURAL RESOURCES

Kinguppaat pillugit ilisimatisissut

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Pineqartoq: Kitaanut Tunumullu kinguppaat pillugit biologit 2012-imut siunnersuutaat.

Ilisimatitsissut una biologit Kitaani Tunumilu 2012-imi kinguppanniarnissamut siunnersuutigaat.

Kitaani kinguppaat:
Kitaani 2012-imi kinguppanniarnissanut siunnersuutigineqarpoq pisat 90.000 tons sinnissanngikkaat. 2011-imut siunnersuut 120.000 tonsiuvoq taamaalillunilu 2012-imut siunnersuut pisassanik 25%-imik appariaaneruvoq.

Tamatumunnga pissutaasut pingaanerit makkuupput:
- biomasse ukiuni tallimani annikilliartorsimavoq
- kinguppaat mikisut kinguppattanut akuusut aatsaat taamak ikitsigipput
- kinguppaqartarfik annikinnerulersimavoq
- saarulleeqqat malunnartumik amerlanerulerneratigut toqusartut amerlanerulernerat ilimagisariaqarpoq

Kinguppaat ikileriarsimanissaat ilimagineqareersimavoq taamaalinissaalu siunnersuisarnerni 2005-imiilli oqaatigineqartareersimalluni. 2003-miit 2006-mut kinguppalerujussuusimavoq tamatumali kingorna ikiliartulersimallutik. Matuma ataani siunnersuinermi tunuliaqutarineqartut naatsumik eqqartorneqassapput:

1. Pisat tamarmiusut 1998-imi 80.000 tonsiniit 2004-2008-mut 150.000 tonsinut qaffassimapput (figur 1). 2010-mi appariaqqipput 134.000 tonsinut Kalaallit Nunaan-

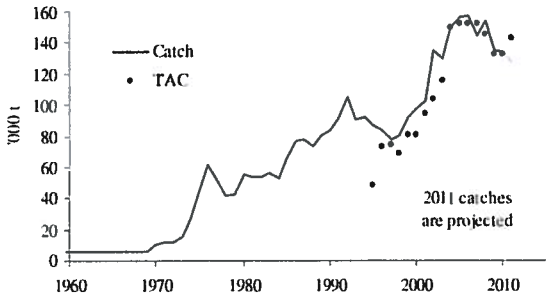
nut pisassiissutip annikinnerunerata kinguneranik. 2011-mi pisaasimasut 126.000 tonsiunissaat ilimagineqarpoq (Canadap pisat ilaat annikinnerusut pisarisimavai (2008-mi pisaqarsimanngilaq: 6.000 aamma 2.000 tons 2010-mi 2011-milu)).
2003 -2005-imut pisaasarsimasut (ukiumut 150.000 tons) biomassip ilaannannguarai (Iluaqutaasoq: pisat/biomasse). Ukiuni kingulerni iluaqutaanerat annertunerulersimavoq tamannalu isumakulutitsivoq.

2. Biologit misissuinerisa (survey) takutippaat kinguppaat biomassiat 2003-miit 2011-mut appariarsimasoq 1990-ikkut naalerneranisut annertussuseqalerluni (figur 3).
3. Logbogit malillugit pisaasartut (CPUE-indeks) takutippaat 2008-2010-mut annertunngitsumik appariarneqarsimasoq, 2011-mili 2005-2008-misulli annertutigileqqilluni qaffariaqqissimalluni. Ukiuni arlalinni isumakuluutigineqarsimavoq CPUE – indeks ilumut kinguppaqatigiit allanngoriartornerannut takussutissaanersoq nalornissutigineqarluni, 2011-milu CPUE-indeks qaffariarpoq – massa biologit 2003-miilli misissuisarnerisa appariarneqartoq takutittaraluaraat (figur 3).
4. Saarullik (saarullik kinguppattortuuvoq): Oqaluttuarisaanerup ingerlanerani saarullik qanoq kinguppaqartigineranut aalajangiisuusorujussuusimavoq, tassa saarulleqarneruleraangat kinguppakillisarluni. 2011-mi biologit misissuinerisa takutippaat saarulleqarnerulersimasoq aammalu Kitaani sumi tamaani 2009-meersunik assut saarulleeraqartoq (20 cm missiliorlugu angissusillit), tamakkoqarfiilu 2003-meersut takunnerannut naleqqiullugit kinguppaqarfimmiinnerupput. Saarullinikkiartorneq kinguppaat ikilinissaannut pissutaaqataajumaartoq naliliineqarpoq.
5. Nutaat akuliuttartut (kinguppaaqqat akuliussuunnerat) marlunnik ukiullit 2011-mi ikileriaqqipput amerlagisassaajunnaarlutik (figur 2). Kinguppaat marlunnik ukiullit ukiut 2-4 qaangiuppata biomassip aalisarneqarsinnaasup annertussusissaanut takussutissaasarput, taamaattumik taakkua akuliussuunnerat 2005-imiilli annikissimammat kinguppaqarnerata malunnartumik imaaliinnarluni pitsanngoriaateqarnissaa ilimagineqarsinnaanngilaq. Aammami kinguppaat taama angissusillit (15-22 mm CPL) ukiumi tullermi aalisarnermut akuliuttussat ikipput. Tamannalu 2012-mi aalisarnermut akuliuttussanik isumakuluuteqartitsivoq.
6. Ukiuni arlaqalersuni aalisarnerup annersaa aalisarfimmi annikinnerujartuinnartumi ingerlanneqarsimavoq, ullumikkullu aalisarneq Store Hellefiskebankip avannaani Diskobugtimilu ingerlanneqarpoq, tassa 1990-ikkut naalerneranni aalisarfiusumi.
7. Matematiske modelip, siunnersuinermi atorneqartartup pisaasartut ilaatippai (tamakkiisumik kinguppaqatigiinnit ilanngaataasartoq), qalusinermi pisaasartut (CPUE logboginiit) aamma biologit misissuineri (survey biomasse), aammalu saarullit biomassiata annertussusia (saarullit kinguppattortuupput). Modeli ukiuni siusinnerusuni atorneqartumit nutartigaavoq, ilaatigut qalusinermi pisaasartut biologillu misissuineri oqimaaqatigiinnerusumik sunniuteqartilerlugit (figur 3). Modeli NAFO-mit nalilerneqarpoq pisoqqamut naleqqiullugu ineriartornermik pitsaanerusumik siusinnerusumillu malinnaalluarnerusutut, pisoqqamimi qalusinermi pisaasartut biologit misissuinerinit annertunerujussuarmik naleqartinneqarmata.
8. Modelip takutippaa 2012-imi pisat 90.000 tonsiuppata ikiliartuutaanngitsumik toqusarneq (Zmsy) 31 %-iusoq qaangerneqassanngitsoq. NAFO-p siunnersuisui ilisimatuut aarlerinartoq tamanna siusinnerusukkut siunnersuuteqartarsimanermit annertunerusutut maluginiarpaat, tamannalu akuerineqarpoq modelimi malugineqarsinnaammat biomasse (Bmsy) aarlerinartumiittuartoq. Ilisimatuut siunnersuisut taamaattumik inassutigaat pisassat 90.000 tons sinnissanngikkaat.

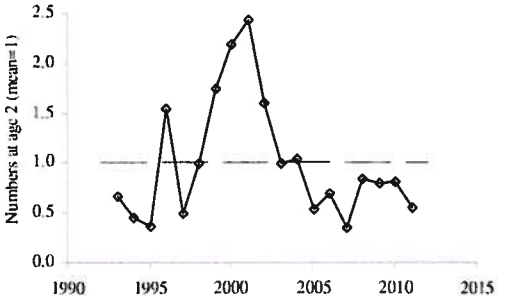
9. Kitaani kinguppanniarnermik aqutsinissamut pilersaarutip piumasaraa "allatut ajornarluinnaraangat aatsaat ukiumut TAC 10% sinnerlugu allanngortinneqartassasoq". Aappaatigulli aamma isumaqatigiissutaalluni "TAC ilisimatuut siunnersuinerat malillugu naleqqussarneqartassasoq aammalu ukiut pingasut sinnerlugit sivisussuseqartariaqanngitsoq".

Ukiuni makkunani Atlantikut Avannaani kitaani uumasoqatigiinnermi annertoorsuarnik allanngorneqarpoq. Canadami kinguppaqarnera piffissami sivikitsuararsuarmi aamma annikillisimavoq. Tamatumunnga nassuiaataasinnaasut ilagaat – pingaartumik Canadamut tunngatillugu– immap kissassusia annertoorujussuarmik allannguuteqarsimammat aammalu saarulleqarnerujartormat.

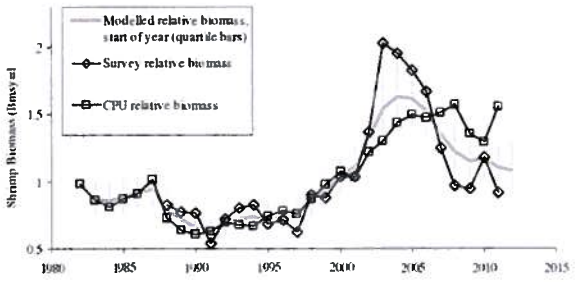
- ❖ Aqutsiveqarfimmut (SFA6) Newfoundlandip avannaaniittumut tunngatillugu 2010-miit 2012-imut pisassiissutit ataatsimut katillugit 40 % ikilisinneqarsimapput 86.000 tonsiniit 52.000 tonsinut.
- ❖ Flemish Cap 2010-miit aalisarfigeqqusaanngilaq. 2003-mi tassani pisat 63.000 tonsiusimapput 2011-imilu aalisarneq matuneqarpoq, aamma
- ❖ Grand Bank-imut siunnersuut ukiut pingasut ingerlaneranni affaannanngorlugu apparneqarpoq 25.000 tonsimiit 17.000 aamma 9.000 tonsimut.



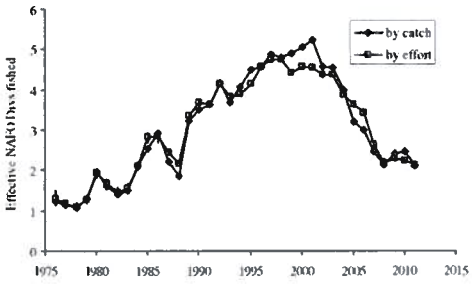
Figur 1. Pisat tamarmiusut (2010: Kalaallit Nunaat 134.000 tons, Canada 5.000 tons) aamma pisassiissutit (2011: Kalaallit Nunaat 124.000 tons, Canada 18.597 tons).



Figur 2. Kinguppaaqqat siunissami aaliarnermut ilaalerumaartut amerlassusiat.



Figur 3. Kinguppaqatigiit allanngoriartornerat 1975–2011.



Figur 4. Kinguppaqarfiit sumiinneri (logbogit malillugit). 1975-imiit 2011-mut.

Tunumi kinguppaat:

Tunumi kinguppaqatigiinnut tunngatillugu siunnersuut 2012-imi allanngorani 12.400 tonsiuvoq. Pisassiissutit 2004-miilli 12.400 tonsinut inissinneqarsimapput. Pisaasartut ikileriarujussuarsimapput 2003-mi 13.000 tonsingajanniit 2008-mi 3.000 tons inulersimallugit. 2009-mi 2010-milu pisat amerlipput 4.600 aamma 3.700 tonsinut. Ilimagineqarpoq 2011-mi pisat 2.000 tons ataasimajumaaraat. Siunnersuuteqarneq aaliarnermit paasissutissanik (kalinnermi pisat logboginiittut) aamma biologit ukiuni 2008-2011-mut misissuisarnerannik tunngaveqarpoq. Kalinnermi pisaasartut malillugit kinguppaqarnera taamaaginnarsorinarpoq, apeqqutaallunili kalinnermi pisaasartut kinguppaqatigiit allanngoriartornerannut ilu-

mut takussutissaanersoq nalorninarmat. Nalorninermut pissutaanerpaavoq pisaasartut ikiliartornerat aningaasarsiornermik kinguppaalluunniit ikiliartornerannik patsiseqarnersoq erseqqinngimmat. Biologit misissuineri ukiut pingasut ingerlaneranni annertuumik allanngorarsimapput taamaattumillu erseqqissunik kinguppaqatigiit qanoq innerannut takussutissiinatik.

Bilag 1 aamma bilag 2 tassaapput Kitaanut Tunumullu tunngatillugu NAFO-p siunnersuutaata tuluttuanik eqikkaanerit.

GN-ip naqitat katillugit aqqanillit allallugillu saqqummiuppai, ataatsimut Kitaanut Tunumullu siunnersuinermut tunuliaqutaasut. Kinguppannut tunngatillugu siunnersuut nassuiarneqarpoq NAFO/ICES-imi kingullermik ataatsimiinnermi 19.–26. oktober 2011 ingerlanneqartumi, tassani ataatsimiinnermi ilisimatuut 15-it Canadamit, EU-mit, Norgemit, Ruslandimit Kalaallit Nunaanniillu (GN) aggersut, seniorforsker Michael Kingsley aamma afdelingschef Helle Siegstad peqataapput. Pisortatigoortumik siunnersuut takuneqarsinnaavoq NAFO-p (www.NAFO.int) nittartagaani. NAFO-miit siunnersuutip nalunaarusiornerata tuluttuua quppernerit A4-t 100 sinnerlugit takissuseqarpoq, taassumalu assilinera Aalisarnermut Pisortaqarfimmut Aalisarnermullu Aqutsiveqarfimmut tunniunneqassaaq.

Inussiarnersumik inuulluaqqusillunga

Helle Siegstad

Helle Siegstad
Afdelingschef

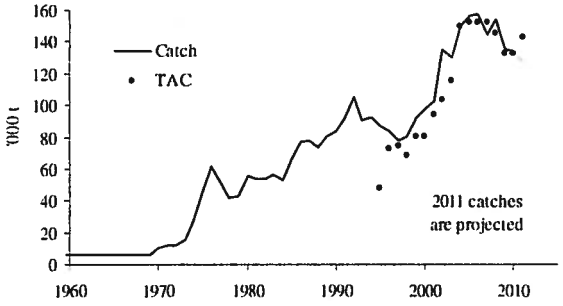
Bilag 1.Northern shrimp in Subareas 0 and 1

Background: The shrimp stock off West Greenland is distributed in Subarea 1 and Div. 0A east of 60°30'W. A small-scale inshore fishery began in SA 1 in the 1930s. Since 1969 an offshore fishery has developed.

Fishery and Catches: The fishery is prosecuted mostly by Greenland in SA 1 and Canada in Div. 0A. Canada did not fish in 2008 and fished little in 2009, but has since resumed fishing. Recent catches are:

	Catch ('000 t)		TAC ('000 t)	
Year	NIPAG	STATLANT 21	Advised	Actual
2008	152.9	148.6	130	145.7
2009	135.5	133.5	110	133.0
2010	134.0	134.0	110	133.0
2011	126.0		120	142.6

1 Provisional.
2 Total of TACs set by Greenland and Canada.
3 Predicted to year end by industry observers.



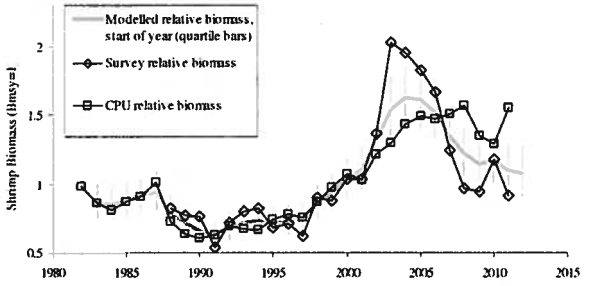
Data: Catch, effort, and position data were available from all vessels. Series of biomass and recruitment indices and size- and sex-composition data were available from research surveys. Series of cod biomass and cod consumption were also available.

Assessment: An analytical assessment framework was used to describe stock dynamics in terms of biomass (B) and mortality (Z) relative to biological reference points.

The model used was a stochastic version of a surplus production model including an explicit term for predation by Atlantic cod, stated in a state-space framework and fitted by Bayesian methods. *MSY* (Maximum Sustainable Yield) defines maximum production, and B_{msy} is the biomass level giving *MSY*.

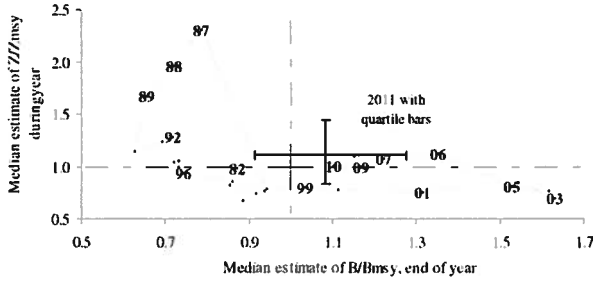
A precautionary limit reference point for stock biomass (B_{lim}) is 30% of B_{msy} and the limit reference point for mortality (Z_{lim}) is Z_{msy}. Recent CPUE values have stayed high, while the area fished has contracted and survey biomass indices have decreased, and the index is now considered to be of questionable reliability. Therefore in the 2011 assessment, the model accepted was modified from that used in foregoing years to give equal weight to CPUE and survey indices of biomass. The resulting median estimate of *MSY* was 135 000 t/yr.

Indices of how widely the stock and the fishery were distributed were calculated from catch positions in the fishery and the survey.



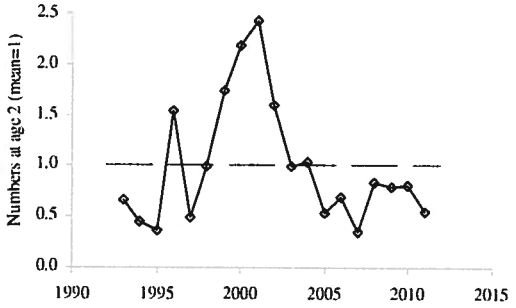
Biomass. A stock-dynamic model showed a maximum biomass at the end of 2003, with a continuing decline since; the probability that biomass will be below B_{msy} at the end of 2011 with projected catches at 126 000 t was estimated at 38% and risk of its being below B_{lim} at less than 1%.

Mortality. The mortality caused by fishing and cod predation (Z) is estimated to have stayed below the upper limit reference (Z_{msy}) from 1996 to 2005, but is now estimated to have averaged 6% over the limit value since 2006. With catches projected at 126 000 t the risk that total mortality in 2011 would exceed Z_{msy} was estimated at about 59%. Atlantic cod is widely distributed on the West Greenland shrimp grounds in 2011 and predation is expected to remain high



Recruitment. The stock structure in 2011 is deficient in shrimps of intermediate size 15–22 mm CPL, presaging poor short-term recruitment to both the fishable and spawning stocks; numbers at age 2 in 2011 are at 55%

of the series mean, so medium-term recruitment is also expected to be poor.



State of the Stock. Modelled biomass is estimated to have been declining since 2004. At the end of 2011 biomass is projected to remain slightly above B_{msy}. Total mortality for the year is projected to exceed Z_{msy}. Recruitment to the fishable stock, in both the short and the medium term, is expected to be low.

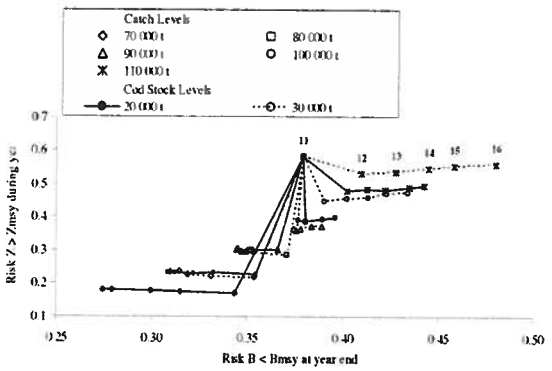
Short-term predictions: Estimated risks for 2012 with an "effective" (the amount of cod biomass overlapping the shrimp biomass) 20 000 t cod stock are:

20 000 t cod	Catch option ('000 t)						
Risk of end 2012 (%)	60	70	80	90	100	110	120
falling below B_{msy}	33.1	34.4	35.5	37.5	38.1	40.2	41.3
falling below B_{lim}	<1	<1	<1	<1	<1	<1	<1
exceeding Z_{msy}	13.4	17.0	22.7	30.7	38.7	47.8	55.1

Medium-term Predictions:

Predicted probabilities of transgressing precautionary limits after 3 years in the fishery for Northern Shrimp on the West Greenland shelf with 'effective' cod stocks assumed at 20 000 t (20kt) and 30 000 t(30kt) were estimated at:

Catch (Kt/yr)	Prob. biomass < B_{MSY} (%)		Prob. biomass<B_{lim} (%)		Prob. mort > Z_{msy} (%)	
	20 Kt	30 Kt	20 Kt	30 Kt	20 Kt	30 Kt
60	27.4	29.2	1.6	2.0	14.0	18.4
70	30.0	31.9	1.5	2.1	17.7	22.7
80	32.2	34.9	1.6	2.2	22.7	29.0
90	36.1	38.8	1.8	2.3	30.7	37.2
100	38.0	41.3	1.8	2.4	38.8	45.8
110	42.2	44.5	1.8	2.4	48.3	54.8
120	44.6	47.8	1.8	2.6	56.2	61.8



Recommendation: Recent catch levels are not estimated to be sustainable. Scientific Council therefore recommends that catches in 2012 should be reduced substantially.

The risk of exceeding Z_{msy} at a catch level of 90 000 t with an effective cod stock at the 2011 level in 2012 is estimated to be around 31%. Scientific Council notes that this risk is higher than was recommended in previous assessments. This is because model results indicate a stationary stock above B_{msy} at this risk level of exceeding Z_{msy}. Scientific Council therefore recommends that catches in 2012 should not exceed 90 000 t.

Special Comments: Scientific Council were not in a position to predict the cod stock so assumed that the cod stock in 2012 would be at the same level as 2011 in its analysis. Should the cod stock increase beyond this assumption catches may have to be decreased further.

Sources of Information: SCR Docs 04/75, 04/76, 08/62, 11/50, 11/51, 11/52, 11/55, 11/57, 11/58, SCS Doc. 04/12

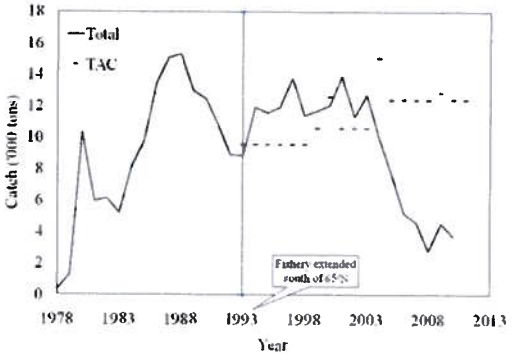
Bilag 2: Northern shrimp in Denmark Strait and off East Greenland

Background: The fishery began in 1978 in areas north of 65°N in Denmark Strait, where it occurs on both sides of the midline between Greenland and Iceland. Areas south of 65°N in Greenlandic waters have been exploited since 1993. Until 2005 catches in the area south of 65°N accounted for 50 - 60% of the total catch but since 2006 catches in the southern area accounted for 25% or less of the total catch.

Fishery and Catches: Two nations participated in the fishery in 2011. Catches in the Iceland EEZ decreased from 2002-2005 and since 2006 no catches have been taken. Recent catches and recommended TACs are as follows:

	Catch ('000 t)	TAC ('000 t)		
Year	NIPAG	Recommended	Greenland EEZ	Iceland EEZ[1]
2007	4.6	12.4	12.4	
2008	2.8	12.4	12.4	
2009	4.6	12.4	12.8	
2010	3.7	12.4	11.8	
2011	1.1[2]	12.4	11.8	

[1] Fishery unregulated in Icelandic EEZ;
[2] Catch till October 2011.

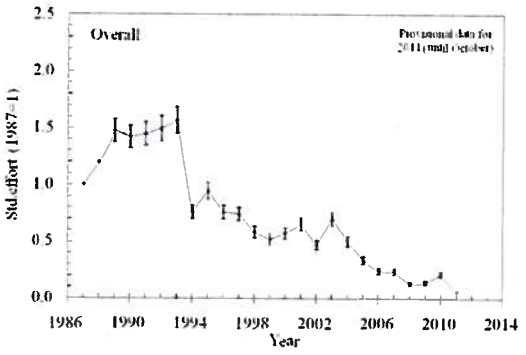


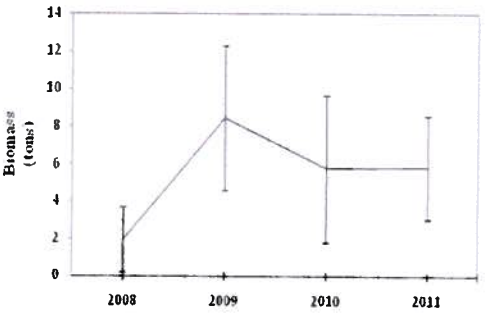
Data: Catch and effort data were available from trawlers of several nations. Annual surveys have been conducted since 2008.

Assessment: No analytical assessment is available. Evaluation of the status of the stock is based on analysis of commercial fishery data and survey data.

Recruitment: No recruitment estimates were available.

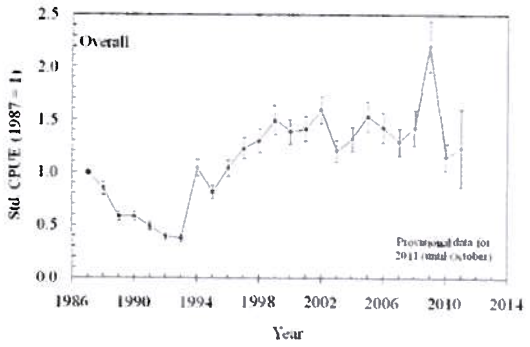
Exploitation rate: Since the mid 1990s exploitation rate index (standardized effort) has decreased, reaching the lowest levels seen in the time series from 2008 - 2011.





Biomass: The biomass index from 2008-2011 varied greatly with no clear trend.

CPUE: Combined standardized catch-rate index for the total area decreased steadily from 1987 to 1993, showed an increase to a relatively high level in 1998, and has fluctuated around this level since. There are concerns as to whether the 2009 value properly reflects the state of the stock.



State of the Stock: The stock biomass is believed to be at a relatively high level, and to have been there since 1998.

Recommendation: Scientific Council finds no basis to change its previous advice and recommends that catches should remain below 12 400 tons in 2012.

Special Comments: The predominant fleet, accounting for 40% of total catch, has decreased their effort in recent years, which gives some uncertainty as to whether recent index values are a true reflection of the stock biomass. This decrease may be related to the economics of the fishery.

Sources of Information: SCR Doc. 03/74, 11/56, 11/54.