



04. november 2021  
J.nr. 20.00-11

## Kitaata Tunullu imartaanni raajarniarnerit pillugit biologit 2022-imut siunnersuinerisa eqikkarnerat

Eqikkaanermi matumani NAFO-p siorna siunnersuinerani allannguutaasimasut naatsumik allaaserineqarput, kiisalu raajartassiisutigineqarsinnaasutut innersuussutigineqartut saqqummiunneqarlutik. Innersuussutigineqartut ilanngussami itisilerlugit nassuiarneqarput.

Kalaallit Nunaata kitaata imartaanni raajartassiisutigineqarsinnaasutut innersuussutigineqartut 2022-imi 115.000 tonsiupput. Raajartassiisutit 2021-imut sanilliullugit allannguuteqanngillat. Nunatta Kangiani raajartassat allannguuteqaratik 3.000 tonsiunnassapput, 2021-imi siunnersuinerimut naleqqiullugu allannguuteqarani.

### 2022-imut siunnersuineq

#### Raajat

*Kalaallit Nunaata kitaata imartaani*

115.000 tonsit.

2021-imut siunnersuineq: 115.000 tons.

2021-imi pisarineqartussatut naatsorsuutigisat tamakkerlugit: 108.000 tonsit missaat.

#### Raajat

*Kalaallit Nunaata Kangiata imartaani*

3.000 tons.

2021-imut siunnersuineq: 3.000 tons.

2021-imi pisarineqartussatut naatsorsuutigisat tamakkerlugit: < 3.000 tons.

Siunnersuineq pisortatigoortoq Aalisarnermut Naalakkersuisoqarfimmuttaaq nassiunneqartoq NAFO`p nittartagaani ([www.nafo.int](http://www.nafo.int)) atuarneqarsinnaalissaaq 2021-ip naajartornerani. Pinngortitaleriffimmeersut siunnersuiniarnermi atugassanik allakkianik tunuliaquttatut atorneqartussanik aamma suliaqarput. Uppernarsaataasunik sulii amerlanerusunik piunnaqartoqassapput Pinngortitaleriffik tunniussaqaarnisamat soorunalimi piareersimavoq.

Siunnersuinerimut tunuliaqutaasut itinerusumik nassuiaateqarfigineqarnissaat, apeqqutinut akissutissaasinnaasut aammalu ilisimasanik immersoqatigiinnissaaq periarfissiisutiginiallugit Pinngortitaleriffimmeersut oqartussaasut inuussutissarsiortullu sinniisaannik piaartumik aggersaanialersaarpugut.

Inussiarnersumik inuulluaqqusillunga

Helle Siegstad, afdelingschef

# Appendiks

## Kalaallit Nunaata kitaata imartaani raajat

NAFO' mit innersuussutigineqarpoq 2022-imi raajartassiissutigineqarsinnaasut 115.000 tonsiussasut. 2021-imut siunnersuineq assigalugu.

### Siunnersuinermit tunngassuteqartut

Kalaallit Nunaata kitaata imartaani pisassiissutigineqarsinnaasutut innersuussutigineqartunik annertussusi-liinermi misissuinerit naliliiffigineqarnerat aallaavigallugu aalaakkaasumik peqassuseqarpoq. Pinngortitaleriffiup erseqqissaatigissavaa ukioq manna siunnersuineq ukiunut siuliinut sanilliullugu qularnaassuseqannginnerummat. Peqassutsimik misissuinerit ukioq manna ingerlanneqarsinnaasimangillat Pinngortitaleriffiup ilisimatuussutsikkut umiarsuassaata *r/v Tarajoq*-ip tunniunneqarnissaa kinguaattoornikummat.

Raajaqassuttip nikerarnera missiliorniarlugu naatsorsuusiortnermi paasissutissat, soorlu aamma ukiuni siuliini taamaaliortarsimasugut, raajarniat pisarisartagaannit kisitsisinik (Takussutissiaq 1), biologit misissuisarnerinit naatsorsuusiort naapertorlugit raajaqassuttip missiliuussinerni kisitsisinik, aammalu raajarniartartut kalinnermi ataatsimi pisarisartagaasa annertussusiort kiisalu saarullit raajatortarnermikku raajaqassuttip ilanngartuutissaattut naatsorsuutigisat oqimaassusinnorlugit missiliorneqarnerinit kisitsisinik aallaaveqartarpoq. Qarasaasiaq atorlugu naatsorsuinerit takutippaat raajaqassuseq oqimaassusinnorlugu 2004-mi qaffasinnerpaamiissimasoq tamatumalu kingorna 2014-ip tungaanut appariartuinnavissimalluni. Kingornali raajaqassuseq oqimaassusinnorlugu 2017-imiilli alaakkaasumik amerlassuseqarsimavoq, 2021-illu naajartornerani naatsorsuusiani takuneqarsinnaavoq raajaqassuttip tamakkiisumik piujuartitsiniarnerpaamillu iluaqutigineqarsinnaanerata killinga qaangerlugu qaffassimasoq (Takussutissiaq 2).

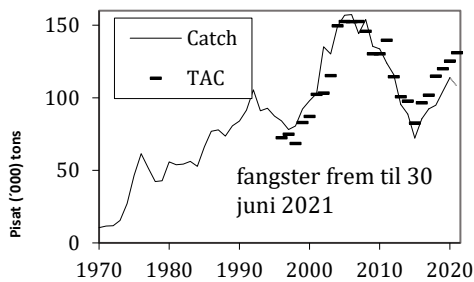
Raajaqqat ukiunik marlunnik pisoqaassusillit ukiullu tulliuuttut pingasut, sisamat qaangiuppata raajarniarnermi akuulerumaartussat amerlassusiat agguaqatigiissillugu amerlassusiat qaangerlugu 2019-imi 2020-imi inissisimavoq. (Takussutissiaq 4). Avataani raajat ukiunik marlunnik utoqqassusillit amerlapput, akerialianik Qeqertarsuup Tunuani raajat ukiuni marlunnik utoqqassusillit ikittuararsuullutik.

2014-ip kingorna raajaqassuttip annaasaqaataasartut piffissami sivikitsuinnarmi appariaraluarput, 2020-imi qaffaqqillutik  $Z_{msy}$  missaaniilerput (Takussutissiaq 3).

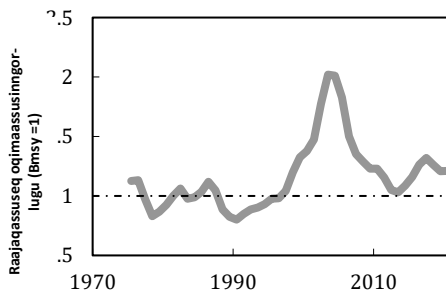
Takussutissiaq 1. Kalaallit Nunaata kitaani Canadamilu raajat (tonsinnorlugit) 2013-miit 2021-imut tulaanneqartartut tamakkerlugit

Ukioq	2013	2014	2015	2016	2017	2018	2019	2020	2021
Kalaallit Nunaat	95.379	88.765	72.254	84.356	89.396	93.189	101.997	115.000 <sup>1</sup>	108.000 <sup>1</sup>
Canada	2	0	2	1.171	3.215	1.689	2.463	2.000 <sup>1</sup>	100 <sup>1</sup>

<sup>1</sup> naatsorsuutigisat

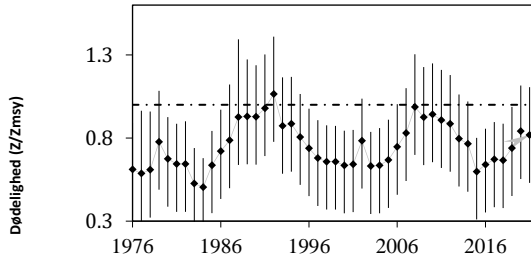


Takussutissiaq 1. Pisat tamakkiisut 1970-2021

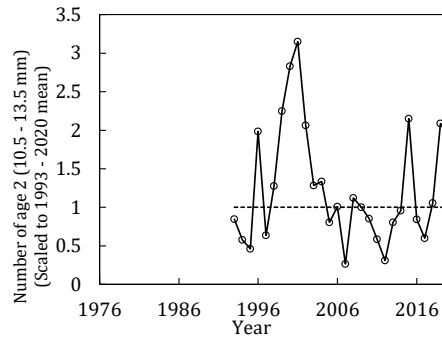


Takussutissiaq 2. Raajaqassuseq oqimaassusinnorlugu (qarasaasiamik naatsorsuut atorlugu)

# Appendiks



Takussutissiaq 3. Aalisagaqassutimik annaasaqaataasut tamakkerlugit (aalisarneq uumasoaqatiminillu nerineqarneri)



Takussutissiaq 4. Raajaaqqat aalisarneqarsinnaalerumaartut takkussuunerat (ukiunik marlunnik utoqaassusillit)

Ilisimatuussutsikkut Siunnersuisoqatigiit Naalakkersuisut aqutsinikkut piumasaqaatigisaat aallaavigalugit Nunatta Kitaani raajarniarneq naliliiffigaat isumaqarlutillu 2022-imi 115.000 tonsinik raajarniartitsinissaq piujuartitsiniarnermik tunngaveqassasoq. Imaappoq raajaqassutsimit tamakkiisumik annaasaqaataasartut ( $Z_{msy}$ : pisarineqartartut toquinnartartullu katillugit) piujuartitsiniarnermik tunngaveqarunnaarnissaanut periarfissaq 35 %-iuvoq aammalu taamaalilluni raajaqassutsip appasinnerpaaffissaatut killissarititaamit appasinnerusumiilernissaata angunissaanut periarfissaq appasilluni ( $B_{lim}$ ).

## Kalaallit Nunaata Kangiata imartaani raajat

Kangiata imartaani 2022-imit raajartassiisuteqarnissami 3.000 tonsit sipporneqartariaqanngitsut NAFO innersuussuteqarpoq, 2021-imi pisassiisutaasimasutulli. Paasissutissat pissarsiarineqartut paasinarsippaat ukiuni kingullerni raajaqassuseq pitsanngoriaateqarsimasoq. Kilisattunit peqassutsimillu misissuinerit paasinarsivoq raajat sumiiffimmi annikitsumiittut, taamaattumillu raajaqassutsip naliliiffiginissaa nalorninartoqartoq.

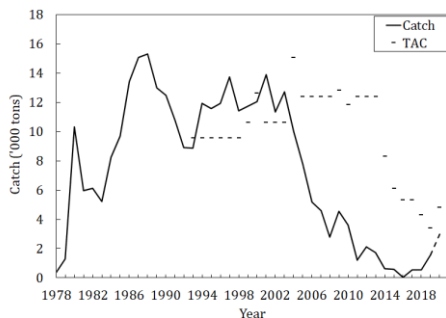
### Siunnersuinermit tunngasut

2008-miilli nalunaarsuisoqartalermalli (Takutitassiaq 7) 2020-imi raajaqassuseq oqimassusinngorlugu aatsaat taamak qaffasitsigisimavoq. 2020-imi pisarineqartartut 1986-imi nalunaarsorneqarneranniit aatsaat taamak amerlatigisimapput (Takutitassiaq 6), kilisattoqarnerali annikimmat kalinnerit ikittuinnaat aallaavigalugit sumiiffik tamakkerlugu qanoq peqartigineranik takussutissiisoqarnerasoq oqaatigiuminaappoq. Peqassutsimik misissuinerit kilisannerillu 2020-imi sumiiffimmi isorartunngitsumi pisimmamata. Pisarineqarsinnaanngortussat taaneqarsinnaanngillat rajaaqqat ikittunnguit misissuiffiqineqartumi pisarineqarsimmamata.

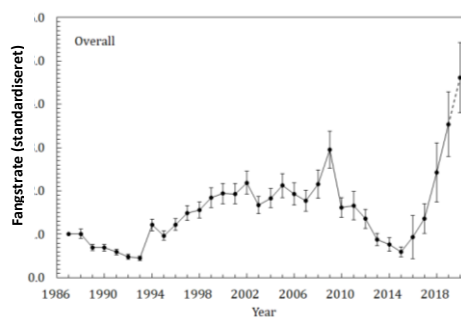
Tabel 2. Kangiata imartaani raajat pisaasartut tulaanneqartartullu tamakkerlugit 2013-miit 2021-imit

Ukioq	2013	2014	2015	2016	2017	2018	2019	2020	2021
Kalaallit Nunaat	1.717	622	576	49	561	547	1.550	2.839 <sup>1</sup>	2.370 <sup>1</sup>

<sup>1</sup> naatsorsuutigisat

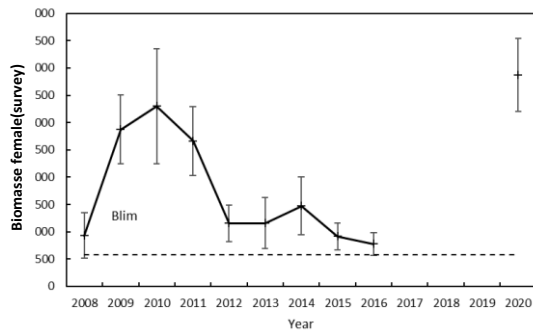


Takussutissiaq 5. Pisaasartut tamakkerlugit 1978-2021



Takussutissiaq 6. Kalinnermi ataatsimi pisaasartut (1986-2021)

## Appendiks



Takutitassiaq 7. Raajaqassuseq oqimaassusinnngorlugu (arnavissat) (2008–16+2020)

### Northern shrimp in Subarea 1 and Div. 0A Advice November 2021 for 2022

#### Recommendation

In line with Greenland's stated management objective of maintaining a mortality risk of no more than 35% (subject to a risk of biomass being below  $B_{lim}$  of less than 1%), Scientific Council advises that catches in 2021 should not exceed 115 000 t.

With regard to the Canadian harvest strategy, SC notes that catches of 115 000 t in each of the years 2021 to 2023 would result in less than 35% risk of exceeding  $Z_{msy}$  2021 and 2022 and exactly 35% risk of exceeding  $Z_{msy}$  in 2023.

#### Management Objectives

A management plan and management objectives have been defined by the Government of Greenland in 2018. The objective is to maintain a mortality risk of no more than 35% of exceeding  $Z_{msy}$  (subject to a risk of biomass being below  $B_{lim}$  of less than 1%). Canada has a harvest strategy with the objective to maintain the stock in the Healthy Zone (>80% of  $B_{msy}$ ); when the biomass is above 80% of  $B_{msy}$ , the risk of being above  $Z_{msy}$  should be less than 35%, based on the 3-year projections. Advice was also drafted to be consistent with the NAFO precautionary approach (FC Doc. 04-12).

Objective	Status	Comment/consideration
Apply Precautionary Approach	●	Stock status is both estimated and forecast relative to precautionary reference points

● OK

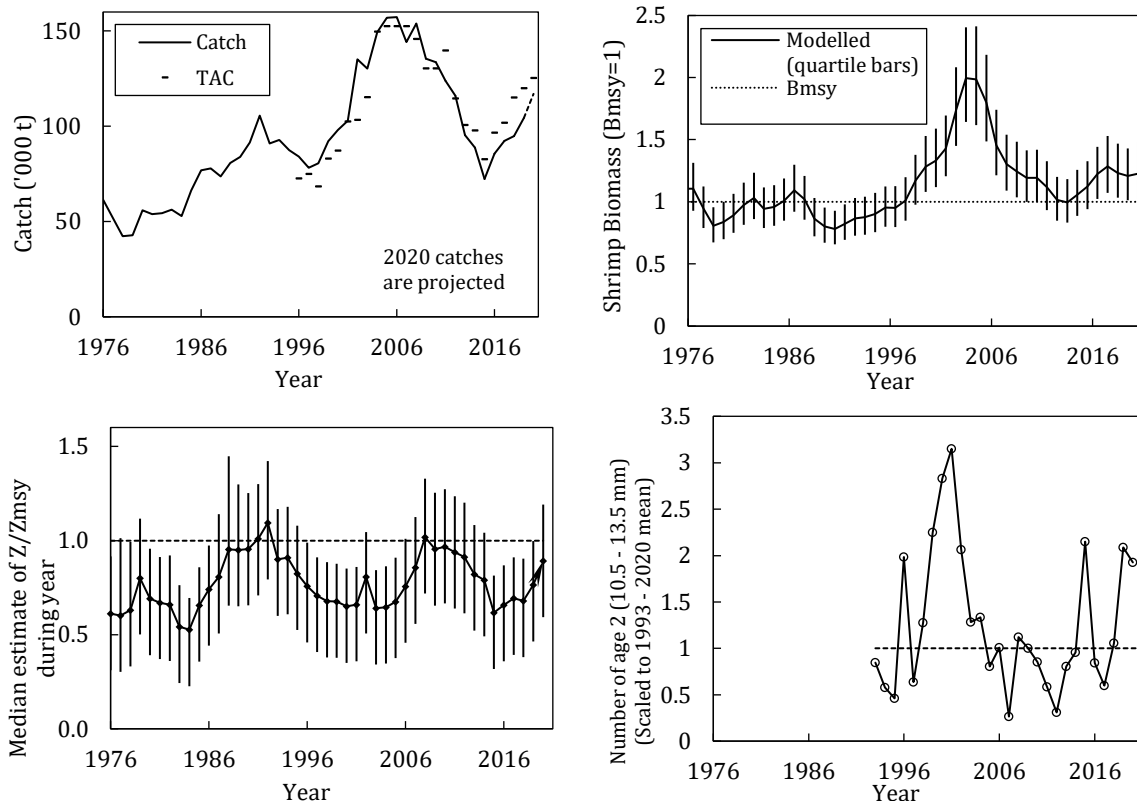
#### Management unit

The stock, considered distinct from all others, is distributed throughout Subarea 1, extends into Div. 0A east of 60°30'W, and is assessed as a single stock. In 2019, 98% of the landings were from Greenland.

#### Stock status

Biomass at the end of 2020 is above  $B_{msy}$  and the probability of being below  $B_{lim}$  is very low (<1%). The probability of mortality in 2020 being above  $Z_{msy}$  is 40%. Recruitment (number of age-2 shrimp) in 2020 is above average.

## Appendiks



### Reference points

$B_{lim}$  has been established as 30%  $B_{msy}$ , and  $Z_{msy}$  (fishery and cod predation) has been set as the mortality reference point (FC Doc. 04-18).  $B_{msy}$  and  $Z_{msy}$  are estimated directly from the assessment model.

### Projections

Predicted probabilities of transgressing precautionary reference points in 2021 – 2023 under eight catch options and subject to predation by a cod stock with an effective biomass of 7 Kt.

7 000 t cod	Catch option ('000 tons)								
	Risk of:	95	100	105	110	115	120	125	130
falling below Bmsy end 2021 (%)	24	24	25	27	26	27	27	28	28
falling below Bmsy end 2022 (%)	25	25	27	28	29	29	30	31	31
falling below Bmsy end 2023 (%)	25	26	28	30	31	32	33	33	33
falling below Blim end 2021 (%)	0	0	0	0	0	0	0	0	0
falling below Blim end 2022 (%)	0	0	0	0	0	0	0	0	0
falling below Blim end 2023 (%)	0	0	0	0	0	0	0	0	0
exceeding $Z_{msy}$ in 2021 (%)	19	22	26	30	33	37	40	44	44
exceeding $Z_{msy}$ in 2022 (%)	19	22	27	31	34	39	42	45	45
exceeding $Z_{msy}$ in 2023 (%)	20	23	28	32	35	39	43	46	46
falling below Bmsy 80% end 2021 (%)	8	8	9	9	9	9	10	9	9
falling below Bmsy 80% end 2022 (%)	9	10	11	11	11	12	13	13	13
falling below Bmsy 80% end 2023 (%)	10	10	12	12	13	14	16	17	17

### Assessment

Advice is based on risk analysis coming from a quantitative model. The analytical assessment was run in 2020 with revised treatment of the input data (SCR Doc.20-56, 20-58) and with updated data series.

The next assessment is scheduled for 2021.

### Human impact

Mortality related to the fishery has been documented. Other human sources (e.g. pollution, shipping, oil-industry) are considered minor.

## Appendiks

### *Biological and Environmental Interactions*

Cod is an important predator on shrimp. This assessment incorporates this interaction. Other predation is likely but not explicitly considered. Shrimps might be important predators on, for example, fish eggs and larvae.

### **Fishery**

Shrimps are caught in a directed trawl fishery. Bycatch of fish in the shrimp fishery is around 1% by weight. The fishery is regulated by TAC.

Recent catches and TACs (t) have been as follows:

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Enacted TAC <sup>1</sup>	139 583	114 425	100 596 <sup>1</sup>	97 649 <sup>1</sup>	82 561 <sup>1</sup>	96 426 <sup>1</sup>	101 706 <sup>1</sup>	114 876 <sup>1</sup>	119 875 <sup>1</sup>	125 229 <sup>1</sup>
STATLANT 21	123 195	114 970	91 802	88 834	71 779	84 303	91 725	91 869	102 706	
NIPAG	123 989	115 977	95 381	88 765	72 256	85 527	92 584	94 878	104 314	117 000 <sup>2</sup>

<sup>1</sup> Sum of TACs autonomously set by Canada and Greenland.

<sup>2</sup> Projected to year end

### **Effects of the fishery on the ecosystem**

Measures to reduce effects of the fishery on the ecosystem include area closures, moving rules and gear modifications to reduce damage to benthic communities and reduce bycatch.

### **Special comment**

From 1993 to 2010 the Greenlandic survey in the Canadian area (SFA1) was conducted annually. In that period, average biomass in that area was 2% of the total biomass estimated in Subarea 1 and Div. 0A. Since 2011, due to ice cover, there has only been sporadic information from the Greenlandic survey in the Canadian area (SFA1). The area was surveyed only in 2013 and 2017. In 2013, the biomass in that area (SFA1) was less than 1% of the total estimated biomass in Subarea 1 and Div. 0A, whereas it was about 2% in 2017.

**Source of Information** SCS Doc 13/04, FC Docs 04-18, SCR Docs 20-53, 54, 55, 56, 57, 58.

# Appendiks

## Advice November 2020 for 2021 Northern shrimp in Denmark Strait and off East Greenland

Advice November 2020 for 2021

### Recommendation

The available information indicates the stock has increased in recent years. Scientific Council advises that fishing mortality should not increase in 2021. On this basis, the catch in 2021 should not exceed 3000 t, corresponding to the projected catch in 2020.

### Management objectives

No explicit management plan or management objectives have been defined by the Government of Greenland. Advice was drafted to be consistent with the NAFO precautionary approach (FC Doc 04-12).

Objective	Status	Comment/consideration
Apply Precautionary Approach	●	$B_{lim}$ is defined. No fishing mortality reference is defined.

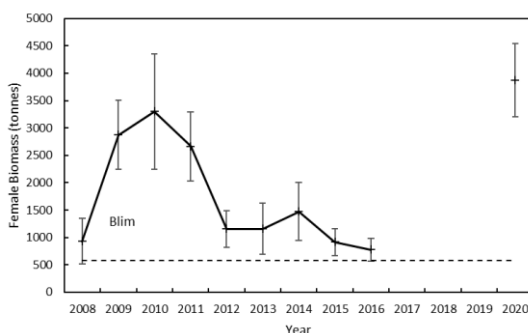
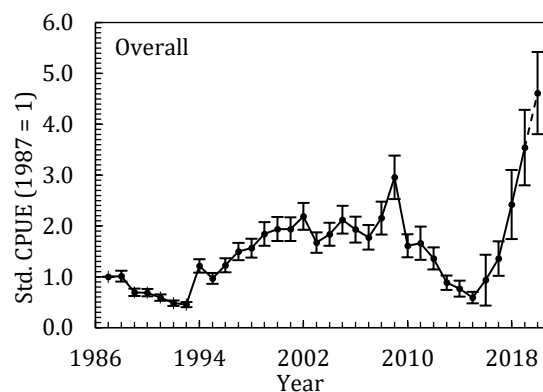
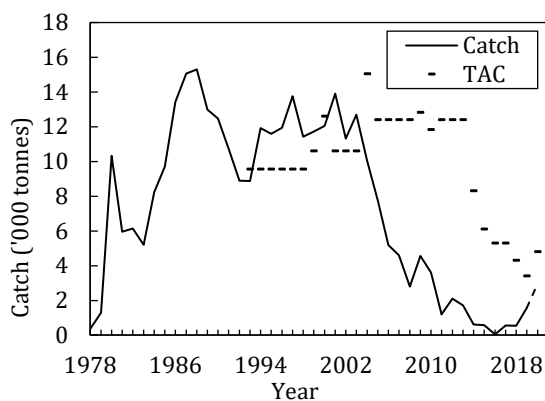
● Intermediate

### Management unit

The shrimp stock is distributed off East Greenland in ICES Div. 14b and 5a and is assessed as a single population.

### Stock status

The stock in 2020 is at a high level. The survey biomass in 2020 is the highest observed since the beginning of the survey, in 2008. The commercial CPUE in 2020 is also the highest since the beginning of the time series, in 1986. There is no recruitment index available for this stock, few juvenile shrimps are caught in the survey area.



### Reference points

Scientific Council considers that 15% of the maximum survey female biomass provides a proxy for  $B_{lim}$ . The record high survey biomass found in 2020 results in  $B_{lim} = 580$  t.

# Appendiks

## Projections

Quantitative assessment of risk at various catch options is not possible for this stock currently.

## Assessment

A survey was conducted in 2020 after three years with no survey data. The survey biomass was the highest since the survey started in 2008. The standardized commercial CPUE has increased since 2015 and was at a historical high level in 2020. The survey biomass in 2020 is concentrated in a fairly small geographical area and the recent fishing effort concentrates in the same general area. Recent fishing effort has been relatively low, so this CPUE may not reflect stock status for the entire stock distribution area.

An analytical assessment model (surplus production model, SPiCT), using both the commercial and the survey CPUE, was investigated this year. Results can be found in the NIPAG report (SCS 20/021). The model results indicated a healthy stock status; however, the model needs to be further explored next year.

### *Human impact*

Mainly fishery related mortality has been documented. Other sources (e.g. pollution, shipping, oil-industry) are considered minor.

### *Biological and Environmental Interactions*

Cod is an important predator on shrimp. The cod stock has generally been decreasing in East Greenland waters since 2014.

## Fishery

Shrimp is caught in a directed trawl fishery. The fishery is regulated by TAC and bycatch reduction measures include move-on rules and Nordmøre grates.

Recent catches and TAC (t) were as follows:

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Enacted TAC</b>	12 400	12 400	12 400	8 300	6 100	5 300	5 300	4 300	3 384	4 750
<b>SC Recommended TAC</b>	12 400	12 400	12 400	2 000	2 000	2 000	2 000	2 000	2 000	2 000
<b>NIPAG</b>	1 199	2 109	1 717	622	576	49	561	547	1 580	2 839 <sup>1</sup>

<sup>1</sup> To July 2020

## Effects of the fishery on the ecosystem

Measures to reduce effects of the fishery on the ecosystem include move-on rules to protect sponges and corals.

## Source of Information

SCR Doc. 20-059, 20-060, 20-061.