

The resource situation for shrimp, king crab and snow crab

Dr. Carsten Hvingel

Head of Research,

Benti resources and processes

Institute of Marine Research

King crab



King crab target

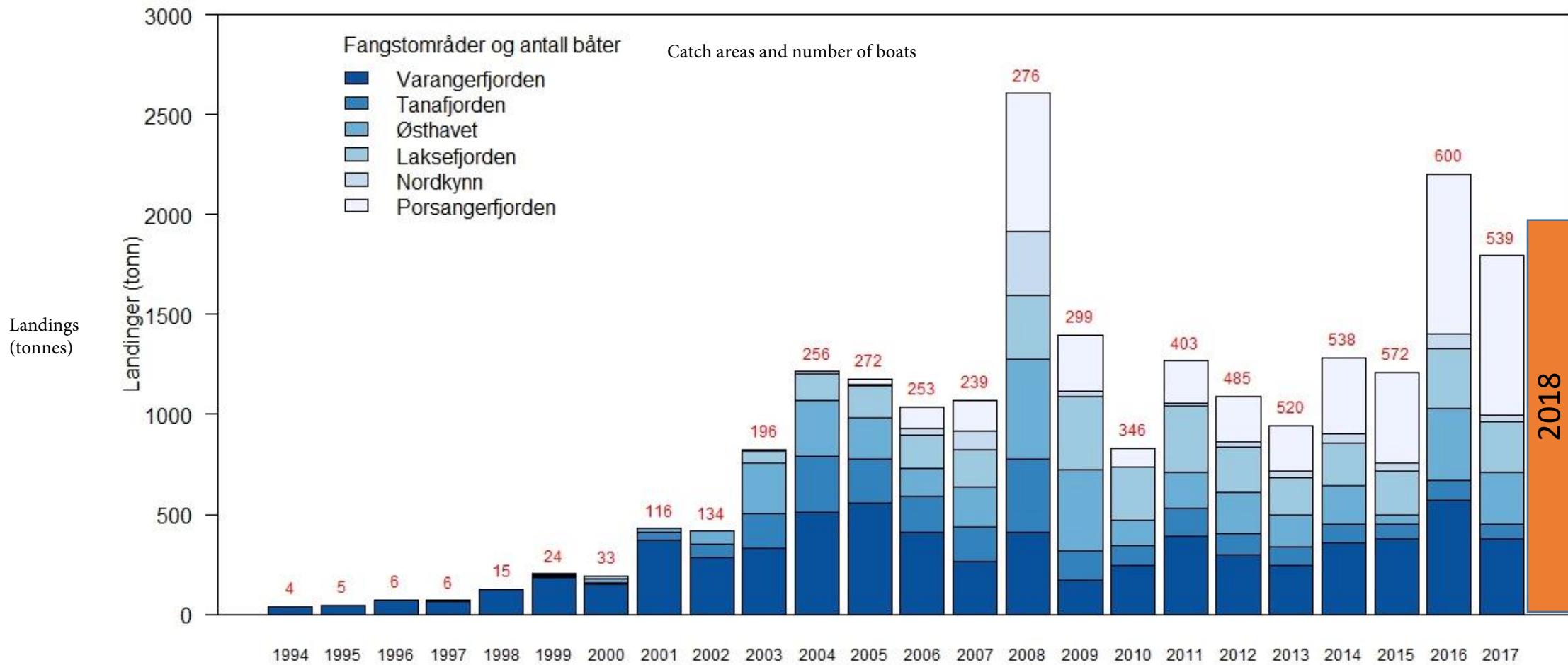
NFD:

1. Prevent spread
2. Maintain a long-term commercial fishery

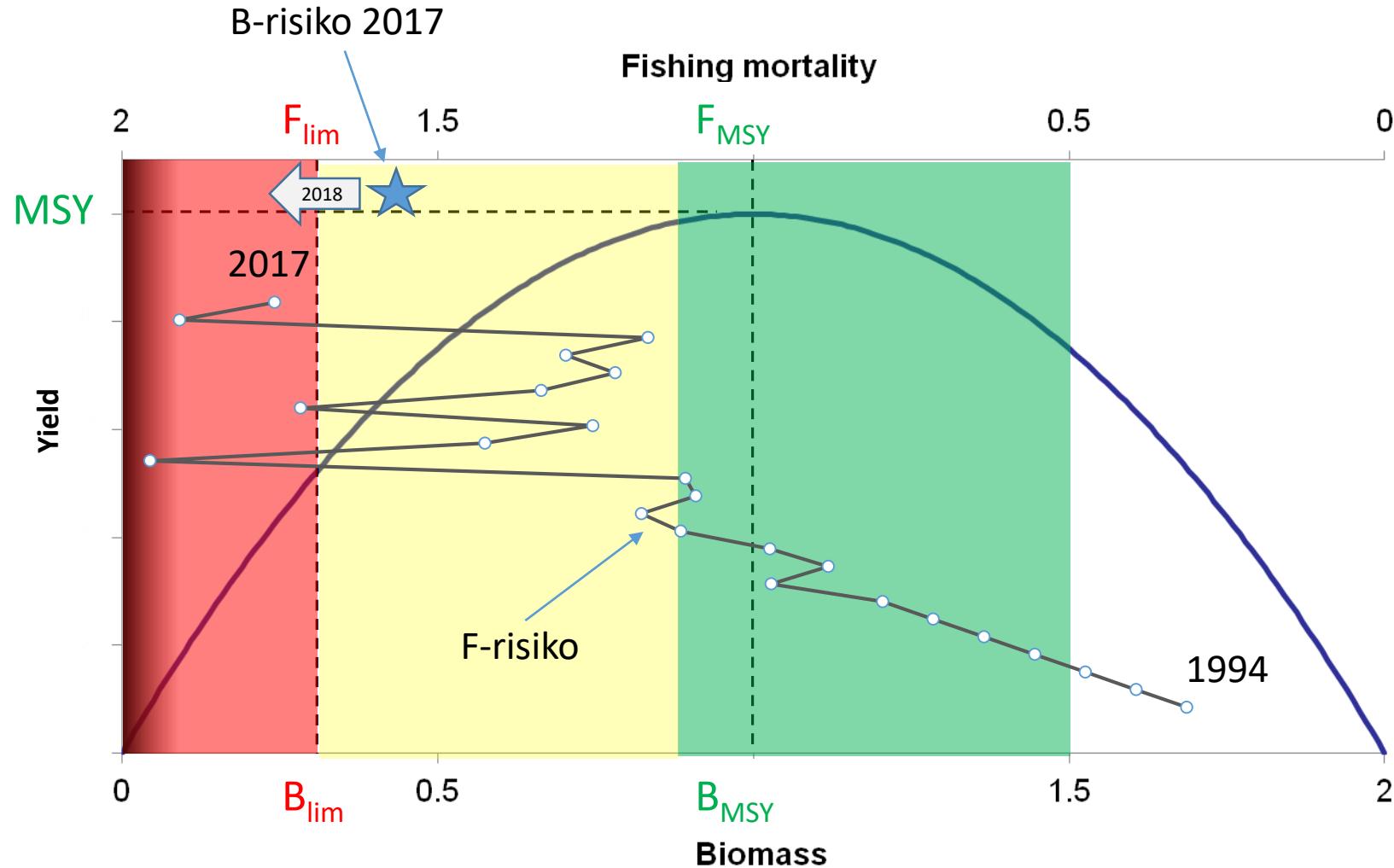
HI's translation:

- To ensure the lowest possible spread, the stock should be taxed relatively hard....
- In order to simultaneously protect the resource's ability to support long-term fishing, taxation should have a low probability (maximum approx. 35%) of exceeding Flim and a low risk (maximum 5-10%) that the stock falls below Blim.
... But not too hard

King crab landings

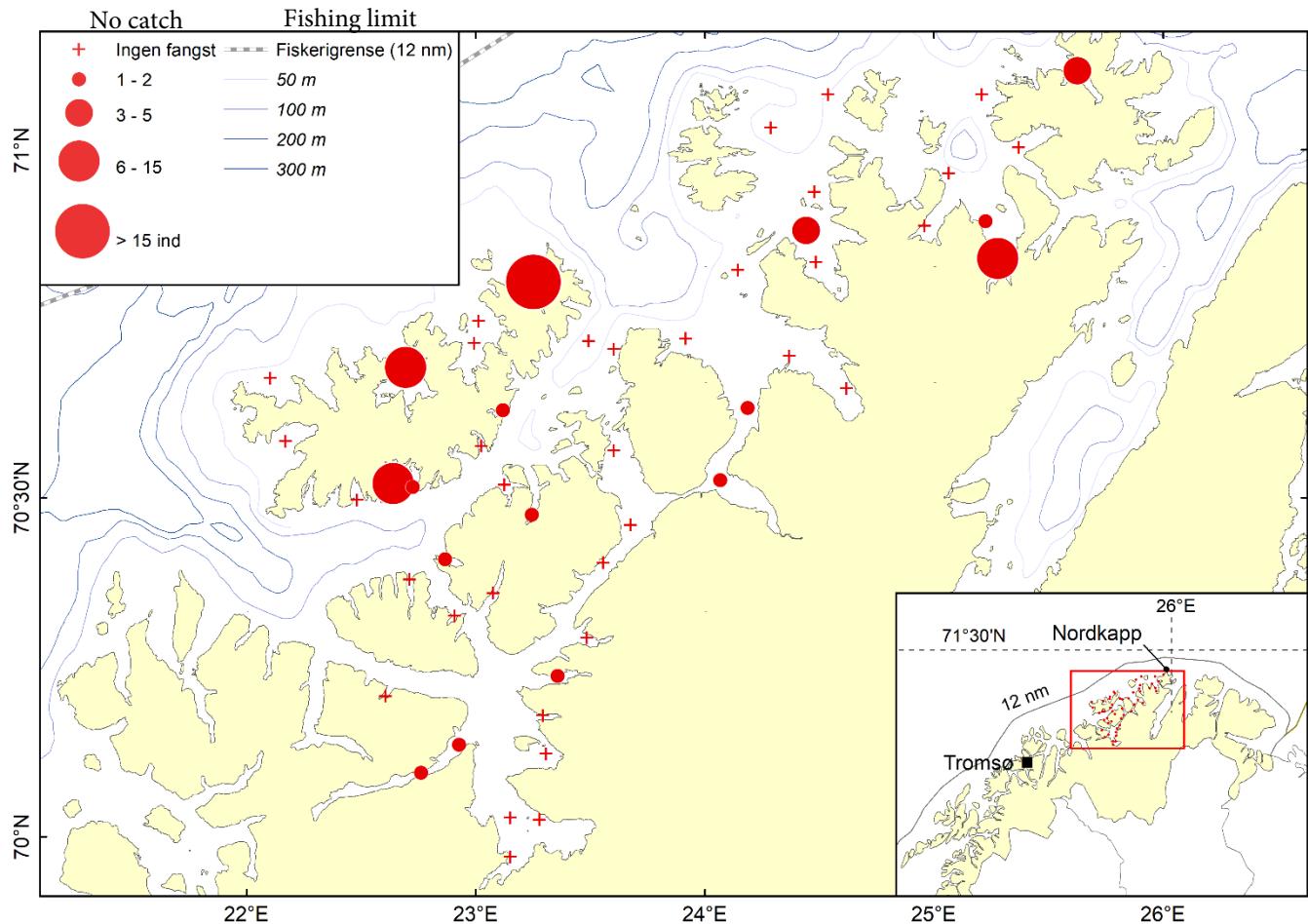


King crab - development and status



Spread west of 26°E

- Increases the range
→ but slowly!
- ... and there are few of them
→ west f 26°E: 1-2% of density east of.



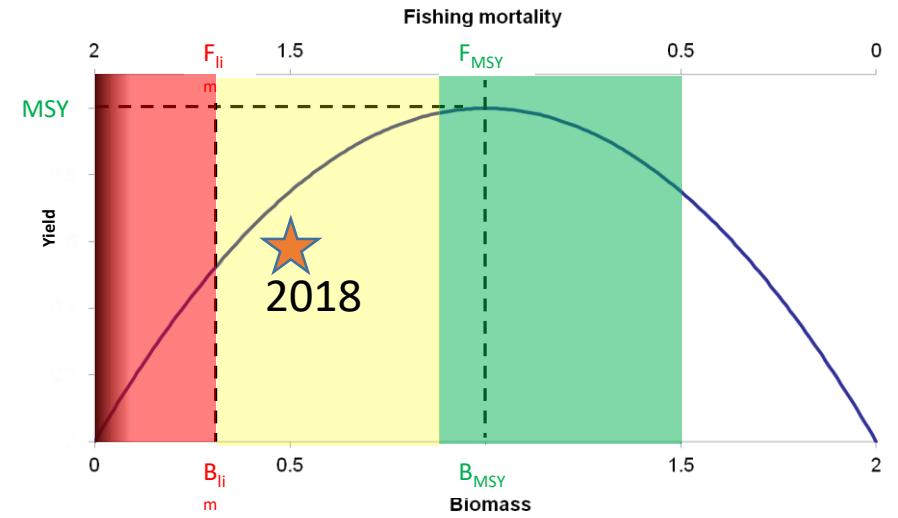
Status, goal achievement

- Objective 1 (prevent proliferation)
- Objective 2 (Ensure long-term fishing)



King crab advice

HI recommends that the total catch for 2018 does not exceed 1250 tonnes. This corresponds to a 35% risk that the fishing mortality exceeds Flim and ensures a low risk that the stock falls under Blim by the end of 2018



In the longer term, it is likely that catches will have to be significantly reduced from the current level.

Snow crab



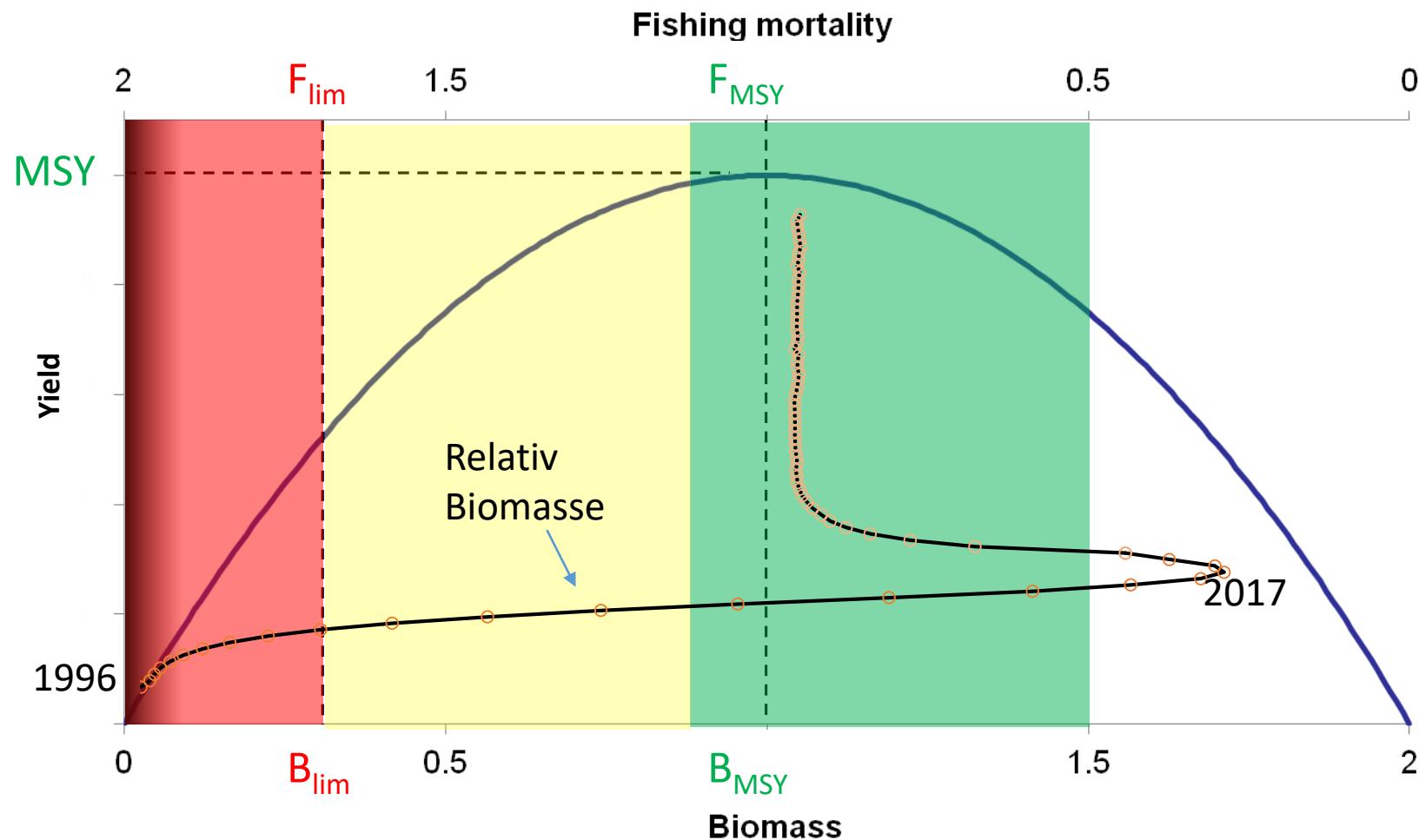
Snow crab targets

NFD: "The snow crab shall be managed with the goal of sustainable harvesting that provides a basis for value creation for society, and based on the knowledge base on how the species affect each other in the ecosystem."

HI's translation:

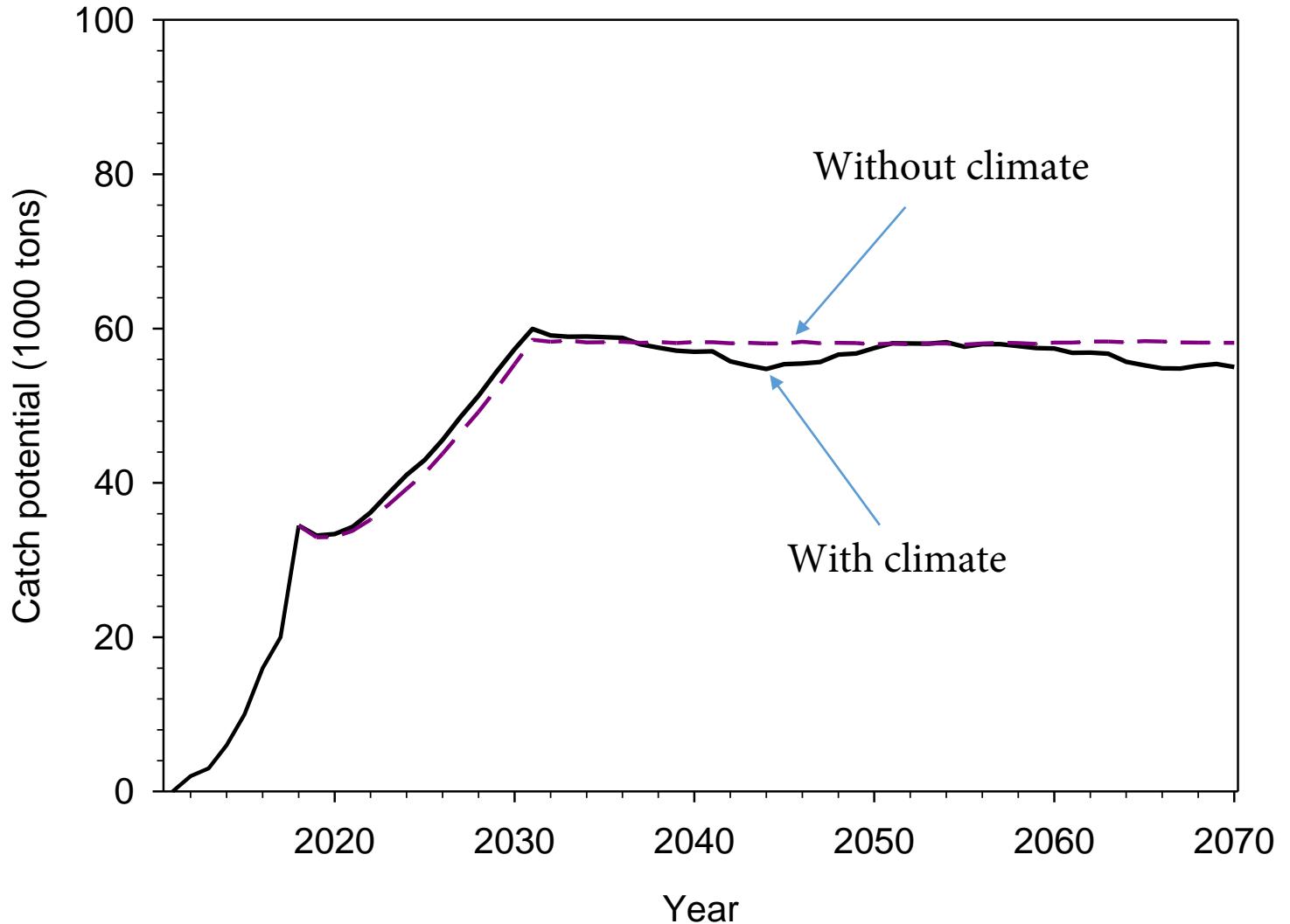
1. Maximizing long-term catch yields
2. Minimize the risk of unwanted ecosystem effects

Snow crab - development and status (the entire Barents Sea)



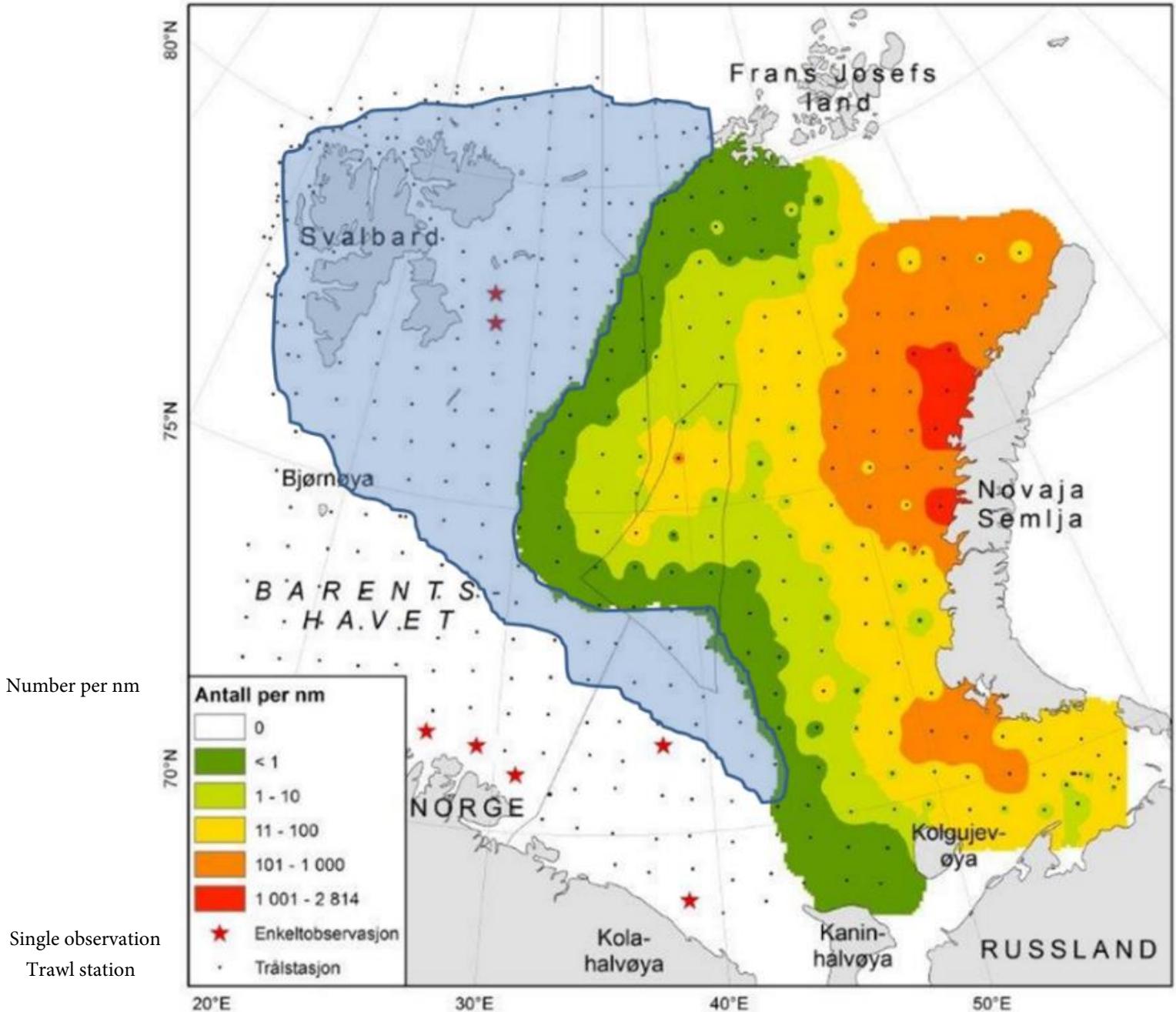
Catch (Barents Sea)

- Catch t.o.m. 2017 and simulated catch potential when fishing near Fmsy
 - great potential (but also ‘great uncertainty in calculations)
 - low climate effect until 2070



Spread

- Increases the range
→ found in all suitable habitats in <10 years
- ... completed ~ 2030



Status, goal achievement

- Objective 1 (Maximizing long-term catch yields)



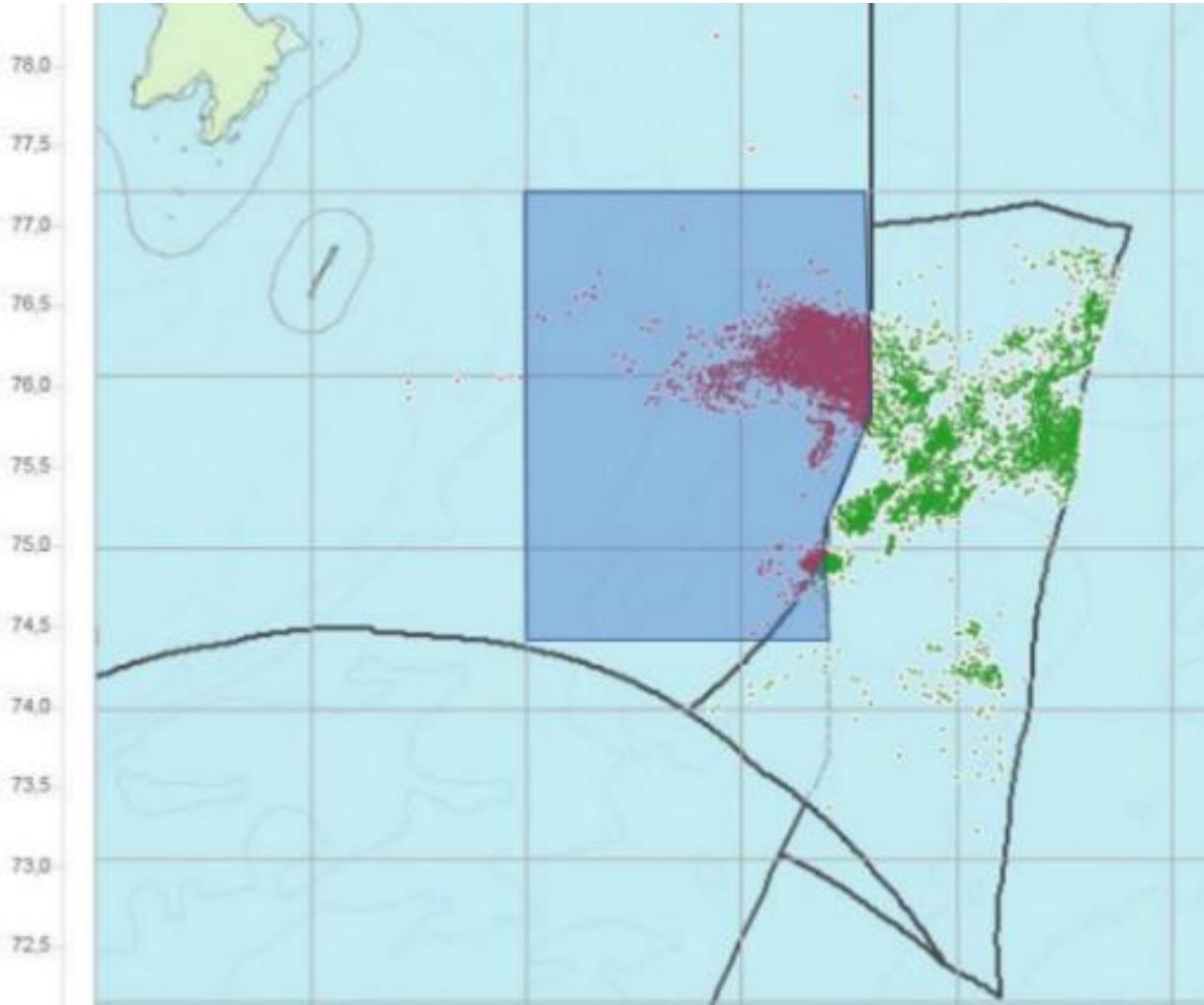
- Objective 2 (Minimize the risk of unwanted ecosystem effects)



Snow crab advice

Only for "the blue field":

- HI recommends the catch for 2018 in the range 4000-5500 tonnes.
- Minimum size 100 mm shield width
- Closing from June to the end of August

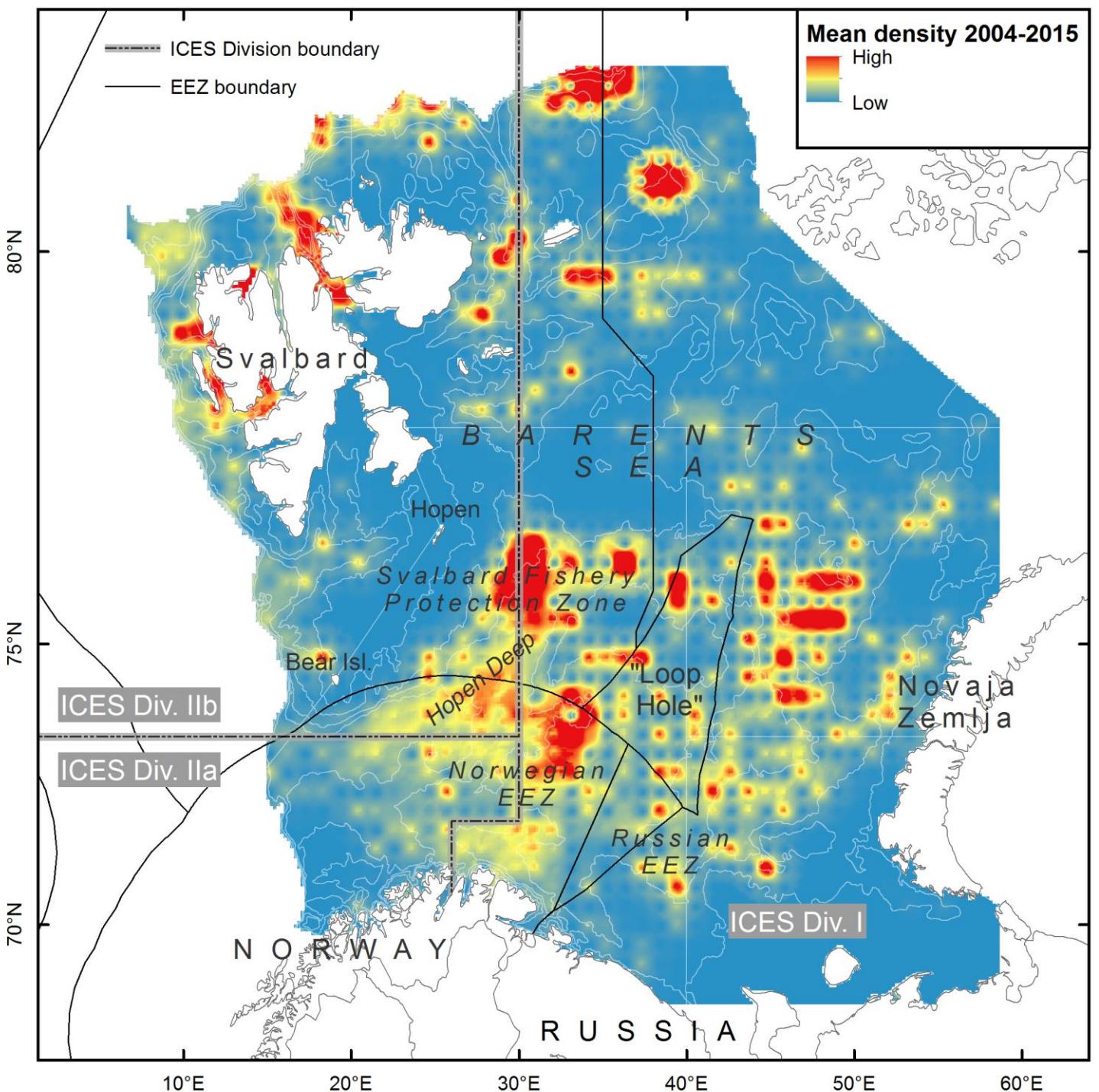


Shrimp, Barents Sea



Here they are, the prawns!

- Tendency to more eastern distribution in recent years



Shrimp targets

NFD: «... highly stable long-term dividend».

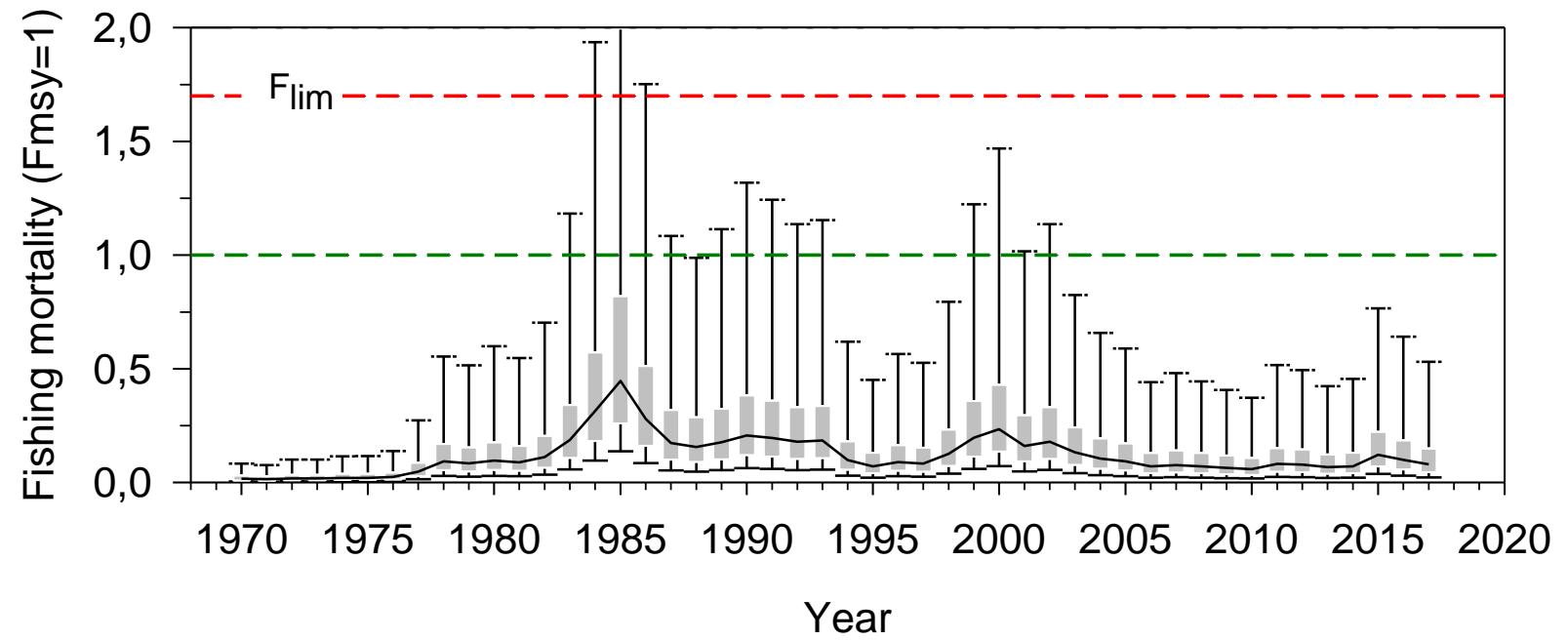
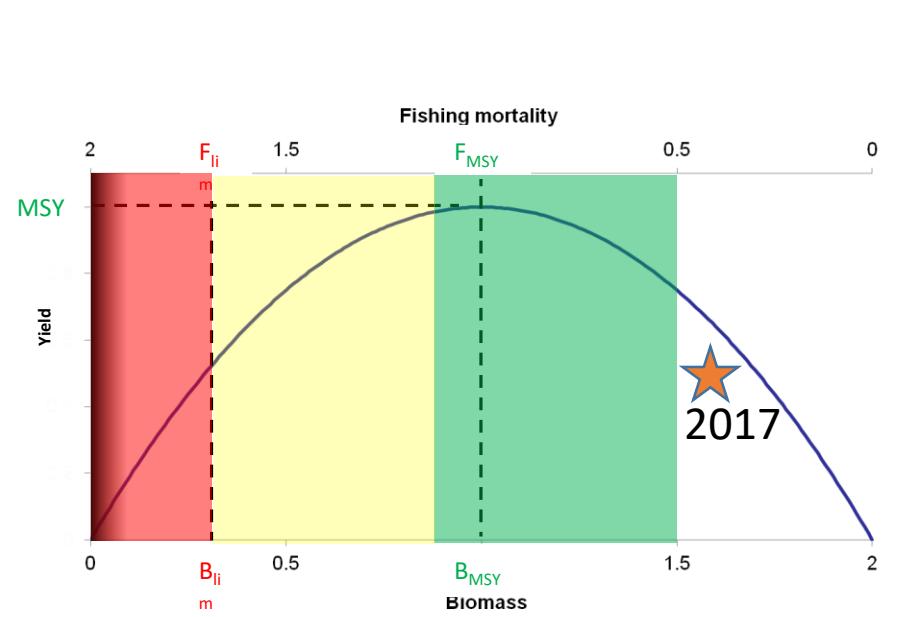
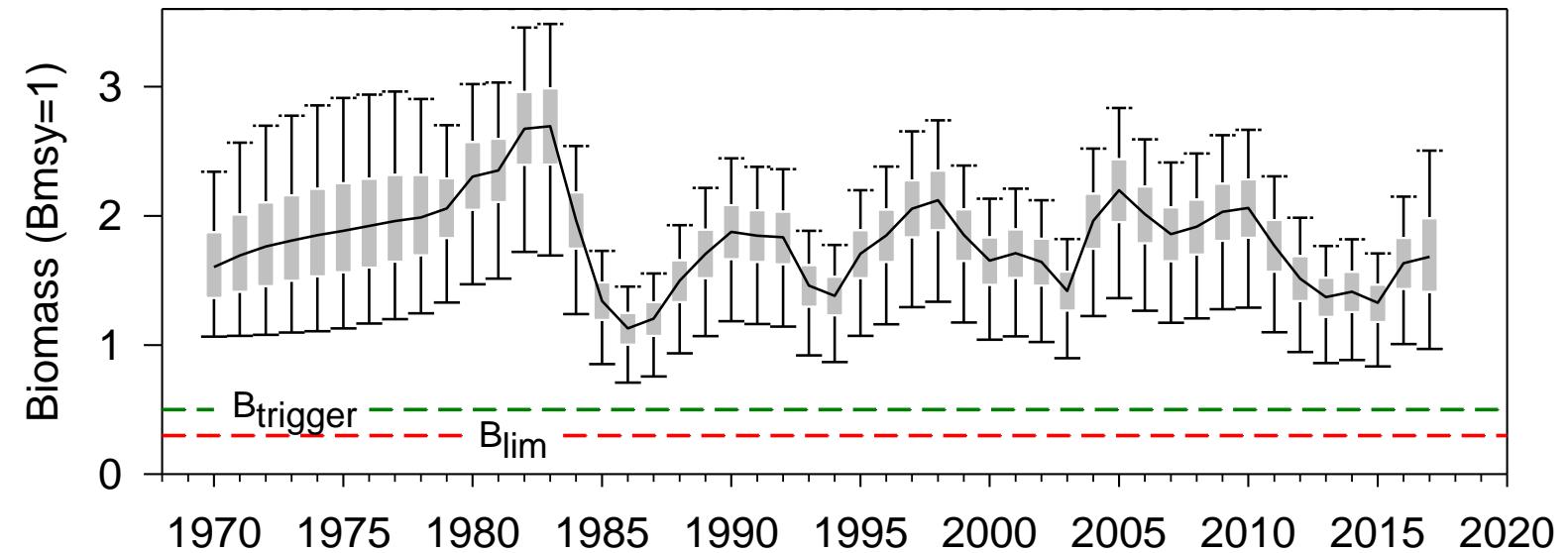
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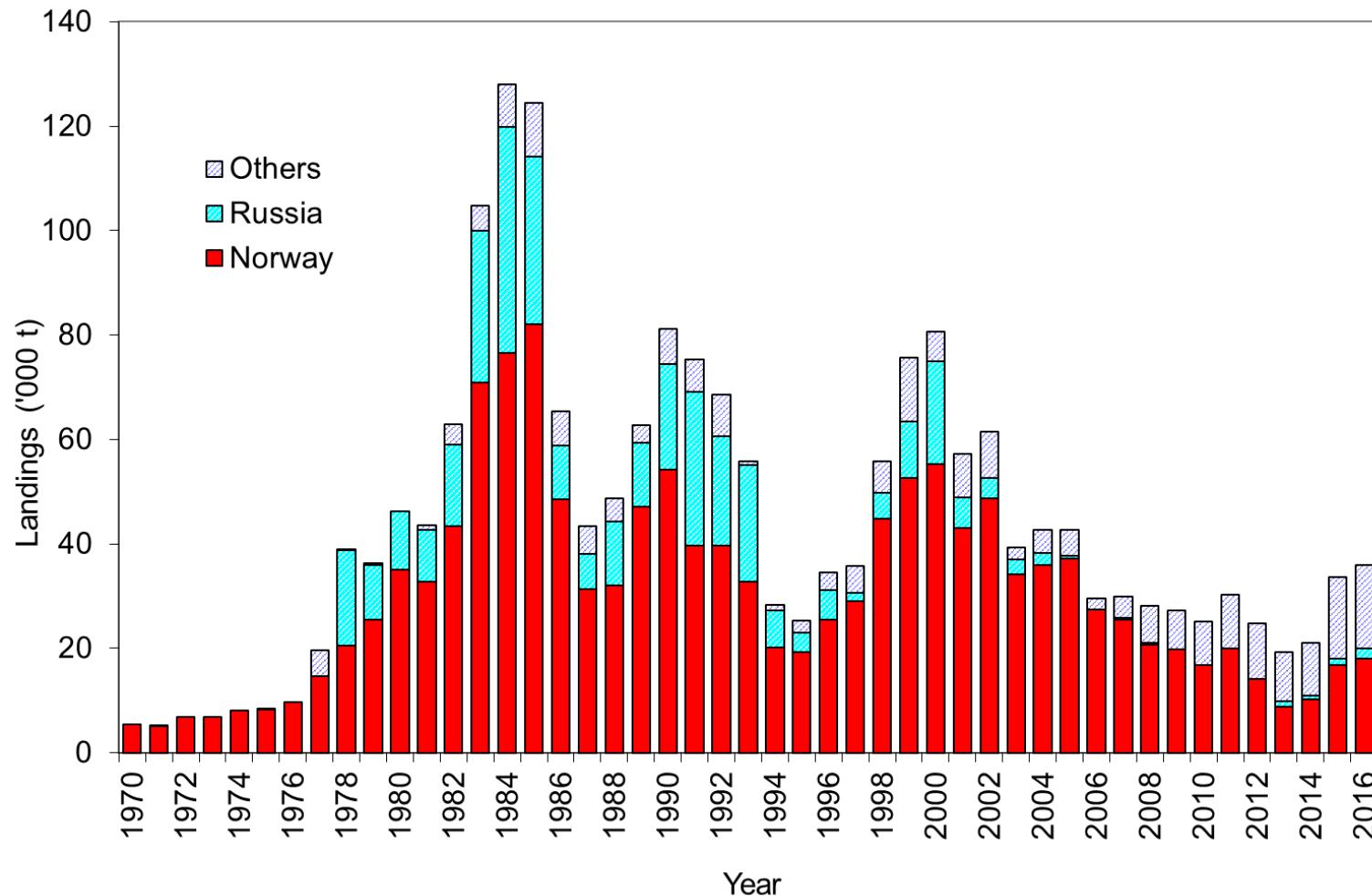
Management practice:

- Licenses, by-catch rules (closures), gear restrictions,..., but not quotas!

Biomass and Fishing mortality



Catch



Status, goal achievement

- Objective 1 (Maximizing long-term catch yields)
-
- Objective 2 (Minimize the risk of unwanted ecosystem effects)



Table 1

Northern shrimp in subareas 1 and 2. State of the stock and fishery relative to reference points.

	Fishing pressure			Stock size		
	2014	2015	2016	2015	2016	2017
Maximum Sustainable Yield	F_{MSY}	✓	✓	✓	Below	✓
Precautionary Approach	$F_{pa'}$ F_{lim}	✓	✓	✓	Harvested sustainably	✓
Management plan	F_{MGT}	—	—	—	Not applicable	—
				B_{MSY} $B_{Trigger}$	✓	✓
				$B_{pa'} B_{lim}$	✓	✓
				B_{MGT}	—	—

Shrimp advice

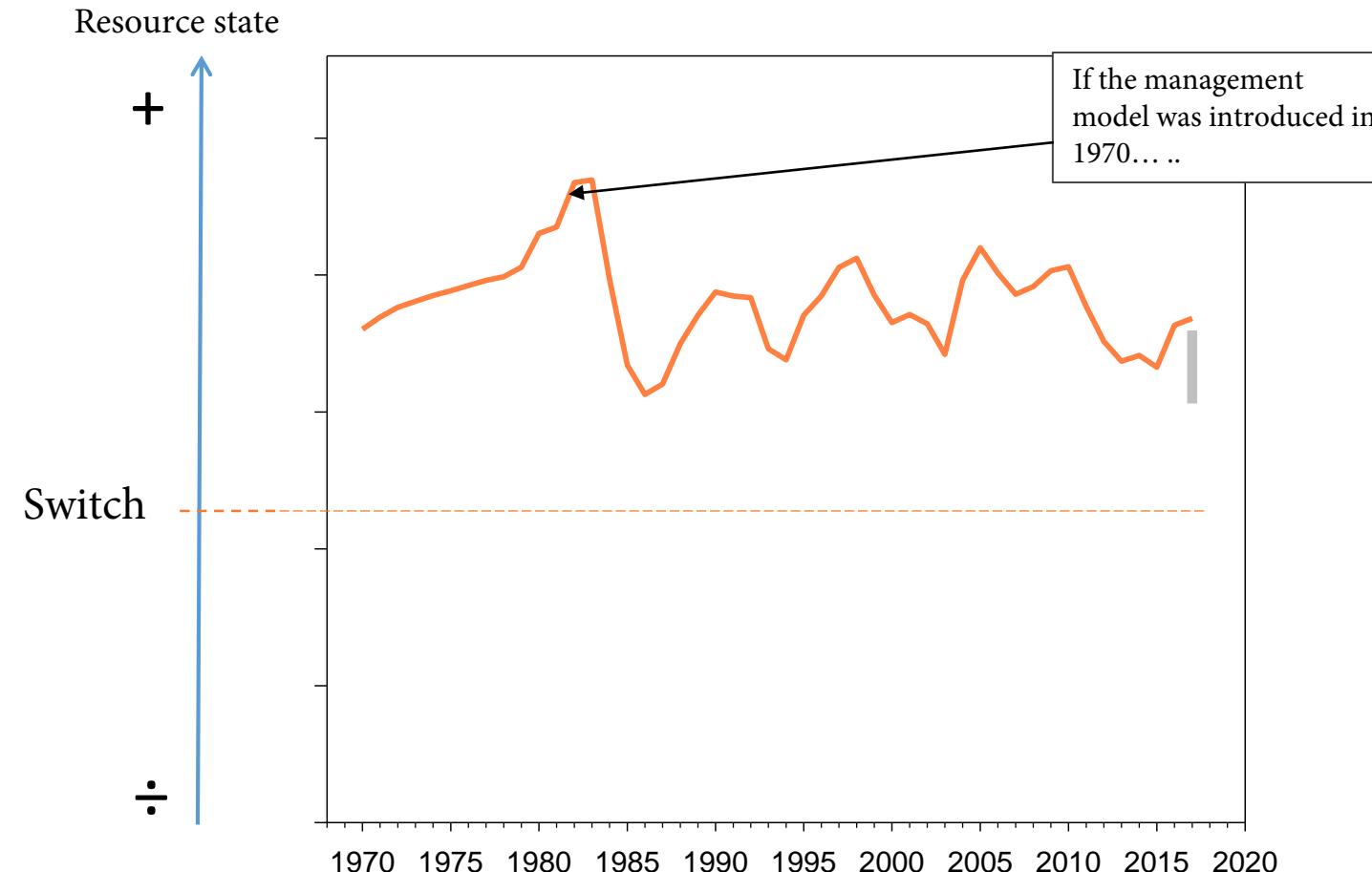
"ICES advises that when the MSY approach is applied, with additional precautionary considerations, catches in 2018 should be no more than 70 000 tonnes".

But do we have to have a harvesting rule?

- Yes - if the fishing is to be MSC certified

Requirements: rule in the management plan that implements the limitation of catches when the stock is poor.

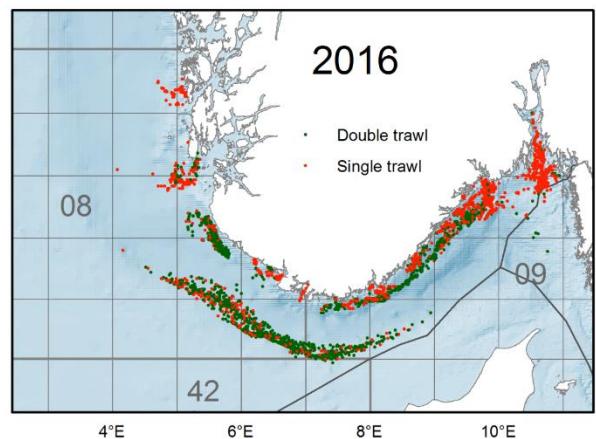
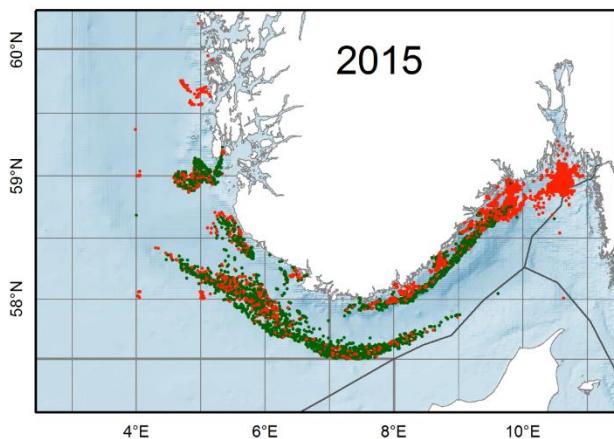
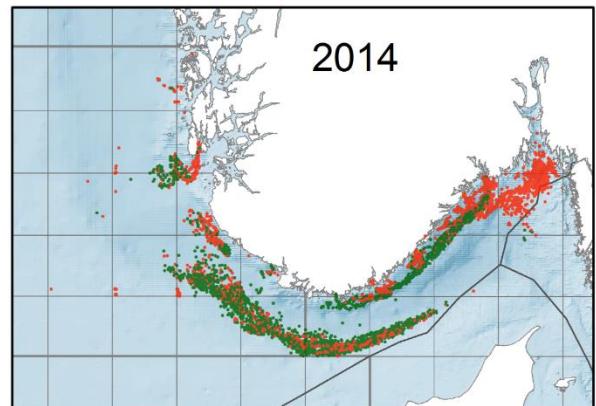
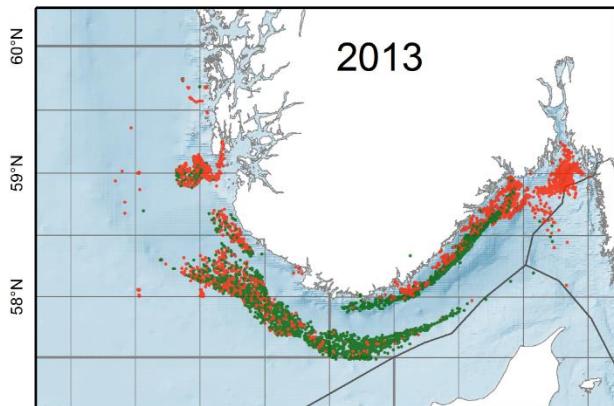
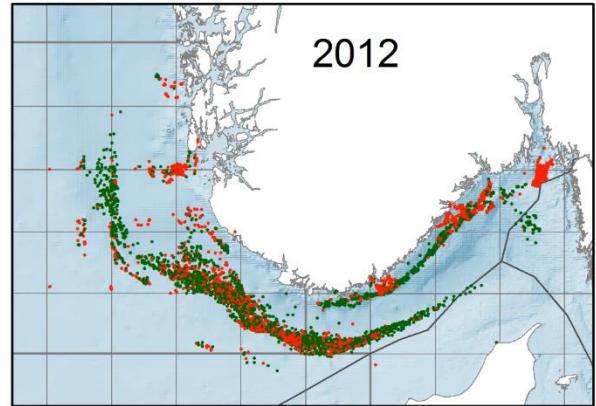
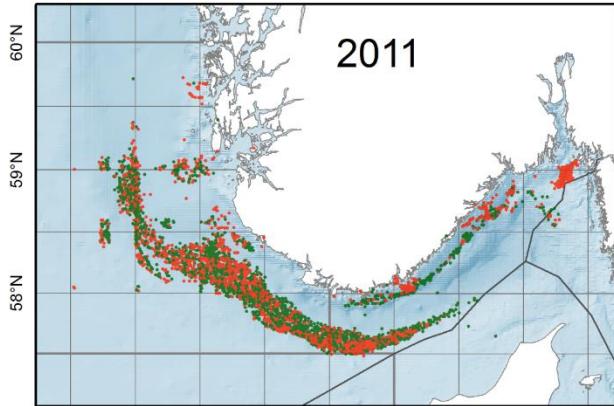
A management model with a harvesting rule



Shrimp, North Sea-Skagerak



Here are the shrimp
in the south!



Shrimp targets

NFD: «... highly stable long-term dividend».

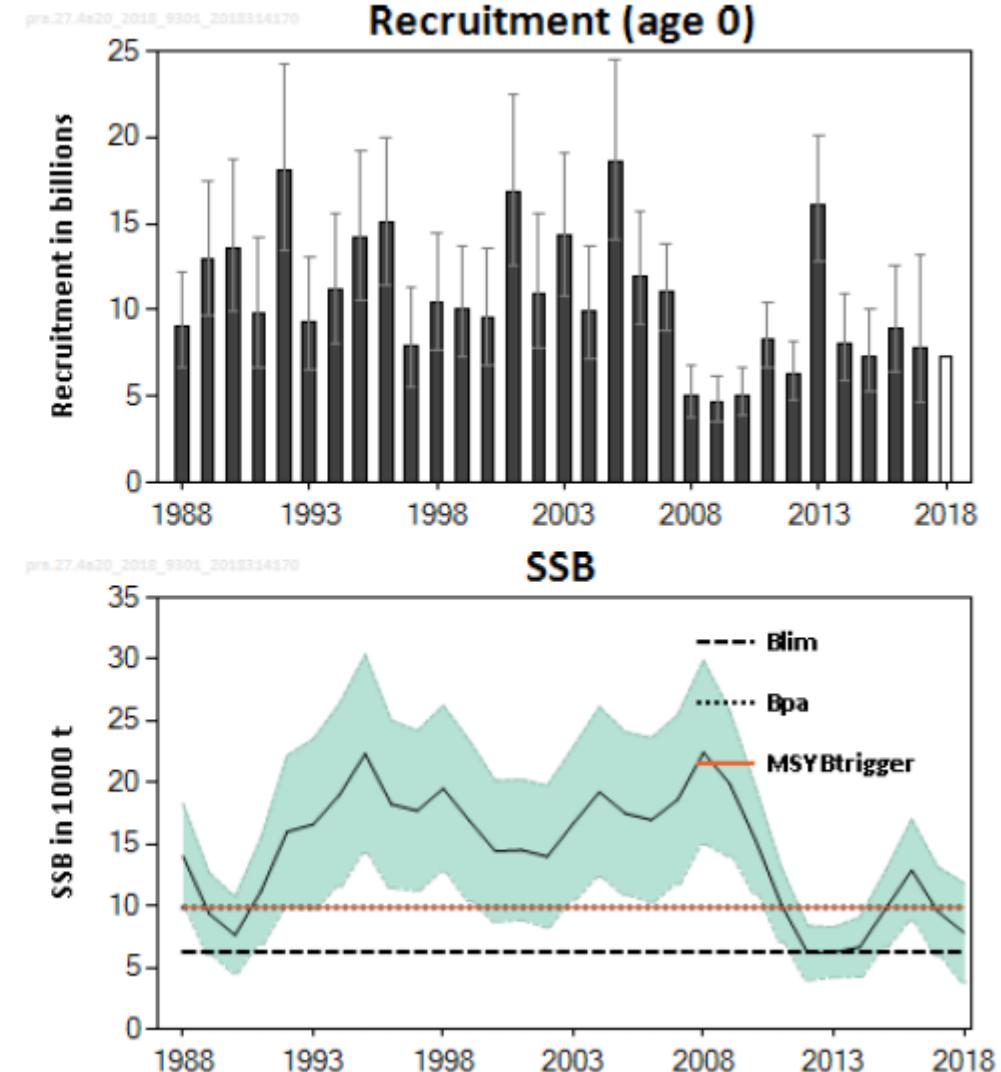
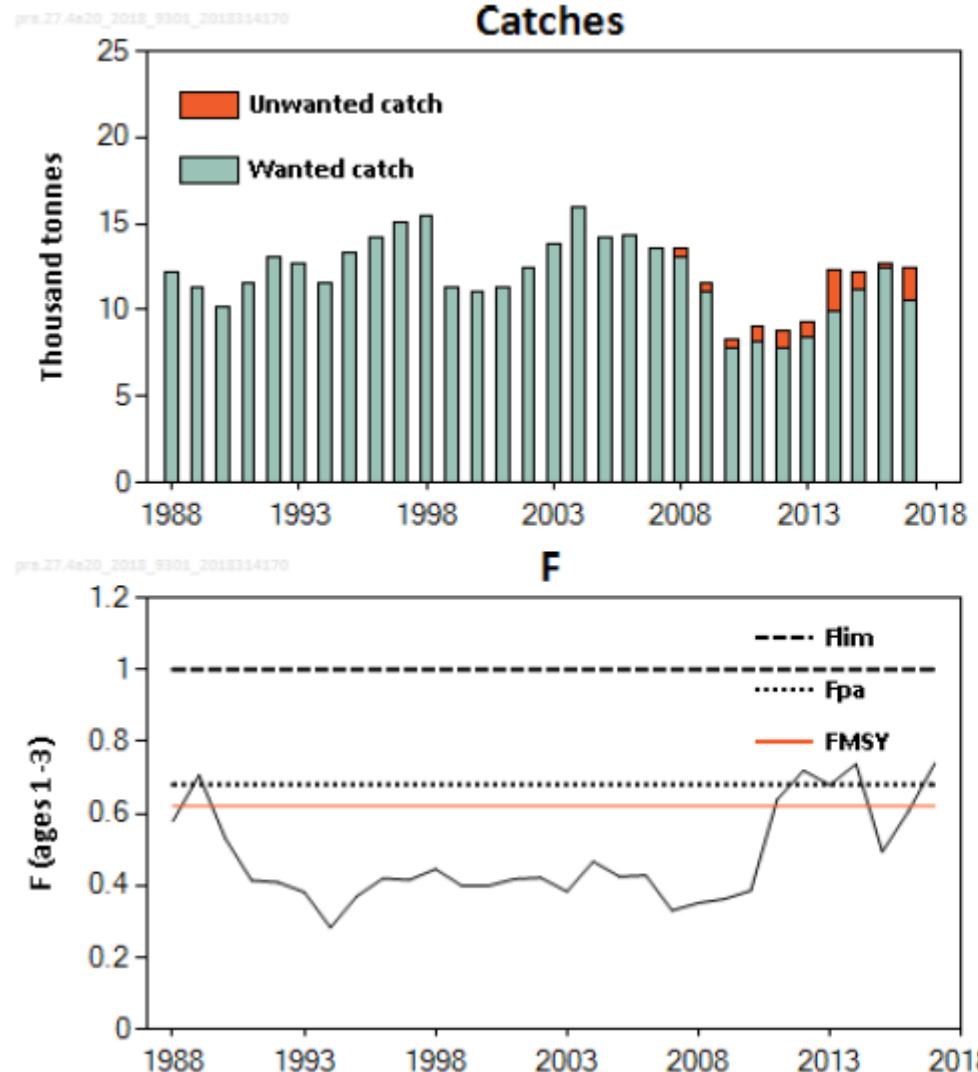
HI's translation:

1. Maximizing long-term catch yields
2. Minimize the risk of unwanted ecosystem effects

Management practice:

- Quotas, by-catch rules, gear restrictions,...., ..,
- The quota is divided between DK, S and Nor in negotiations with the EU

Status



Status, goal achievement

- Objective 1 (Maximizing long-term catch yields)



- Objective 2 (Minimize the risk of unwanted ecosystem effects)



Table 1

Northern shrimp (*Pandalus borealis*) in divisions 3.a and 4.a East. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size		
		2015	2016	2017	2016	2017	2018
Maximum sustainable yield	F_{MSY}	✓	✓	✗ Above	✓	✗	✗ Below trigger
Precautionary approach	F_{pa}, F_{lim}	✓	✓	○ Increased risk	✓	○ Increased risk	— Not applicable
Management plan	F_{MGT}	—	—	— Not applicable	—	—	— Not applicable

Shrimp advice

- "ICES advises that when the MSY approach is applied, catches in 2018 should be no more than 8571 tonnes."

..and then there was the draft

?



HAVFORSKNINGSINSTITUTTET
INSTITUTE OF MARINE RESEARCH

First announcement:

Shellfish - Resources and Invaders of the North

ICES/PICES/NAFO Symposium, 5 to 7th November 2019,
hosted by the Institute of Marine Research, Norway



When: 5-7th November 2019

Where: Tromsø, Norway

Who: Scientists, managers, industry

What: Research into, and management
and exploitation of, cold-water shellfish
resources

Scope: *Shellfish are the diamonds of the sea.* The mollusks and crustaceans that make up the shellfish group are a high-valued, high-quality food source and support substantial fisheries in boreal, subarctic and arctic areas. There is already a strong interest in both the North Pacific and the North Atlantic for shellfish resources, their population dynamics and their management, especially under changing environmental conditions. Global warming is now stressing indigenous cold-water species at the southern limit of their distribution range and promoting their shift northward, possibly into the high Arctic where receding ice will make exploitation of these and perhaps new species commercially feasible.

Ressurssituasjonen for reke, kongekrabbe og Snøkrabbe

Dr. Carsten Hvingel

Forskingssjef,

Bentiske ressurser og prosesser

Havforskningsinstituttet



INSTITUTE OF MARINE RESEARCH
HAVFORSKNINGSINSTITUTTET

Kongekrabbe



Kongekrabbemål

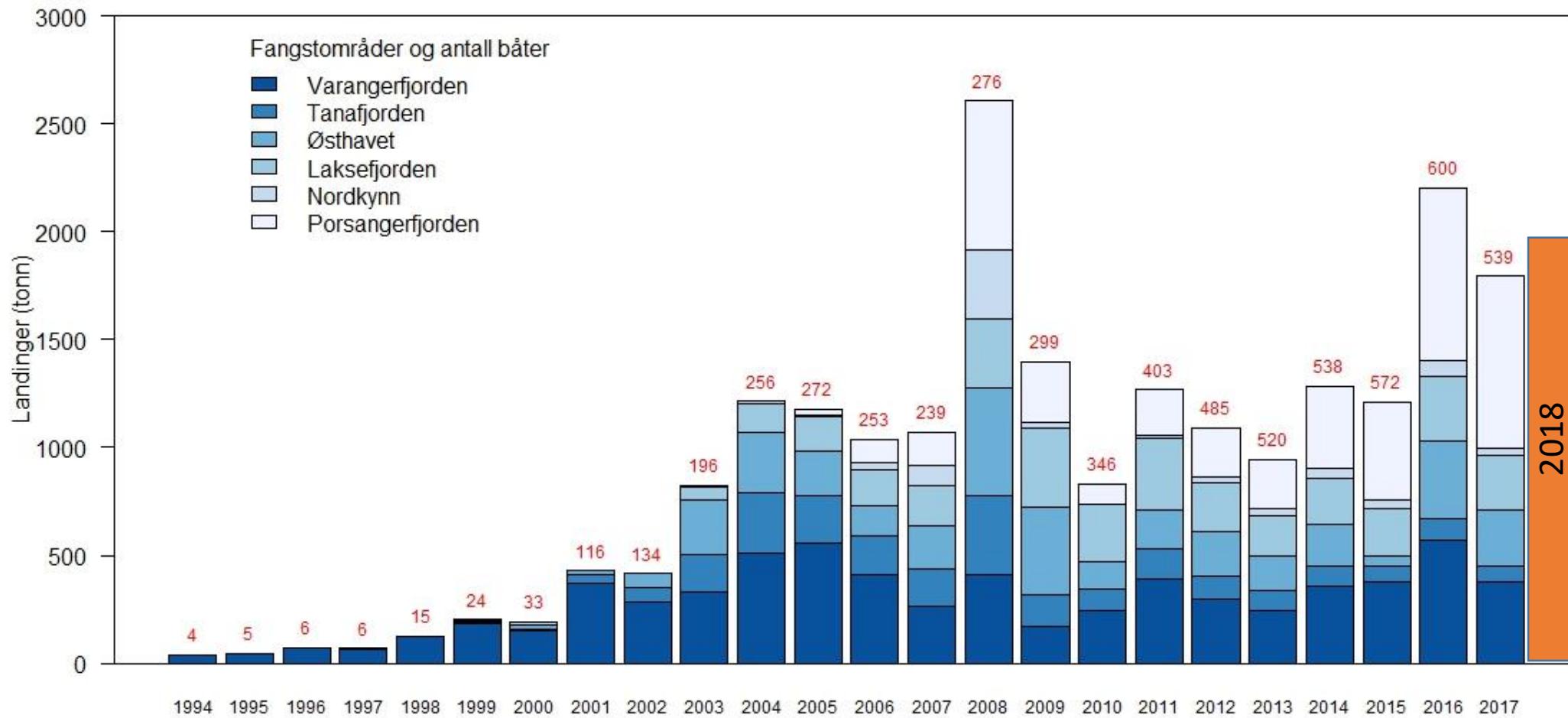
NFD:

1. Hindre spredning
2. Opprettholde et langsiktig kommersielt fiskeri

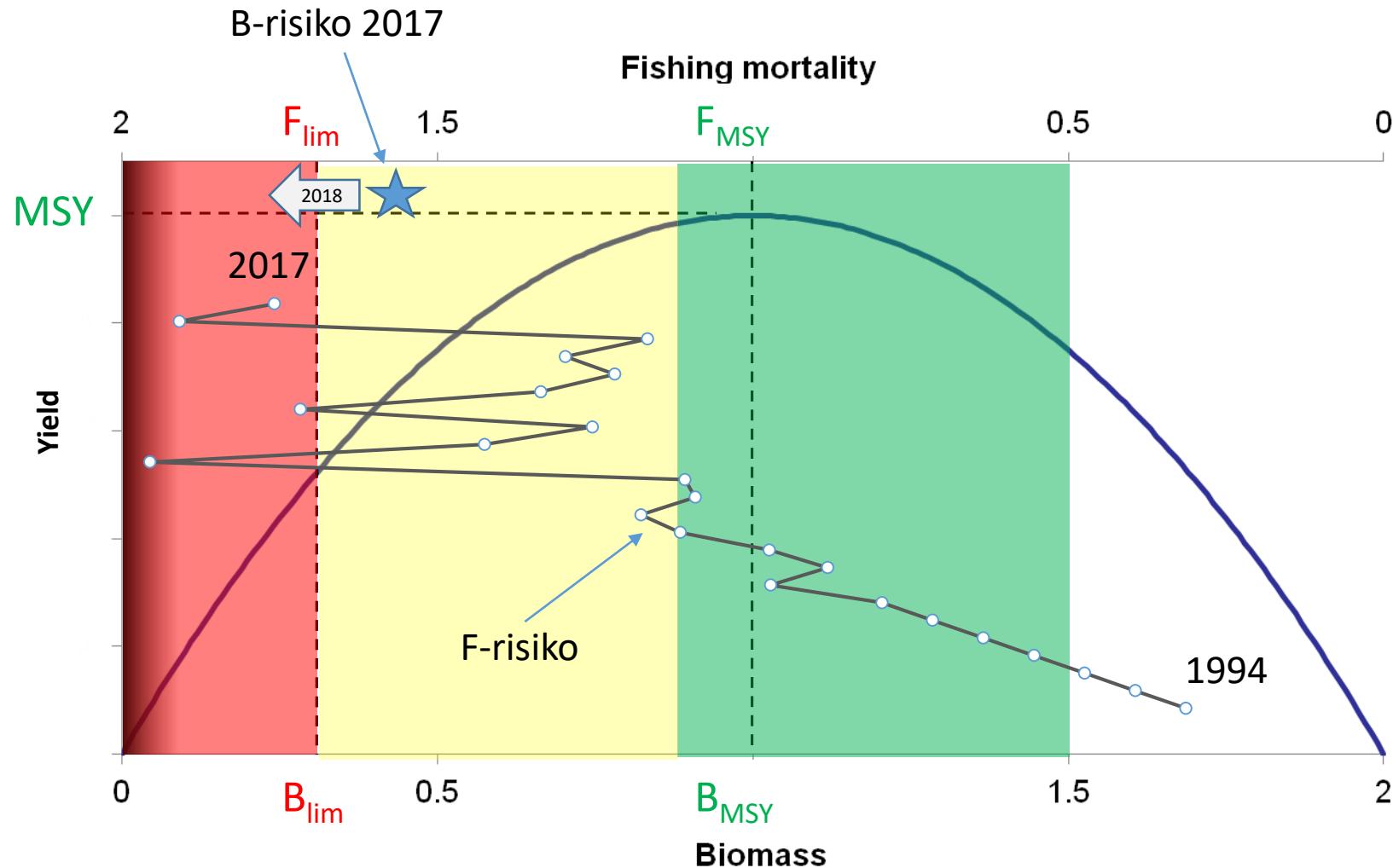
HIs oversettelse:

- For å sikre lavest mulig spredning bør bestanden **beskattes relativt hardt....**
- For samtidig å beskytte ressursens evnen til å understøtte et langsiktig fiskeri, bør beskatningen ha lille sannsynlighet (maksimalt ca. 35%) for å overskride F_{lim} og lav risiko (maksimalt 5-10%) for at bestanden kommer under B_{lim} .
...men ikke for hardt

Kongekrabbe landinger

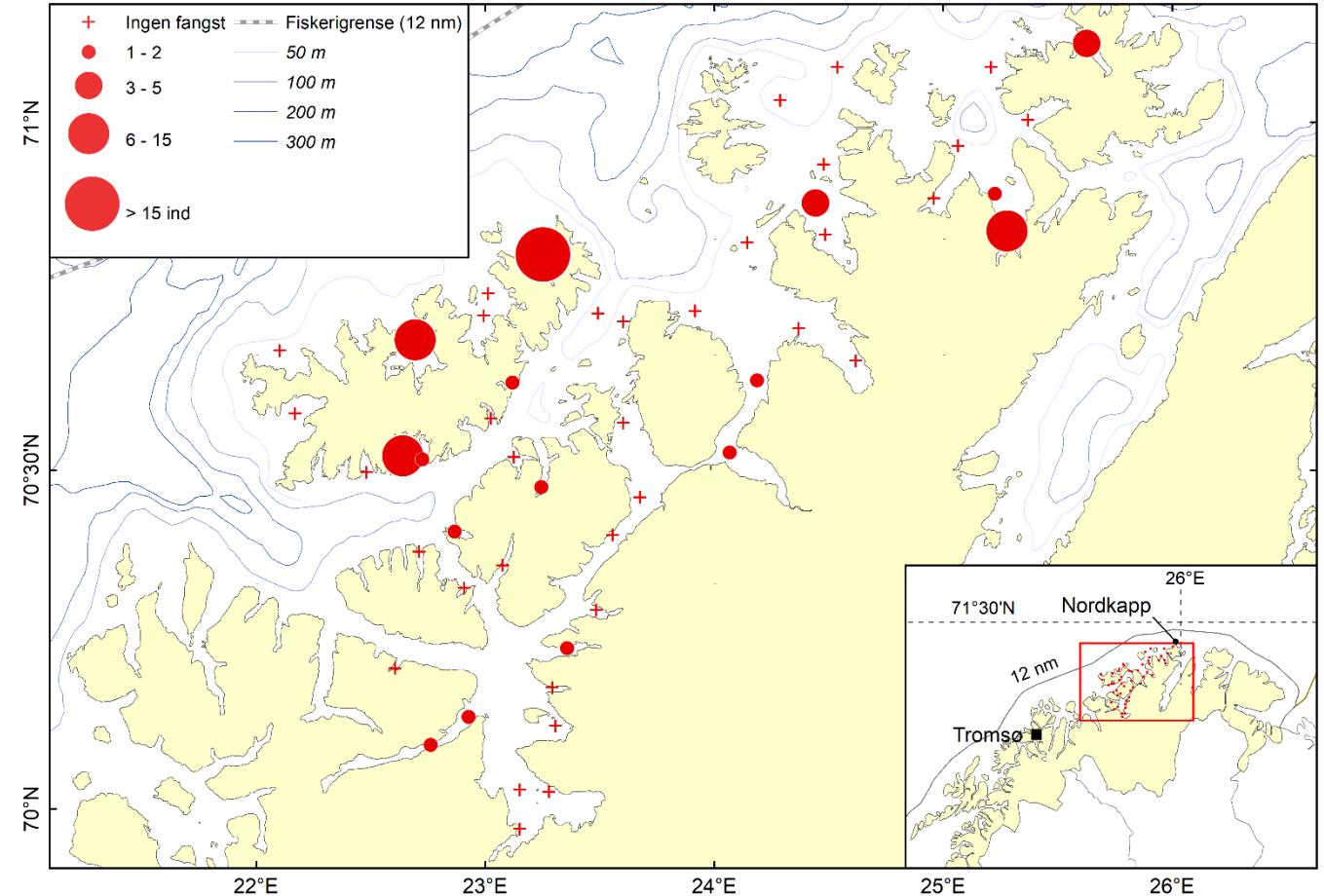


Kongekrabbe – utvikling og status



Spredning vest for 26°E

- Øker utbredelsesområdet
→ men langsomt!
- ...og der er få av dem
→ vest f 26°E: 1-2% av tetthet østen for.



Status, måloppnåelse

- Mål 1 (hindre spredning)

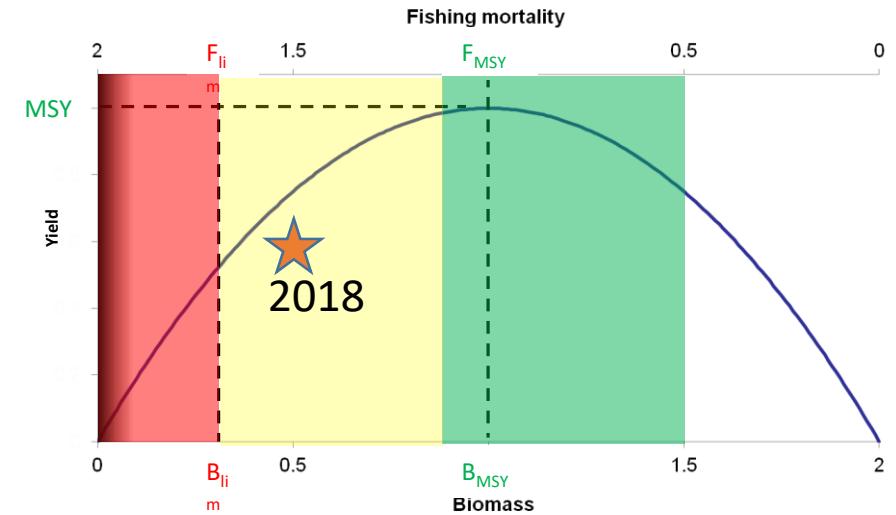


- Mål 2 (Sikre langsiktig fiske)



Kongekrabberåd

HI anbefaler at den totale *fangsten for 2018 ikke overstiger 1250 tonn*. Dette korresponderer med en 35% risiko for at fiskeridødeligheten overskridet F_{lim} og sikrer en lav risiko for at bestanden faller under B_{lim} ved utgangen av i 2018.



På lengere sikt er det sannsynlig at fangesterne må reduseres betydelig fra nåværende nivå.

Snøkrabbe



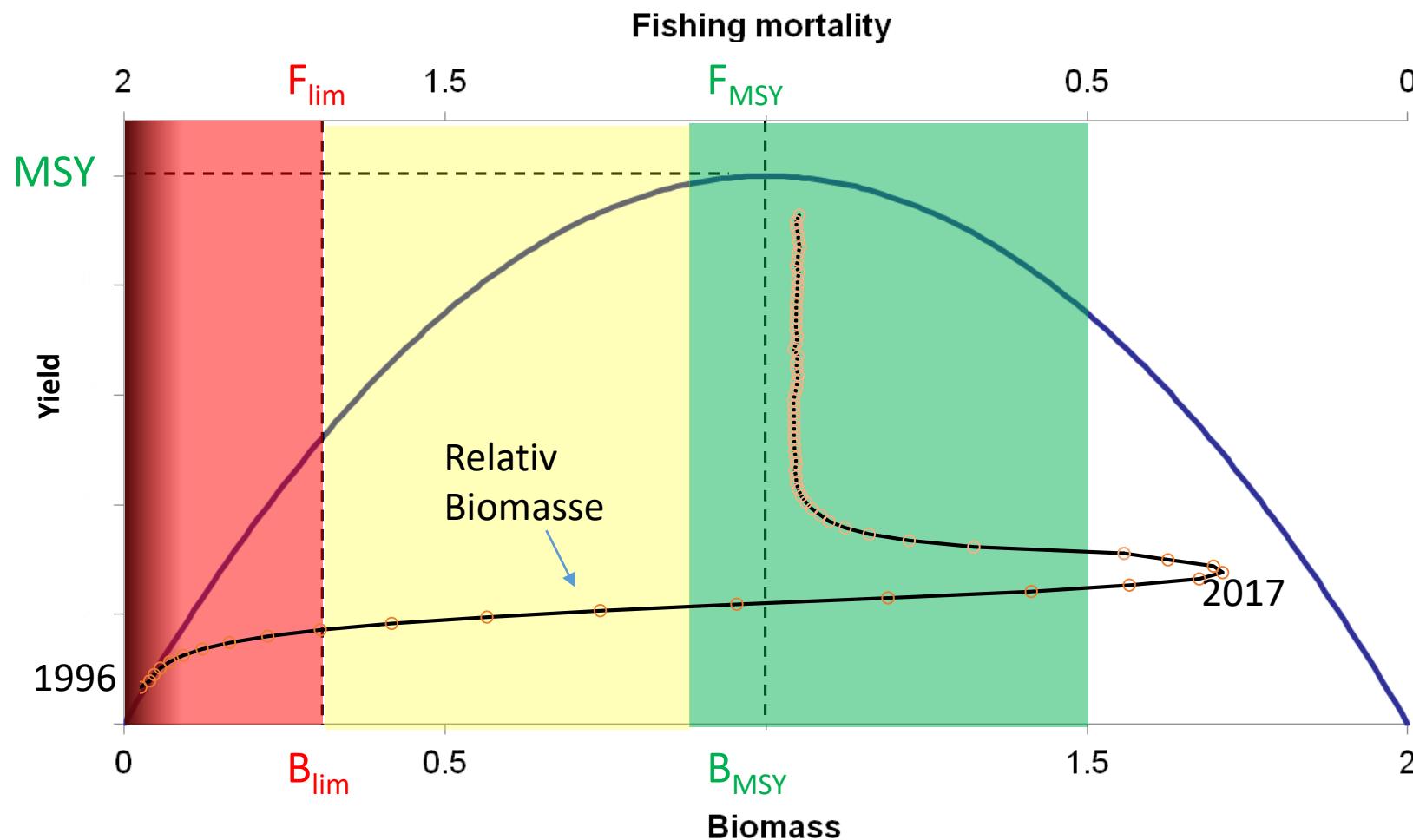
Snøkrabbemål

NFD: «Snøkrabben skal forvaltes med mål om **bærekraftig høsting** som gir grunnlag for **verdiskaping** for samfunnet, og med utgangspunkt i kunnskapsgrunnlaget om hvordan artene påvirker hverandre i økosystemet».

HIs oversettelse:

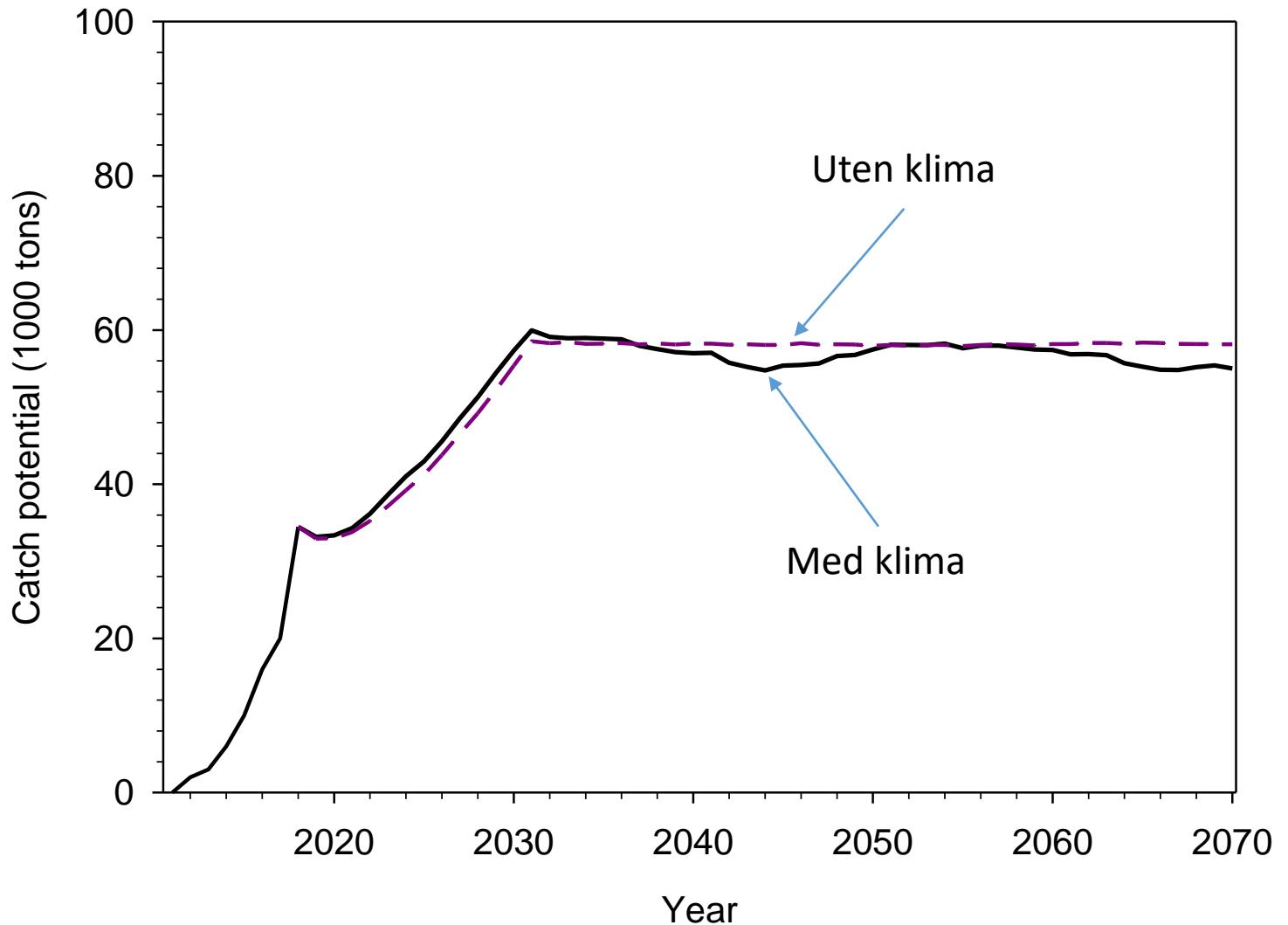
1. Maksimering av fangstutbytte på lang sikt
2. Minimere risikoen for uønskede økosystemeffekter

Snøkrabbe – utvikling og status (hele Barentshavet)



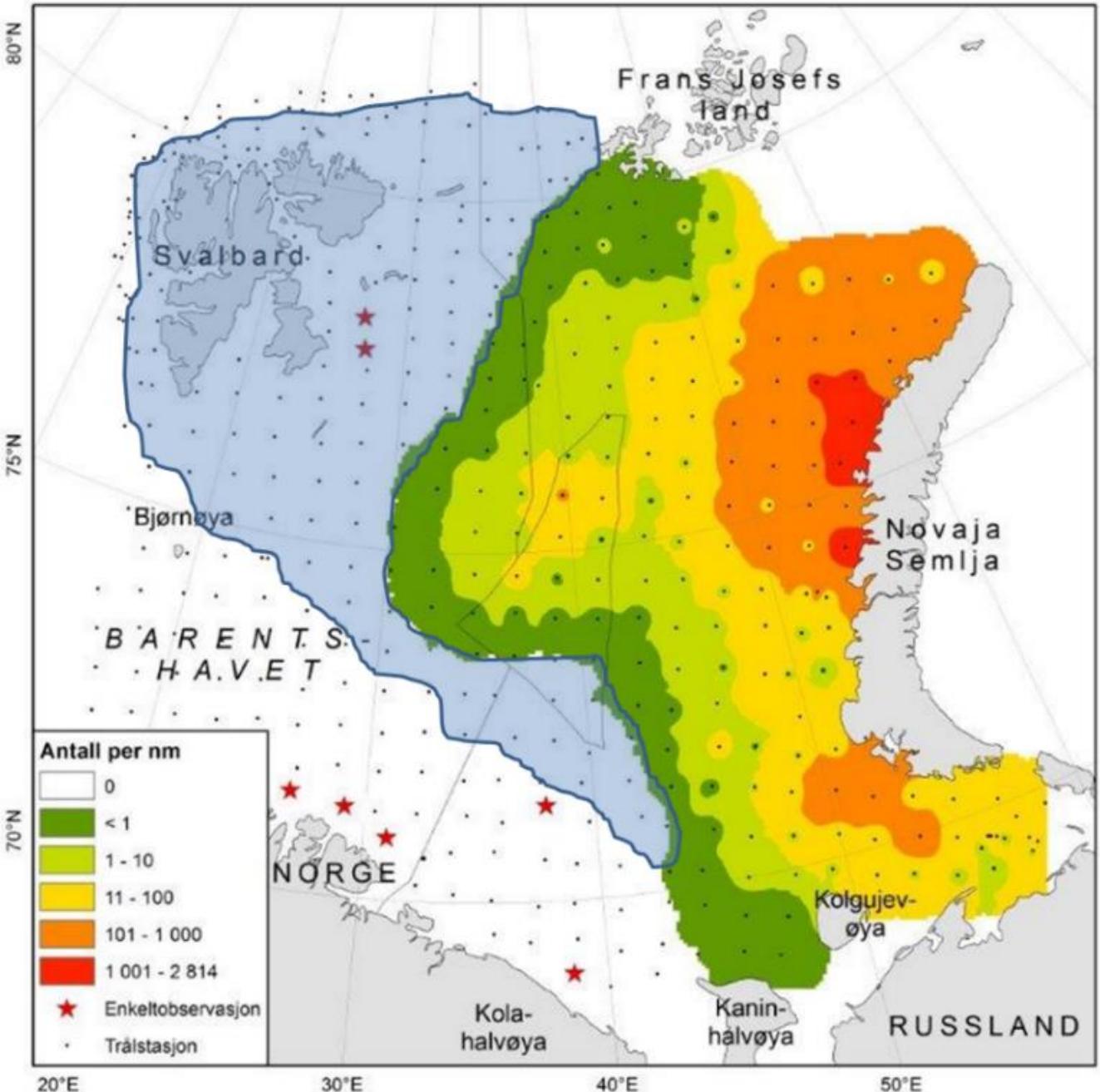
Fangst (Barentshavet)

- Fangst t.o.m. 2017 og simulert fangspotensial ved fiske nær F_{msy}
- stort potensjal (men også stor usikkerhet i beregninger)
- lite klimaeffekt til 2070



Spredning

- Øker utbredelsesområdet
→ finnes i alle egnete leveområder om <10år
- ...ferdig utviklet ~2030



Status, måloppnåelse

- Mål 1 (Maksimering av fangstutbytte på lang sikt)



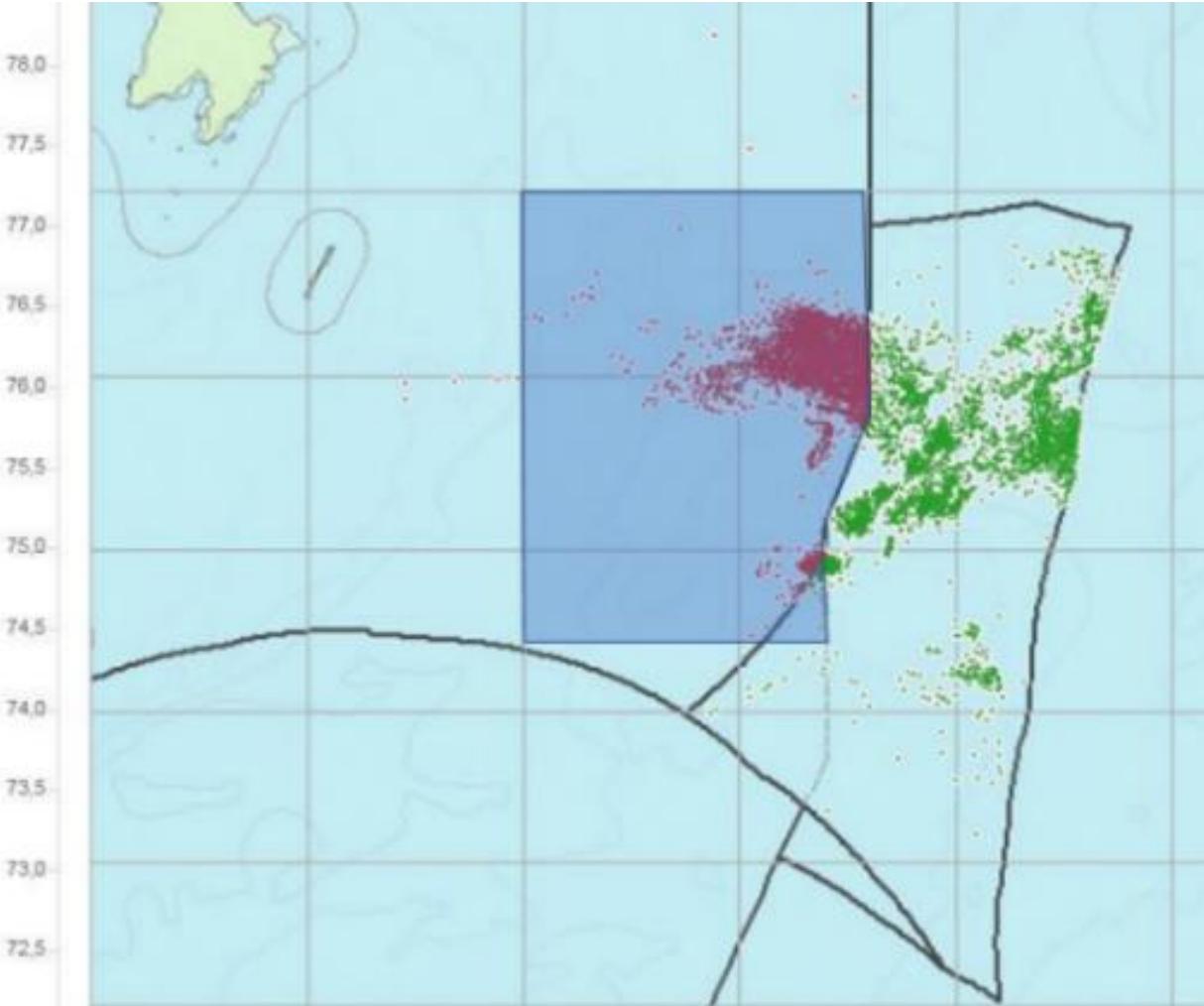
- Mål 2 (Minimere risikoen for uønskede økosystemeffekter)



Snøkrabberåd

Bare for «det blå feltet»:

- HI anbefaler *fangsten for 2018 i intervallet 4000-5500 tonn.*
- Minstemål 100 mm skjoldbredde
- Stengning fra Juni til ut August

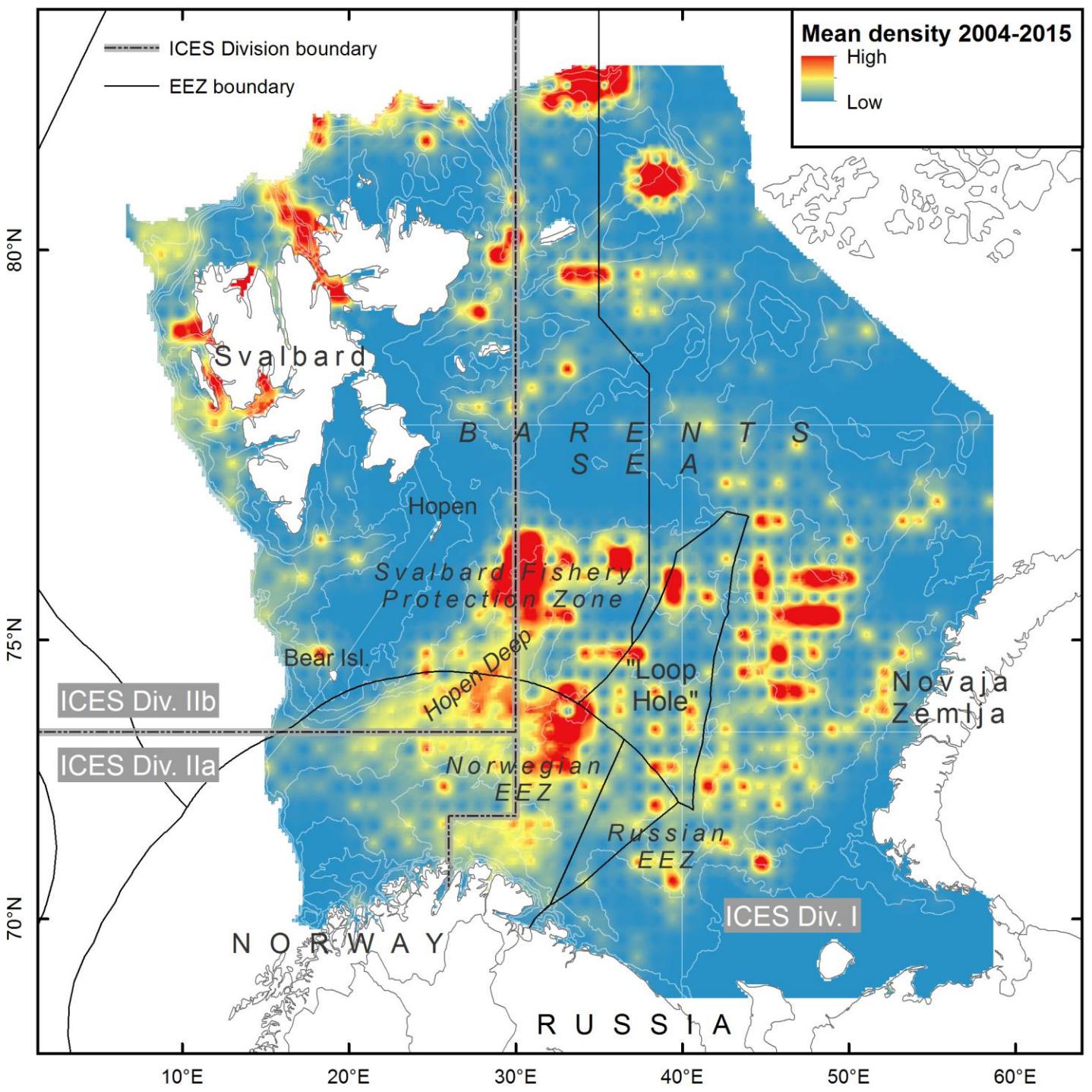


Reke, Barentshavet



Her er de, rekene!

- Tendens til mer østlig utbredelse i senere år



Rekemål

NFD: «...høyt stabilt langtidsutbytte.....».

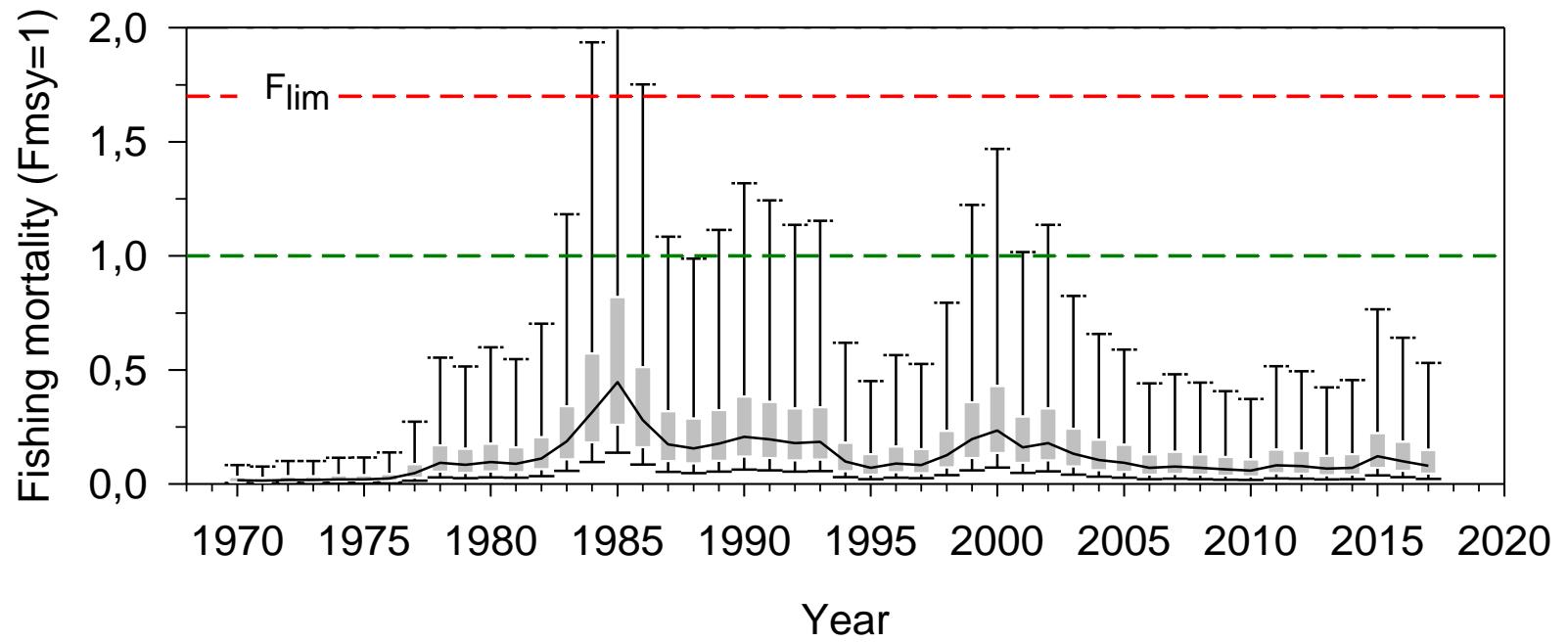
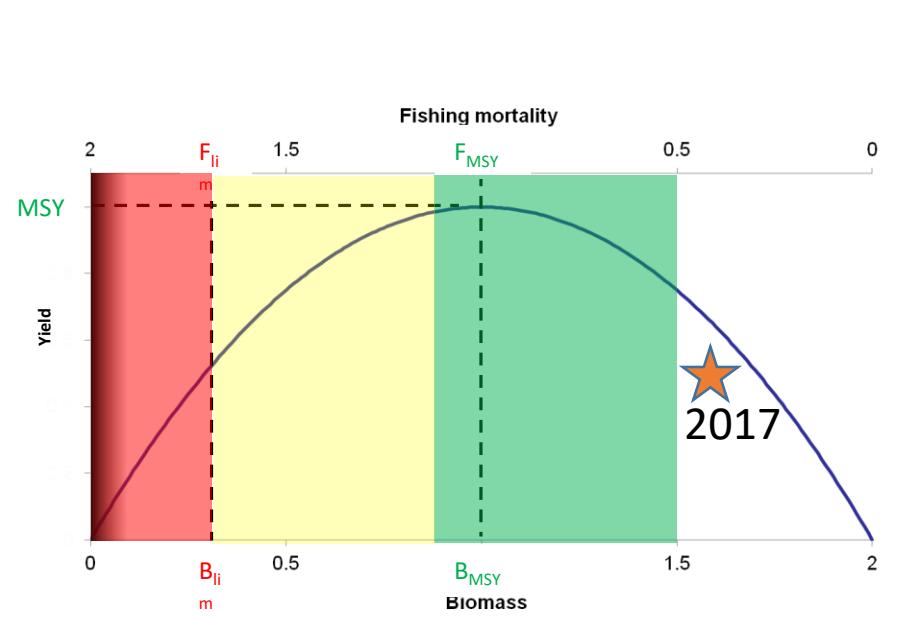
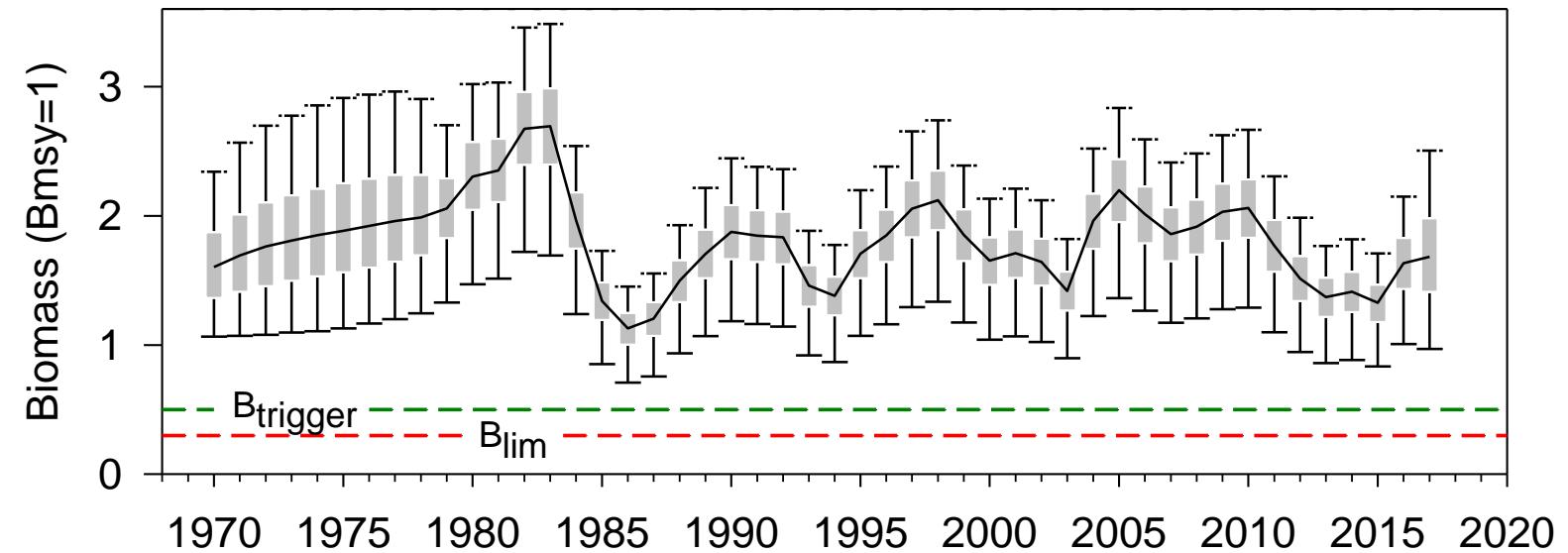
HIs oversettelse:

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2. Minimere risikoen for uønskede økosystemeffekter

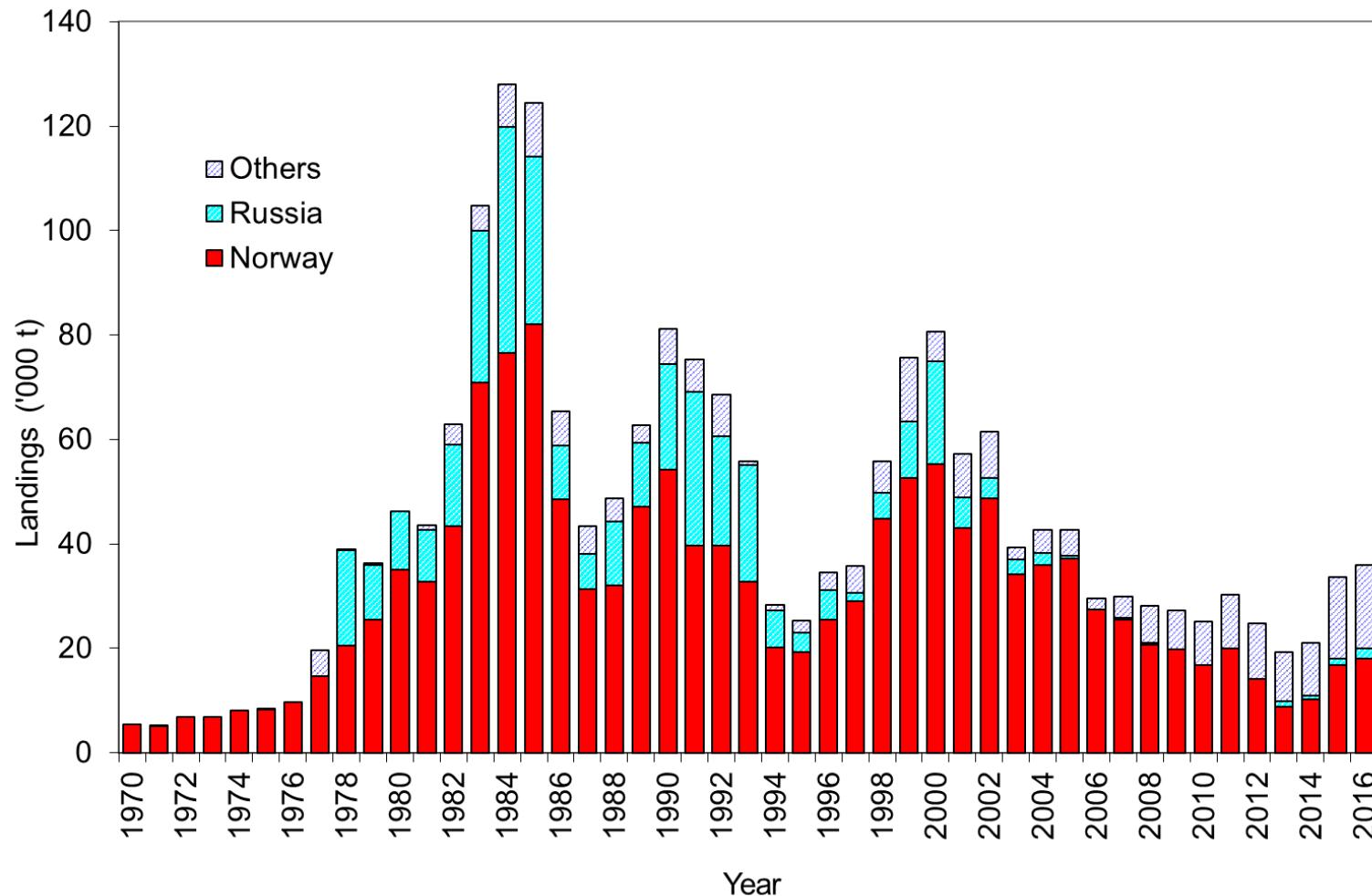
Forvaltningspraksis:

- Lisenser, bifangstregler (stengninger), redskapsrestriksjoner,..., *men ikke kvoter!*

Biomass and Fishing mortality



Catch



Status, måloppnåelse

- Mål 1 (Maksimering av fangstutbytte på lang sikt)



- Mål 2 (Minimere risikoen for uønskede økosystemeffekter)



Table 1

Northern shrimp in subareas 1 and 2. State of the stock and fishery relative to reference points.

	Fishing pressure			Stock size		
	2014	2015	2016	2015	2016	2017
Maximum Sustainable Yield	F_{MSY}	✓	✓	✓ Below	✓	✓
Precautionary Approach	$F_{pa'}$ F_{lim}	✓	✓	✓ Harvested sustainably	✓	✓
Management plan	F_{MGT}	—	—	— Not applicable	—	— Not applicable
				B_{MSY} $B_{Trigger}$	✓	✓
				$B_{pa'} B_{lim}$	✓	✓
				B_{MGT}	—	—

Rekeråd

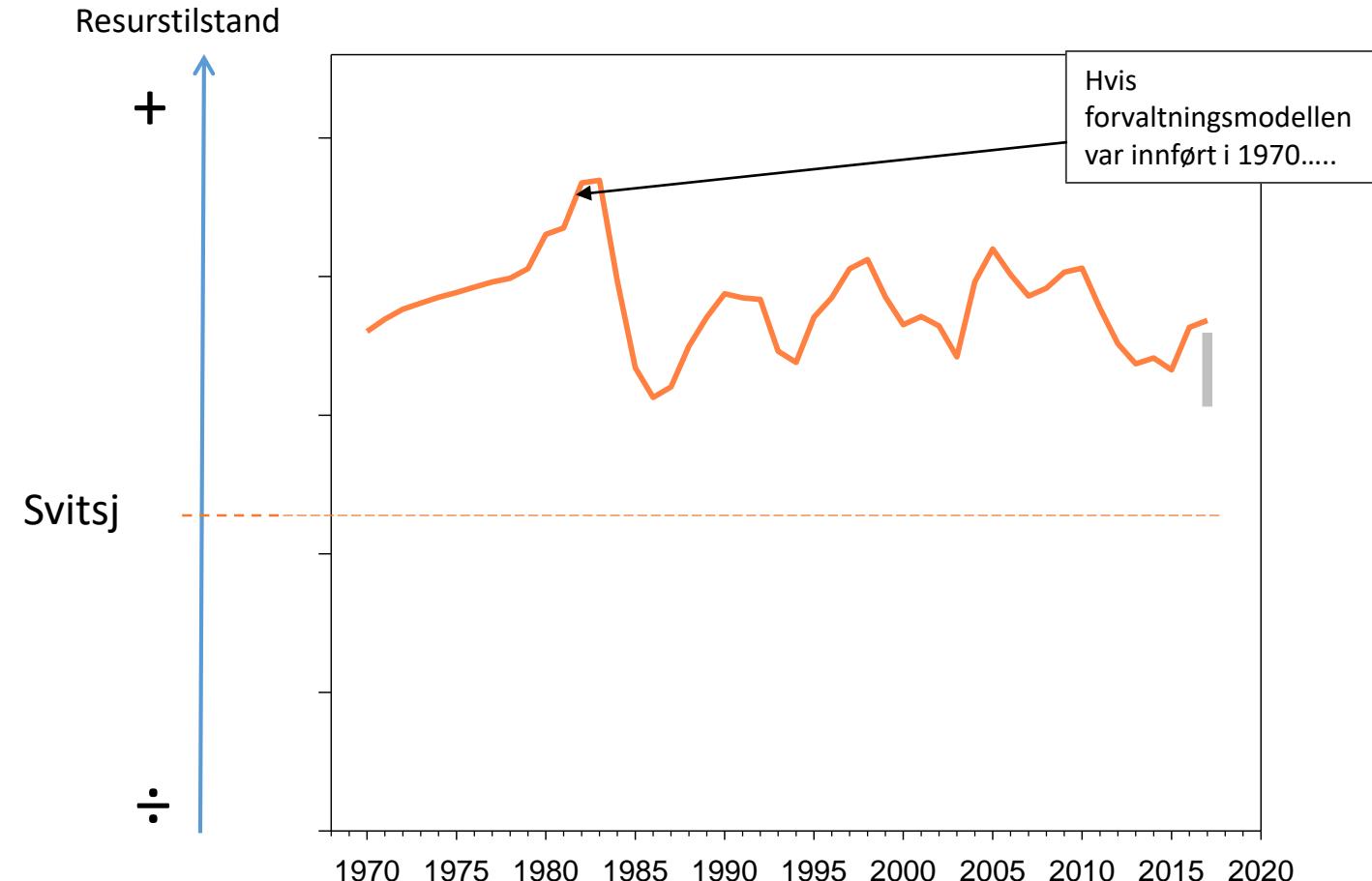
“ICES advises that when the MSY approach is applied, with additional precautionary considerations, catches in 2018 should be no more than 70 000 tonnes”.

Men må vi ha høstningsregel?

- Ja – hvis fisket skal være MSC sertifisert

Krav: regel i forvaltningsplanen som iverksetter begrensning av fangstene når bestanden har det dårlig.

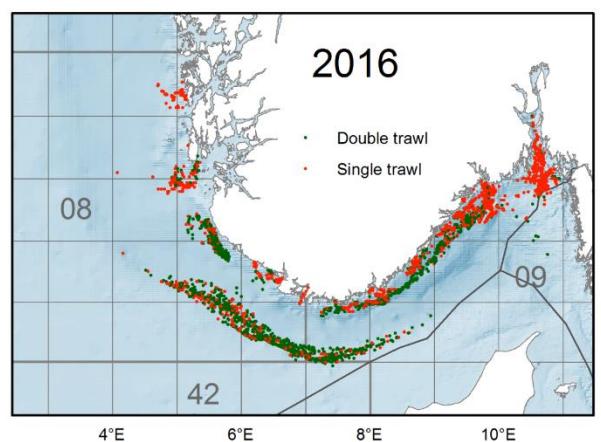
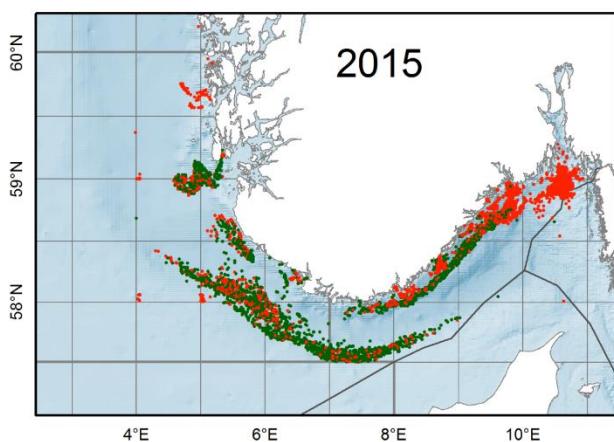
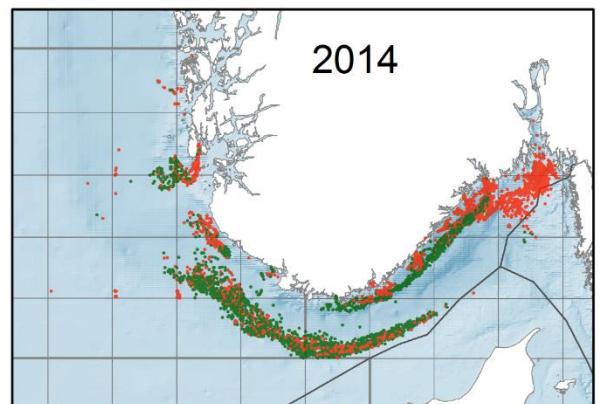
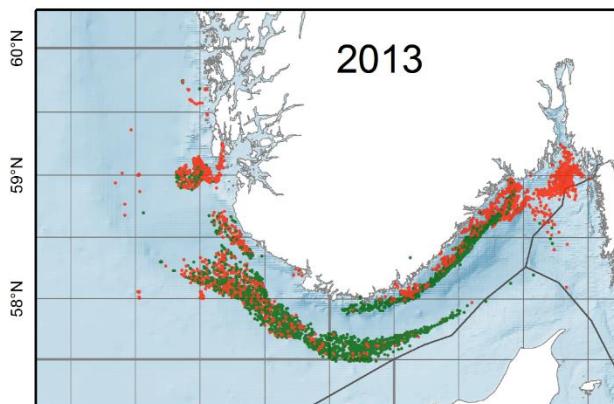
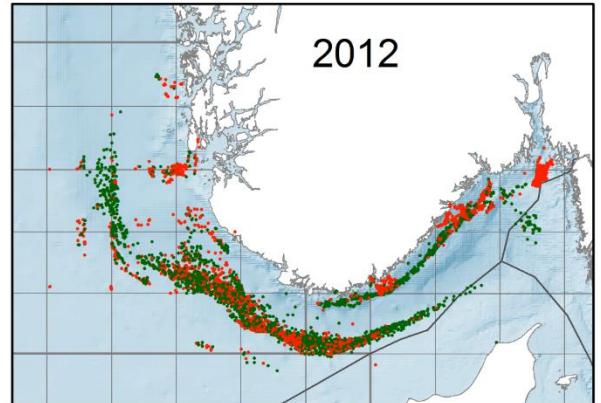
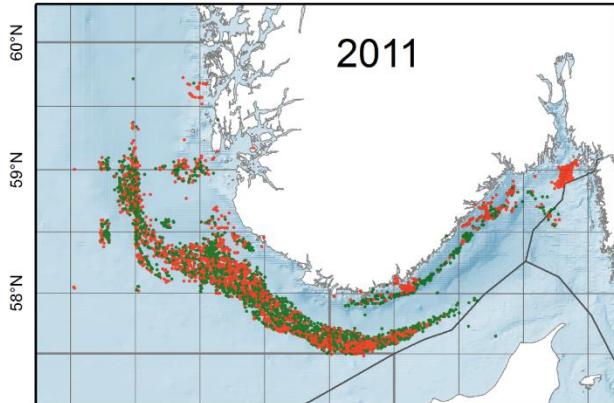
En forvaltningsmodell med høstningsregel



Reke, Nordsjø-Skagerak



Her er rekene i sør!



Rekemål

NFD: «...høyt stabilt langtidsutbytte.....».

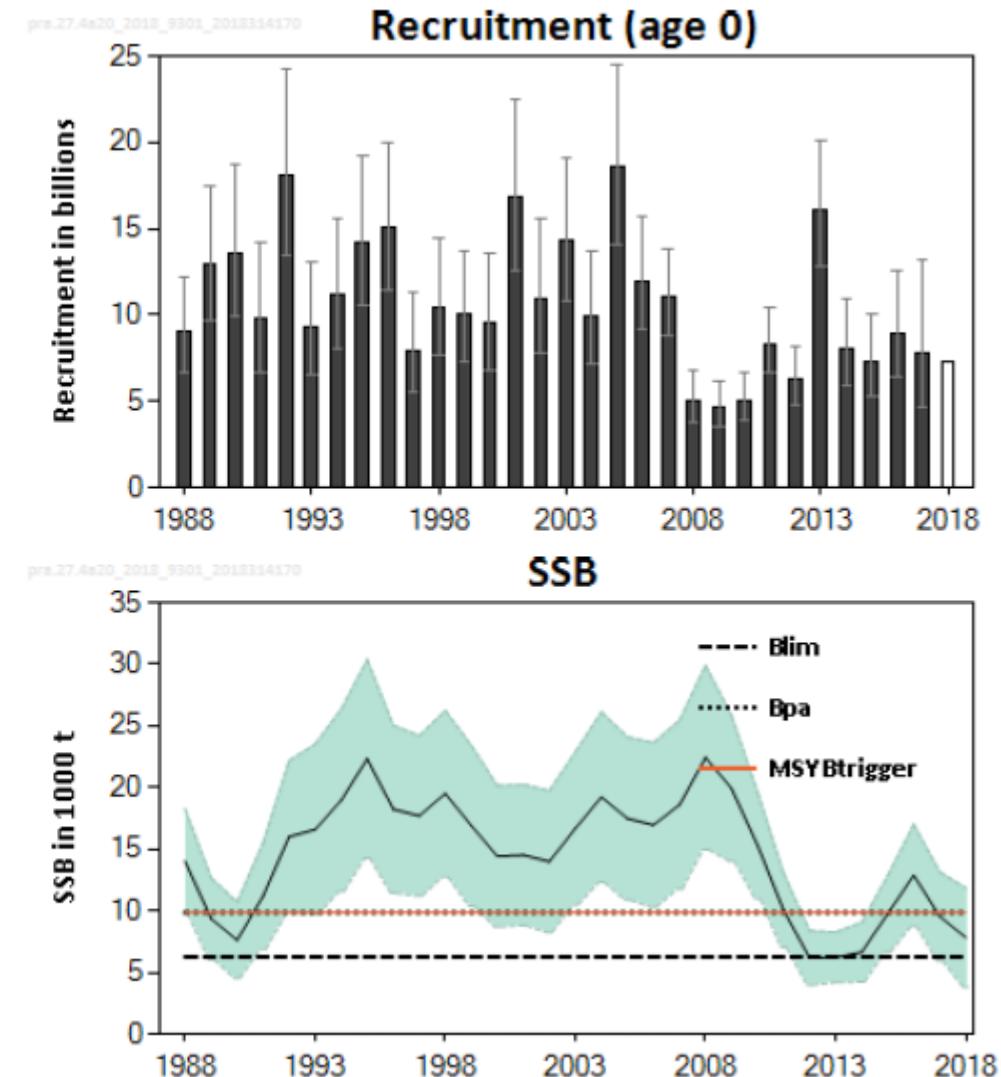
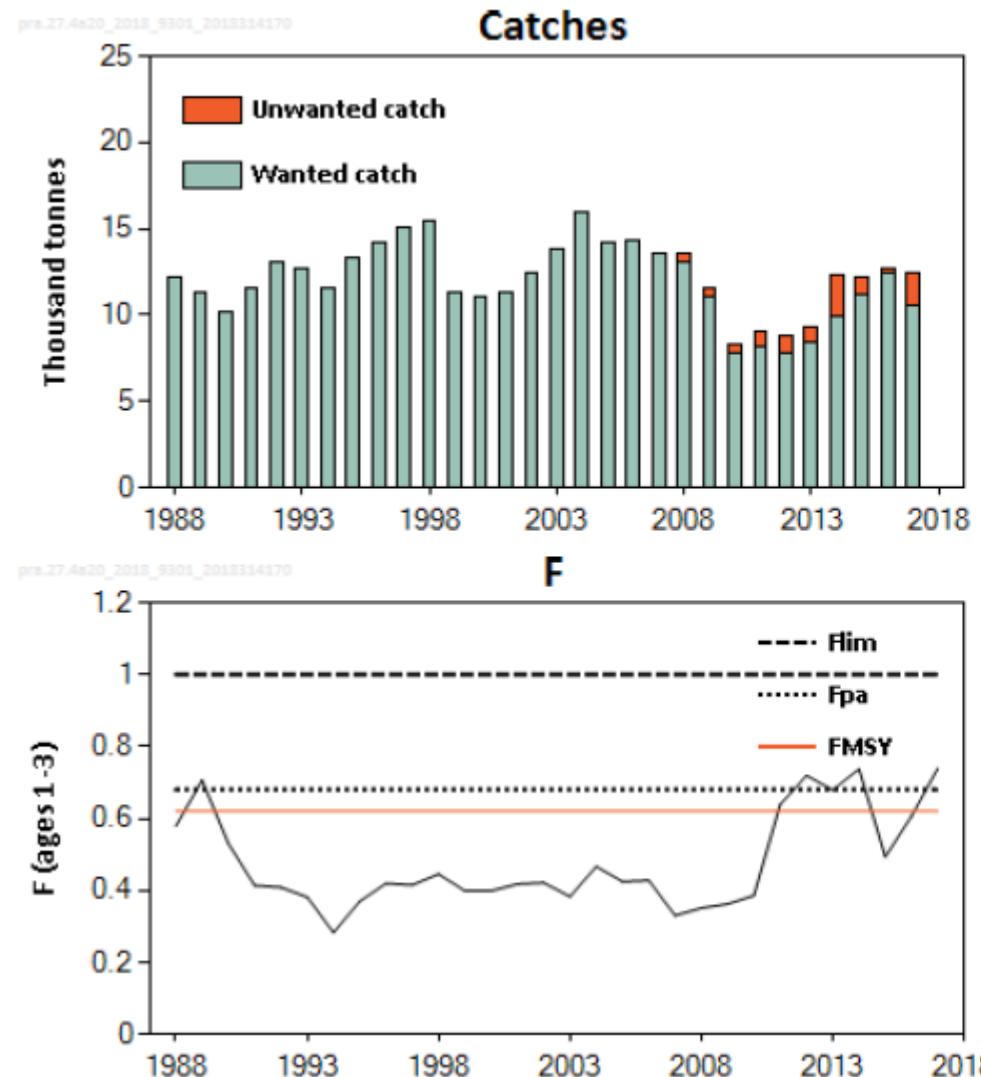
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1. Maksimering av fangstutbytte på lang sikt
2. Minimere risikoen for uønskede økosystemeffekter

Forvaltningspraksis:

- Kvotert, bifangstregler, redskapsrestriksjoner,....,..,
- Kvoten deles mellom DK, S og Nor i forhandlinger med EU

Status



Status, måloppnåelse

- Mål 1 (Maksimering av fangstutbytte på lang sikt)



- Mål 2 (Minimere risikoen for uønskede økosystemeffekter)



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Northern shrimp (*Pandalus borealis*) in divisions 3.a and 4.a East. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size		
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Maximum sustainable yield	F_{MSY}				Above		
Precautionary approach	F_{pa}, F_{lim}				Increased risk		
Management plan	F_{MGT}	—	—	—	Not applicable	—	—
							Below trigger
							Increased risk
						—	Not applicable

Rekeråd

- “ ICES advises that when the MSY approach is applied, catches in 2018 should be no more than 8571 tonnes.”

..og så var det utkast

?



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