Note of the Scheveningen HLG to the Commission on choke species in the North Sea in the context of the full application of the landing obligation as from 1 January 2019

Choke species are an enormous challenge to the implementation of the landing obligation which unfolds all its complexity from 1 January 2019, especially in mixed fisheries. Every Member State and fishery is affected to various degrees by choke species situations.

In the annex, the Scheveningen group has compiled a collection of potential choke species situations for which the 'tool box' contained in Regulation (EU) no. 1380/2013 and discard plans do not offer satisfactory solutions. The list does not indicate an order of urgency as every potential choke species situation has its own limiting effect and all are of serious concern to the Member State or fishery affected. The management of seabass, even though not a species subject to a TAC, is also a reason for concern for some Member States as causing additional limiting effects in other fisheries.

Without indication of any prioritization, the following choke species in the North Sea are highlighted:

- Plaice (PLE/2A3AX4.) for NL, BE, DE (if no exemption is granted)
- Whiting (WHG/2AC4.) for UK, NL, DE, BE, DK
- Sole (SOL/2AC4) for FR, UK, DE
- Hake (HKE/2AC4) for UK, NL, DE, FR
- Brown shrimp for NL, DE, DK (if landing obligation also applies to by-catches of unregulated fisheries and if no exemption is granted)
- Skates and rays (SRX/2AC4-C) for all Member States (if no exemption is granted)
- Saithe (POK/2AC.) for UK, DK
- Lemon sole and witch flounder (L/W/2AC4-C) for BE, DE, DK
- Turbot and Brill (T/B/2AC4-C) for DE, BE
- Ling (EU; LIN/04-C.) for UK, FR
- Megrims (LEZ/2AC4-C) for BE, DK
- Cod (COD/2A3AX4.) for BE
- Tusk (USK/04-C.) for UK

For fisheries in the Skagerrak and Kattegat the following choke species are of particular importance:

- Whiting (WHG/03A.) for SE, DE
- Cod (COD/03AN.) and (COD/03AS.) for DK
- Ling (LIN/03A.) for DK

As all these species are caught in mixed fisheries they are difficult to avoid. The list of species is not exhaustive and as stocks and TACs fluctuate over the years, issues are to a certain extent difficult to predict. In the annex the Scheveningen group has attempted to overview all potential choke situations that can occur in 2019. Selectivity has been improved in some fisheries and further research is on-going. However, additional improvements in selectivity by themselves are in most cases not sufficient to avoid a choking effect. Also in some fishery a further improvement of

selectivity is prone to affect the economic viability of the sector concerned. The perception of scope for adaptation of fishing patterns varies between different MemberSstates and fisheries. Interspecies flexibility is limited to scenarios where the non-target species is within safe biological limits and is therefore not available for a number of stocks. Furthermore, its application might have a major impact on the non-target stock causing a certain reticence for its utilisation. Moreover, the utilisation of interannual flexibility would provide a short alleviation at best and would aggravate the problem in future years, therefore in most cases it is of no real help.

The Scheveningen group is fully aware of the potential of quota swaps as a mitigation tool to address choke species situations and to make fishing opportunities available where they are most needed. However, there are certain stocks where there is not sufficient fish 'in the system'. Also, Member States and fishermen may be reluctant to swap away quotas for fear a Member State or fisherman might overshoot their own quota as a result. There are also certain fears that the scarcity of certain quotas might have an inflationary effect on the 'currency' the Member State in need has to pay in return. In the specific context of the North Sea the effect of Brexit on the availability of swaps also remains to be seen but is, in light of the pivotal location of the UK in the North Sea, particularly critical.

In certain instances choke species situations are economic in nature and the availability of quotas is not an issue. Plaice by-catches in the sole fisheries for NL and BE and by-catches of quota stocks in the brown shrimp fishery of DE, NL and DK, if requested exemptions were denied, are examples. If all undersized by-catch of quota species in these fisheries needed to be sorted and landed, fishing activities could not continue in an economically viable way.

Choke species are expected to be the major issue in the run-up to the full implementation of the landing obligation. Within the Scheveningen group they have been the subject of intensive work and wide discussions involving both Member States and the Advisory Councils. As a result the Scheveningen group has also established a mitigation tool which indicates the likely choke species for individual Member States, as well as an additional choke species analysis which uses initial quota allocations to quickly identify likely choke species. These should be used as additional information to comprehend the choke species problem in its full complexity.

Even with the entry into force of the full landing obligation as from 1 January 2019 the Scheveningen group does not consider the adoption of a discard plan as a one-time only exercise. Fish stocks evolving constantly, a stock in a safe situation in one year can easily turn into a major choke species even in a single quota year, for an individual Member State or for all Member States. Member States and the Commission need therefore to look out for new pragmatic solutions whenever such situations should occur.

Solutions to 2019 choke risks

Stock	**North Sea Plaice (PLA/24-C.)**
Choke Risk	High
Main issues	• Very large by catch of undersized plaice in BT2 fisheries targeting sole. • Economic threat if all plaice is to be landed because it limits the capacity to land species that is actually targeted (sole). • Quota currently sufficient but could be limiting in future.
Possible Mitigation Actions	
Avoidance	• Plaice is too widespread in the North Sea to be avoided.
Selectivity	• Undersized plaice is mainly caught in the fisheries targeting sole. Due to physical characteristics of both sole and plaice and current parameters of MCRS of both species, it is difficult to achieve selectivity by separating the species. A trial using 90mm nets has shown to have adverse effects on selectivity. There is ongoing research into selectivity based on behaviour and improving fishing net architecture.
Exemptions	• Proposed: Temporary high survival exemption for BT2 for 3 years based on several conditions and further research. • Proposed: de minimis for plaice in nephrops fisheries (TR2) with a SEPNEP in area's 2A and 4. • A de minimis would be insufficient to cover the amount of by catch of undersized plaice in BT2.
Quota	• Current quota allocation is still sufficient. But unclear how trend will progress. • Swapping is an option for some – but not all - member states. • Interspecies flexibility is not a solution, since it doesn't solve the economic issues. • Removing the TAC is not an option since it is a targeted species, furthermore it would not solve the problem of large by-catches • Interannual flexibility would not solve the problem because it is not currently a quota problem.
Conclusions	• Implementation of the landing obligation for by-catch of plaice in BT2 targeting sole will likely make the BT2 fishery uneconomic as the by catches are high and would seriously impede the capacity to land the targeted species (sole). • As quota is currently sufficient, possible quota measures do not address the issue. • Much selectivity and survivability research has been done, however this has not resulted in substantial improvements yet. The research is continuing.
Solutions	
Preferred Solution	Allow transition under a temporary high survivability exemption. This temporary exemption would have conditionalities attached: [phased introduction of fully documented fisheries to gain insight into discard

	composition, participation in research to improve selectivity and survival].

Stock	**North Sea whiting**
Choke Risk	Very High
Main issues	• High level of discarding in current catches – ICES estimate 37% of all catches in 4 and 7.d are discarded. • Can't easily be avoided or selected out of catches. • Caught in multiple different fisheries, including industrial, as a bycatch, making it challenging to engage industry to take action to reduce catch. • Concern that catches (including discards) exceed fMSY and that F (0.24) is significantly above fMSY (0.15) limiting scope for quota increases.
Possible Mitigation Actions	
Avoidance	• Whiting is thought to be concentrated in the western part of the North Sea so may be some role for avoidance, however, have to be careful not penalise vessels who cannot move out of high abundance areas.
Selectivity	• ICES believe that a large percentage of whiting caught in small mesh fisheries (<100mm cod end) is discarded. Greater selectivity in these fisheries is possible and may go some way to reducing the problem - though it is thought unlikely that increased selectivity can resolve the issues by themselves.
Exemptions	• The quota available is thought to be below existing catches, so there is insufficient currency to enable swaps between Member States to work. • Interspecies Flexibility (ISF) is unlikely to provide an option as stock is not within SBL. • An others quota would raise difficult question about how to allocate the quota between (and within) MS. Also, depending on how an others TAC is calculated, the overall effect could be to make the 'others' TAC a choke instead – unless the aim is to allow significant additional mortality on the hake stock. • Making whiting prohibited could reduce overall catches, but due to its abundance whiting would continue to be caught and discarded in significant volumes – there would be much less control on fishing mortality as a result. • Removing the TAC may create targeted fishery on the stock, with negative effect on stock health and fMSY – significant risk of losing control over fishing mortality as a result. • No realistic TAC region to merge with.
Quota	• Widely accepted that whiting caught in trawls do not survive in any significant volumes. • The volume of fish being discarded is well beyond a reasonable *de minimis* exemption. Also a standard *de minimis* exemption would see the TAC reduced to account for the volume of fish discarded, which would provide no relief in a situation where the lack of quota is the source of the choke problem. • We could construct an combined *de minimis* (e.g. a combined DM), but that would likely result in less control of the fishery and restrict our ability to control fishing mortality. Generally a sensible *de minimis* will allow for a set volume of discards at the expense of a similar volume of landings - this solution only really works in

	situations where there are small fish, or disproportionate costs involved, not in a choke situation such as this.
Conclusions	• This is a significant choke risk for all NS MS, with a risk of choking multiple different fisheries in the NS. • Difficult to assess quota holdings of different fisheries against catches, so difficult to say which fleet segments are most exposed. • However, available quota in the NS appears to be less than catches and while selectivity and avoidance behaviours can help, they are unlikely to resolve the problem by themselves. • Quota flexibilities and exemptions provide limited benefits, but significant concerns over our ability to control fishing mortality.
Solutions	
Preferred Solution	Allow enough flexibility in the quota system for all catches of whiting to be landed and for fleets to establish their exposure, taking into account the Regulation (EU) no. 1380/2013 and the North Sea MAP. Fleets to calculate if they should undertake more selectivity, avoidance or increase quota holdings.

Stock	**North Sea sole (SOL/24-C.)**
Choke Risk	Light
Main issues	• Very uneven quota allocation with one MS being allocated 75% of TAC • The French gill net fishery likely to be limited. • UK beam trawl 80-119 likely to be limited. • DE beam trawl 80 – 119 may be limited.
Possible Mitigation Actions	
Avoidance	• Sole is too widespread in the southern North Sea to be avoided.
Selectivity	• Sole is caught in mixed fisheries with interests in other targets and by-catches. However, there appears to be scope for mesh size increases to improve selectivity in medium term future.
Exemptions	• High survivability exemption for undersized sole in a shallow otter trawl fishery (80-99mm) by small boats within 6 miles from coastlines in the southern North Sea and outside nursery areas. • De minimis exemption for sole in gill net fisheries. • De minimis exemption for undersized sole in beam trawls (Flemish panel). • De minimis exemption for undersized sole in beam trawls of brown shrimp fisheries. • Interspecies Flexibility (ISFwould be legally possible but is unlikely to be applied as sole is considered a valuable target stock.
Quota	• The economically valuable quotas are short (overfishing occurs according to MSY) and hence difficult to be swapped. • Removing quota is not an option for a target stock.
Conclusions	• There is a light risk that sole constitutes a significant choke stock for certain mixed fisheries, i.e. French gill net and UK beam trawl 80-119. DE may need to decrease quota for targeted sole fishery . • The available quota is short and uneven distributed among MS. • Selectivity and avoidance behaviours are extremely unlikely to resolve the problem in the near future. • Quota flexibilities and exemptions provide either no or limited benefits.
Solutions	
Preferred Solution	Allow transition under a temporary high survivability exemption to improve selectivity and stock rebuilding. Increase swapping of allocated fishing possibilities (however results uncertain in light of high value of sole catches.

Stock	**North Sea hake**
Choke Risk	Very High
Main issues	• The NS hake TAC is very small as a proportion of the hake stock and for the volume of stock which can be found in the NS. • Significant quota deficit across all MS in the North Sea. • Can't easily be avoided or selected out and caught in high abundance. • In 2016 ICES estimates 20,298t of hake was landed from the North Sea and IIIa with further 4,189t discarded. This was 17% of total catches of the stock despite the TAC for the North Sea and IIIa as a whole being 6,306t, which is 6% of the global TAC. • Additionally, discards in the North Sea may be underestimated. One Member State has evidence which suggests it alone discarded 3,997t of hake in the North Sea in 2016. • There will not be enough quota in the system to allow swapping to work.
Possible Mitigation Actions	
Avoidance	• Hake is too widespread in the North Sea to be avoided.
Selectivity	• Hake is roughly the same shape and size as other whitefish such as haddock and cod, so cannot be selected out without losing key target stocks as well.
Exemptions	• The quota available is far below existing catches, so there is insufficient currency to enable swaps between Member States to work. • Interspecies Flexibility (ISF) is unlikely to provide an option due to the volumes of quota required plus the impact on the hake stock of the additional mortality being transferred into it. In addition, the currency required to do the ISF exchange would significantly impact on the fishing opportunities available for other stocks. • An others quota would raise difficult question about how to allocate the quota between (and within) MS. Also, depending on how an others TAC is calculated, the overall effect could be to make the 'others' TAC a choke instead – unless the aim is to allow significant additional mortality on the hake stock. • Making hake prohibited could reduce overall catches, but due to its abundance hake would continue to be caught and discarded ain significant volumes. • Removing the TAC would likely create a targeted fishery on the stock, with negative effect on stock health and fMSY. • Merging the TAC regions may offer some relief, though it would still leave NS states with very limited quota holdings.
Quota	• Widely accepted that hake caught in trawls do not survive in any significant volumes. • The volume of fish being discarded is well beyond a reasonable *de minimis* exemption. Also a standard *de minimis* exemption would see the TAC reduced to account for the volume of fish discarded, which would provide no relief in a situation where the lack of quota is the source of the choke problem. • We could construct an unreasonable *de minimis* (e.g. a combined DM), but that would likely result in less control of the fishery and

	restrict our ability to control fishing mortality. Generally a sensible *de minimis* will allow for a set volume of discards at the expense of a similar volume of landings - this solution only really works in situations where there are small fish, or disproportionate costs involved, not in a major choke situation such as this.
Conclusions	• This is a significant choke stock for all NS MS, with a high risk of choking all trawl fisheries in the NS. • The available quota in the NS is significantly less than catches and the volume of hake which can be found in the North Sea. • Selectivity and avoidance behaviours are extremely unlikely to resolve the problem. • Quota flexibilities and exemptions provide limited benefits, but significant concerns over our ability to control fishing mortality. • Most sensible approach would be to rebalance the volume of quota between the North Sea and other areas to more accurately reflect stock distribution. We believe it is right to ask STECF/ICES to consider this.
Solutions	
Preferred Solution	Allow STECF to analyse temporal and spatial distribution of the stock with a view to changing allocations to sea basins. We have asked the Commission to ensure that STECF address this question at its next plenary session.

Stock	**North Sea skates and rays**
Choke Risk	Very High/Critical
Main issues	• Skates and rays: Bycatch species, albeit almost targeted in certain circumstances • Vessels having a mixed activity catch simultaneously a diversity of species during the same fishing operation • Can't easily be avoided or selected out due to morphology. • High risk that the group TAC will choke fisheries
Possible Mitigation Actions	
Avoidance	• Voluntary avoidance actions • Real time closure will not solve the problem as the species are widespread over the NS (more than in the WW)
Selectivity	• It is very difficult to improve selectivity without causing significant commercial losses. It's impossible to avoid rays by increasing mesh size given the average size of rays.
Exemptions	• High survival exemption: the works done on skate and rays demonstrate a potential for high survival. • A number of researches support the high survival of skates and rays. The UK has carried out several survivability studies on discard survival for thornback ray in otter trawl and trammel net, Blonde ray and Cuckoo ray in beam trawl. Furthermore, the Netherlands have studied survival for thornback ray and spotted ray in beam trawl (pulse) fisheries in the North Sea. In France, ENSURE, a study conducted by IFREMER, also shows a high potential of survival for skate and rays caught with demersal trawls. The final report will be available during the second semester 2018.
Quota	• Interspecies Flexibility (ISF) is unlikely to provide an option since not all rays species are within the biological safety limits (F<Fpa). • An others quota would raise difficult question about how to Define and then allocate the quota between (and within) MS. Also, depending on how an others TAC is calculated, the overall effect could be to make the 'others' TAC a choke instead – unless the aim is to allow significant additional mortality on the stock. • Removing some species from the global TAC could be a solution
Conclusions	• There is a common opinion between the MS that the current management with the combined TAC (many species) isn't working. We should work towards an approach, which would result in a combination of avoidance and high survivability. Possible to start with a high survivability exemption in 2019,

	with an obligation to do further research on different species. A separate working group is working on a package of solutions (especially under the auspices of the *Dutch elasmobranch society*, etc.).
Solutions	
Preferred Solution	• High survivability exemption

Stock	**North Sea saithe**
Choke Risk	High/Very High
Main issues	• Discards of saithe have historically been assessed as low by ICES at 9% of catch, but this is assessed across 3.a, 4 and 6. • However, discards have doubled between 2015 and 2016 from 5,003t to 10,603t. • Concern that this discard data is not complete. One Member State has evidence suggesting its fleet alone discarded 9,925t in 2016. • Less and less certain there is sufficient quota in the North Sea. • Can't easily be avoided or selected out and caught in high abundance.
Possible Mitigation Actions	
Avoidance	• Saithe is too widespread in the North Sea to be avoided.
Selectivity	• Saithe is roughly the same shape and size as other whitefish such as haddock and cod, so cannot be selected out without losing key target stocks as well.
Exemptions	• Growing concern from industry that the quota available is far below existing catches, so there is insufficient currency to enable swaps between Member States to work. • Interspecies Flexibility (ISF) is unlikely to provide an option due to the volumes of quota required plus the impact on the saithe stock of the additional mortality being transferred into it. In addition, the currency required to do the ISF exchange would significantly impact on the fishing opportunities available for other stocks. • An others quota would raise difficult question about how to allocate the quota between (and within) MS. Also, depending on how an others TAC is calculated, the overall effect could be to make the 'others' TAC a choke instead – unless the aim is to allow significant additional mortality on the hake stock. • Making saithe prohibited may reduce overall catches, but it would end a very valuable fishery and, due to its abundance, would continue to be caught and discarded in significant volumes. • Removing the TAC would likely create a targeted fishery on the stock, with negative effect on stock health and fMSY.
Quota	• Widely accepted that saithe caught in trawls do not survive in any significant volumes. • The volume of fish being discarded is well beyond a reasonable *de minimis* exemption. Also a standard *de minimis* exemption would see the TAC reduced to account for the volume of fish discarded, which would provide no relief in a situation where the lack of quota is the source of the choke problem. • We could construct an unreasonable *de minimis* (e.g. a combined DM), but that would likely result in less control of the fishery and restrict our ability to control fishing mortality. Generally a sensible *de minimis* will allow for a set volume of discards at the expense of a similar volume of landings - this solution only really works in situations where there are small fish, or disproportionate costs involved, not in a potentially major choke situation such as this. • Swaps may offer a way forward, but concern that there is insufficient volume of quota in the North Sea to cover existing fisheries.

Conclusions	• This may be a significant choke stock for all NS MS, with a high risk of choking all trawl fisheries in the NS. • The available quota in the NS could be significantly less than current catches. • Selectivity and avoidance behaviours are extremely unlikely to resolve the problem by themselves. • Quota swapping may be a possible solution, but concern that there is insufficient quota in the North Sea.
Solutions	
Preferred Solution	To consider whether there is sufficient quota in the North Sea to cover catches.

Stock	**Lemon Sole and Witch**
Choke Risk	2
Main issues	• Precautionary TAC. • TAC introduced in 1998 for non-stock conservation reasons. • Bycatches in the mixed demersal fisheries. • For some Member States, quota swaps between MS are necessary to cover all the realized catches.
Possible Mitigation Actions	
Avoidance	• Lemon Sole is widespread in the North Sea.
Selectivity	• Lemon Sole is a flatfish, so cannot be selected out without losing fishing efficiency and fishing rentability.
Exemptions	Industry is afraid that in case of choke swaps between Member States could consume too much time with swap ratio's that aren't in line with real market value. • Maybe Interspecies Flexibility (ISF) could be a partial solution. • Removing the TAC is maybe a way forward.
Quota	• Lemon Sole and Witch are flatfishes without swim bladder. Their chance for survivability after being caught in the trawl gear is in this context realistic. Scientific data on survivability are not yet available. • The volume of fish being discarded, mainly below MCRS, seems to be reasonable for a *de minimis* exemption.
Conclusions	• This is a category 2 choke. • Selectivity and avoidance behaviours are extremely unlikely to resolve the problem. • Quota flexibilities and exemptions provide limited benefits., • Scrapping of the TAC seems to be a possible way forward. If that option is chosen also relative stability is scrapped at once.
Solutions	
Preferred Solution	Transition period with an exemption for high survivability. Uplift precautionary TAC to compensate for unwanted catches could help partially.
Fall Back Solution	Scrapping precautionary TAC.

Stock	**North Sea turbot and brill (T/B/2AC4-C)**
Choke Risk	Medium
Main issues	• By-catch in sole and plaice fisheries with beam trawls (80-119mm). • Precautionary set low fishing possibilities, stock appears relatively high and exploitation low. • Joint management of two distinct species with likely different productivity and conservation needs • Can't easily be avoided or selected out due to its overlap in occurrence and body shape with targets like sole and plaice. • BE, DE and NL beam trawl fisheries likely to be limited
Possible Mitigation Actions	
Avoidance	• Turbot and brill are widespread in the North Sea at rather low abundances.
Selectivity	• Turbot and brill are wanted by-catch and resemble the targets sole and plaice in terms of body shape, which makes species selection quite impossible.
Exemptions	• Potential high survivability exemption for turbot and brill. • De minimis exemption for undersized turbot and brill in beam trawls of brown shrimp fisheries. • Interspecies Flexibility (ISF) is not applicable due to the fact that the stock assessments are indicative only and lack biological reference points (precautionary TAC).
Quota	• The economically valuable quotas are short and hence difficult to be swapped. • Removing the TAC may lead to a more targeted fishery on these by-catch stocks, with negative effect on stocks' health.
Conclusions	• There is a medium risk that turbot and brill constitute significant choke stocks in certain important fisheries, i.e. the beam trawl fisheries for sole and plaice. • The available precautionary quota for two different stocks implies a high management risk. • Selectivity and avoidance behaviours are unlikely to resolve the problem in short term. • Quota flexibilities and exemptions provide either no or limited benefits.
Solutions	
Preferred Solution	Increase the precautious TAC in the North Sea to cover unavoidable catches and improve scientific knowledge to formulate a production model and derive sustainable references in terms of exploitation and stock sizes.

Stock	**North Sea ling**
Choke Risk	High
Main issues	• Healthy state of the stock. • By catch in the saithe fishery (fished in the MSY limits) • Can't easily be avoided or selected out • Less and less certain there is sufficient quota in the North Sea and increased presence of the stock in the North Sea. Risk that the catch will not be in adequation with TAC in few years. • In 2016 the French discard rates was beyond 3%, whereas the discard rate of the Belgium fleet was around 27%. The discard of the UK fleet was about 1%. Although ling catches are currently being well managed, the industry is concerned that this may not be possible over the longer term.
Possible Mitigation Actions	
Avoidance	• Ling is too widespread in the North Sea to be avoided. • Might be possible to punctually avoid some unwanted catches based on fishermen knowledge, although it seems hard to assume that this will resolve the problem
Selectivity	• It is very difficult to improve selectivity without causing significant commercial losses as fishermen targeting saithe already use a 120mm mesh size. Furthermore, increasing mesh size won't solve the issue as almost all individuals are above minimum size.
Exemptions	• Widely accepted that ling caught in trawls do not survive in any significant volumes. • A de minimis exemption will give fishermen some flexibility needed to implement the landing obligation. • Because the catches are low, with a 4% de minimis the volume of fish being discarded with an exemption will be reasonable (177 tonnes).
Quota	• Landings have been stable for the last five years, with an increase in discards in the last three years. Fishing mortality is below the proxy of the Fmsy reference points and the stock has been increasing since 2004. • Interspecies Flexibility (ISF) is unlikely to provide an option due to the volumes of quota required plus the impact on the ling stock of the additional mortality being transferred upon it.
Conclusions	• This may be a choke stock for NS fisheries, with a risk of choking trawl fisheries in the NS. • Selectivity and avoidance behaviours are extremely unlikely to resolve the problem by themselves.

	• Quota swapping may be a possible solution, but concerns that there is sufficient quota in the North Sea basin: the deletion of the TAC could be foreseen.
Solutions	
Preferred Solution	• A de minimis exemption up to a maximum of 5% in 2019 and up to a maximum of 4% in 2020 of the total annual catches of that species by vessels using bottom trawls of more than 100 mm (OTB, OTT, PTB) in ICES divisions 4 will solve the problem as the volume of unwanted catches is low in a fishery that is already selective.

Stock	**Megrim in the North Sea**
Choke Risk	Potential
Main issues	• Insufficient quota long term
Possible Mitigation Actions	
Avoidance	• Not possible
Selectivity	• The requirements for gear in fishery with megrim bycatches entails primarily a 120 mm trawl as determined in the EU regulation. • Further selectivity as regards megrims is not possible as it would limit wanted catch.
Exemptions	•
Quota	• Analytical TAC • Swaps are used to the widest extent possible
Conclusions	• Short term: continued swapping • Long term: Removing the TAC in EU27-waters of the North Sea.
Solutions	
Preferred Solution	• Removing the megrim TAC in EU27-waters of the North Sea. • In order to monitor the fishery and collect information of the stock's distribution in 2 and 4 it could be advisable to introduce a requirement to register all catches of megrim haul by haul, including catches below 50 kg. Additionally, fishery for megrim in the North Sea should be restricted to a bycatch fishery.

Stock	**North Sea cod**
Choke Risk	High
Main issues	• The TAC has more than doubled from the low point of 2007, however, f is still above fMSY and SSB is only just around Bpa – too early to say stock has recovered. • Can't easily be avoided or selected out and caught in high abundance and in many different fisheries. • Concern that actual (unrecorded) discards may be higher than ICES estimates and top-up will be insufficient to match catches. • Industry very concerned about reliance on swaps. • Continued concerns about attempts being made to move quota from the main North Sea TAC to other areas.
Possible Mitigation Actions	
Avoidance	• Cod is too widespread in the North Sea to be avoided.
Selectivity	• Cod is the same shape and size as other whitefish such as haddock, saithe and hake, so cannot be selected out without losing key target stocks as well.
Exemptions	• Industry believes TAC is significantly lower than catches and that the uplift is insufficient. Therefore, as TAC will be lower than current catches, swaps there will be insufficient quota to match catches. • Industry also concerned about lack of currency to enable swaps between Member States to work. • Interspecies Flexibility (ISF) is unlikely to provide an option due to the volumes of quota required and concerns about the impact on the stock caused by the additional mortality being transferred into it. In addition, the currency required to do the ISF exchange would significantly impact on the fishing opportunities available for other stocks. • An 'others' quota would raise difficult question about how to allocate the quota between (and within) MS. Also, depending on how an 'others' TAC is calculated, the overall effect could be to make the 'others' TAC a choke instead – unless the aim is to allow significant additional mortality on the hake stock. Additionally, it feels unrealistic to expect North Sea cod to be folded into an 'others' stock at this stage. • Making cod prohibited may reduce overall catches, but due to its abundance hake would continue to be caught and discarded in significant volumes. Additionally, it feels unrealistic to expect North Sea cod to be prohibited and if it was there would likely be some very negative press as a result. • Removing the TAC would likely create a targeted fishery on the stock, with very negative effects on stock health and fMSY. • North Sea cod is assessed as one stock. The Eastern Channel cod TAC follows the evolution of the NS and an interzonal flexibility could be a minor help.

Quota	• Widely accepted that cod caught in trawls do not survive in any significant volumes. • The volume of fish being discarded is well beyond a reasonable *de minimis* exemption. We could construct a *combined de minimis* , but that would likely result in less control of the fishery and restrict our ability to control fishing mortality. Generally a sensible *de minimis* will allow for a set volume of discards at the expense of a similar volume of landings - this solution only really works in situations where there are small fish, or disproportionate costs involved, not in a choke situation caused by lack of quota. • Concerns that attempts move quota out of main North Sea TAC may continue, making problems in the North Sea more acute.
Conclusions	• This may be a significant choke stock for all NS MS, with a high risk of choking all trawl fisheries in the NS depending on the TAC and the availability of quota to swap. • Selectivity and avoidance behaviours are extremely unlikely to resolve the problem. • Quota flexibilities and exemptions provide limited benefits, but significant concerns over our ability to control fishing mortality. • There is an argument that TACs should be set at a level which gives industry confidence normal fishing activity will continue. However, TAC also needs to be set at a level which allows the stock to continue to recover.
Solutions	
Preferred Solution	Set the TAC at a level which will effectively balance fishing activity and continuing stock recovery, taking into account the Regulation (EU) no. 1380/2013 and the North Sea MAP. Interzonal flexibility with Eastern Channel could help only partially.
Fall Back Solution	Use of ISF or similar methods which allows us to bypass mortality and quota limits. This would be an option of last resorts and would raise a number of challenges.

Stock	**North Sea tusk**
Choke Risk	High
Main issues	• Discards as a percentage of catch are high, though in terms of volume they are thought to be low. • For example in 2016 there were landings of 39t by UK vessels and estimated discards of 147t, discarding 79% of all tusk caught. • ICES assess tusk as one stock across 3.a, 4, 5.b, 6.a, 7-9 and 12b. • The EU TAC for these areas is 4,124t, with a North Sea TAC of 235t and no flexibility to move quota across from Area 5, 6 and 7 (which has a TAC of 3,860t) • There is also a separate TAC in the Norwegian waters of area 4 (170t for EU in 2018). • ICES estimates only 153t (3% of total catches) of tusk were discarded across its range in 2016. • Greater quota flexibility could cover potential discard issues. • Additionally, stock is thought to be being fished below fMSY, may be scope to increase TAC.
Possible Mitigation Actions	
Avoidance	• Little is known of areas of tusk abundance, it does not seem possible to use avoidance measures.
Selectivity	• Due it its shape and size, tusk cannot be selected out of whitefish gadoid catch.
Exemptions	• A standard *de minimis* exemption would see the TAC reduced to account for the volume of fish discarded, which would provide no relief in a situation where the lack of quota is the source of the choke problem. • Interspecies Flexibility (ISF) is unlikely to provide an option due to the currency required for the ISF exchange reducing the fishing opportunities available for other stocks.
Quota	• The available quota in the NS may be significantly less than current catches. • Selectivity and avoidance behaviours are extremely unlikely to resolve the problem by themselves. • Quota swapping may be a possible solution, but concern that there is insufficient quota in the North Sea. F is below MSY so there could be potential to negotiate an increased TAC. • Also quota flexibility between areas may be helpful in managing any problems.
Conclusions	• This may be a significant choke stock with a high risk of choking UK TR1 fisheries in the North Sea. • Selectivity and avoidance behaviours are extremely unlikely to resolve the problem. • Securing an increase in TAC would likely be the best way to proceed.
Solutions	
Preferred Solution	Secure an increase in TAC taking into account of the Regulation (EU) no. 1380/2013.and the North Sea plan.

Stock	**North Sea pelagic species (for demersal fisheries)**
Choke Risk	Very High
Main issues	• By-catch species • Vessels having a mixed activity catch simultaneously a diversity of species during the same fishing operation and sometimes some pelagic species are caught with demersal vessels. • Can't easily be avoided.
Possible Mitigation Actions	
Avoidance	• Pelagic species are too widespread in the North Sea to be avoided.
Selectivity	• It is very difficult to improve selectivity without causing significant commercial losses. Almost all individuals are above minimum size.
Exemptions	• A de minimis exemption will give fishermen some flexibility needed to implement the landing obligation due to the cost of the handling of catches on board. • If a de minimis is not granted for these species for all sizes in demersal fisheries, they will be choke species. • Widely accepted that pelagic species caught in trawls do not survive in any significant volumes.
Quota	• Interspecies Flexibility (ISF) is unlikely to provide an option due to the volumes of quota required plus the impact on the stock of the additional mortality being transferred upon it. In addition, the currency required to do the ISF exchange would significantly impact on the fishing opportunities available for the targeted stocks.
Conclusions	• Those species are significant choke stocks for all NS MS, with a high risk of choking all bottom trawl fisheries in the NS. • Selectivity and avoidance behaviours are extremely unlikely to resolve the problem by themselves. • A de minimis aims at giving some flexibility needed for fishermen, exercising bottom trawler métier, to implement the landing obligation.
Solutions	
Preferred Solution	A combined de minimis exemption for mackerel, horse-mackerel and herring combined, up to a maximum of 7 % in 2019 and 2020 and up to a maximum of 6% in 2021 of the total annual catches of these species by vessels using bottom trawls (OTB, OTT and

	PTB) of mesh size 70-99 mm in ICES Subarea 4.

Stock	**Skagerrak/Kattegat whiting**
Choke Risk	Medium
Main issues	• DE has no quota for whiting in 3a. • Precautionary TAC. • High levels of discards (57 %, ICES 2017). • Available improvements in selectivity can be further used.
Possible Mitigation Actions	
Avoidance	• Whiting is too widespread in the area to be avoided. • EU and Norway have implemented real time closure systems to avoid capture of whiting under MCRS (EU regulation 783/2011).
Selectivity	• Fisheries for Nephrops and Northern prawn can be continued with trawls equipped with species selective grids and Nephrops creels. In SE, work has been conducted since the 90s and use is widespread in the fishery, through regulation, incentives and on a voluntary basis. • In mixed fisheries (>90 mm trawls), a decrease in whiting catch can be achieved with a more selective panel (SELTRA300 sqm), or increased mesh size. In that case whiting can potentially work as an incentive to increase selectivity in the trawl fisheries concerned.
Exemptions	• De minimis for bycatches under MCRS in the >90mm bottom trawl fishery. • Combined de minimis for bycatches below MCRS in the fishery for Nephrops conducted with bottom trawls (OTB, TBN) with a mesh size of at least 70 mm equipped with a species selective grid with bar spacing of maximum 35 mm in ICES area 3a. • Combined de minimis for bycatches below MCRS in the Northern prawn trawl fishery with sorting grid, with unblocked fish outlet in 3a. • Survivability exemption not relevant for whiting in trawl fisheries. Survivability exemption introduced from 2018 for whiting bycatch in pots and fyke nets (FPO, FYK) in area 3a and 4 (minor bycatch <2 t).
Quota	• Precautionary TAC. • Swaps may offer a way forward, but depending on level of TAC and availability.
Conclusions	• May be a challenge for 2019, but swaps and increased selectivity is possible, at least to a certain extent.
Solutions	
Preferred Solution	Keep TAC alongside existing exemptions, work with swaps and increased selectivity as a tool to decrease bycatch of whiting, and other species caught in mixed fisheries.

Stock	**Kattegat cod**
Choke Risk	High (dependent on level of TAC and adaptations).
Main issues	• High levels of discards, mainly above MCRS. • Further improvements in selectivity are possible, but would decrease the economically important bycatches for some fishermen.
Possible Mitigation Actions	
Avoidance	• Cod is too widespread in the area to be avoided. • DK and SE have introduced protected areas to decrease capture of juvenile cod.
Selectivity	• The requirements for gear in the Nephrops fishery in Kattegat entails a 90 mm trawl with panels, which already provides for further selectivity compared to the requirements in Regulation no. 850/1998 on technical measures. • Target fisheries for Nephrops and Northern prawn can be continued with trawls equipped with species selective grids and Nephrops creels. However, installing sorting grids would eliminate important bycatches of both cod and other valuable bycatches (round- and flatfish) in the Nephrops fishery and incur an unreasonable lack of income for some fishermen. In the flatfish fishery with trawls further selectivity is not possible. • In mixed fisheries, improvements can be achieved by using a more selective panel, or increased mesh size.
Exemptions	• Combined de minimis for bycatches below MCRS in the fishery for Nephrops conducted with bottom trawls (OTB, TBN) with a mesh size of at least 70 mm equipped with a species selective grid with bar spacing of maximum 35 mm in ICES area 3a. • Combined de minimis for bycatches below MCRS in the Northern prawn trawl fishery with sorting grid, with unblocked fish outlet in 3a. • Survivability exemption introduced from 2018 for cod bycatch in pots and fyke nets (FPO, FYK) in area 3a and 4.
Quota	• Precautionary TAC.
Conclusions	• May be a challenge for 2019.
Solutions	
Preferred Solution	Setting fishing opportunities taking into account cod in a mixed fishery and best available scientific advice. Make use of increased selectivity and avoidance when possible.

Stock	**Ling in Skagerrak/Kattegat**
Choke Risk	High
Main issues	• Insufficient quota • TAC in 3a is far less than 1 % of the total TAC and separate scientific studies in 3a not economically viable. • TAC has been stable (“statement stock”) for several years. TAC was increased in the North Sea for 2018, but not for 3a.
Possible Mitigation Actions	
Avoidance	• Not possible
Selectivity	• The requirements for gear in fishery with ling bycatches entails primarily a 90 mm trawl with panels (seltra) in 3a, or 120 mm trawl as determined in the EU regulation. • Further improvements in selectivity are possible by using a more selective panel, or increased mesh size, but would decrease the economically important bycatches for some fishermen. •
Exemptions	•
Quota	• Precautionary TAC • Swaps are used to the widest extent possible • TAC has been limited to EU-waters (Reg 511/2018). Approximately 25 % of landings have been taken in NEZ, which is no longer included in the TAC.
Conclusions	• Ling is caught as bycatch. In one MS, it has in most years been necessary to limit landings to weekly rations and eventually prohibit landings of ling in the course of the year resulting in discards. Landings of ling have been prohibited as early in the year as June. With the introduction of the landing obligation ling in 3a is expected to become a choke species for mixed fisheries in the Skagerrak.
Solutions	
Preferred Solution	• One MS, with the largest quota share, suggests removing the ling quota in 3a combined with monitoring of the fishery on a haul-by-haul basis and including catches below 50 kg. • One MS suggests increasing the TAC in 3a based on the trend-based advice from ICES, and increase selectivity in mixed fisheries (>90 mm trawls) by using a more selective panel (SELTRA300 sqm), or increased mesh size. • Make use of increased selectivity and avoidance when possible. • No directed fishery for ling should be allowed.

Stock	**Skagerrak/Kattegat sole**
Choke Risk	Potential (but depending on level of TAC)
Main issues	• One Member States (SE) has a low quota share for sole in 3a.
Possible Mitigation Actions	
Avoidance	• Most target fishery can be prevented to adapt to quota situation, but not all bycatch.
Selectivity	• Fisheries for Nephrops and Northern prawn can be continued with trawls equipped with species selective grids and Nephrops creels.
Exemptions	• Combined de minimis for bycatches below MCRS in the fishery for Nephrops conducted with bottom trawls (OTB, TBN) with a mesh size of at least 70 mm equipped with a species selective grid with bar spacing of maximum 35 mm in ICES area 3a. • Combined de minimis for bycatches below MCRS in the Northern prawn trawl fishery with sorting grid, with unblocked fish outlet in 3a. • Survivability exemption not relevant for sole in trawl fisheries. Survivability exemption introduced from 2018 for whiting bycatch in pots and fyke nets (FPO, FYK) in area 3a and 4 (minor bycatch <2 t).
Quota	• Precautionary TAC. • Swaps has offered a way forward, but is dependent on level of TAC and availability.
Conclusions	• Depending on the level of the TAC and availability for quota swaps.
Solutions	
Preferred Solution	If TAC is low and swaps not available, this is a choke species for SE.

Stock	**Norway pout – North Sea, Skagerrak, Kattegat**
Choke Risk	Potential (at EU level)
Main issues	• Unavoidable bycatch in fishery for Northern prawn. • SE has no quota share.
Possible Mitigation Actions	
Avoidance	• Insufficient scientific evidence of temporal or spatial distribution of the population.
Selectivity	• The larger part of Norway pout bycatches are caught in the fishery for Northern prawn with species selective grid and a collecting bag. Bycatches could be reduced by removal of the collecting bag but this would lead to significant loss of (co-)targeted fish (mainly cod and saithe).
Exemptions	• Survival exemption not considered relevant. • Sweden is seeking inclusion of Norway pout in the existing deminimis exemption for fish bycatch caught in Northern prawn trawl fishery with sorting grid and unblocked fish outlet in 3a. (All of the Northern prawn fishery is not covered by the de minimis exemption).
Quota	• Analytical TAC. Sweden has a 0 share of the Norway pout quota. Swedish Norway pout catches in 2016 consisted of 4 t landings and 257 t discards.
Conclusions	• Should quota swaps not be available, and in the last hand interspecies flexibility (if the stock situation allows) other solutions needs to be found to mitigate the choke situation in the Northern fishery with collecting bag.
Solutions	
Preferred Solution	Norway pout is an unavoidable bycatch in a highly valuable fishery for Northern prawn. A more long term solution than yearly swaps, to cover bycatch, should be considered. SE does not have a quota for Norway pout.

Stock	**Skagerrak cod**
Choke Risk	High (dependent on level of TAC and adaptations).
Main issues	• High levels of discards above MCRS. • Substantial increase in abundance of cod in Skagerrak in contrast to slight decrease in Southern part of the North Sea • Concern that discards according to discard atlas are higher in relation to wanted catches compared to the North Sea and that TAC will be insufficient to match catches. • Industry concerned about lack of cod and other currency in the area to enable swaps between Member States.
Possible Mitigation Actions	
Avoidance	• Cod is too widespread in the area to be avoided.
Selectivity	• Cod is the same shape and size as other whitefish such as haddock, saithe and hake, so cannot be selected out in the white-fish fishery without losing key target stocks as well. • The requirements for gear in the Nephrops fishery in Skagerrak entails a 90 mm trawl with panels, which already provides for further selectivity compared to the requirements in Regulation no. 850/1998 on technical measures. • Target fisheries for Nephrops and Northern prawn can be continued with trawls equipped with species selective grids and Nephrops creels. However, installing sorting grids would eliminate important bycatches of both cod and other valuable bycatches (e.g. sole and plaice) and incur an unreasonable lack of income for some fishermen. In the flatfish fishery further selectivity is not possible. In mixed fisheries (>90 mm trawls), improvements can be achieved by using a more selective panel (SELTRA300 sqm), or increased mesh size (above 120 mm). For some fishermen this would, however, eliminate valuable catches and incur a lack of income.
Exemptions	• Combined de minimis for bycatches below MCRS in the fishery for Northern prawn conducted with bottom trawls (OTB, TBN) with a mesh size of at least 70 mm equipped with a species selective grid with bar spacing of maximum 35 mm in ICES area 3a. • Combined de minimis for bycatches below MCRS in the Northern prawn trawl fishery with sorting grid, with unblocked fish outlet in 3a. • Survivability exemption introduced from 2018 for cod bycatch in pots and fyke nets (FPO, FYK) in area 3a and 4. • Other measures such as general survival- or de minimis exemptions, inter species flexibility, others quota, making cod a prohibited species, abolishing the TAC or inter area flexibility were deemed inappropriate due to the risk of negative impact on the cod stock as well as other associated species.
Quota	• Analytical TAC.
Conclusions	• May be a challenge for 2019.
Solutions	

Preferred Solution	Setting fishing opportunities taking into account cod as a mixed fishery. Make use of increased selectivity and avoidance when possible.