INTERNATIONAL MARITIME ORGANIZATION

E

SUB-COMMITTEE ON NAVIGATION, COMMUNICATIONS AND SEARCH AND RESCUE
10th session
Agenda item 3

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# ROUTEING MEASURES AND MANDATORY SHIP REPORTING SYSTEMS

## Experience gained from the establishment of traffic separation schemes and other routeing measures in the vicinity of Kattegat between Denmark and Sweden

**Submitted by Denmark and Sweden**

**SUMMARY**

| | |
|---|---|
| *Executive summary:* | This document provides information about the experience gained from the establishment of traffic separation schemes and other routeing measures in the vicinity of Kattegat between Denmark and Sweden. |
| *Strategic direction, if applicable:* | 7 |
| *Output:* | 7.22 |
| *Action to be taken:* | Paragraph 18 |
| *Related documents:* | SOLAS regulation V/10; resolution A.572(14), as amended; MSC.1/Circ.1060; SN.1/Circ.336; COLREG.2/Circ.71; NCSR 5/3/3, NCSR 5/3/4, NCSR 5/3/5 and NCSR 5/INF.3 |

## Background

1 At the fifth Sub-Committee meeting on Navigation, Communications and Search and Rescue (NCSR 5), proposed routeing measures for ship traffic in the vicinity of Kattegat were approved. The routeing measures were adopted by the Maritime Safety Committee, at its ninety-ninth session, and were circulated to Member States through SN.1/Circ.336 and COLREG.2/Circ.71.

2 The routeing measures in the vicinity of Kattegat were implemented on 1 July 2020.

3 The proposal was a cooperation between Denmark and Sweden and the objectives were to:

.1 lead ship traffic via routes that would guide and separate two-way ship traffic better;

.2 achieve safe passage and guidance to shipping in the most simplified way possible without imposing unnecessary restrictions on navigation for local ship traffic; and

.3 reduce the risk of marine environmental pollution caused by collision and/or grounding in the waters off the Danish and Swedish coasts.

4 The following routeing measures were established in 2020:

.1 recommended route A and recommended route B, west of Skagen, Denmark;

.2 two traffic separation schemes (TSS) with associated precautionary area and inshore traffic zone (ITZ) north of Skagen, Denmark;

.3 recommended route S outside the west coast of Sweden;

.4 recommended route T in Kattegat;

.5 a precautionary area at the junction between the recommended route T and the recommended route S;

.6 two deep-water routes within the recommended route T; and

.7 three TSSs and two associated inshore traffic zones within the recommended route S.

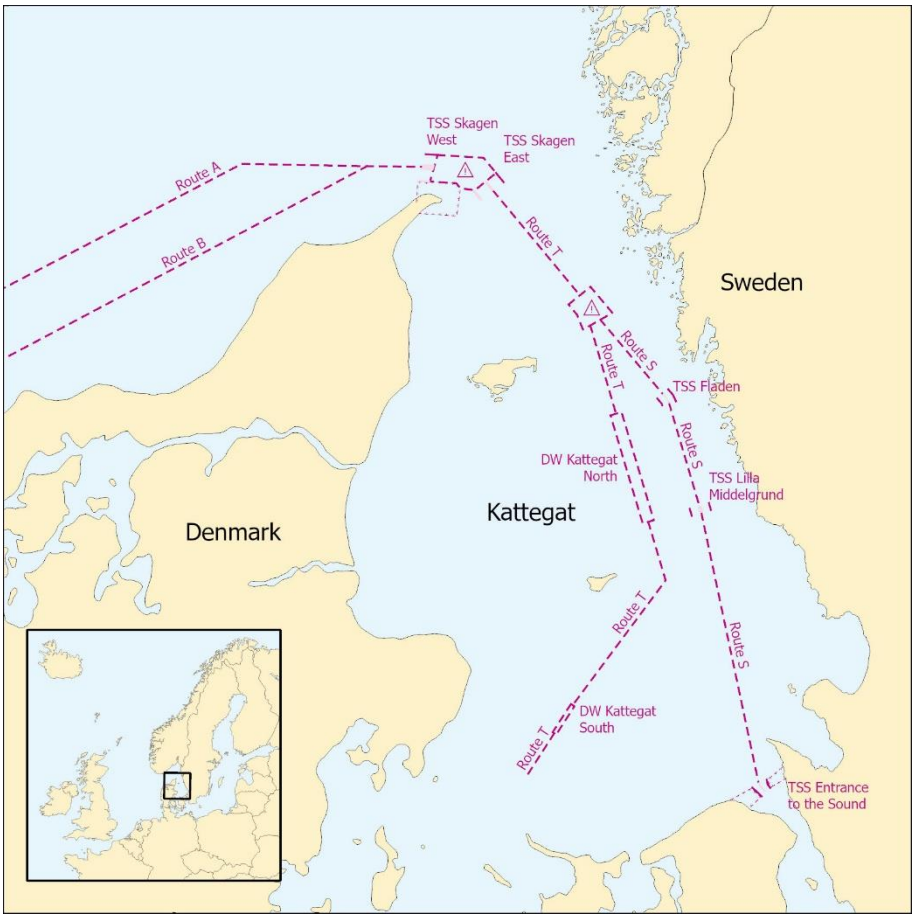


**Figure 1: Routeing measures in Kattegat**

**Analyses of the effects of the routeing measures in the vicinity of Kattegat**

5 Since 1 July 2020, the Maritime Administrations in Denmark and Sweden have continuously monitored the ship traffic in the area, in order to identify whether the objectives of the routeing measures have been met.

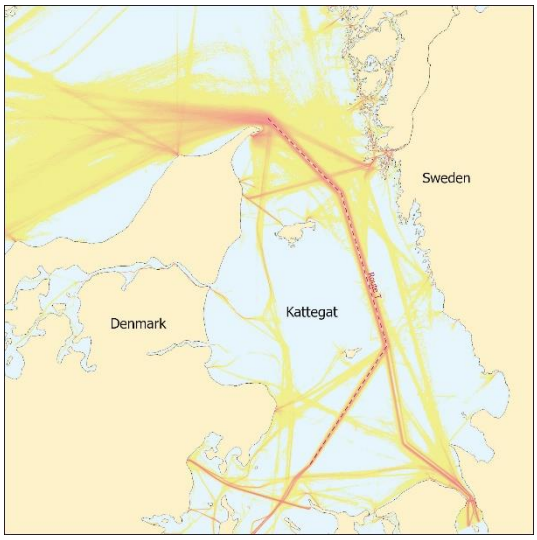


**Figure 2: Ship density for all ships in 2019**

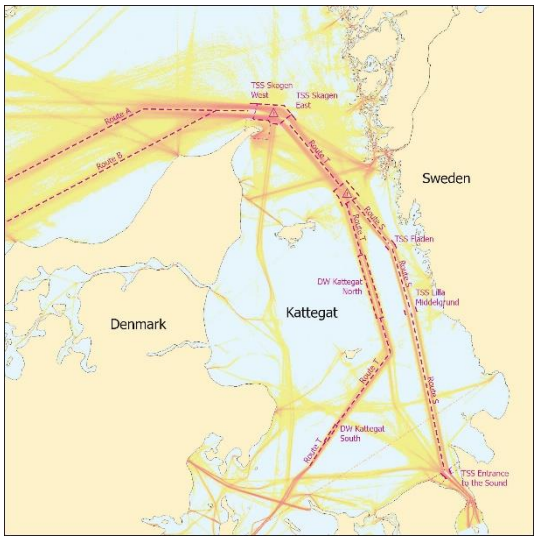


**Figure 2: Ship density for all ships in 2021**

6 The following hotspots have been specifically analysed:

.1 TSS Skagen E and W with associated precautionary area and inshore traffic zone;

.2 recommended route S outside the west coast of Sweden; and

.3 TSS Entrance to the Sound with two associated inshore traffic zones.

Details regarding the analyses of these areas are described below.

**TSS Skagen**

7 The pictures below show the traffic patterns and traffic distributions around Skagen before and after the implementation of the TSSs "Skagen West" and "Skagen East".

They clearly illustrate the changes that occur in the ships' traffic patterns when implementing a TSS. The distance between oncoming traffic has increased and the traffic patterns are much more predictable.

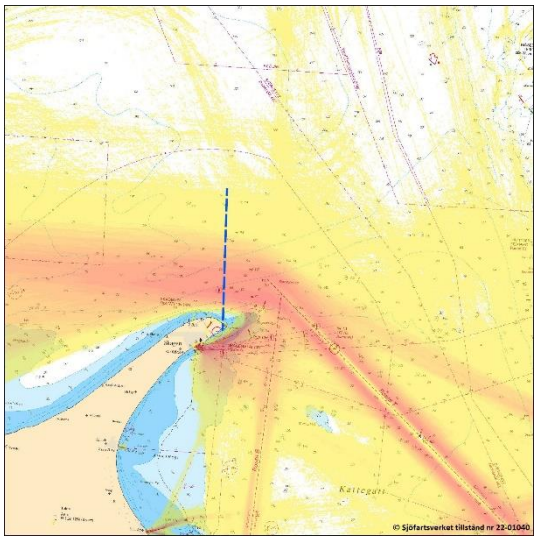


**Figure 3: Ship density at Skagen in 2019**

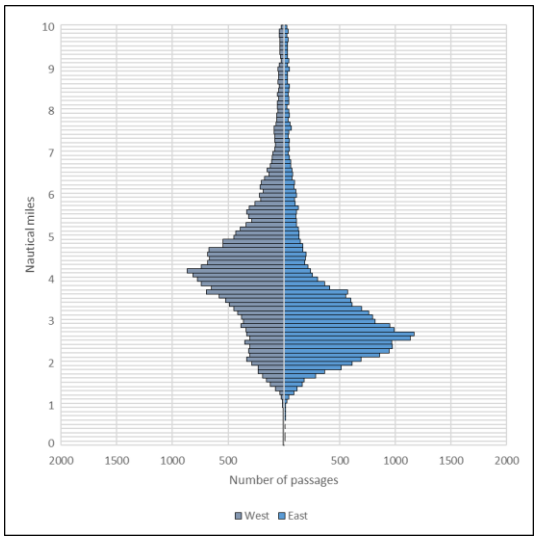


**Figure 4: Ship distribution at Skagen in 2019**

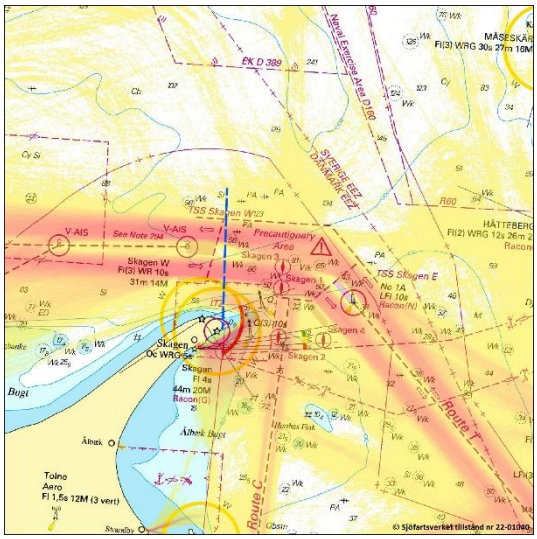


**Figure 5: Ship density at Skagen in 2021**

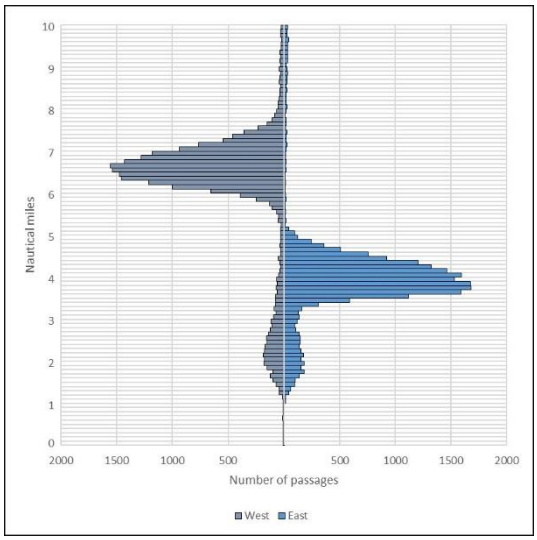


**Figure 6: Ship distribution at Skagen in 2021**

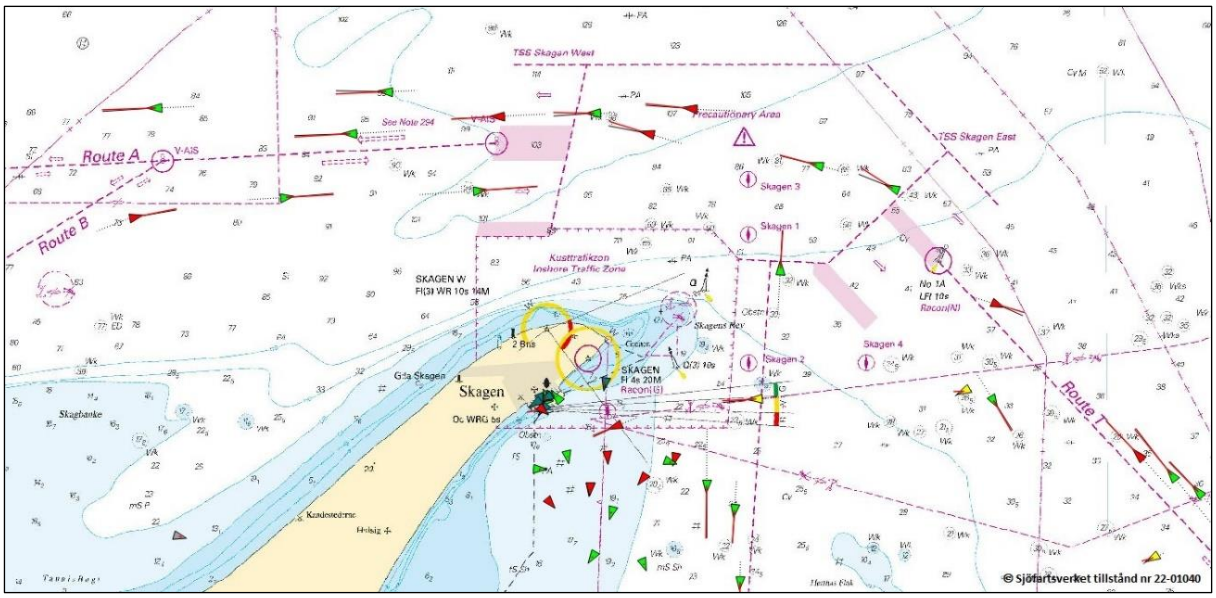


**Figure 8: Still picture from a replay of the traffic around Skagen**

**Recommended route S outside the west coast of Sweden**

8 The recommended route S, the route between the precautionary area at Kummel Bank and the entrance to the Sound, is recommended for ships with a draught of 10 metres or less. The main purpose for the introduction of the route was to spread the traffic in Kattegat over a larger area, allow more sea room for ships sailing in the area and were expected to improve the safety of navigation as it reduces the risk of collisions. The illustrations below show that since the routeing measures were implemented, a large number of ships use the recommended route S spreading the traffic as intended.

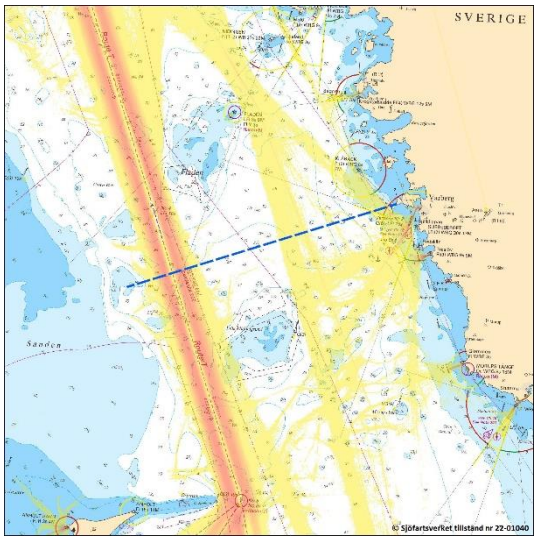


**Figure 9: Ship density in Kattegat in 2019**

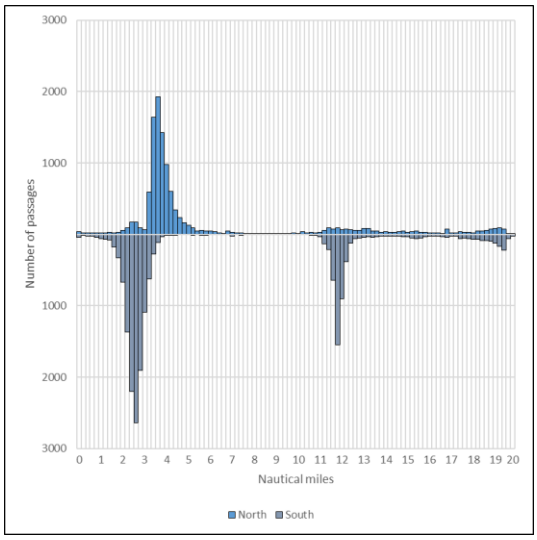


**Figure 10: Ship distribution in Kattegat in 2019**

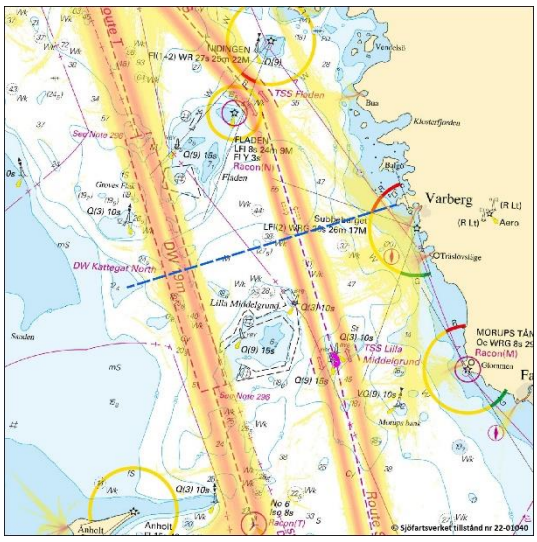


**Figure 11: Ship density in Kattegat in 2021**

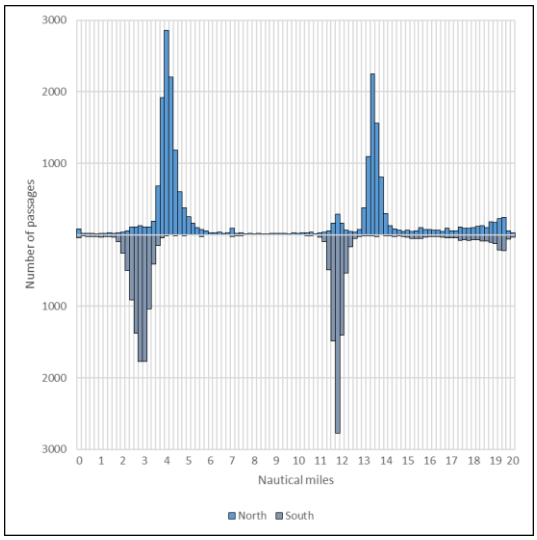


**Figure 12: Ship distribution in Kattegat in 2021**

**TSS "Entrance to the Sound" and two associated inshore traffic zones within the recommended route S**

9 TSS "Entrance to the Sound" were proposed to be established in order to separate opposing streams of traffic, to reduce the danger of collision or groundings and to organize safe traffic in environmentally sensitive areas in and around the new recommended route S.

10 The pictures below illustrate clearly that the traffic patterns have changed after the implementation of the routeing measures and more ships use the recommended route S. The implementation of the TSS together with the ITZ has most likely contributed to directing the traffic so ships in route S are lined up before entering the Sound and keep their course after leaving the Sound. Without the TSS and ITZ, a large number of vessels using route S would most likely use a route closer to the Kullen lighthouse, where ships used to go before 2020 as shown in figures 13 and 14.

11 The TSS "Entrance to the Sound" is situated within the mandatory ship reporting system SOUNDREP, operated by Sound VTS, and the area is closely monitored. Some infringements to COLREG rule 10 on TSS have been reported in the western and eastern inshore traffic zones and distributed to the concerned flag States.

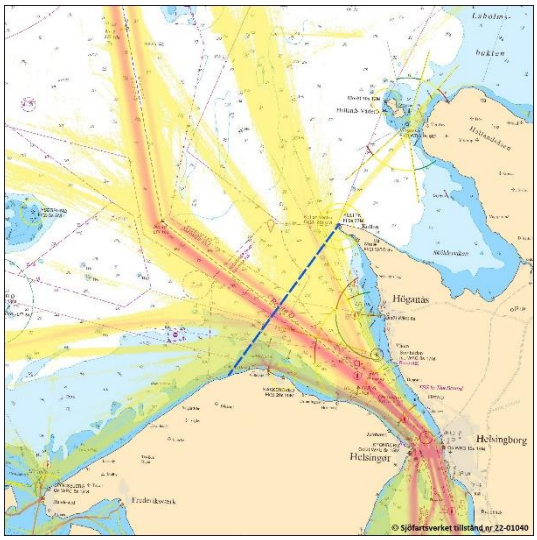


**Figure 13: Ship density in the entrance to the Sound in 2019**

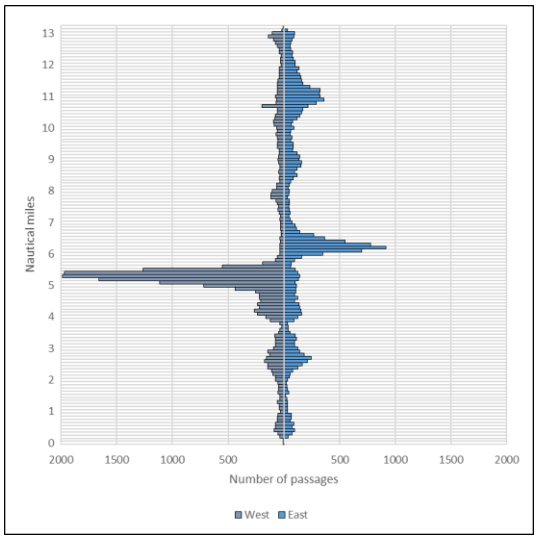


**Figure 14: Ship distribution in the entrance to the Sound in 2019**

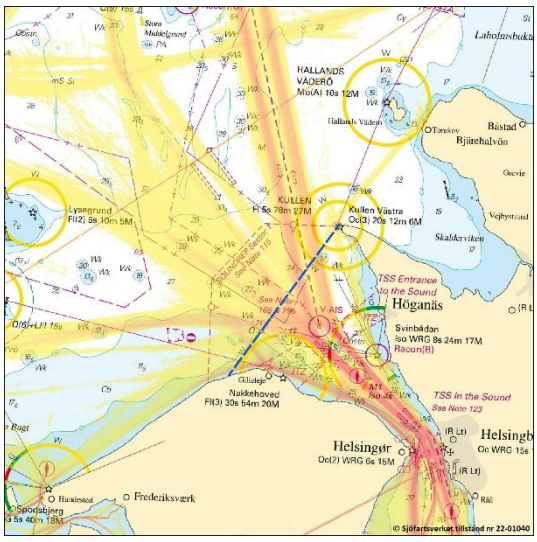


**Figure 15: Ship density in the entrance to the Sound in 2021**

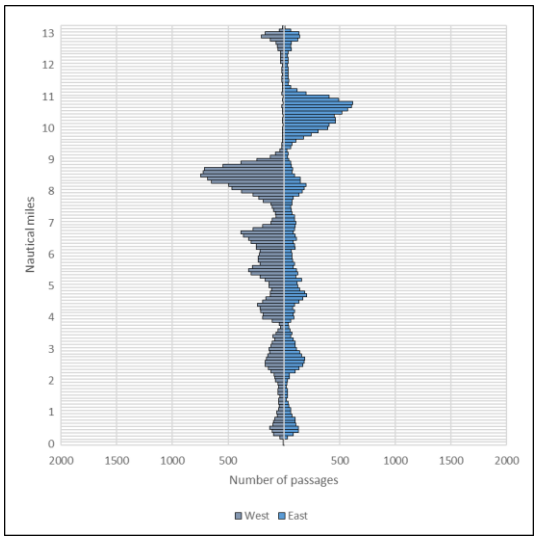


**Figure 16: Ship distribution in the entrance to the Sound in 2021**

## Incidents and accidents

12 The Danish and Swedish Maritime Administrations are monitoring the effect of the implemented routeing measures continuously. However, due to the limited period since the routeing measures came into force, Denmark and Sweden can only conclude the positive trend experienced with the traffic separation. Hopefully, Denmark and Sweden are able to conclude on the continuous low numbers of groundings and collisions when more reliable information over a longer period of time is gathered.

## Offshore developments in the area

13 The Danish and Swedish Maritime Administrations are closely monitoring potential plans for e.g., offshore installations, wind farms etc., which may affect the ship traffic near the established routeing measures. During the last few years, offshore wind farm planning has increased in the area. However, no specific projects have been approved so far.

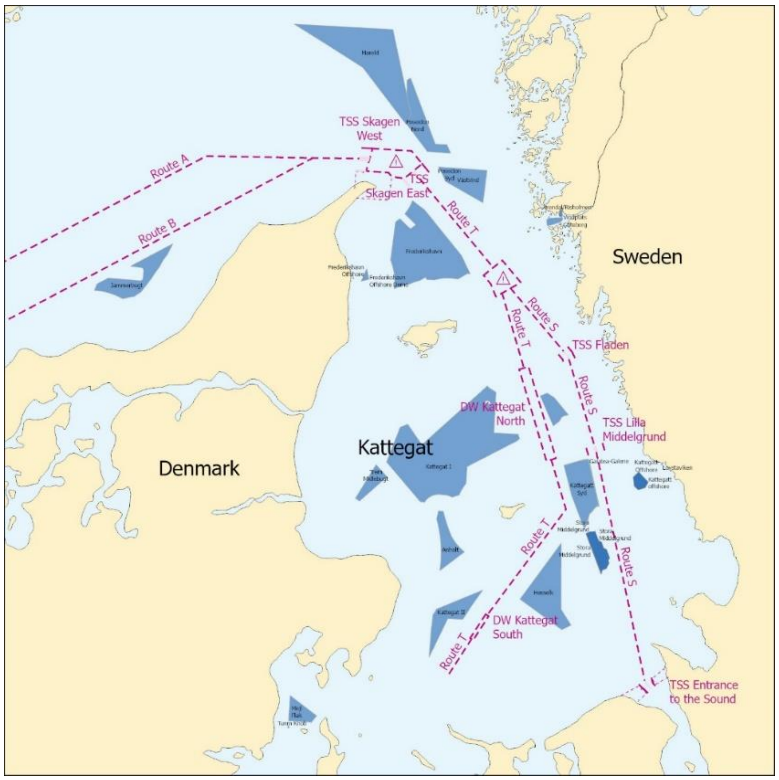


**Figure 19: Reservations for offshore wind production sites according to EMODnet[1] and Vindlov[2]**

## Aids to navigation

14 Before the introduction of the routeing measures, the aids to navigation (AtoN) in the area were analysed. Physical AtoNs were deployed, adjusted or withdrawn and virtual AIS AtoNs were established in certain areas, in order to inform the shipping about the new TSS, etc.

15 The Administrations have decided to keep the virtual AtoNs active, as the information is portrayed on the ships' electronic chart display and information systems (ECDIS), and as such providing awareness and additional information about the TSSs, etc.

## Conclusions

16 In general, the intentions and purposes of the routeing measures have been fulfilled, and the analyses have demonstrated that the traffic has been better distributed and created more predictable traffic patterns for the benefit of safety of the navigation in the area.

17 TSSs have all over the world for many years been considered as the most effective means of separating two-way ship traffic and enhances safety of navigation and this has also been the case for the established TSSs in Kattegat. The Danish and Swedish Maritime Administrations are satisfied with the results of the routeing measures. However, the measures will continuously be monitored for potential amendments. Currently, there are no planned amendments to the routeing systems as Denmark and Sweden still need to monitor the effects over a longer period of time.

1 https://emodnet.ec.europa.eu/en

2 https://www.energimyndigheten.se/fornybart/vindkraft/vindlov/ (only in Swedish)

**Action requested of the Sub-Committee**

18 The Sub-Committee is invited to note the information provided.