

**Paper for Consideration by Data Quality Working Group**  
**Norwegian CATZOC routine**

**Submitted by:** Norway

**Executive Summary:** Description of how CATZOC values in ENC's are allocated (Norway).

**Related Documents:** S57 IHO Transfer Standard for Digital Hydrographic Data.

**Related Projects:** -

### Introduction / Background

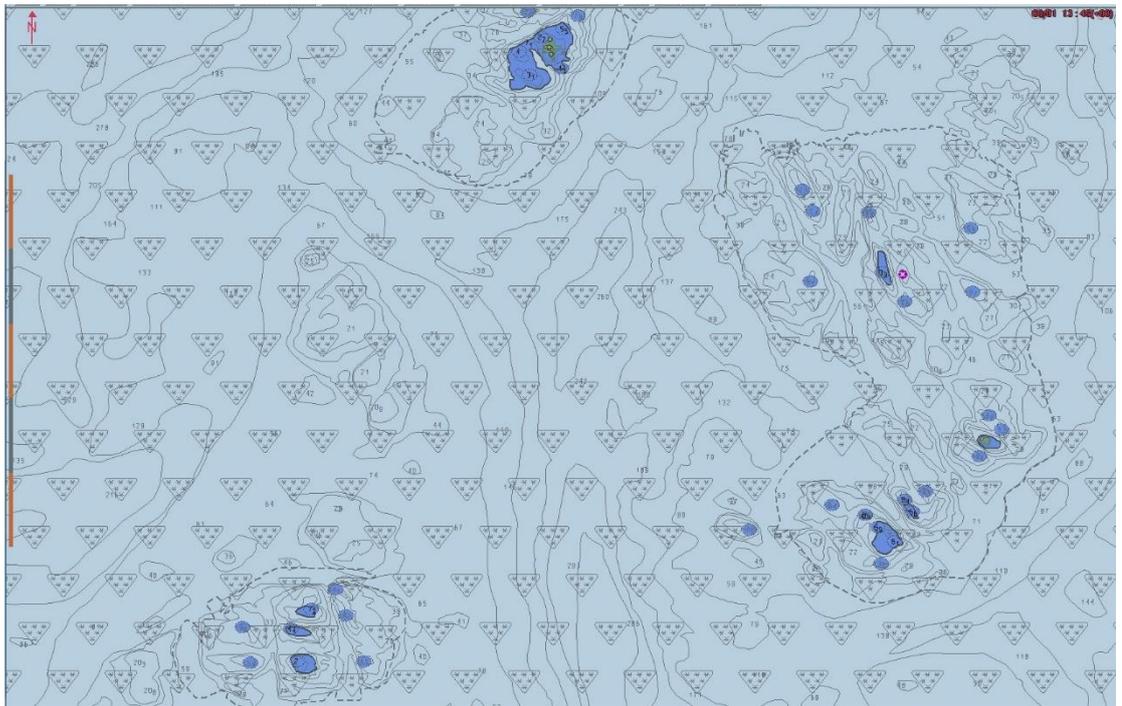
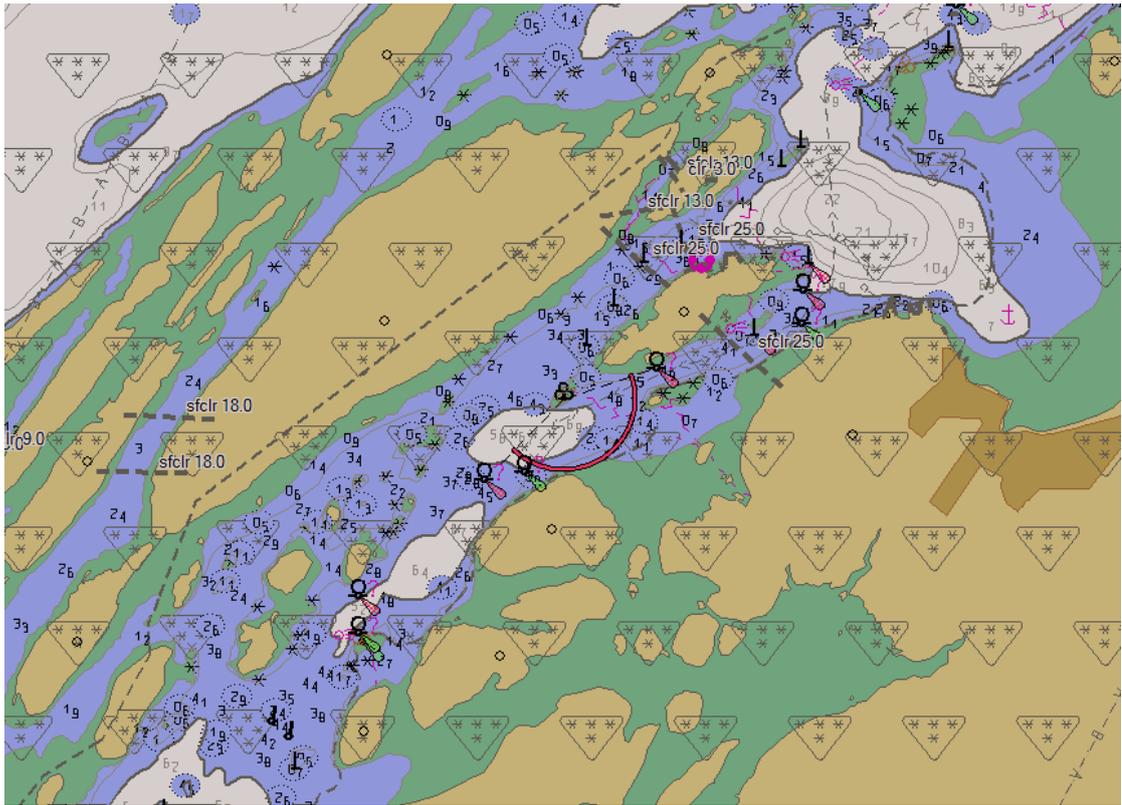
The Zones of Confidence (ZOC) diagram describes the quality of the bathymetry in the different areas. There are five quality categories in the ZOC diagram (A1 to D).

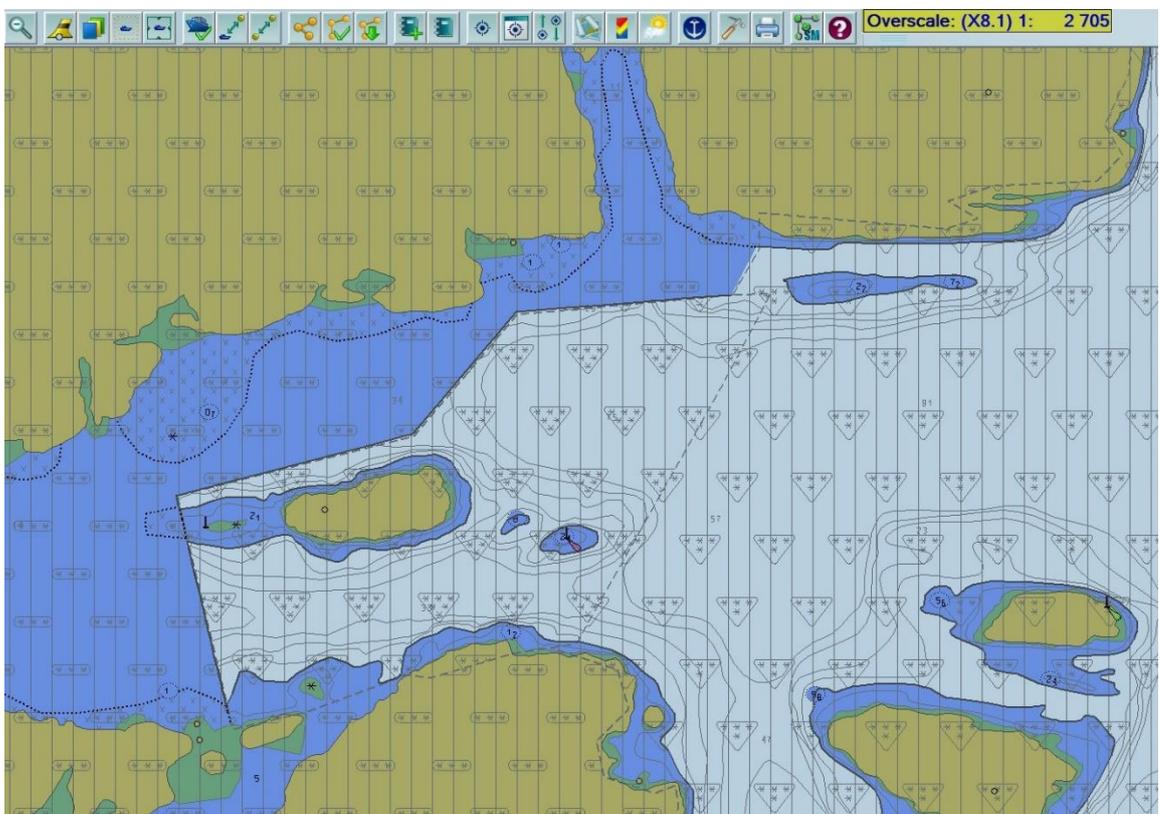
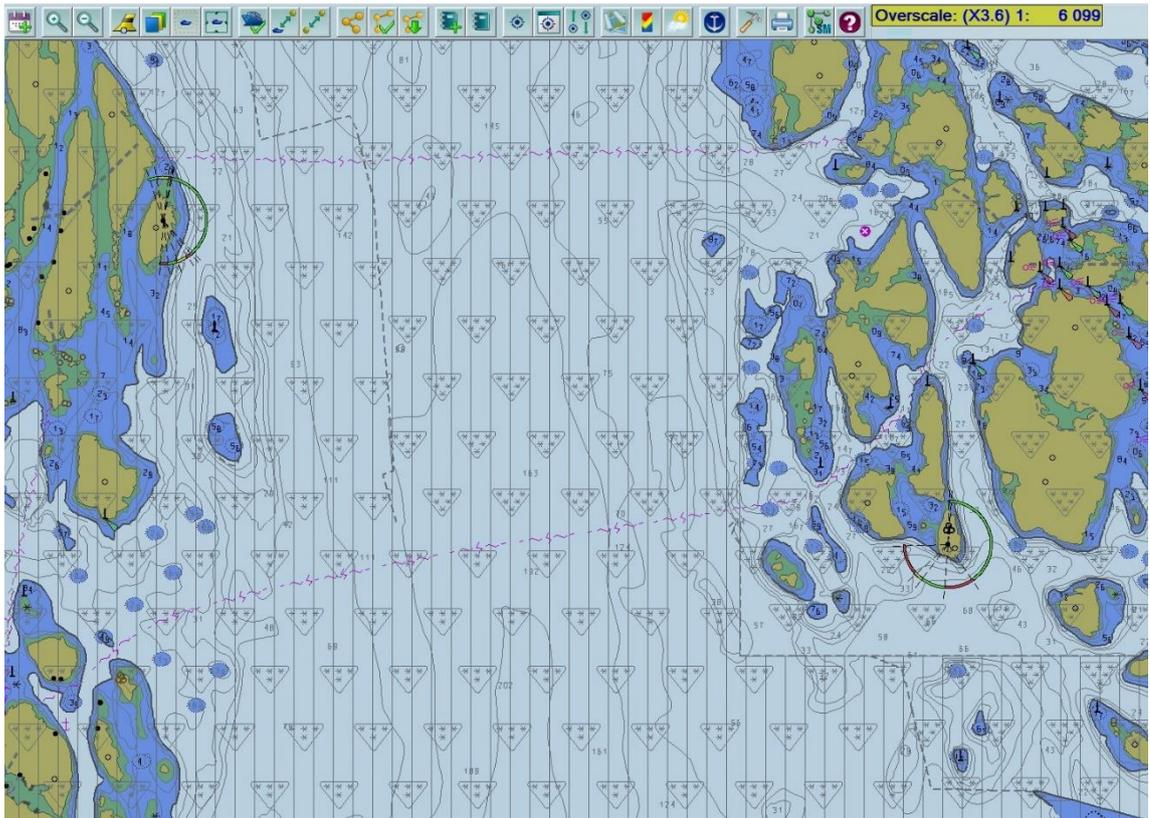
### Analysis/Discussion

Until autumn 2013, mainly category B and C were used for Norwegian coastal waters based on the following classifications: ENC's with source data from older surveying (before 1960) were given ZOC value C, while ENC's with source data from surveying younger than 1960s were given ZOC value B. From 1 of January 2014 areas measured with multibeam sonar or which otherwise met the requirements were given the categories A1 or A2. The delimitation of the different zones were added in the ENC's to always show which zone it is.

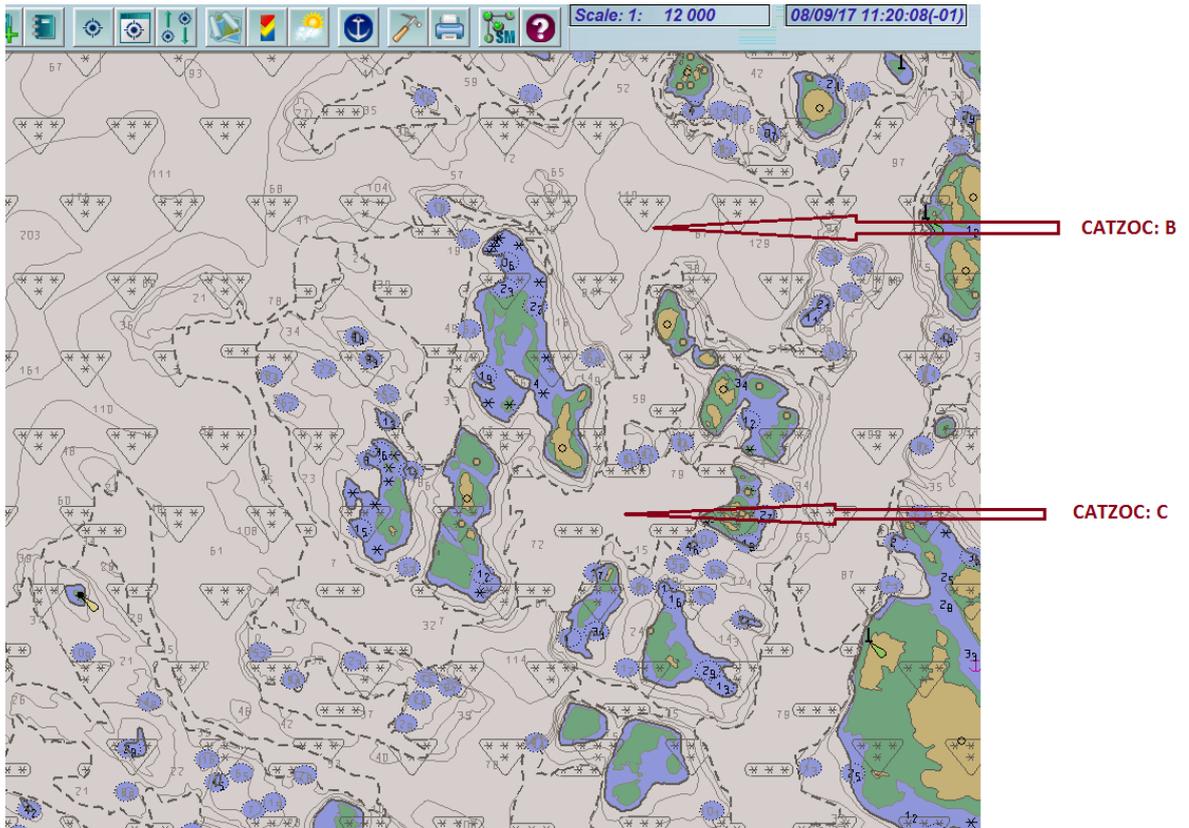
Because of production method used it can lead to difficulties in visualizing CATZOC with different values in relatively small area in the same chart. A border between A1-A2 and B categories almost indistinguishable and difficult to perceive. See pictures below.







The same between B and C categories. See picture below.



Historically, the charts around Svalbard were produced on different datum sets (the reference system, which the graticule refers to). In older charts for example, both the Local Datum (Grønfyord datum) and the European Datum were used. Both these reference systems are of unequal quality, and possible inaccuracies in the systems must be taken into account. Uncritical use of older charts and modern positioning systems (like GPS) can, because of discrepancies etc. related to the datum, lead to serious mistakes (several hundred meters) during navigation. This further means that the safety margin that sailors should always apply may not be in place as expected. In some of the older charts, information is given showing the displacement between the graticule of the chart and the World Geodetic System (WGS84). New charts for the area are made in accordance to the World Geodetic System (WGS84), while new prints of the older charts retain the existing graticule. The paper charts in the area are on a scale of 1:100 000 or less, and that these charts often form the basis for electronic charts over these waters. The coastline can have considerable discrepancies when compared to the graticule of the chart. Furthermore, the lines of survey for these waters are spaced out to such a degree that the occurrence of undiscovered shoals and rocks cannot be excluded. Navigation in these waters requires extra caution.

The glacier fronts seawards are continually changing. In general, the glacier fronts are receding: observations exist where the glaciers have receded several hundred meters during the last decades. It is also usual that the glaciers have shorter periods when advancing considerably ("surging glaciers"). Large quantities of ice then move downward from the top of the glacier and collapse below. For this reason, contour lines and terrain close to the glacier can deviate from contour lines on the chart. In the chart the glacier fronts seawards can refer to a certain year, but such information does not always exist. Changes in the front of a glacier can cause a considerable difference between the existing front and the charted front. In areas where the glacier fronts have receded compared to fronts shown on the chart, no depth information exists. Also the coastline can change, in particular close to large rivers.

Glaciers are in some cases used as a reference in conjunction with leading lines. These can be old and well-known points, which have been used for decades. Changes in the form and outline of glaciers might, however, cause changes in the reference point.

Surveys are incomplete in some areas of Svalbard. Large areas are not surveyed at all. These areas are presented as white areas limited by a red dashed line and the text "Unsurveyed". Areas inside the 50 meters depth contour in areas with old surveys are not safe.

In newly surveyed areas of Svalbard, the surveying is performed at depths deeper than 3 meters only. Shallow areas are not surveyed.

### **Conclusions**

There are some difficulties in visualizing CATZOC with different values in relatively small area in the same chart. A border between A1-A2 and B categories is difficult to perceive.

There are significant areas around Svalbard, which are qualified as "Unsurveyed" or categorized as C and D. Changes in the form and outline of glaciers is challenging to visualize with high accuracy.

### **Recommendations**

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### **Justification and Impacts**

No impact

### **Action Required of Data Quality Working Group**

The DQWG is invited:

- a. to note and discuss this report
- b. to provide feedback.