

Paper for Consideration by CSPCWG

[Commentary on CSPCWG7-08.11 Depiction of Imprecise Shoal Depth Areas]

Submitted by:	US/NGA
Executive Summary:	Satellite altimetry and mathematical algorithms can be used to determine possible shoal areas, or “Red Dot” areas. Both vertical (depth) and horizontal (radius) margins of error are determined and used when depicting the shoal areas on paper charts. This paper is a commentary of the CSPCWG7-08.11 submission by the UK.
Related Documents:	INT 1, S-4
Related Projects:	None

Introduction / Background

The US/NGA Red Dot program was established in 2005 shortly after the grounding of the USS San Francisco. As a result of this incident, NGA collaborated with the US Navy to find unconventional means in identifying potential hazards to submerged navigation. The Red Dot working group was formed, and using known gravimetric data, they developed a list of potential hazardous shoal areas. The Red Dot areas are compared against all NGA data holdings and charts to prove and/or disprove them as hazards. In total, 692 Red Dots were found to be unknowns and possible dangers to submerged navigation.

Analysis / Discussion

NGA discovered potential hazardous shoal areas, called Red Dots, using satellite altimetry and mathematical algorithms. Once the Red Dots were identified, a thorough analysis is conducted in order to determine if further ship survey of the area is needed. A margin of error of +/- 250 meters in depth is implied for each Red Dot. The Red Dot depth is adjusted with the margin or error to determine a ‘least predicted depth’. This depth is then used to determine if charting is necessary. Red Dots less than 550 meters in depth are charted. Any depth greater than 550 meters is charted **only** if the surrounding depths are at least five times greater than the Red Dot (i.e. a Red Dot of 640 meters should be added if the nearest charted depths are 3200 meters or more). Currently charted depths remain as is on the chart and are not deleted or substituted at this time. Chart scale also determines how a Red Dot is portrayed, as noted below.

1. If the adjusted predicted depth is a negative number (above sea level), the predicted shoal area is charted as a danger circle or area [K1] with blue tint and a legend: “Shoal [area] rep (YYYY)”. No depth is specified.

Add “Shoal rep (2009)” area bound by dotted line joining...

Add Danger circle [K1] “Shoal rep (2009)”, radius 5 miles, bound by dotted line joining...

2. If the adjusted predicted depth is a positive number and does not exceed the size of a printed depth, it is charted with the legend “Rep (YYYY)”. If the size would have exceeded the printed area, (PA) is added.

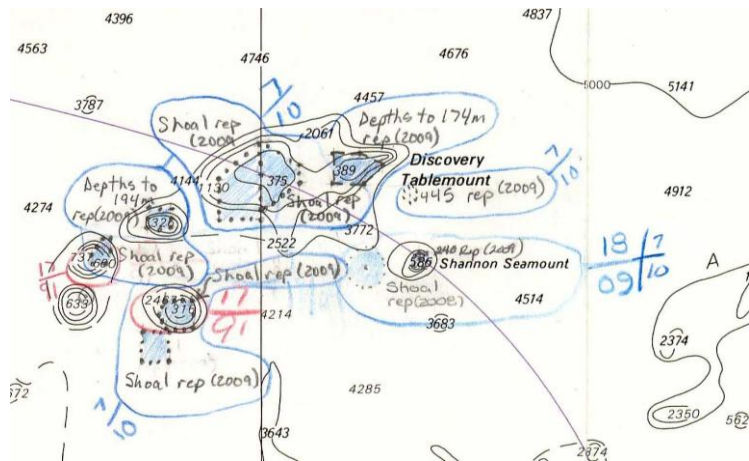
Add Depth 445 meters “Rep (2009)”

3. If the chart allows for the radius or area of a predicted depth to be charted as a distinct area feature, a determination must be made as to whether the depth area is dangerous (shallower than 30 meters) or non-dangerous (deeper than 30 meters), and dotted or dashed lines would be used, respectively, along with the legend “Depths to XXXm rep (YYYY)”.

Add “Depths to 194m rep (2009)” blue tint area bound by dashed line joining...



Example 1



Example 2

The Red Dots are evaluated against current bathymetric information to determine if further investigation is necessary. If it is found that the Red Dot **is not** a potential hazard and there is sufficient chart coverage, the Red Dot is deleted. If it is found that the Red Dot **is** a potential hazard to submerged navigation, the area will be surveyed and the information gathered will be evaluated against chart coverage. Once known depths are found and charted, the Red Dot areas may be deleted.

Out of the 692 Red Dots found, 380 remain to be evaluated for final determination.

Conclusions

NGA feels it is necessary for possible shoal areas that may be hazardous to navigation should be depicted on standard nautical charts until final determination of validity is confirmed or disproven.

Recommendations

Expand the current definition of shoal areas to include predicted areas in INT 1 and in S-4.

Justification and Impacts

The expansion of the current definition allows for the prudent mariner to successfully navigate using the fullest information available. The INT 1 WG would be essential if new symbology is determined to be necessary.

Action required of CSPCWG

The CSPCWG is invited to:

Note the current policy and production process that the US/NGA uses with regards to the analysis and chart portrayal of potential hazardous shoal areas derived from satellite altimetry and mathematical algorithms.

- a. endorse
- b. agree
- c. note
- etc.