

Paper for consideration by NIPWG

Spatial Model – Approximate Areas for Nautical Information Specifications

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Executive Summary:	Describes a potential issue with approximate areas in the current S-100 spatial model and nautical publications data.
Related Documents:	(1) NIPWG1-1.8.1;
Related Projects:	(1) S-100; (2) S-122, S-123, S-126, and other NIPWG product specifications

1 Introduction/Background

Work on the S-122 GML data sample discovered a potential problem with approximate areas in S-100 relevant to several NIPWG data products. This paper describes the issue.

2 Analysis/Discussion

2.1 Modelling approximate areas

The North American right whale sighting areas in the S-122 sample are encoded as relatively large regions in and near U.S. waters where the right whale population may be present. In contrast to seasonal management areas, critical habitat, and dynamic management areas, the boundaries of the “sighting areas” in the S-122 sample do not seem to have published in official publications as restricted areas or marine protected areas of one type or another. They appear to be significant mainly as locations where right whales are more likely to be found. The 3 locations are:

- year round in the north-eastern region from Cape Code to Nova Scotia;
- during winter and early spring, in the calving area in the coastal waters off the Southeast Atlantic coast;
- during fall, in the migration route from the northern zone to the calving area, which runs through near-shore waters along the mid-Atlantic coastline.

The regions are depicted on fact sheets published by NOAA Fisheries [FS1, FS2].

Similar questions have been brought up in SNPWG meetings, in the context of Physical Environment (S-126) and Radio Services (S-123) product specifications. The solution suggested was applying the attribute **quality of position** to the relevant boundary on the spatial attribute with value 4 (approximate). This approach may not be suitable for all cases where fuzzy areas exist.

Radio services may be received guaranteed in a certain distance from ashore for sure and with decreasing reliability of the service at increasing distances beyond this distance. That would require a graduation of the service reliability which could fuzzy out at the outer edge.

Sailing Directions often describe passages where the recommended path is a corridor and the limits are not specified. That would require a fuzzy spatial limit.

An alternative model for fuzzy areas may be needed. It may be possible to use the positional uncertainty value attached to the boundary curve in a further approximation but this may not suffice.

The working group is requested to discuss the importance of fuzzy spatial objects, and, if a solution is desired, to define more use cases and outline the parameters for the desired solution.

3 Impacts

Adding fuzzy areas will allow more realistic data, the magnitude of the benefits from which remain to be determined. Costs for the modelling of fuzzy spatial objects also still to be determined, but obviously additional training, labour for data production, and complexity in software are among them.

4 References

[FS1] North Atlantic Right Whale Fact Sheet, NOAA Fisheries, Southeast Regional Office. Location: <http://sero.nmfs.noaa.gov/protected_resources/outreach_and_education/index.html> (retrieved 12 Jun 2015).

[FS2] North Atlantic Right Whale Seasonal Distribution and Habitat Use (Fact Sheet), NOAA Fisheries, Southeast Regional Office. Location: <http://sero.nmfs.noaa.gov/protected_resources/outreach_and_education/index.html> (retrieved 17 Jun 2015).

5 Actions Requested

The NIPWG is invited to:-

- comment on the importance and anticipated impacts;
- discuss whether a solution is required or desirable for nautical publications product specifications;
- if solutions are needed/desired, discuss ways forward to providing them.