Paper for consideration by NIPWG7

Creation of S-122 for German waters

Submitted by:	BSH
Executive Summary:	Description of creation process of S-122s
Related Documents:	S-122 Product Specification, NIPWG 6-30.3
Related Projects:	S-100, S-122

Introduction / Background

The development of the S-122 (Marine Protected Areas) S-100 compliant product specification was initiated by HSSC1/8 in 2009 and was based on a U.S. request.

Parallel development of the S-100 data model affecting the product specification developments at all, necessary data model harmonisation efforts with S-101 (ENC) and the lack of technical expertise of the NIPWG team members in writing S-100 compliant product specifications have caused several delays. Finally, the first version of the product specification passed the Member State approval process in 2018 and was officially released in 2019. At NIPWG 6 several NIPWG Member States including Germany indicated developing the first data sets. Germany completed the work in September 2019 and the data set is now available for use.

Analysis/Discussion

It has to be noted that BSH does not provide information on MPA in their navigational products. Regulations affecting the safety of navigation have been incorporated in the BSH portfolio of nautical products, such as charts (Paper and ENC) and Nautical Publications. The first step of work was to collect all MPA related information in one file. Considering that this work should be reusable, taking into account that this work should be done in the most effective way, and being aware that information of associations and inverted associations should be provided, BSH decided to use an MS Excel Spreadsheet which has been developed by the company Portolan Sciences for other data modelling work in the past (see Annex A).

Considering the fact that the currently used production software version (HPD Version 3.1) does not support the implementation of S-100 based product specifications and consequently no production of S-100 compliant products, BSH decided to build up an own software environment. The following configuration has been set up:

- SQLite
- QGIS
- Python
- XMLSpy (to check the GML against the schema).

As a basis dataset and to reduce the manual workload, the Marine Protected Areas dataset from IUCN has been selected and downloaded (https://protectedplanet.net). This dataset contains the basic MPAs information and the associated spatial. The shape file has been loaded into QGIS and filtered with SQL statements by different attributes (Country, Marine and IUCN category). Unnecessary dataset information has been filtered and removed. The dataset content needed also some cleaning work (e.g. different spelling of same data content) (see Annex B).

MPAs spatial have been reused to create the spatial of both RestrictedAreaRegulatory and RestrictedAreaNavigational. It has been considered that the spatial of RestrictedAreaRegulatory is identical with the spatial of the relevant MPA. Comparing RestrictedAreaNavigational with official German HPD S-57 RESAREs discovered that the RESAREs spatial are not always identical with the MPAs spatial. Consequently, geometries of the copied RestrictedAreaNavigational have been deleted, modified or split into several RestrictedAreaNavigational.

The following main data model components have been used:

Feature type	Items	National distinctions
MarineProtectedArea	95	The Federal Agency for Nature Conservation defines the MPA. These MPAs are the basis for areas where navigational regulations apply. These regulation areas are established be the Water and Shipping Administration. Only in a few or in parts of these areas regulations apply which have impacts on navigation.
RestrictedAreaRegulatory	95	
RestrictedAreaNavigational	76	
VesselTrafficServiceArea	1	
Information type		
Regulations	40	
NauticalInformation	1	
ContactDetails	2	
Authority	3	
Applicability	9	

The following issues have been noted during the encoding process:

RestrictedAreaNavigational:
Spatial of existing ENC RESAREs have been used. Some of these RESAREs are also covering land areas. This might be possible in the current ENC regime. However, this has been checked against the new S-101 product specification element RestrictedAreaNavigational and it seems to be allowed there too. It is believed by BSH that restricted areas related to navigation should only be allowed in water areas.

Vessel Traffic Service:
The current spatial of this feature could not be specified correctly. Therefore, an artificial spatial has been created.

Spatial operations:
It was identified that the complex data model structure causes an extremely long computing time for spatial operations by QGIS, such as dissolving of polygons.

Completeness of data:
The entries of the Baltic Sea area are complete. The only exemption is the wrong spatial of the VTS area. The entries for the North Sea area are also complete. Several minor areas where navigational restrictions apply exist in certain National Park areas. These areas can be encoded on request at a later date. In the meantime, the current encoding details have been considered as appropriate and as suffice for purpose.

The test data set contains entries in both German and English language. This is based on the fact that official translations of certain legal texts are not available. BSH provided translations where possible and appropriate.

References to the law have been provided by fileReference and fileLocator. The latter has been used to point to specific paragraphs if the law itself is comprehensive.
It is well known that the law could also be embedded as text or that it could be stored as a support file in a separate repository which then could be part of the whole data package.

Four persons with different expertise were involved in the whole conversion process:
- IT was involved to set up the database based on the UML
- Data modeller was involved to convert the source information into the data model structure
- Encoders were involved to fill up the data base with the converted source information
- IT was involved to build an S-122 GML.

Justification and Impacts
The data set is available and can be used. Investigations show that amendments for Marine Protected Areas are very rare.
The data base structure can be used for implementing other GML based S-100 compliant products specifiations.
Results of the work show that further data model harmonisation with S-101 could be beneficial and should be initiated / pursued if different S-100 based data sets were to be loaded and provided together on one screen / device.

Action required of NIPWG7

The NIPWG7 is invited to:

      a.   note this paper,

      b.   provide input if appropriate.

Note: FOR REASONS OF ECONOMY, DELEGATES ARE KINDLY REQUESTED TO BRING THEIR OWN COPIES OF THE DOCUMENTS TO THE MEETING
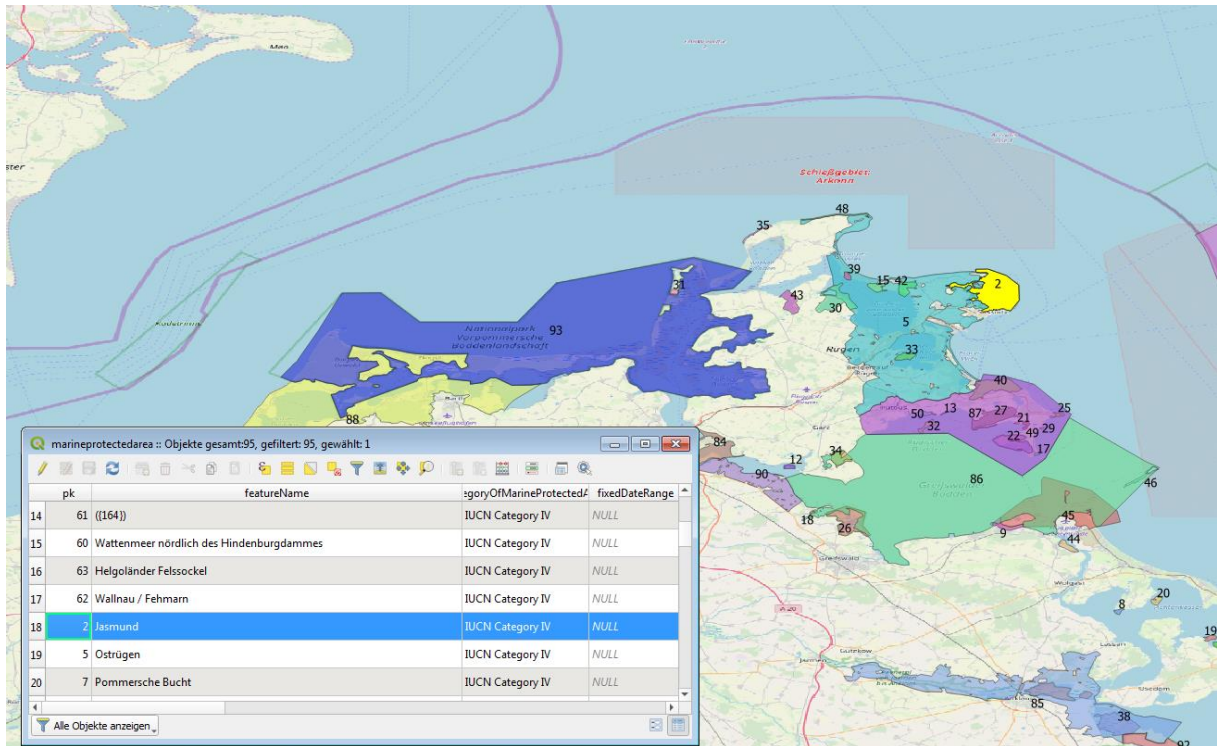
Annex A:

Excerpt of the mapping of MPA information using sophisticated Excel spreadsheet provided by Portolan Sciences.

Location in original, e.g., line number. For reference and review	ID (auto)	associations (use = cell formula)	Object (type acronym or Camelcase Name if no acronym)	Attributes (type acronym or camelCaseName)	sub-attributes (for complex attributes) - Type acronym or camelCaseName	Content or Value (type value)	allowed value label (optional)	Comments
German MPA		MPAARE1						
marine protected area, Suedperd	MPAARE1		MPAARE					ID 555632803
				featureName				
					text	Südperd		
					LANGGE	DE		
					categoryOfName	1	official name	
				CATIUC		5	Category IV	
				juristriction		2	national	
				sourceIndication				
					sourceType	1	law or regulation	
					source	Bundesamt für Naturschutz		
					country	DE		
					categoryOfAuthority	12	environmental	
		REGLTS1		informationassociation				
		REGLTS2		informationassociation				
		REGLTS3		informationassociation				
bei Südperd	RESAREnav1		RESAREnav					
				restriction		27	speed restriction	
				restriction		8	entry restricted	
				sourceIndication				
					sourceType	1	law or regulation	
					source	Generaldirektion Wasserstraßen und Schifffahrt		
					country	DE		
					categoryOfAuthority	15	maritime	
		REGLTS2		informationassociation				
		REGLTS3		informationassociation				

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Annex B:

MPA Examples (waters around Island Rügen)

Area Jasmund (UICN Cat IV) has been selected.