

BSH S-100 implementation status



BUNDESAMT FÜR
SEESCHIFFFAHRT
UND
HYDROGRAPHIE

Federal Maritime and Hydrographic Agency, Germany



Reduction of paper charts (up to Q4/2026)

Standardisation of chart formats (A0)

Standardisation of chart scales

1:6.000 (inlets)

1:12.500 (inlets)

1:30.000

1:50.000

1:150.000

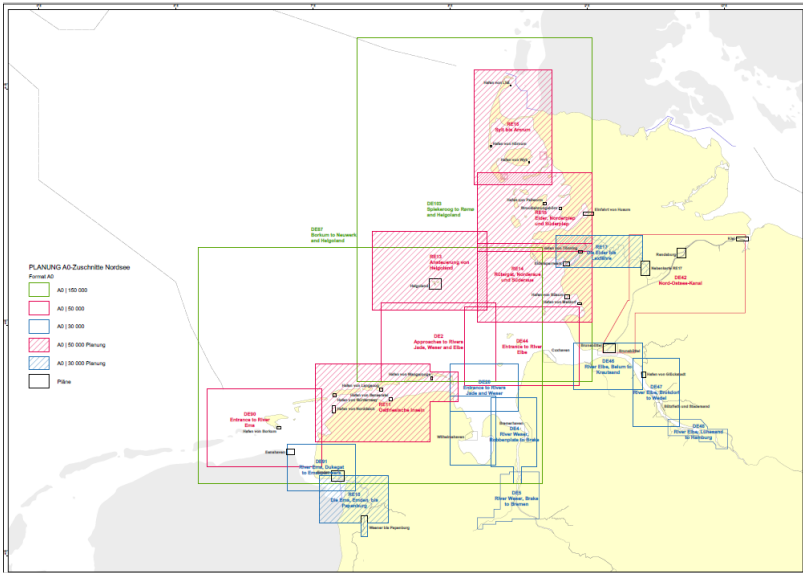
1:375.000 (planning)

From currently 128 charts and 159 inlets to
48 charts and 85 inlets

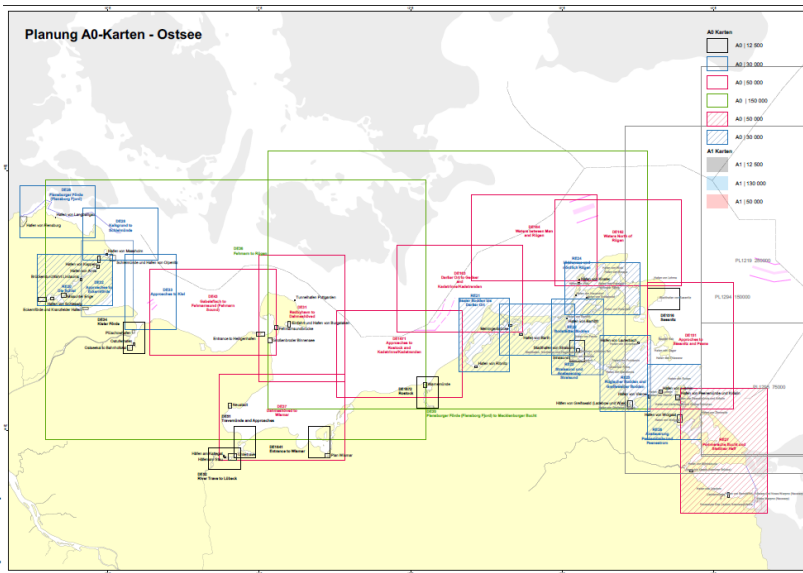
HPD

Preparation Steps and Timeline

Reduction of paper charts (up to Q4/2026)



Up to Q4/2025



Up to Q4/2026

HPD

Preparation
Steps and
Timeline

| S-101 Scale Bands | Maximum Display Scale | Optimum Display Scale | Minimum Display Scale | HPD Usage Band Ranges | S-57-ENC-CS | Paper Chart Scales |
|----------------------|-----------------------------|-----------------------------|-----------------------------|--------------------------|---|--------------------|
| | | | | Usage 1 | | |
| | | | | HD-ENC | | |
| Port I | 2.000 | 4.000 | 11.999 | 2 – 11.999 | 4.000 (6 - Berthing) | 3.000 6.000 |
| Port II | 6.000 | 8.000 | 21.999 | 12.000-21.999 | 8.000 (5 - Harbour) | 12.500 20.000 |
| Transit | 11.000 | 22.000 | 90.000 | 12.500 – 49.999 | 22.000 (4 - Approach) | 30.000 50.000 |
| Overview I | 45.000 | 90.000 | 180.000 | 50.000 – 149.999 | 90.000 (3 - Coastal) 180.000 (2 – General) | 150.000 300.000 |
| Overview II | 90.000 | 180.000 | 1.500.000 | 150.000 – 2.000.000 | 1.500.000 (1 - Overview) | 2.000.000 |

HPD

Preparation S-101 Scale Bands

(as of 31 March 2025)



Source Data Conversion (up to Q4/2025)

Test and adjustment of S-57->S-101->S-57 mapping files

Test and adjustment of references between different scale bands

Conducting source data preparation

Start of dual fuel production based on converted data

Data Base Conversion (commencing end of Q4/2025)

Preparing source data (all items verified)

Conduct conversion

Validation of conversion results (kitchen work)

Verification of converted HPD source data

HPD

Preparation Steps and Timeline

| Product | Responsible Organisation | Area | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|--|--------------------------|------------|-----------------------------|------|------|------|------|------|------|
| S-101 (ENC) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-102 (Bathymetric Surface) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-104 (Water Level) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-111 (Surface Current) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-122 (Marine Protected Area) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-123 (Radio Services) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-124 (Navigational Warnings) | WSV | North Sea | under consideration | | | | | | |
| | | Baltic Sea | under consideration | | | | | | |
| S-125 (Marine Aids to Navigation) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-126 (Marine Physical Environment) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-127 (Marine Traffic Management) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-128 (Catalogue of Nautical Products) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-129 (Under Keel Clearance) | third party | North Sea | in progress for river Weser | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-131 (Marine Harbour Infrastructure) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-411 (Ice Information) | BSH | North Sea | | | | | | | |
| | | Baltic Sea | | | | | | | |
| S-412 (Weather and Wave Hazards) | DWD | North Sea | under consideration | | | | | | |
| | | Baltic Sea | under consideration | | | | | | |
| S-413 (Weather and Wave Conditions) | DWD | North Sea | under consideration | | | | | | |
| | | Baltic Sea | under consideration | | | | | | |
| S-414 (Weather and Wave Observations) | DWD | North Sea | under consideration | | | | | | |
| | | Baltic Sea | under consideration | | | | | | |
| S-421 (Route Exchange) | WSV | North Sea | under consideration | | | | | | |
| | | Baltic Sea | under consideration | | | | | | |
| S-212 (Digital VTS Service) | WSV | North Sea | under consideration | | | | | | |
| | | Baltic Sea | under consideration | | | | | | |

Production Timeline

Source:

VTG Guide Germany

Processing:

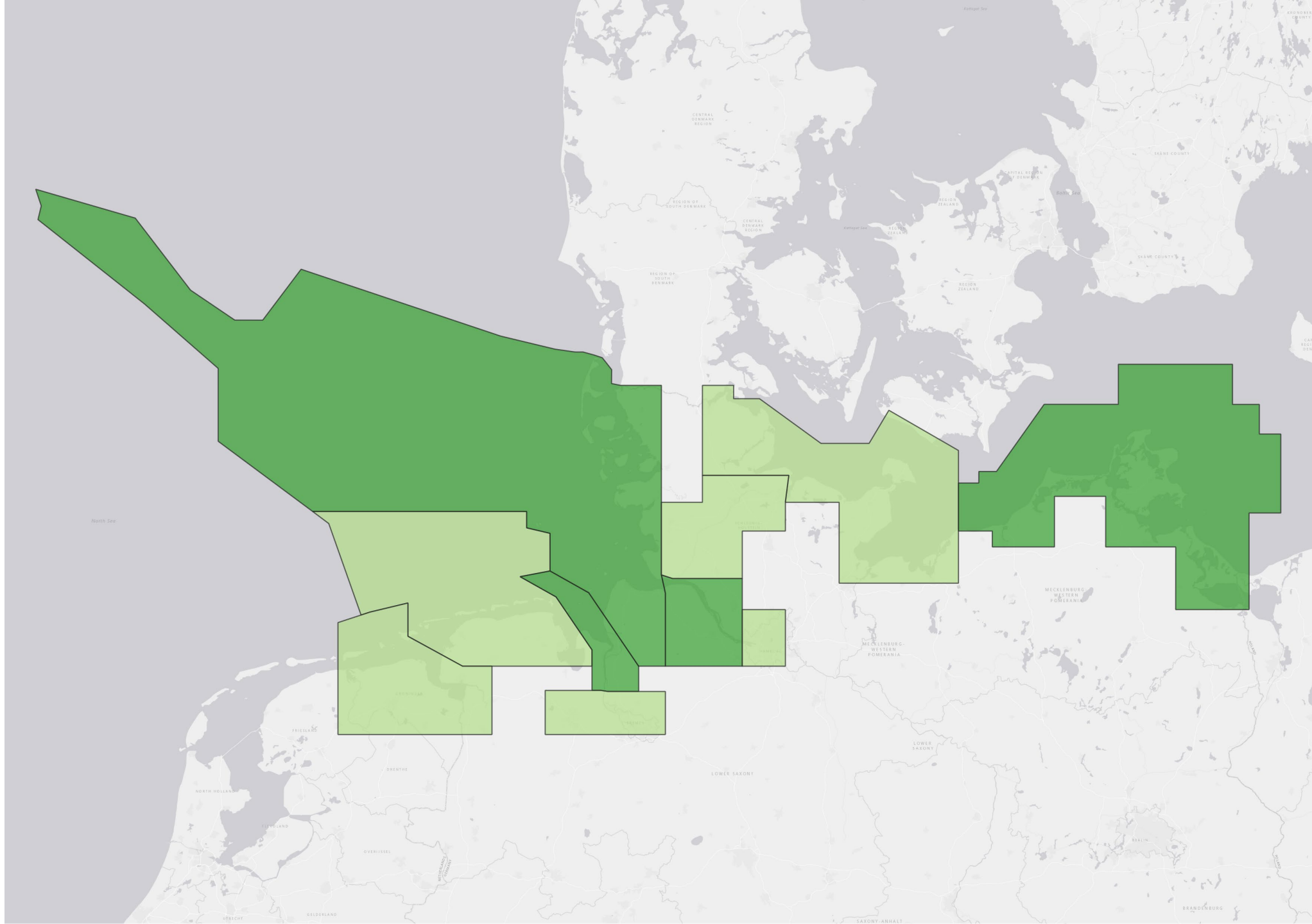
Automated analysis of book content

Converting book content into S-127 data model and assigning relevant VTG Areas

Generating S-127 product

Benefit: VTG Guide Germany publication can be derived automatically

S-127 Marine Traffic Management



Source:

HPD source data

Processing:

Automated analysis of HPD source data

Conversion to S-125 data model

Generating S-125 product

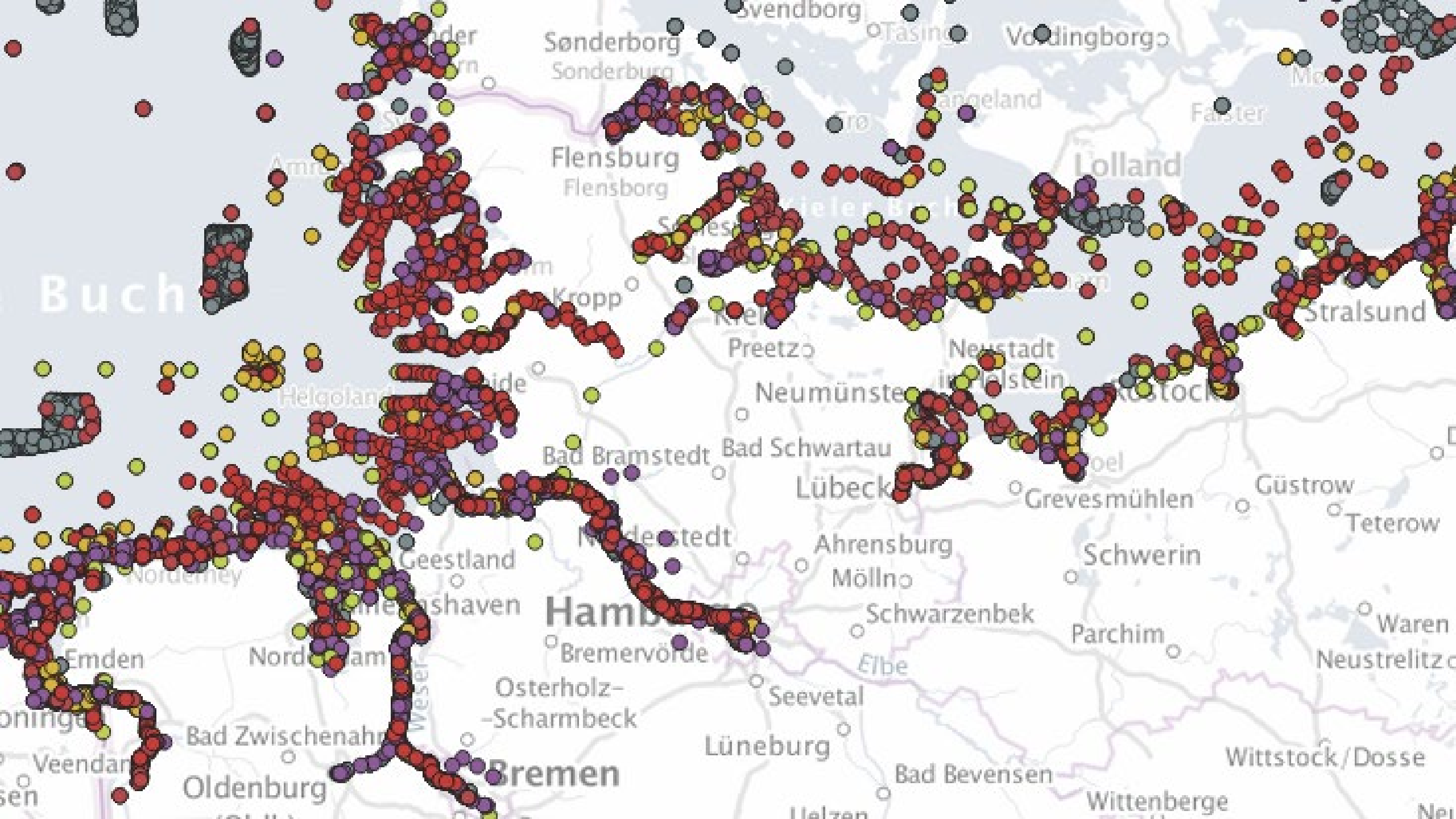
Benefit: List of Lights¹ and Winter Buoyage²
publications can be derived automatically

¹ in progress, new S-125 based publ. 01/2026

² in progress, new S-125 based publ. 09/2025

S-125 Marine Aids to Navigation





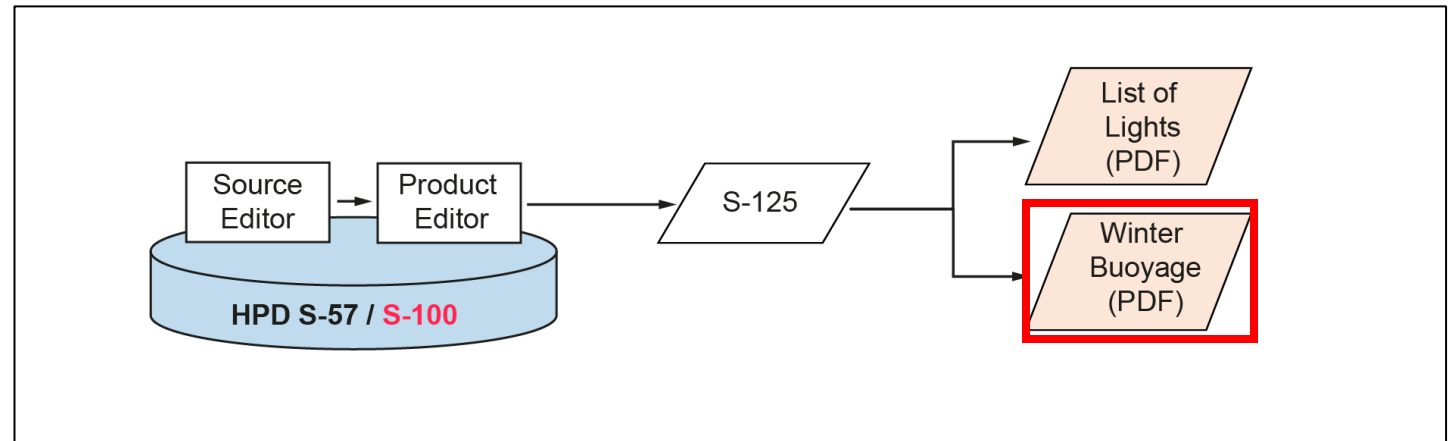
BSH Publication „Winter Buoyage“

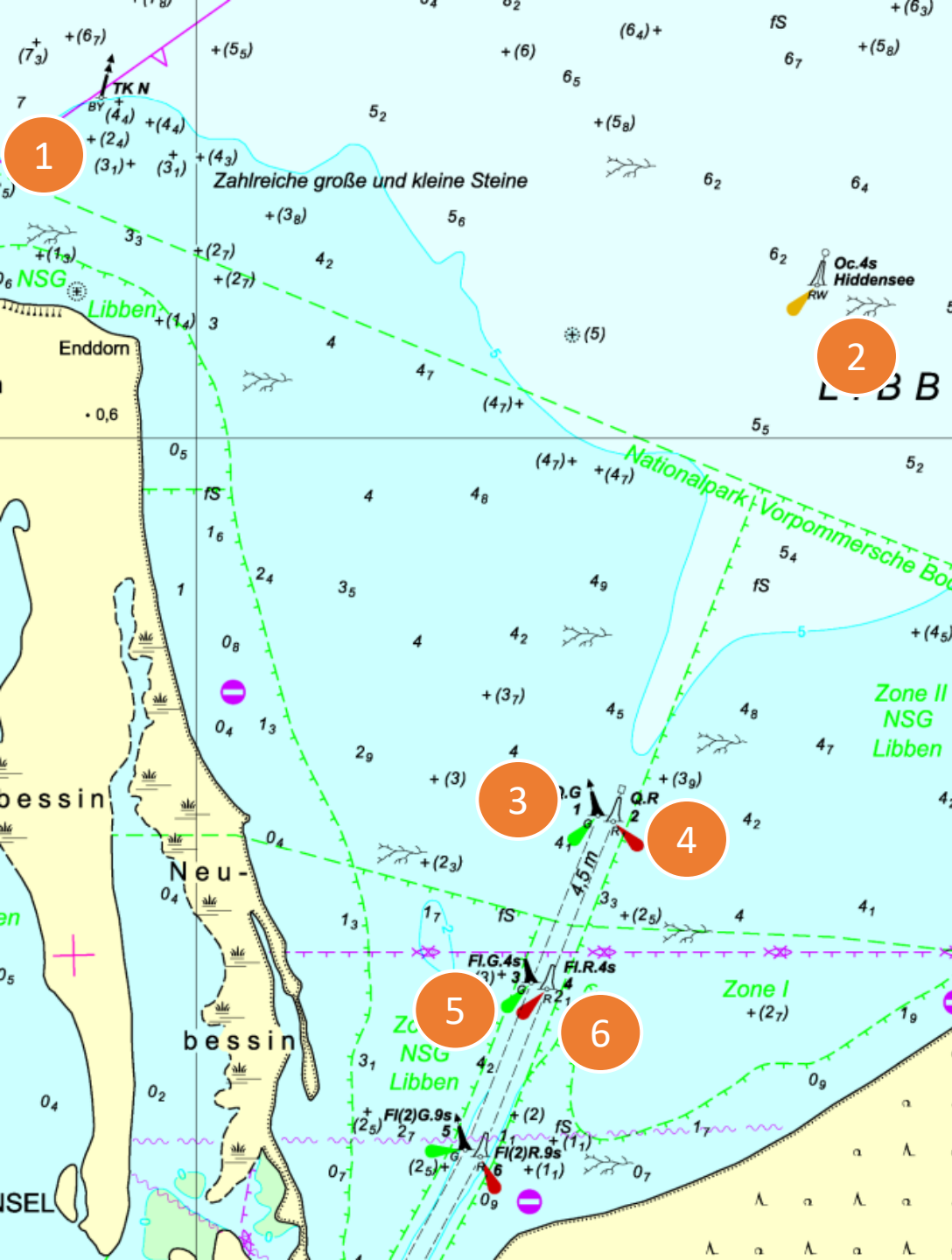
S-125 Production

- Import verified and tailored S-57 AtoN features into HPD Product Editor
- Programming → S-125 file

Winter Buoyage production

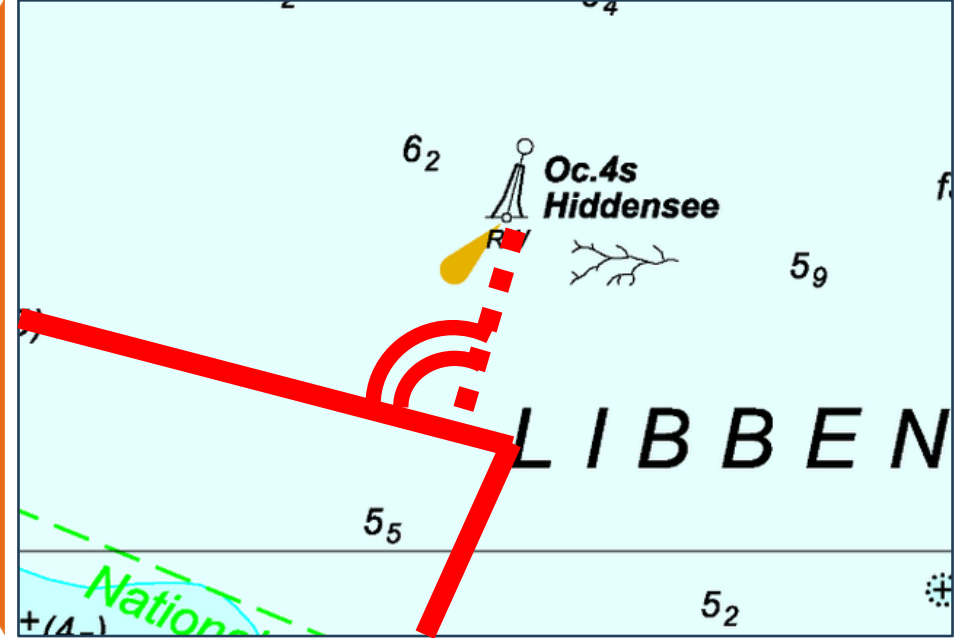
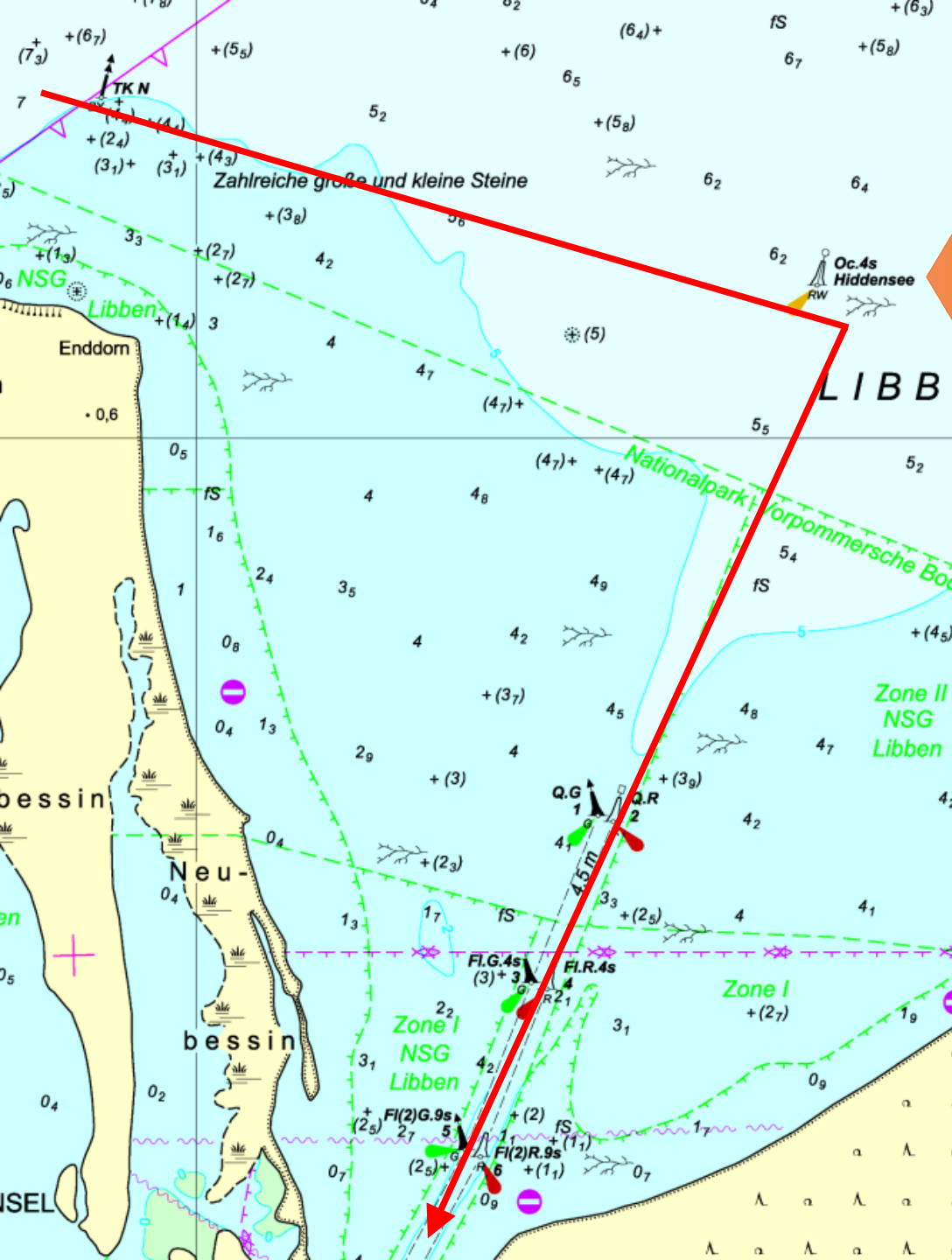
- S-125 file → programming → Winter Buoyage (PDF)





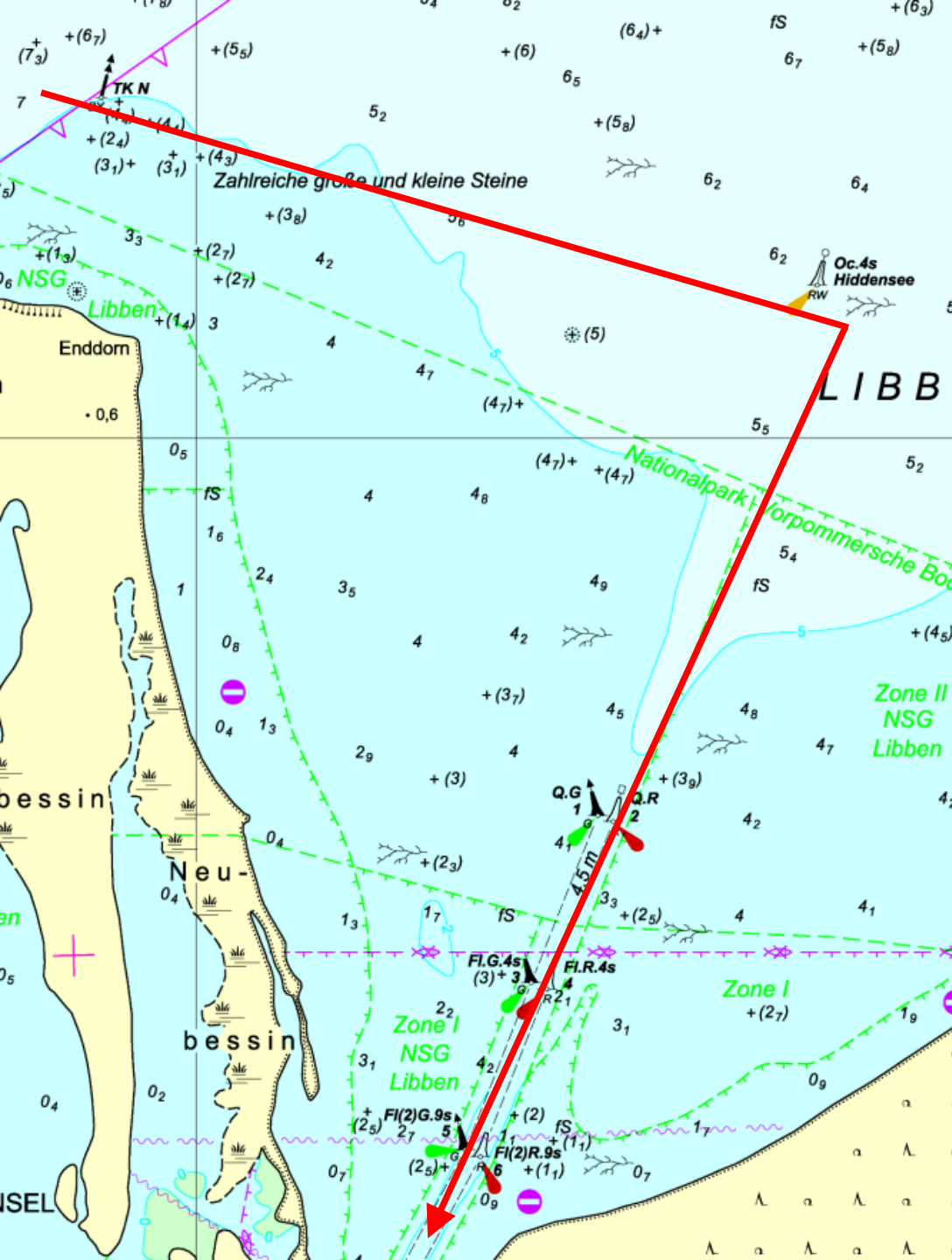
Problem:

- The buoys' order in the publication should be according to their position in the fairway; approaching from sea.
- No S-125 feature attribute exists to sort feature by position.
- Normally, the buoys are named in ascending order, but this is not always the case, see example (*TK N* → *Hiddensee* → 1 → 2 → 3 ...)



Solution:

- Draw an approximate line following each fairway direction in QGIS
- Calculate the buoys orthogonally to the line and sort according to the axis values



Result:

| Symbol / Kennung / Name | Breite | Länge | Änderung bei Beginn der Wintersaison | Mögliche Änderungen bei Eisgefahr |
|--|-------------|--------------|--------------------------------------|-----------------------------------|
| Hiddensee | | | | |
|  TK N | 54°36.66' N | 013°08.68' E | ohne Toppzeichen | |
|  Oc.4s Hiddensee | 54°36.30' N | 013°11.08' E | | ohne Toppzeichen ohne Leuchte |
|  Q.R 2 | 54°35.25' N | 013°10.40' E | | ohne Toppzeichen ohne Leuchte |
|  Q.G 1 | 54°35.27' N | 013°10.34' E | | ohne Toppzeichen ohne Leuchte |
|  Fl.R.4s 4 | 54°34.93' N | 013°10.17' E | | ohne Leuchte |

Source:

IUCN Database

HPD Source Data, German Law

Processing:

Automated analysis of UICN database
geometry and content

Automated analysis of HPD geometry and
content

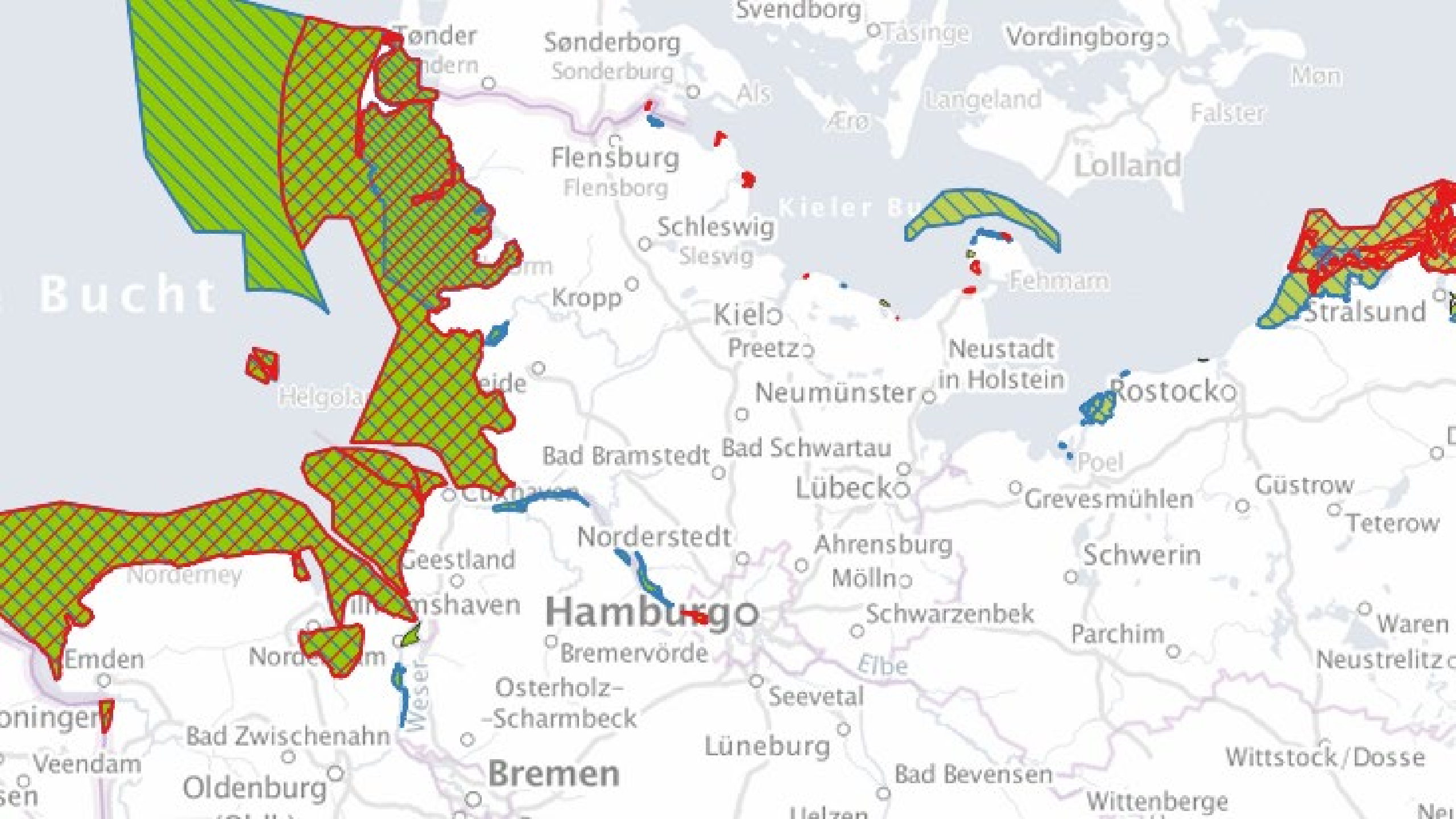
Compare UICN and HPD Data

Analysis of relevant German Law

Conversion into S-122 data model

 Generating S-122 product

S-122
Marine
Protected
Area



Source:

German national survey archive, BSH internal survey data, third party survey data

Processing:

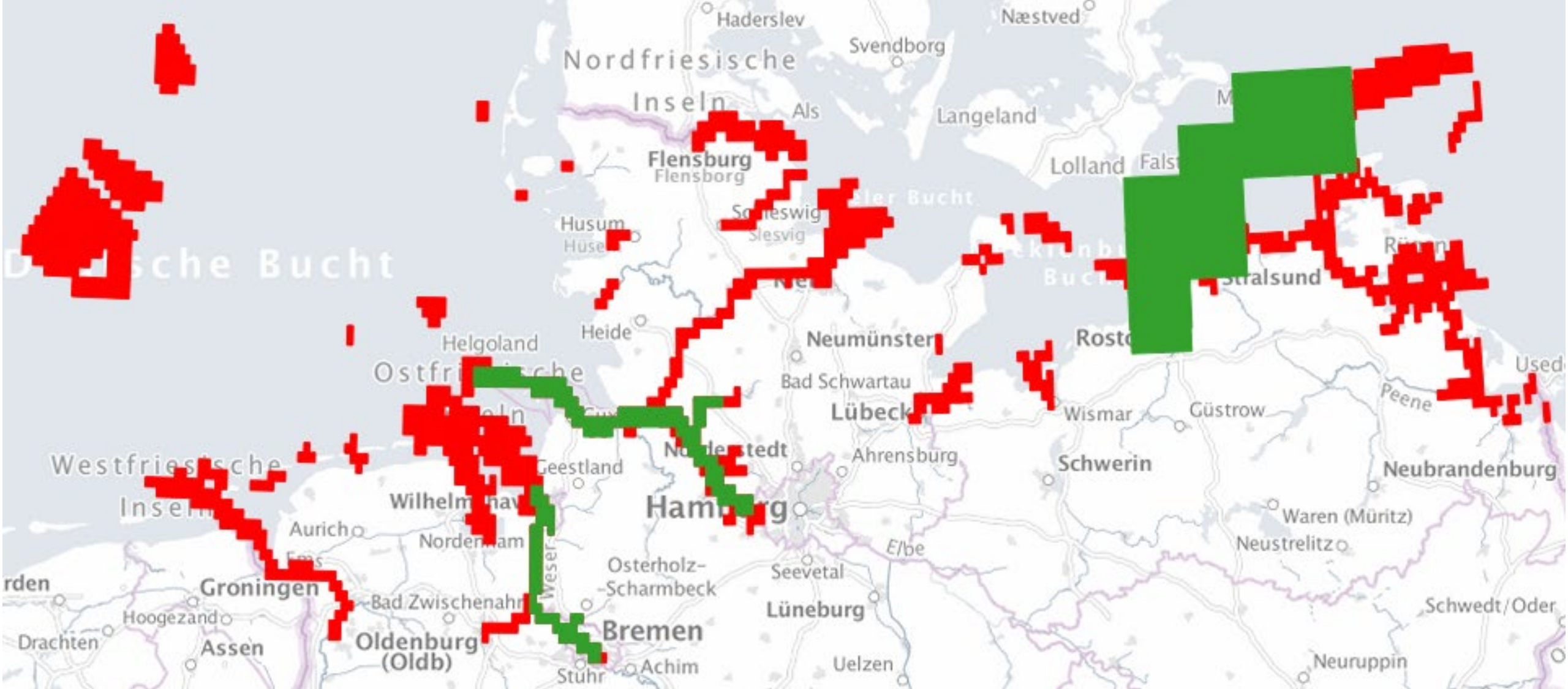
Harmonisation of source data according to predefined settings

Generation of seamless digital elevation model

Conversion into various S-102 resolution grids

Generating S-102 products

S-102 Bathymetric Surface



S-102 Coverage Area



S-102 Continuous delivery service

