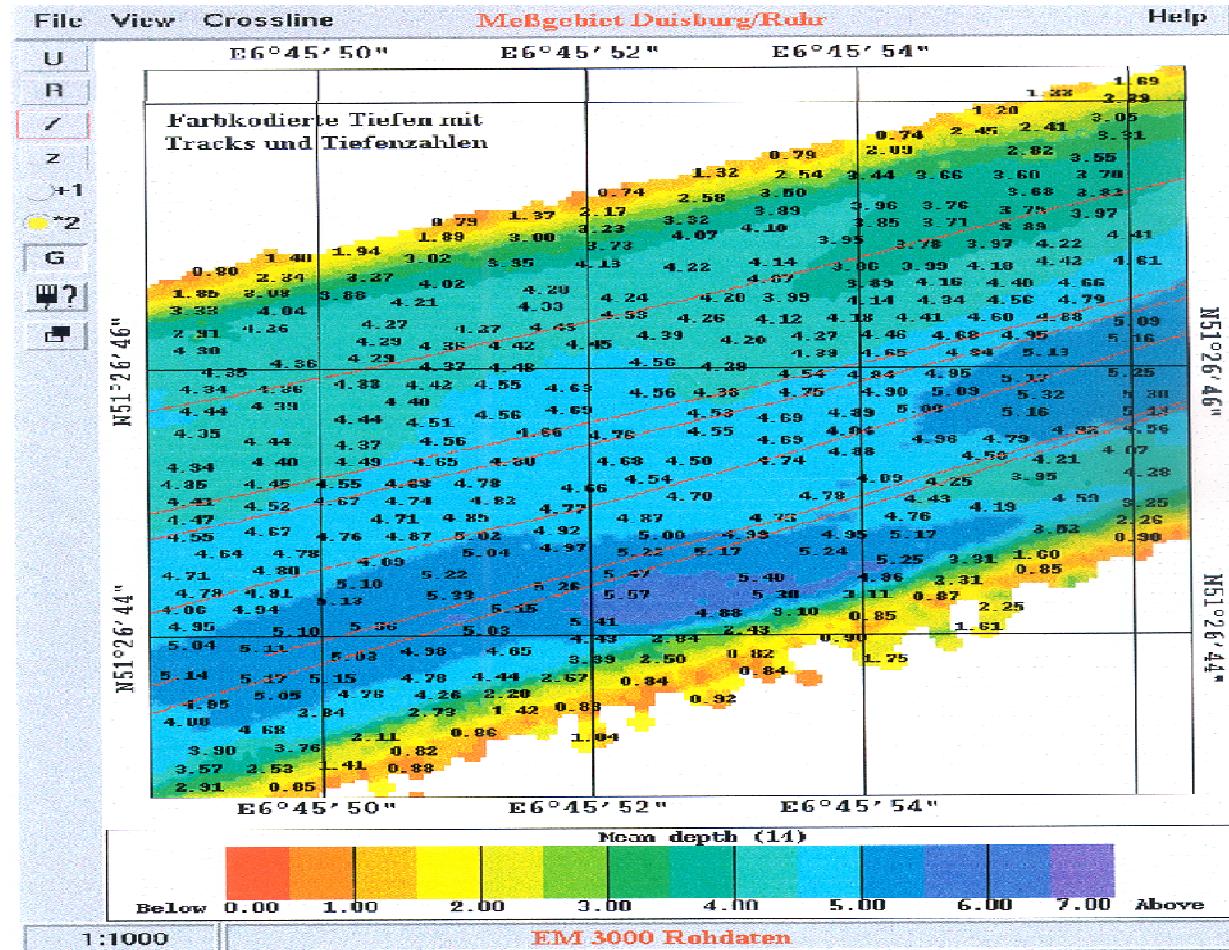
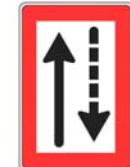
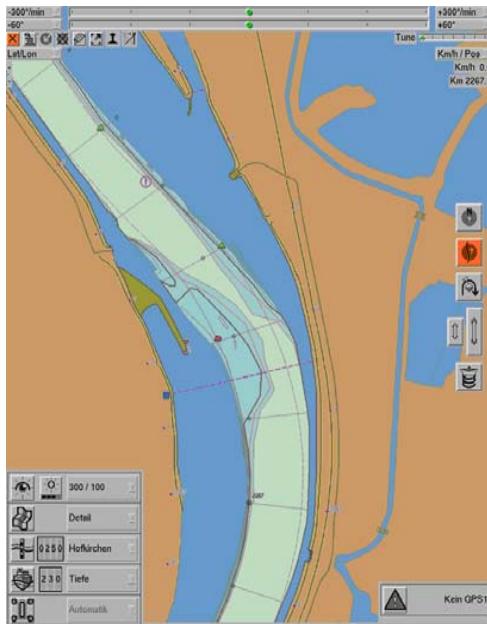


Indication of depth information in IENC's

Result of a German Working group in 2010



Indication of depth information in IENC's

Content:

Initial situation

- Echo sounding equipment

Aim

- Bathymetric ENC (bENC)
- Defining Workflow

Workflow

- From echo-sounding to bENC
- Providing depth information in IENC 2.x
- Dynamic water level
- Dynamic water level together with IENC

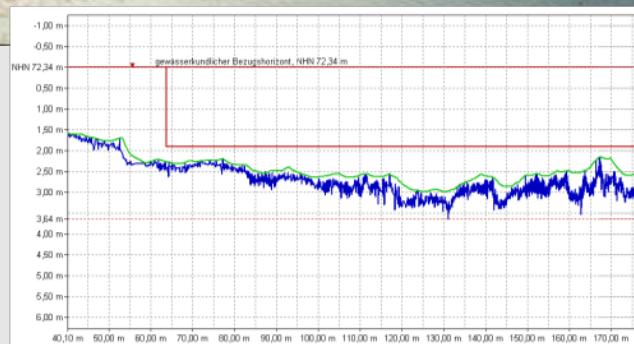
Using bENCs in navigational mode



Indication of depth information in IENC's

Initial situation, standard equipment

Profile sounding with single beam system



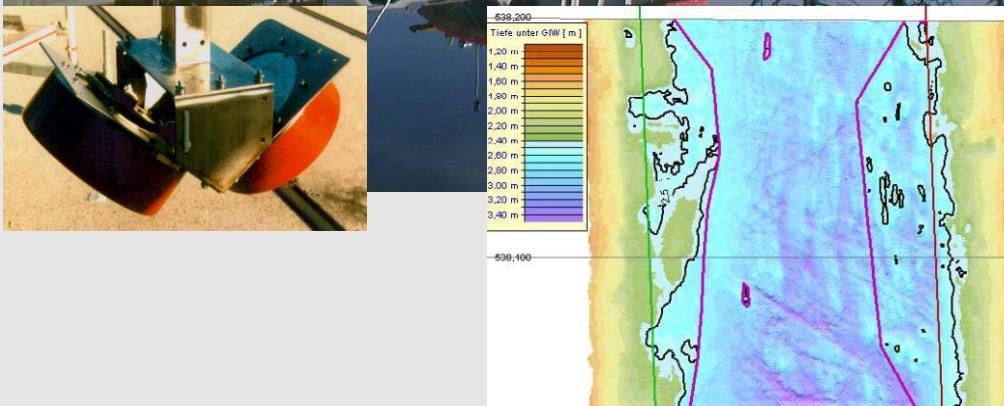
Vintage:	1980
Producer:	Dockyard, Deggendorf
Length:	33,20 m
Width:	8,80 m
Draught:	1,10 m
Motor:	MTU 440 KW
Cantilever:	15 m
Number of transducer:	49
Transducer frequency:	210 kHz
Beamwidth:	9°
Crew:	3
Price:	1,65 M€

Generalized cross sections

Indication of depth information in IENC's

Initial situation, standard equipment

Area sounding with fan system (double transducer)



Vintage:	1993
Producer:	Faaborg, Denmark
Length:	12 m
Width:	3.6 m
Draught:	0.9 m
Motor:	MTU 142 KW
Drive:	High power fin rudder with fixed pitch propeller and changed speed gearbox for slow motion.
Bowthruster:	15 KW
Water displacement:	20 t
Crew:	2
Price:	250.000 €
Price survey system	498.000 €/1998

Generalized depth contours

Indication of depth information in IENC's

Aim of the working group

Bathymetric Electronic Navigational Chart (bENC)

- Actual depth data provision to fairway users (for costal area and inland waterways (where necessary) in Germany)
- Using the nautical chart standard (ENC and IENC)

Defining a workflow for producing bENC's

- Steps
- Preconditions (Quality standard: "aQua")
- Tools
- Result (bENC)



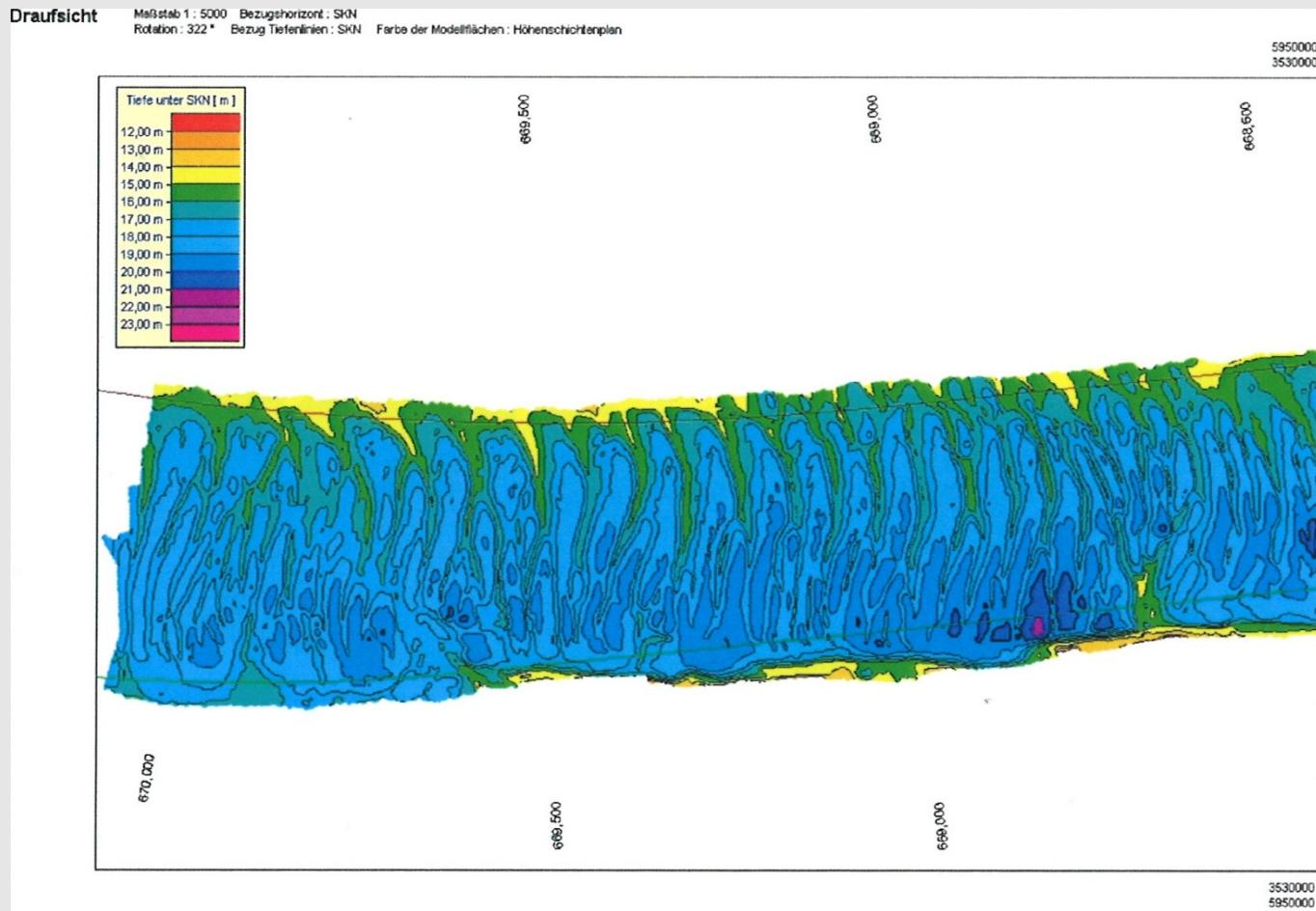
The working group finished in 2010



Indication of depth information in IENC's

Workflow, from echo sounding to bENC

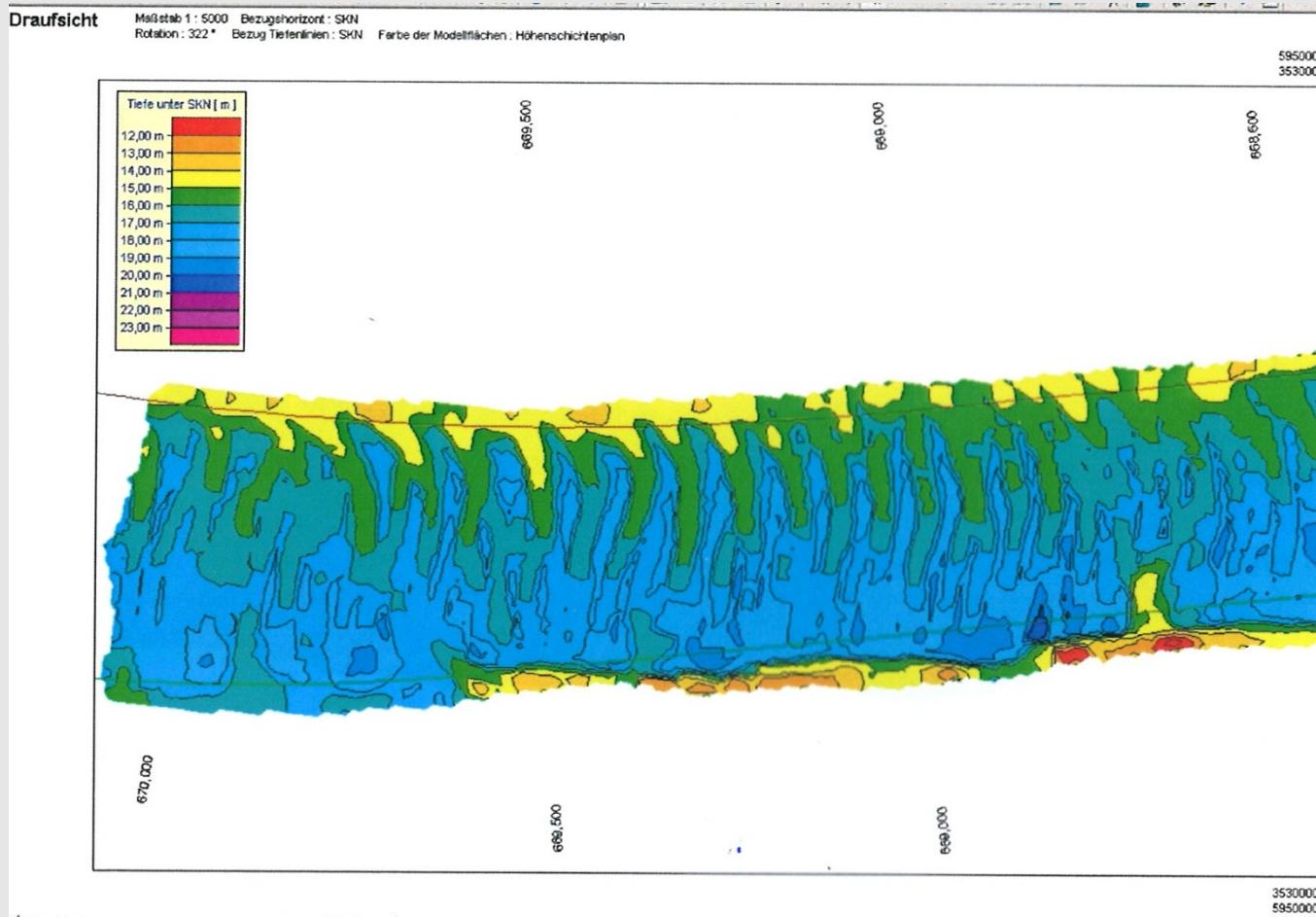
Step 1: DTM of the fairway in 2*2m resolution



Indication of depth information in IENC's

Workflow, from echo sounding to bENC

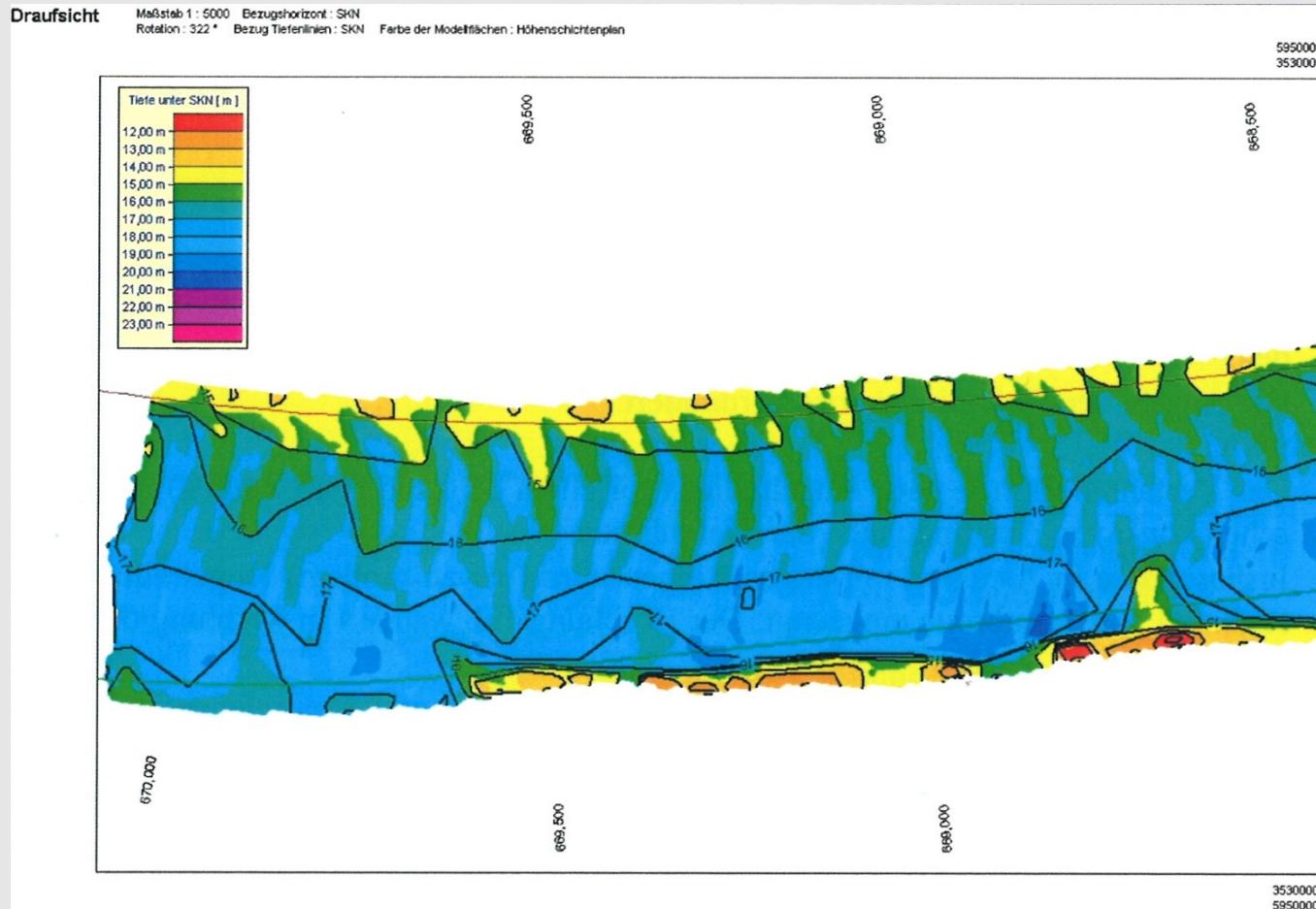
Step 2: DTM of the fairway in 10*10m resolution



Indication of depth information in IENC's

Workflow, from echo sounding to bENC

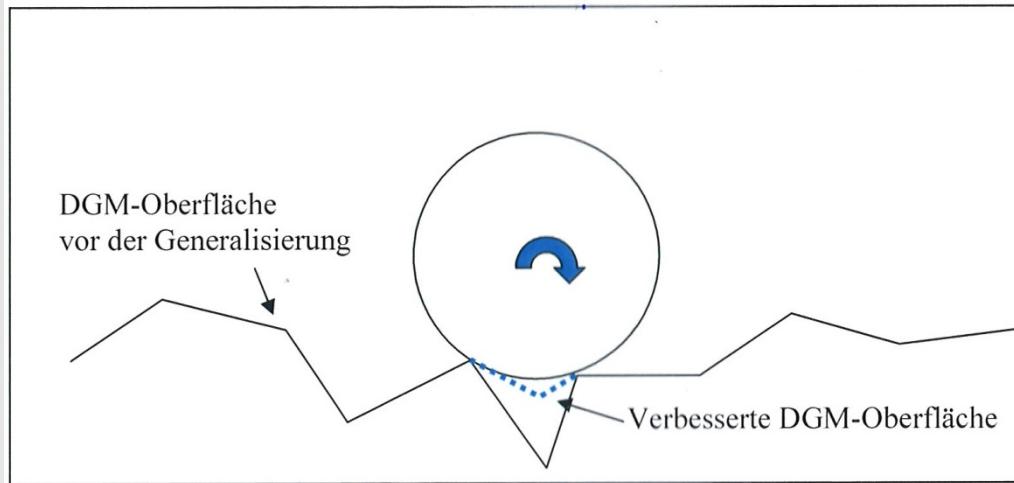
Step 3: DTM with generated depth lines (nautical DTM)



Indication of depth information in IENC's

Workflow, from echo sounding to bENC

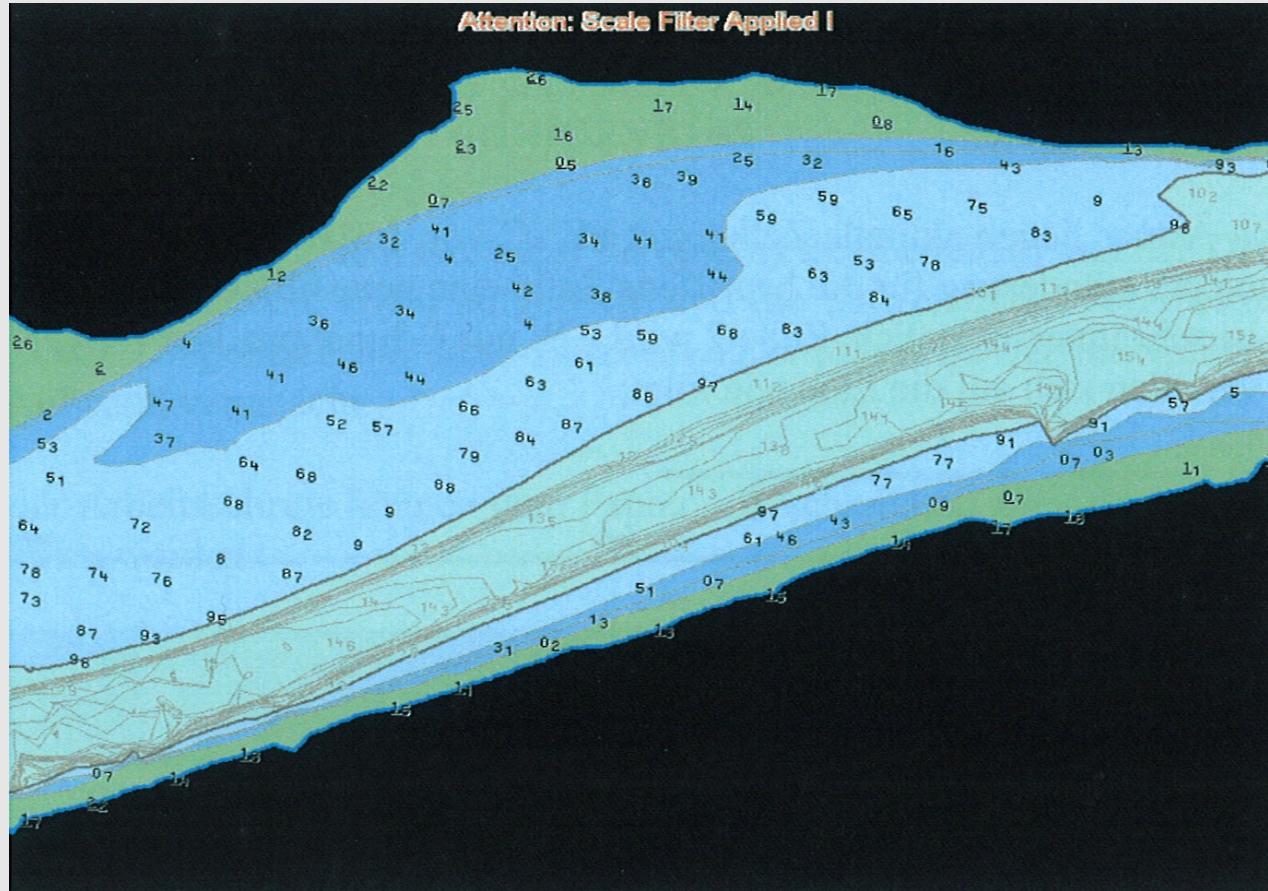
Model smoothing in step 3 (nautical DTM)



Indication of depth information in IENC's

Workflow, from echo sounding to bENC

Step 4: Bathymetrical ENC (bENC)



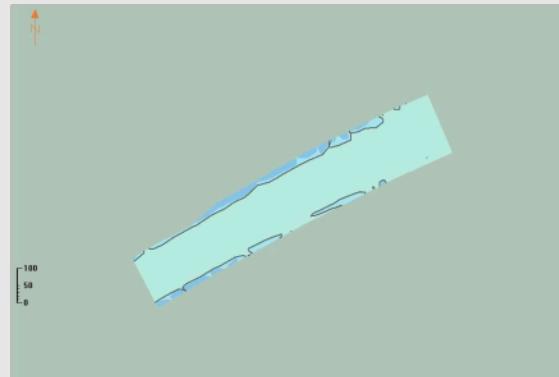
Indication of depth information in IENC's

Providing depths information within IENC 2.x

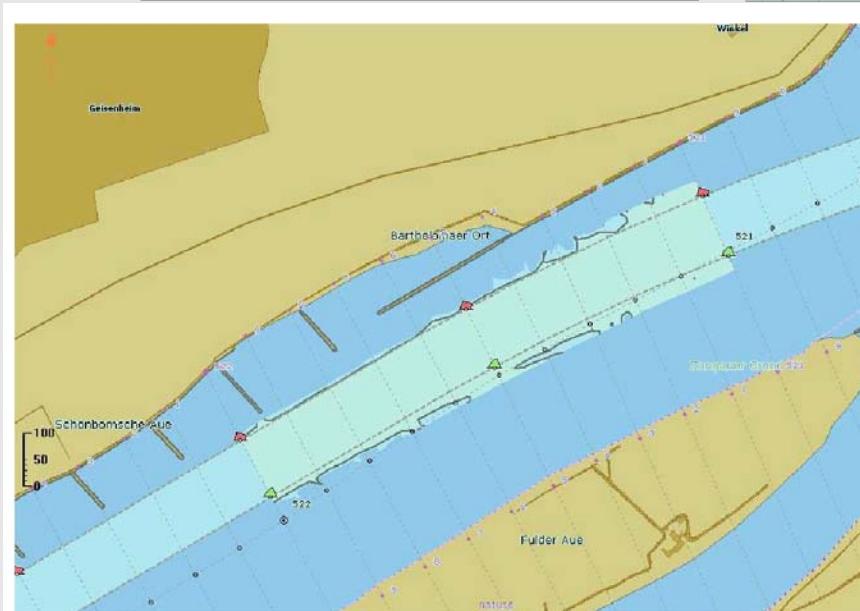
Usage 7, river



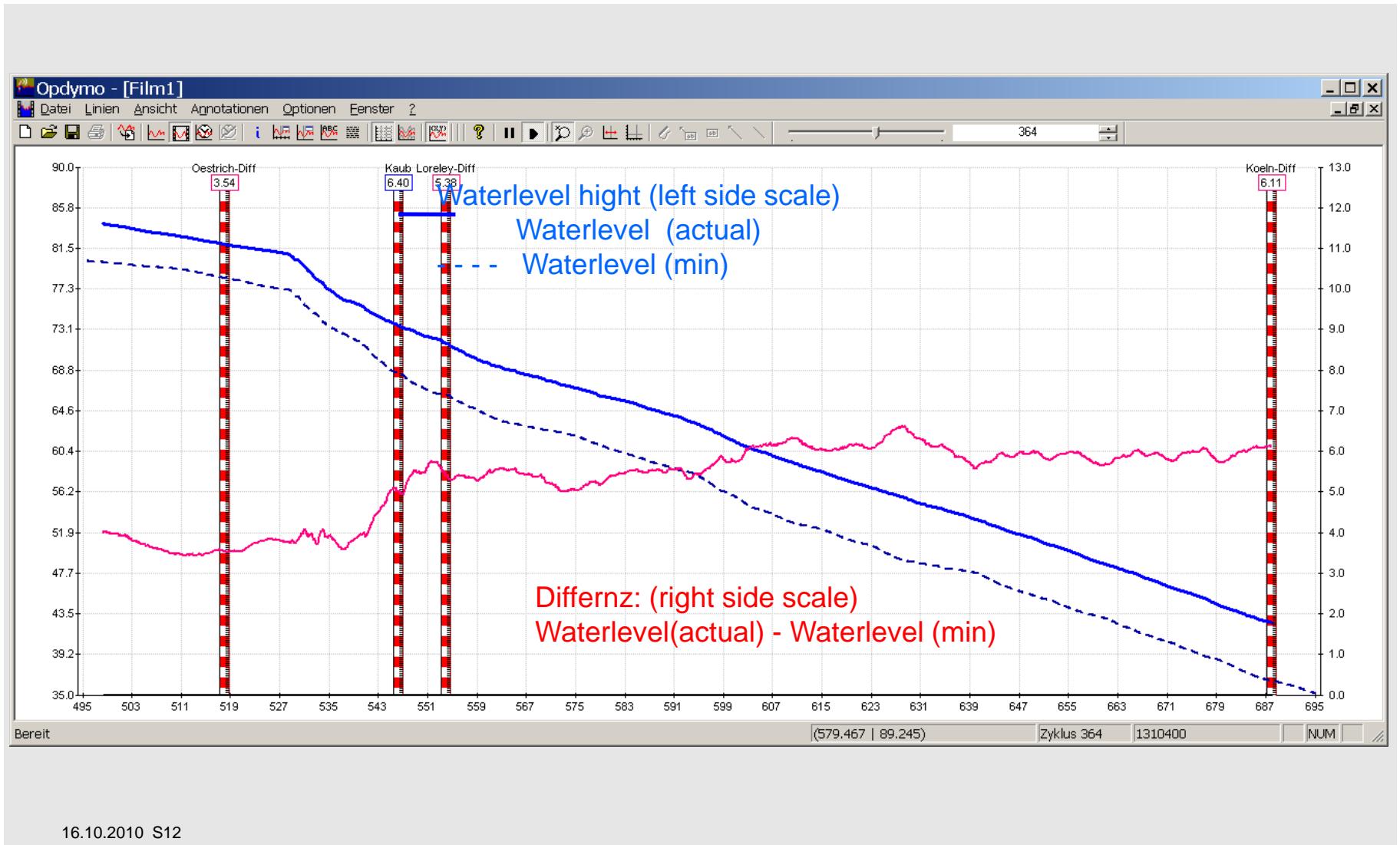
Usage 8, depths



Usage A, overlay



Indication of depth information in IENC's Dynamic water level

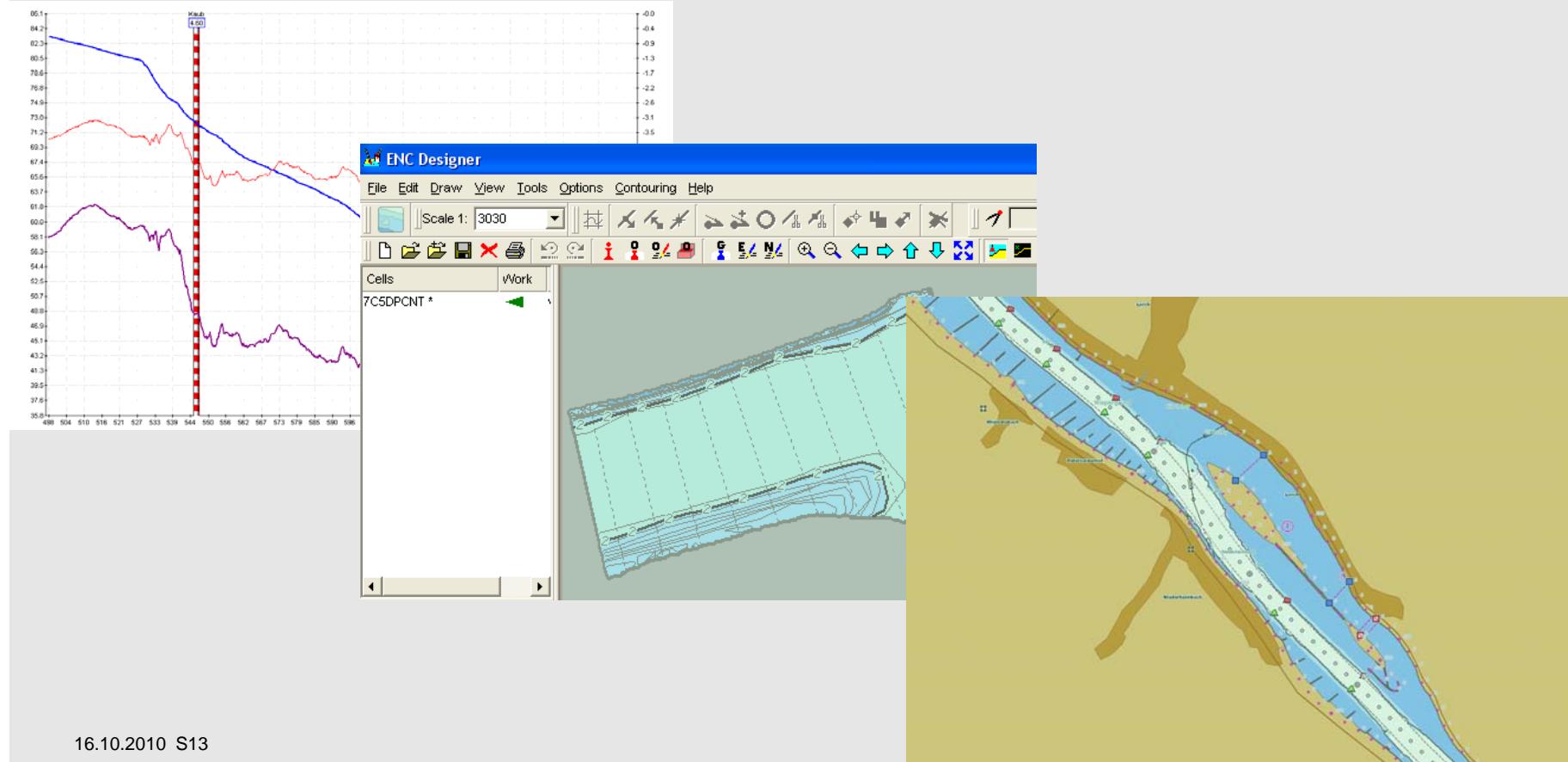


Indication of depth information in IENC's

Dynamic water level together with IENC



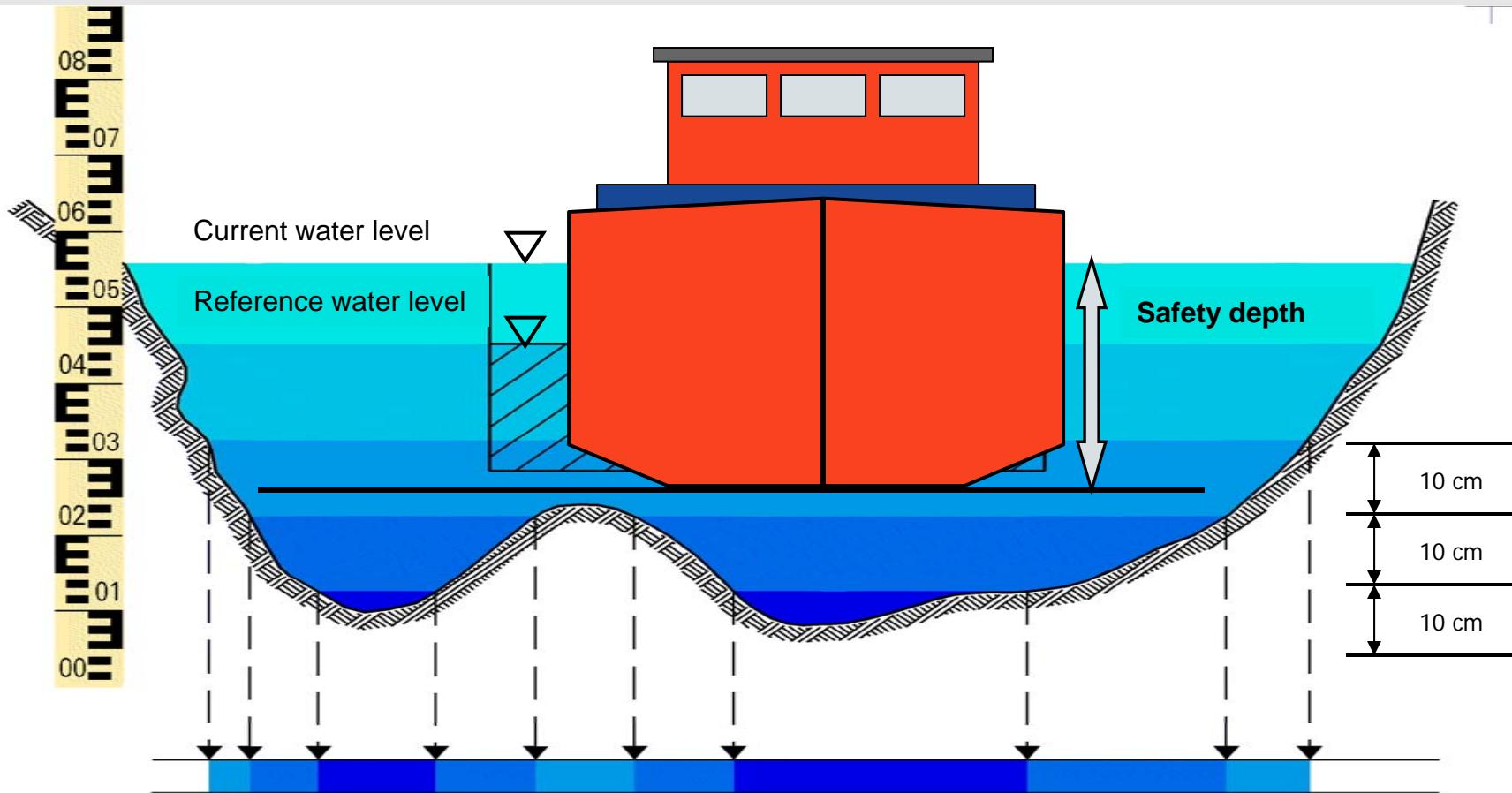
a concept is need
for each river



Indication of depth information in IENC's

Using bENCs in navigational mode

Safety depth and depth information



Representation of the depth layers in the ECDIS Viewer



Wir machen Schifffahrt möglich.

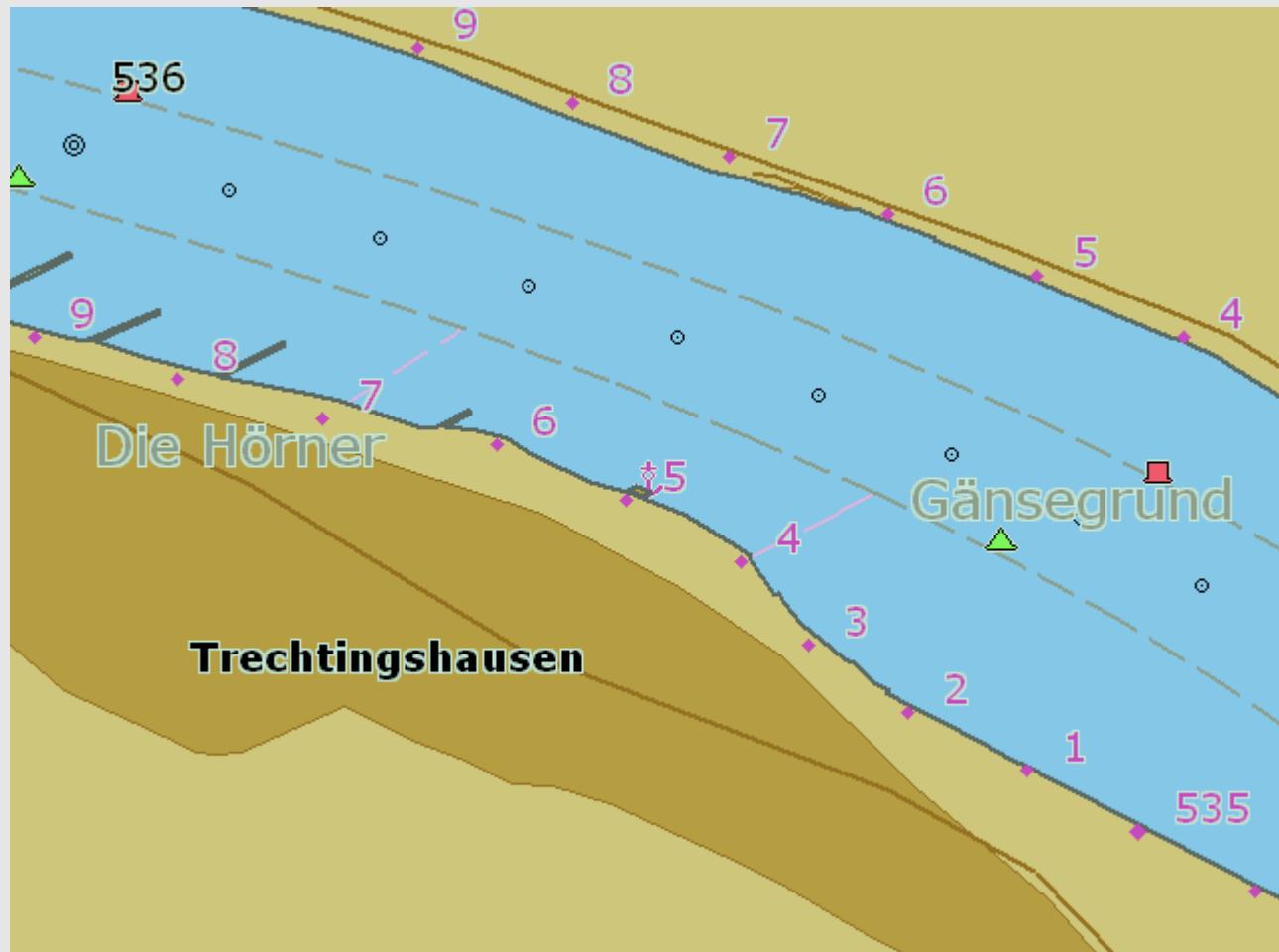
Indication of depth information in IENC's

Using bENCs in navigational mode



Safety depth in ECDIS (1.80m - 5.00m)

5.00m



Wir machen Schifffahrt möglich.

**Thank you for
your kind
attention!**



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Wasser- und
Schifffahrtsverwaltung
des Bundes

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