

PM

Date

10 February 2015

## Collaborative bathymetry:

### The Baltic Sea Bathymetry Database approach

1. Gather all hydrographic offices for the region in one working group [BSDB: Sweden, Finland, Estonia, Latvia, Poland, Germany, Denmark actively participate. The working group is also in contact with Russia, Lithuania and Norway.]
2. Assign clear areas of responsibility [*BSBD: Area split according to ENC responsibility, as no official digital EEZ borders are available.*]
3. **Pragmatically set realistic goals based on common denominators.** Focus on what can be achieved now, and postpone any nice-to-have features for future improvements. This includes parameters such as:
  - Spatial resolution [*BSBD: 500m due to commercial and military interest in higher resolution bathymetry in some countries*]
  - Vertical datum [*BSBD: EVRS2000 (EPSG:5730), but we presently don't care about the various different chart datums, as the errors/differences are negligible (<20cm) for the envisioned kind of applications in the current resolution.*]
  - Projection [*BSBD: Primarily ETRS89-LAEA (EPSG:3035), which works for all of Europe. The nationally important projections are supported through re-projecting from ETRS89-LAEA.*]
  - Licensing of the data set [*BSBD: licensed under a Creative Commons Attribution 3.0 Unported License. Additional restrictions apply (generally: the data, or any derived products, is not to be used in any way for navigation). For possible high-resolution areas in the future, also different licenses could be possible.*]
  - Update frequency/policy [*BSBD: Whenever enough new source data has been collected so that an update becomes significant enough. In practice that means once or twice a year.*]
  - ...
4. Find one hydrographic office that is willing to do the actual work. It is much easier to have the work done (mostly) in one place, as compared to sharing the work. Let the coordinator act freely towards the common goals, instead of micro managing them from the working group [*BSBD: SMA in Sweden coordinates and carries out most of the work*]

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5. All hydrographic offices deliver the most appropriate source data, preferably in as XYZ data points without any interpolation/gridding applied. Spatial resolution should ideally be somewhat better (2 to 5 times) than the final product, but much higher resolution is not necessary (and harder to handle). Higher resolutions of the source data might be needed if more than one depth is to be presented per grid cell (example: min, max, average, median and standard deviation). *[BSBD: Mostly extracts from the national depth databases. Charted soundings extracted from ENC's are a low-quality fallback when absolutely necessary.]*
6. Data is harmonized at the coordinating office with regard to format, projection, vertical datum (if needed).
7. Add additional data sources to fill gaps or constrain edges *[BSBD: GEBCO\_08 in the North Sea, land elevation data to aid gridding along the coast line...]*
8. Run source data through a gridding process, to down sample too dense data and interpolate between sparse data. This also smoothens any border effects between different countries or areas of responsibility. *[BSBD: Block median filtering followed by Stacked Continuous Curvature Splines in Tension interpolation]*
9. Make final grid available for end users *[BSBD: Map centered web site with download functionality, OGC services]*
10. Actively reach out to the end users!

In summary, points 3 and 4 have been the keys for our success with the Baltic Sea. Of course, data delivery (5) is also very important. Even though 8 and 9 required quite a lot of work, one should not focus on them too early.

The Swedish Maritime Administration welcomes any visitors from Hydrographic Offices, undertaking the work to coordinate a bathymetry portal for another Hydrographic Commission, to get a more detailed insight of the setup of the BSBD in Sweden (both technical and organisational). Please contact: Hans Öiås ([hans.oias@sjofartsverket.se](mailto:hans.oias@sjofartsverket.se)) or Benjamin Hell ([benjamin.hell@sjofartsverket.se](mailto:benjamin.hell@sjofartsverket.se))

For a more in-depth description of the BSBD and its background, please refer to our IHR article:

*Hell and Öiås (2014). A new bathymetry model for the Baltic Sea. International Hydrographic Review (12): 21-31.*

[http://www.iho.int/mtg\\_docs/IHRreview/2014/IHR\\_Novemberspecial2014.pdf](http://www.iho.int/mtg_docs/IHRreview/2014/IHR_Novemberspecial2014.pdf)