PO.ID 197

Digital surveys in UK & Germany - do regulatory mechanisms impact data quality and innovation?

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Abstract

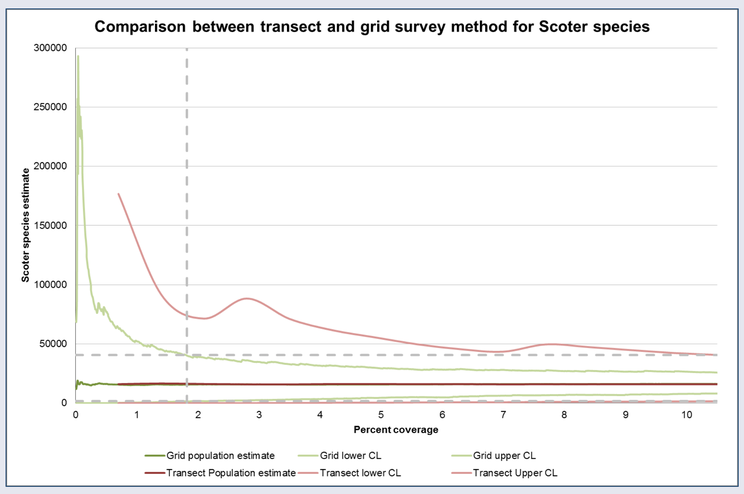
Digital aerial surveys to assess seabird and marine mammal populations in offshore wind farm development areas are becoming the standard in Europe. This approach developed in the UK over 6 years has been applied in Germany for the last year following the StUK4 guidelines.

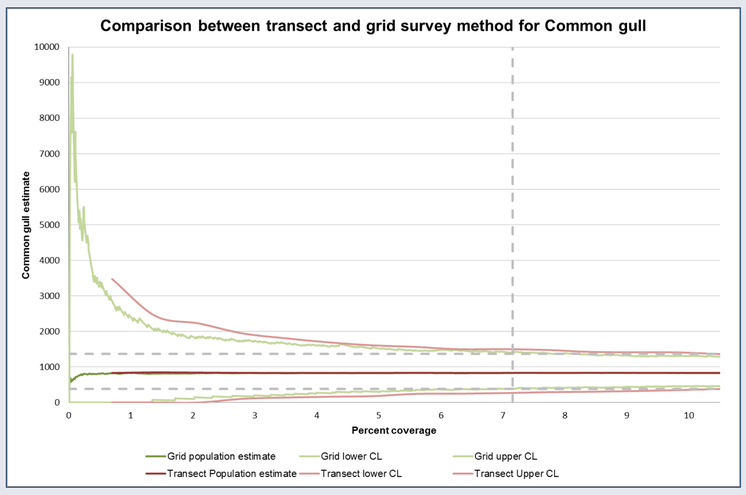
The German StUK4 represents the most recent guidance document defining the environmental impact assessment standards required to deliver offshore wind farm consent. All survey data collected under StUK4 guidelines will be placed into a comprehensive database which will be a valuable tool to generate cumulative impact assessments. Although a regulatory framework ensures that minimum standards are maintained it may limit innovation that can improve standards.

StUK4

1. Coverage requirements

The StUK4 states that a minimum of 10 % coverage is required for **transect-based** digital aerial surveys. Ongoing discussions may lead to 7-8 % coverage being allowed for **grid-based surveys**, as these provide statistically more robust and precise population estimates. The simulation below demonstrates that grids achieve much tighter confidence intervals than transects especially for strongly flocking species such as common scoters but also more widely spaced species such as common gull. For scoters 50 % transect survey coverage is needed to achieve the same confidence intervals as 8% grid coverage.





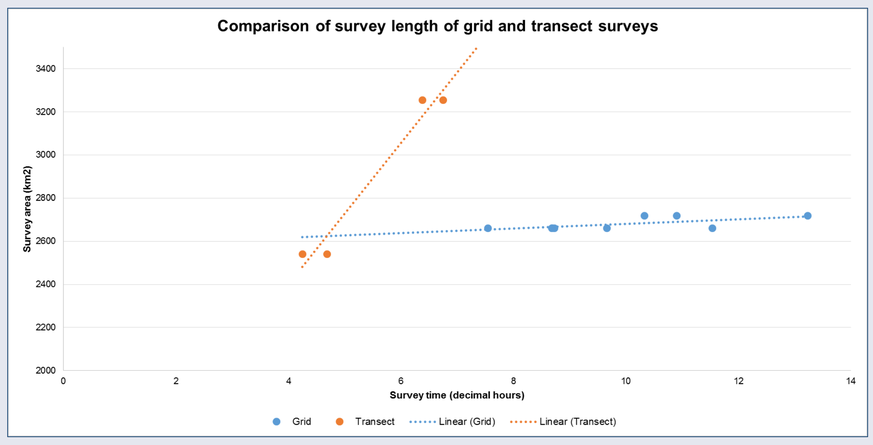
2. Ground resolution distance

Current discussions are likely to result in the need for 2 cm GSD, while 3 cm may be acceptable depending on key species likely to occur in the respective survey area. For still imagery 3 cm can be the best **trade-off** between **data quality** (species ID rates) and **costs.** When comparing different survey methods focus should be on how clear / sharp a **pixel** is rather its size (resolution).

Example: Effect of resolution on species ID		
Species group / species	**ID ≥ 90 %**	
	3 cm	**2 cm**
Red-throated diver	✓ (>90 %)	✓ (>95 %)
Black-throated diver	× (>70 %)	× (>85 %)
Black-legged kittiwake	✓ (>90 %)	✓ (>99 %)
Lesser black-backed gull	✓ (>90 %)	✓ (>99 %)
Common / Arctic tern	× (>75 %)	✓ (>90 %)
Common guillemot (summer)	✓ (>90 %)	✓ (>99 %)
Common guillemot (winter)	× (<50 %)	× (<50 %)

3. Area has to be counted in one day

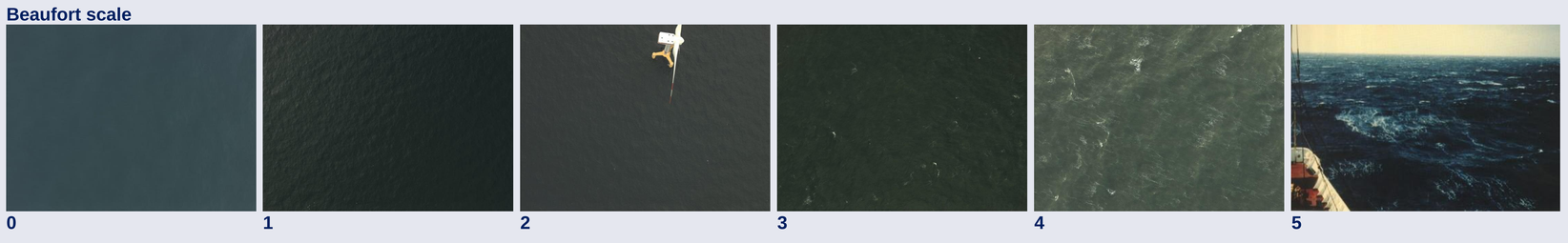
The StUK4 may require that survey areas have to be covered in a **single day** even during short winter days. The graph to the right compares survey length of grid and transect surveys carried out in Germany within the last 18 months. This rule would make it more difficult too collect better data using grid surveys during the winter (see Section 1 above).



As grid surveys cover a survey area **more evenly** to gather **more representative data**, more flight lines are required taking more time to implement. Accordingly restricting surveys to a single day clearly has negative implications for implementation of grid surveys, at least if similar coverage for grid and transect surveys is required. The use of two aircraft to implement grid surveys across extended surveys area is possible, but would increase cost.

4. Weather conditions

There is a clear aim to define the weather conditions suitable for digital aerial surveys. Surveys may only be allowed in sea states of less than **5** to help ensure a high detection rate of birds and marine mammals at acceptable and economically adequate image analysis costs. Although surveys at higher sea states are possible for some species, the data quality and detection could be reduced, and due to the difficulty of finding individuals in waves there would be a large increase in processing time and cost to the client.



Conclusions

Digital aerial surveys are key to delivering high quality and auditable environmental data for impact monitoring during all operational phases of offshore windfarms.

While having standards may help ensure data quality, detailed regulation of survey parameters may stifle the innovation that leads to cost reductions by, for example, using new more efficient sampling techniques, equipment and flight conditions. Moreover, the techniques currently used for digital survey (still photography and video) are sufficiently different to make it difficult to set a single standard suitable for both. Recommendations that may be useful in isolation could stop a survey approach that has many strengths. An example of this is stating that a survey must be delivered in one day which can make collecting better grid-based data for the same percentage coverage difficult during the winter.

References

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2. Garthe, S. & Hüppop, O. (2004) Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology. 41, 724-734.