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Executive summary

The Study Group on VMS data, its storage, access and tools for analysis (SGVMS) took place in Aberdeen, UK, 5–7 September 2012. Heino Fock chaired the meeting with 10 participants from six countries and from ICES.

SGVMS was initiated by WGDIM in 2010 recognizing that in the context of rapidly evolving methodologies of VMS data analysis and emerging requirements with regard to advice for European policies and the ICES Science Plan, a structured approach to holding and accessing VMS data are essential.

SGVMS had consider implications for ICES VMS data management, further progress in quality assurance measures, evaluation of e-logbooks and had to review further progress since its last meeting concerning data availability, data access and storage, data formats and data products, and tools for analysis.

With regards to data management, SGVMS reviewed the requirements for data management based on minimum requirements for provisioning of VMS data for ICES expert groups with regards to spatio-temporal resolution and métier aggregation. SGVMS concluded that establishing an ICES Working Group on Fisheries Spatial Data (WGFSD) would be the most feasible way to facilitate data analysis, data transfer as well as to allow for an auditing process. This working group should work out assessments with regards to DCF and MSFD indicators, and while providing data to the ICES database would be able to address confidentiality issues as requested by the different ICES members.

SGVMS reviewed the quality assurance protocols developed by SGVMS 2010 and worked out a comparison of spatial analysis algorithms.

SGVMS reviewed the use of e-logbooks by different countries and conducted a survey on member state protocols in providing e-logbooks data and parameters recorded. It appeared that differences existed between countries and that this could be problematic for standardized analysis.

WGSFD will meet in September 2013 in Copenhagen, Denmark.

1 Opening of the meeting

1.1 Terms of Reference

a) Review and consider implications for and from VMS data management at ICES based on the ICES strategic position on VMS data and data needs as de-fined by ICES working groups, and determine resources required to accomplish the goals of the strategy;

b) Test and further develop quality assurance measures for standardized data products;

c) Evaluate adoption of e-logbooks for standardized data products for the ICES data centre;

d) Review ongoing work for analysing VMS data and developing standardized data products.

1.2 Objectives and working rationale

Based on the Terms of Reference, the aim of SGVMS was defined to provide advice to ICES on how VMS data could be treated within the ICES data strategy, to work on definitions for standardized data products that can be delivered to and be stored within ICES, and to describe tools needed to develop these data products. The SGVMS recommendations on standardization also aim at addressing needs to develop environmental indicators for Commission Decision 2008/949/EC, but not at developing the indicators themselves.

Commission Decision 2008/949/EC require that analysis of VMS data be resolved to fisheries métier level 6. This means that logbook information is essential to VMS analysis. Within the project *MARE/2008/10; Lot 2 - Development of tools for logbook and VMS data analysis,* the software package 'VMStools' was developed defining formats for VMS, linked logbook data and output.

1.3 Participants

Ari Leskelä	Finland
Carlos Pinto	ICES
Declan Tobin	UK
Hagen Stockhausen	Norway
Heino Fock	Germany
Josefine Egekvist	Denmark
Katharina Schulte	Germany
Patrik Jonsson	Sweden
Per Finne	Norway
Rui Catarino	UK

A detailed list of affiliations is available in Annex 1.

1.4 Background information

SGVMS was established as a subgroup to the ICES expert group on Data and Information Management (WGDIM). In 2011, WGDIM provided information on the recent ICES legal position towards VMS (Annex 5).

The main conclusion from this expertise is that unhindered use of VMS data for scientific purposes under the present and revised EU Data Collection Regulations is possible.

2 ToR a) – Review and consider implications for and from VMS data management at ICES based on the ICES strategic position on VMS data and data needs as defined by ICES working groups, and determine resources required to accomplish the goals of the strategy

2.1 VMS minimum data requirements for ICES expert groups

WGDIM recognized the problems in providing VMS data to ICES via open access sources given the legal constraints still unresolved around VMS data. Therefore, it asked SGVMS to "Incorporate an additional term of reference for their 2012 meeting, addressing suitability/fitness for purpose of VMS and logbook data in relation to the level of aggregation and the requirements from ICES expert groups."

In 2011, SGVMS reviewed data needs from ICES expert groups, types of VMS data products needed, standardized data products for the ICES Data Centre and opportunities for improved data management within ICES.

It was recognized that two different data formats are needed to meet the requirements of different Working groups and as laid down in EU regulations. One format is defined through the TACSAT/EFLALO format already implemented within the FishFrame database (Annexes 6 and 7); the other format considers ping level information as defined in regulation 949/2008/EC.

With regard to data management within ICES, SGVMS analysed 6 different protocols for issuing data calls and facilitating data transfer to the ICES Data Centre. The six options can be ranked according to their feasibility in terms of meeting ICES data needs, resource demand and likely legal objections.

Option 3 was the most feasible option for the short and medium term. This option comprised the compilation of two interrelated datasets, one covering the EC 949/2008 format and the other being métier-aggregated data based on the proposed VMS FishFrame exchange format (Annex 7), i.e. including catch information. This can be seen as the minimum requirement in terms of ICES data needs. It was concluded, that relatively low to medium resources were required to deliver this option, and a working group under ICES could be used to provide the needed output.

With regards to temporal and spatial resolution, monthly data should be delivered at both ping level and métier aggregated. Spatial aggregation of data should be to the 0.05 * 0.05 degree c-square coding system (only métier aggregated), which is regarded as the minimum standard for data exchange within ICES. This format can be easily implemented into the ICES FishFrame database.

2.2 Justification for a working group on spatio-temporal analysis of fisheries data, based on information from logbook, VMS and other data sources

2.2.1 Implications for ICES work

VMS is a highly valuable data source that provides detailed spatial resolution of fishing activities and for which there are legal obligations guaranteeing routine collections. Combined with logbook information, fishing activities can be described by métier. This is potentially valuable information for several ICES working groups and it fits well into the ICES strategy on MSFD and key requirements with regards to Marine Spatial Planning. Among others, the ICES expert groups that regularly utilize VMS information include WGDEEP, WGDEC and WGECO. The use of VMS data will be indispensable to achieve objectives from the ICES Science Plan 2009-2013, especially for the subtopic 'Impacts of fishing on marine ecosystems' under the thematic area 'Understanding of interactions of human activities with ecosystems'.

WGDIM 2012 predicts a rapid increase in the requirement for spatial information that could be derived from VMS and logbook data. As a result there will also be a parallel increase in the demand for analysis of VMS and logbook data.

In future a working group looking at standardized products derived from VMS might also include other data sources like electronic logbook information by haul, AIS data of higher frequency and CCTV data that can facilitate exchange of knowledge of spatially detailed effort measures from VMS and other data sources.

Only a working group can provide continuity in the development of standardized methodologies and can ensure quality assurance of data and software. By contrast, in the absence of a management and coordination plan, each country will end up with their own methods/ software to disseminate VMS data. However, only standardized VMS products can be used in connection with and merged with other standardized data products as for example from stock assessments. To give an example, the quantification of unimpacted seabed under MSFD descriptor 6 (‘seabed integrity’) will strongly depend upon the setting of an upper threshold for fishing effort. However, there are inherent uncertainties in this analysis that will depend on a set of predefined/standardized rules and procedures.

Using these data sources, annually updated products could be produced to meet requirements from MSFD descriptor 6 (seabed integrity) and DCF environmental indicators 5, 6 and 7. These products could be in the form of spatially detailed maps of fishing effort by métier, trends in effort over time and identification of regions unimpacted by certain gears.

Discussions about sharing of VMS data often comes back to legal and confidentiality issues (see Hinz *et al.*, 2012). There is a general understanding that it would be possible for national data holders to exchange VMS data in suitably aggregated format under the auspices of an ICES working group. To get a product with best coverage, the working group should have representatives from as many ICES member states as possible. This requires a clear commitment from ICES members to achieve this goal. However, experiences from the 2012 ICES call on VMS show that, this is not always the case. Positive experience from shared VMS products can help reluctant VMS stakeholders to realize the value of shared data and lead to contribution of data in future. Still, even with limited numbers of contributing ICES members, SGVMS considers the establishment of a working group an essential step forward in order to achieve goals of the ICES Strategic Plan.

If a working group on spatially fisheries data is established, it is recommended that ICES facilitates a platform to upload the standardized aggregated output products, so that these are fully accessible to the Expert Groups. This would enable fisheries effort data to take a more prominent role in the management process.

Besides expert groups already working with VMS data and its derived products, evidence from the literature demonstrates the breath of potential applications for this type of information and highlights the possible benefits to several other ICES expert groups. To date, fields of research include:

- Bird ecology
- Marine mammal ecology
- Spatial planning
- Socio-economics

2.2.2 Implications for ICES data management

Most of the exposure that ICES expert groups have had to VMS has been through the initiative of individual participants bringing their own data/products to the expert groups, offering to share their work/experiences. A consequence of this lack of coordination is that the uses of VMS data are not standardized.

It is expected that a positive experience of data sharing can help those who control access to VMS in ICES Member Countries to realize the benefits of sharing. A co-operative working group would aim to help member countries realize the added benefits of pooling data resources. One of the advantages of multinational standardization of data analysis methodologies is that it can minimize the analysis burden faced by individual countries and it can result in a more active approach to data management. As it would be the responsibility of the working group to develop the methods and VMS data products, there would only be a modest initial resource requirement.

To facilitate use of VMS data in the working groups, SGVMS recommends adopting the FishFrame format as the standardized VMS data format. This format is readily ingestible in current tools, so it represents little further requirements at this stage.

Depending on the progress and level of involvement in the working group, should such be established, there may be an increase in the requirement to manage a collection of VMS data within ICES. However, as the main products would be developed and maintained within the working group, the initial task is considered to be light.

If a new or revised data call is issued, or there is a significant increase in the activity of a working group, it may be possible that requirements for optimization of FishFrame or new tools would be required to effectively manage the collection. However, it is envisaged that such needs would be addressed as part of the regular review of working group activity, and that such requirements are requested from the ICES Data Centre, using the existing processes.

2.2.3 ICES VMSTOOLS-trainings course

The VMSTOOLS-trainings course in June 2012 (ICES TCAVMS REPORT 2012) is acknowledged by SGVMS as a first step to implement standardized VMS analysis within an ICES framework. The course was conducted with a positive feedback from participants.

In light of an expected establishment of an ICES working group on fishing effort dealing with data sources such as VMS and AIS, SGVMS recommends repeating this course upon request to provide the basis for a standardized analysis also to new users.

2.2.4 VMS analysis inside and outside the ICES world – discrepancies to be considered

SGVMS is concerned that the spread of knowledge of standardized VMS analysis, the combination of VMS and logbooks and the subsequent analysis of spatial fishing patterns might still be limited, particularly regarding the control agencies that implement EU 404/2011. This concern is based on the limited participation of individuals outside the ICES scientific community in SGVMS.

In turn, the establishment of a working group under the auspices of ICES could act as multinational, multiagency hub to concentrate all efforts to analyse VMS and to deliver products needed to meet future policy, management and scientific challenges.

2.2.5 Reviewing SGVMS work

Part of these considerations were already expressed in 2010 and 2011, when SGVMS stated that an ICES working group would be a prerequisite to accomplish VMS data transfer between expert groups, since SGVMS as a group was not able to do so, due to its limited resources. The recommendation for establishing a working group instead of a study group is firmly reiterated.

The rationale behind this is that a working group on VMS data could operate in the same way as other assessment groups in ICES, compiling its data, running assessments, providing assessment output in the form of agreed indicators and securing information in FishFrame and other data repositories. The analysis of VMS is by now an established and stable methodology as documented in SGVMS reports 2010 and 2011. Quality assurance issues are covered, and training in the use of analysis software has been conducted by ICES (ICES TCAVMS 2012). Data needs and products for ICES expert groups have been analysed and minimum requirements can be defined (see Section 2.1).

3 ToR b) – Test and further develop quality assurance measures for standardized data products

3.1 Introduction

As previously defined, quality assurance of VMS data refers to the entire process of auditing a procedure to analyse and process data with the aim to deliver a 'fit for purpose' product 'free of mistakes'. Each year one of the key remits of the SGVMS study group was to identify the prevailing issues surrounding quality assurance and data standards and to review any relevant work being undertaken to achieve standardization of data products.

3.2 Summary of SGVMS quality assurance 2010–2012

In 2010, processing of VMS data were assigned to four general categories: 1) raw data; 2) aggregating (merging) VMS and logbook data; 3) general processing of aggregated data; and 4) further "fit for purpose" processing (see SGVMS report 2010). Quality assurance at the raw data level was defined as any action that results in the correction or removal of data. A set of eight common errors for both VMS (4) and logbook (4) were identified. Regarding the linking of VMS and logbook data, two primary quality assurance issues were identified; that associated with matching of positional and logbook data and those for vessels for which VMS data are not available (e.g. <15 m). It was recognized that there are certain VMS data processing rules and assumptions that need to be adaptive. For example, the appropriateness of speed filters as indicators of fishing activity may vary according to métier/gear. Equally the criteria used to justify removal of positions close to port will depend on local fleet behaviour. It is impossible to standardize these parameter values *a priori*, so including a "quality assured" standard may not be appropriate. Knowledge of localized fisheries behaviour patterns may be required to refine analysis. The concept of uncertainty regarding further "fit for purpose" processing of data were discussed, e.g. the standardization of aggregation protocols. Several options for the standardization of VMS post-processing were proposed (e.g. use of c-square grids)

In 2011, a review of standardized data methodologies and products was conducted. Several improvements to VMStools package (MARE/2008/10 lot 2) were evaluated. The methodologies for interpolation between pings were discussed as were the options for calculation of gridded effort data at the c-squares resolution. Artificial neural networks (ANN) were presented as an approach to help define "fishing" events where speed filters do not perform well and to define métiers in the absence of logbook data. Although ANN's may offer a potential solution, there is still a requirement to generate a training database through at-sea observer data. SGVMS considered the possibility of ICES acting as a data centre for anonymised and aggregated VMS and logbook data and the standardization of data formats (FishFrame) necessary for submission of data to ICES. This would enable the provision of standardized data to meet the requirements of several ICES working groups.

In 2012 there was some discussion on the performance of different fishing interpolation methodologies. As VMS positional data are typically only transmitted at a resolution of 1-2hrs, it is currently necessary to employ modelling approaches to better understand patterns of fishing activity. The problem of standardizing methodologies between institutes due to variations in programming language and data availability was discussed. A number of common interpolation methods were compared and the implications discussed (see **Section 3.4** below). Such models focus on the reconstruction of vessel "tracks" based on specific parameters (e.g. speed, heading etc.). Methods for increasing the frequency and detail of data (e.g. CCTV, ais, electronic logbooks) were also presented, see **Section 3.5** for more detail.

Following the first VMStools training course in June 2012, a brief review of data quality assurance was conducted. The VMStools R-package (Hinzten *et al*., 2012) offers a suite of functions to facilitate scrutinizing and processing of VMS data and linking of VMS to logbook data. As the VMStools package was developed in a lot2 project that has now ended, all further development and maintenance of the package will be voluntary. From a quality perspective this might pose problems. For example, collection of haul-based information is expected to increase as electronic logbooks provide easier ways to collect this information. Currently, VMStools is not updated to include haul-based information. For EU vessels operating in Norwegian waters the haul-by-haul information is already mandatory, but the collection of haul by haul information in EU waters often differs between countries (see ToR c). VMStools often includes functional options for several types of analyses. As an example spatial mapping and aggregations can be performed using either c-squares or raster grids. The c-square notation is a spatial reference that simplifies the aggregation of data but the grid is not an equal area grid and this needs to be taken into consideration for possible users of standardized data products. For VMS data to be stored within the ICES FishFrame it must comply with the format (**Annex 7**). Currently the VMStools function for creating the output format (VE and VSL), is tied to specific methods, not necessarily the method to be used to produce standardized products. The VE format contains the effort, landing weight and landing value calculated after combining the logbooks and VMS data. The VSL format contains weight and value by species. The two formats are interleaved. The SGVMS recommend that the FishFrame format function should be developed into a stand-alone function within VMS tools.

3.3 Summary of SGVMS Quality Assurance Conclusions/Recommendations

- SGVMS recommend that users of VMS data consult the 2010 report prior/during data analysis. This includes a substantive list of data processing requirements for raw and aggregated VMS and logbook data, along with suggestions on how to achieve a standard set of quality control actions.
- VMStools package has been delivered through MARE/2008/10 lot 2 incorporating many standardized functions for VMS/logbook analysis. SGVMS recognize that any suitable software package can be used to deliver standardized outputs as long as the user complies with the published processing requirements.
- The existence of VMStools package does not eliminate the need for:
  - an understanding of the data being analysed
  - some proficiency of working with a command-line interface environment and
  - adequate time/resource committed to ensure standardized but meaningful outputs.
- SGVMS recommend that ICES acts as a multinational data centre for VMS
- SGVMS recommend that the FishFrame format function should be developed into a stand-alone function within VMStools package.
- SGVMS recommend that c-squares notation becomes the standard geographical reference system for aggregated data submitted to ICES.

- Provision of higher frequency positional data can enable a better understanding of fleet behavioural dynamics. This may be achieved through linking with non-VMS data e.g. CCTV/AIS.

3.4 Comparison of VMS interpolation methods

Depending on the institute and the programming language, several methods of estimations have been established. All of the methods have shown that they estimate the location of the vessels quite well; nevertheless, it is not sure that all of the methods designate the same area or distribute the fishing effort in a comparable way when applied on the same dataset. For this reason three 'interpolation'-methods were compared on a 3x3 nm grid, called a rectfine-grid (in prep K.F. Schulte). The comparison included the original version of the splines, as described in Hintzen *et al.* (2010), the ellipses (Mills *et al.*, 2007) as well as the amplification method (Fock, 2008). The basic idea of the splines differs from the other two methods. The Splines try to reconstruct the most probable vessel track, while the other two methods incorporate the uncertainty of the information by estimating an area of highest probability density for each of the vessels. For comparison, fishing times of all 164 shrimps vessels operating from August –September 2010 were used (one trip per vessel; Figure 1).

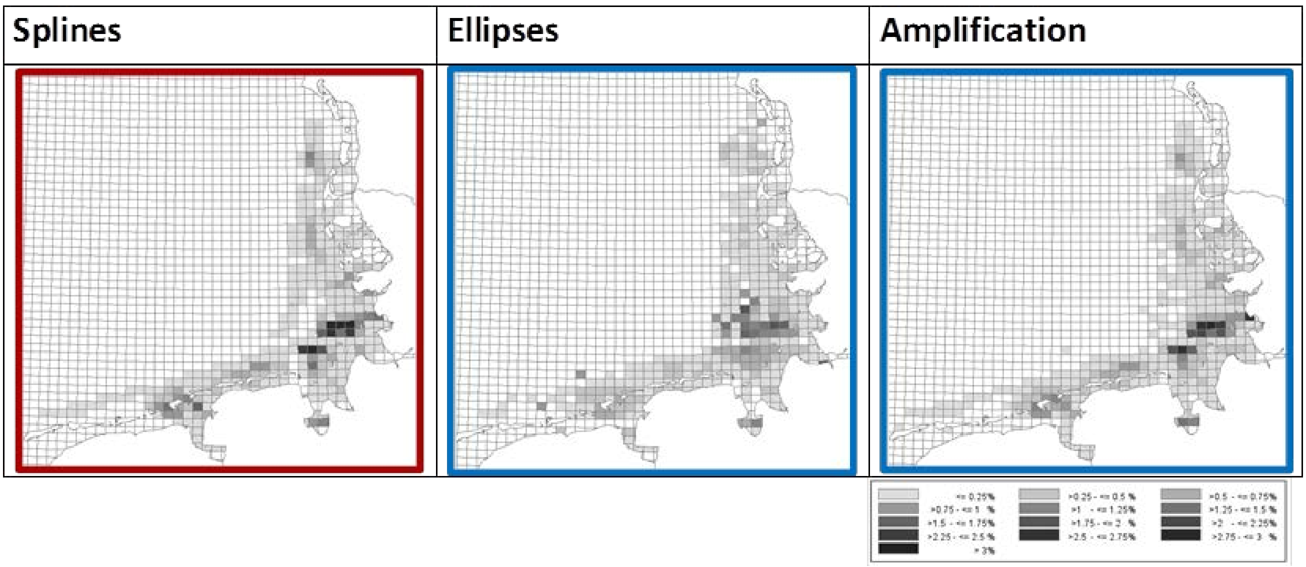

Figure 1. Percentage of designations for the different rectfines and the different methods.

The designated areas were compared as well as the distribution of the effort of the different methods. While the designated areas did not differ significantly, the distribution of the effort was significantly different from the other two methods. In a further approach, it is recommended that available methods should be compared to each other but also ought to be tested against a high resolution dataset, e.g. CCTV/FDF data. This would be useful to assess which of the methods most closely reflects reality. It is expected that different methods might appear most suitable depending on gear or fleet.

3.5 Verification of VMS interpolation

To minimize uncertainty in the result, data quality and data assurance should be considered when using methods of VMS data interpolation. A good way to evaluate the quality of the results and the suitability of the method is using a high frequency dataset for preliminary testing. High frequency datasets such as those produced by the AIS system are widely available and can be downloaded from the Internet for a variety of gears and vessel sizes. Also, several countries are running FDF/CCTV pilots that collect high frequency data. Any of these can be easily manipulated to simulate VMS-like positional data in which you can test the interpolated methods and tune them to obtain the best results.

As an example of what can be accomplished, researchers at Marine Scotland Science have simulated VMS data based on a dataset generated at sea from FDF/CCTV. This simulated VMS data were then interpolated using the Hermite Cubic Spline method described by Hintzen *et al.*, 2010 using VMStools. The frequency of the original dataset is 10 seconds but for readability purposes, the FDF/CCTV data plots shown below (Figure 2) only show "pings" at a 10 minute interval. The plots show the interpolated tracks, before and after the optimization of one of the models' parameters (fm) to this particular vessel.

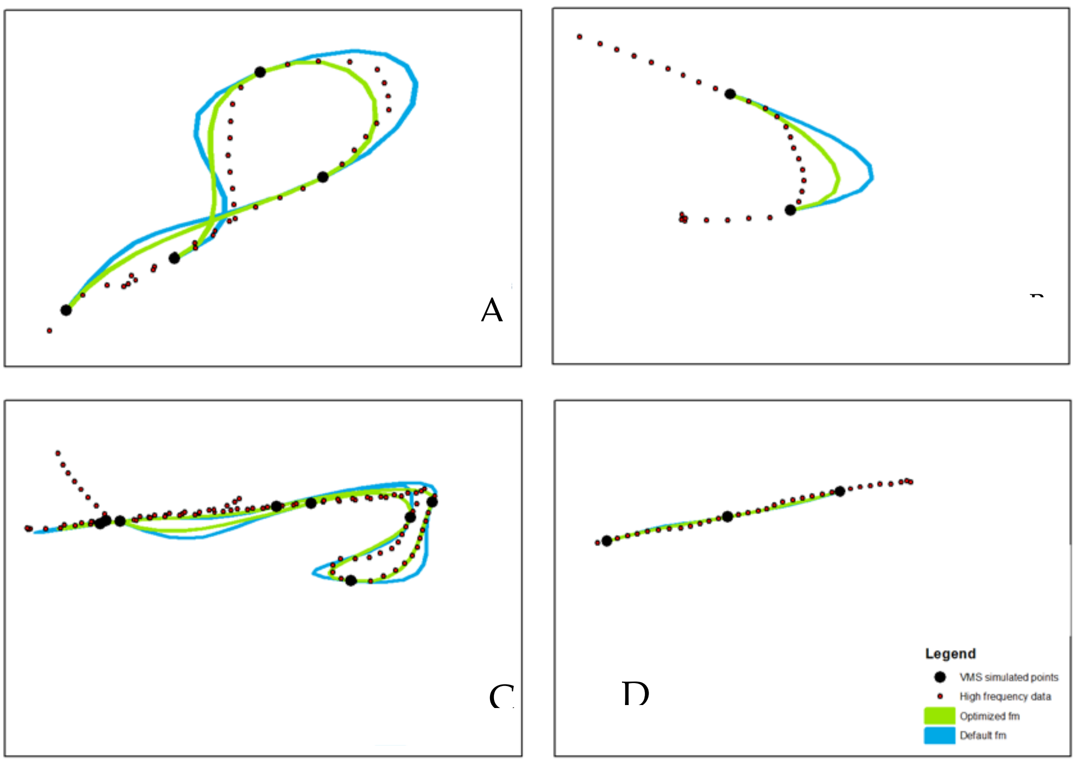

Figure 2. High frequency (10 minute) position data from a single vessel with simulated VMS points at inserted at 2 hourly intervals. Default and optimized cubic splines are fitted to the simulated data.

In the four track examples it can be inferred by the naked eye that the interpolated track resulting after the optimization (green) is closer to the real track that the one using the default parameter (blue). This was also verified by calculating the difference from the real track to the interpolated tracks using a function also available in VMStools package. In track D the difference is very small as the fm parameter does not appear to affect the resulting tracks when they are close to linear. This small example shows the difference that using a high frequency dataset can make to final results.

4 ToR c) – Evaluate adoption of e-logbooks for standardized data products for the ICES centre

E-logbook refers to the routine on-board catch data records completed by fishermen and transmitted electronically in a ready for use format[1]. Adoption of e-logbooks is highly recommended since they often contain more information than paper logbooks. Ideally, data are available up to one day after the catch activity took place and constitute daily reports, per haul for active gears, aggregated per day for passive gears. This, together with additional information regarding the start- and stop times and position of each fishing event is a valuable resource that can effectively control the quality of the information in the VMS data.

Currently e-logbooks constitute part of the VMStools package and, where available, use of e-logbook data is recommended, although there is still room for improvement within the VMStools package. Some selected examples of improvements include:

1) The VMStools-parameter “Catch date” is, in the lowest resolution (i.e. per day), too coarse and thus not sufficient for many applications. The parameter “log event start / stop” should be available for each catch activity (as is the case for Norwegian data), ideally recorded automatically, i.e. independent on human interference (e.g. stress sensors on winches for trawl gear). As a result, distribution of catches per duration of catch activity would be markedly improved.

2) VMStools uses a mixture of data derived from VMS, electronic logbooks and sales slips. The inherent problem is the resolution: sale slips data cannot be allocated to electronic logbook data in the same temporal resolution as the logbooks – this is especially an issue for passive gears.

Although the Norwegian situation seems favourable with VMS and e-logbooks are already in operation, it is obvious that EU vessels are very much capable of e-logbook reporting on the same detailed level as Norwegian vessels, which is reflected in the fact that foreign vessels in Norwegian waters are obliged to report along the same lines to Norwegian authorities as Norwegian vessels. Experience shows that there is no large difference in data quality between e-logbooks reported by Norwegian and foreign vessels.

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[1] The following text is written mainly from the Norwegian point of view, which is best known to the contributors.

For more information on the detailed requirements for EU vessels in Norwegian economic zone, see the agreed record between Norway and EU on Electronic Exchange of catch and activity data (Brussels, 14 November 2011).

Before an adoption of e-logbooks one has to be aware of the main purpose of these data, as this may potentially affect the data quality. For Norway, e-logbooks are mainly used for regulation and control purposes. Missing data do occur in e-logbooks, and although they are "errors" in the scientific sense, they will be kept in the records just to be able to track the behaviour of the fisherman for the case that missing logbooks occur from the same person. Regulation on one side and statistics / research on the other side thus have slightly different aims in the use of e-logbook data. As long as control authorities govern this process the scientist / statistician must be prepared to encounter fully legally data, which he (she) would consider as (partly) erroneous. Hopefully this will change in near future so we could have complete datasets.

Standardization requires that every country involved in collection of e-logbook data are able (and willing) to deliver it. To adopt the e-logbook as a *standardized* data product one first needs to survey the current status in different countries.

Germany

The application of e-logbooks in Germany follows stipulations from EC 1224/2009 and EU 404/2011.

Except for shrimp fishers, haul-by-haul information is collected. For towed gear, this information contains at least one position datum (i.e. the position of hauling) to have a clear indication of the last fishing activity in the 24 h period of each day. This refers to the data transfer protocol in EU 404/2011, Annex XII, lines 189–191.

For passive gear, both setting positions of a net have to be indicated.

Practical experience of combining e-logbooks and VMS analysis tools is yet not available.

Sweden

The e-logbook is fully implemented in the fleet segment of >15 m vessel length. The VMS and e-logbook system in the fleet segment 12-15 m vessel length is currently being implemented. The e-logbook contains information on start and stop position and time for each fishing event for seiners and trawlers. For passive gears, such as gillnets and pots, a mean position per day is given in addition to gear length or number of pots/traps and soaking time.

Portugal

Since the beginning of 2012, Portuguese fishing vessels over or equal to 12 meters length overall are required to present electronic logbooks. However, vessels under 15 metres can be exempted to present the electronic logbook if they operate exclusively within the territorial seas or never spend more than 24 hours at sea from the time of departure to the return to port (according to article 9 and 15 in the Council Regulation (EC) nº 1224/2009. This exemption has been put in practice for Portuguese vessels according to the National Regulation Portaria nº 313/2011, 28th of December 2011 (Portaria nº 313/2011 de *28 de Dezembro de 2011. Diário da República, 1.ª série — N.º 248. (in portuguese). http://dre.pt/pdf1sdip/2011/12/24800/0545305455.pdf (accessed September 2012)).*

During the initial transition period corresponding to the first semester of 2012, both electronic logbooks and paper logbooks was accepted, but from 1 July 2012 only e-logbooks are accepted by DGRM (Direcção-Geral de Recursos Naturais, Segurança e Serviços Maritimos).

Finland

In Finland e-logbooks are in test-use phase on a couple of vessels. According to the current plan, the full application of e-logbooks should take place before the end of the year 2012. Data are collected on a haul-by-haul basis. Beginning and end positions and times of each fishing operation are recorded.

Denmark

Since 1 January 2010 all vessels larger than 24 meters overall had to transmit electronic logbook. During 2011 all vessels >= 12 meters overall had electronic logbook installed, and now transmit the logbook data electronically. Vessels less than 12 meters are encouraged to get electronic logbook and VMS and will get a financial support for establishment like the vessels above 12 meters.

When fishing in the Norwegian EEZ the fishermen are obliged to fill in data haul by haul with start and end time and position. In the European Union EEZ, they are only obliged to fill logbook by day, but have the possibility to fill in by haul, either with end position/time or with both start and end position/time. Vessels with CCTV installed also fill electronic logbook by haul.

The following Table gives a short overview of four countries indicating that reporting schemes for e-logbooks still are different in level of detail, a potential impediment to further standardized analysis.

Table 4.1. Review of e-logbooks information of Norway, Denmark, Sweden, The Netherlands.

	THE PARAMETER IS AVAILABLE IN OUR E–LOGBOOK NATIONAL DATA											
	NORWAY			DENMARK			SWEDEN			THE NETHERLANDS		
PARAMETERS IN "EFLALO2" FORMAT ("VMSTOOLS" PACKAGE)	yes	no	Comment	yes	no	Comment	yes	no	Comment	yes	no	Comment
Fishing trip reference number		X		X			X		SWE 1	X		
Departure country	X			X			X		SWE 1	X		
Departure harbour	X			X			X		SWE 1	X		
Departure date	X			X			X		SWE 1	X		
Departure time	X			X			X		SWE 1	X		
Landing country	X			X			X		SWE 1	X		
Landing harbour	X			X			X		SWE 1	X		
Arrival date	X			X			X		SWE 1	X		
Arrival time	X			X			X		SWE 1	X		
Log event ID		X			X	DEN 1		X	SWE 2		X	
Catch date	X			X			X		SWE 1	X		NED 1
Log event start time	X			X		DEN 2		X	SWE 3		X	
Log event end time	X			X				X	SWE 3		X	
Log event start position latitude	X			X		DEN 2		X	SWE 3		X	
Log event start position longitude	X			X		DEN 2		X	SWE 3		X	
Log event end position latitude	X			X				X	SWE 3		X	
Log event end position longitude	X			X				X	SWE 3		X	
Gear	X			X			X		SWE 1	X		NED 2
Mesh size		X	NOR 1	X			X		SWE 1	X		
ICES rectangle	X			X			X		SWE 1	X		
ICES division	X			X			X		SWE 1	X		
Fishing activity (métier)		X			X	DEN 1	X		SWE 1		X	NED 3
Landing weight estimate of all species caught (FAO species codes)	X			X		DEN 3	X		SWE 1	X		
Landing value of species all species caught (FAO species codes)		X	NOR 2		X	DEN 4	X		SWE 1		X	NED 4

Comments:

NOR 1: Available from 2013, NOR 2: Can potentially be obtained from sales slips, DEN 1: Generated at DTU Aqua during data handling, DEN 2: Only mandatory when fishing in Norwegian EEZ, DEN 3: If catching less than 50 kg of a species (10 kg for certain species) the species can be grouped in an "others" group., DEN 4: Can be found in the sales slips, SWE 1: As defined in Annex XI to 404/2011, SWE 2: Log of what?, SWE 3: Type of event? If haul, then yes for SWE, NED 1: Not 100% reliable NED 2: No specifications. E.g. TBB can be all sorts of innovative flatfish gear like pulse trawl, sumwing, hydrorig, outrig etc., NED 3: It is defined in our database VISSTAT, but it isn't in the government's database. NED 4: It

is not part of e-Logbook data, but we receive price/kg from the Ministry of Economic Affairs, Agriculture and Innovation, based on auction data.

5 ToR d) – Review ongoing work for analysing VMS data and developing standardized data products

5.1 VMStools – R package

The VMStools R-package (Hinzten *et al.*, 2012) offers a suit of functions to facilitate scrutinizing and processing of VMS data and linking the VMS and logbook data. The VMStools was developed in an EU Lot2 project that has now ended. This means that further development and maintenance of the package depends on voluntary work. From a quality perspective this might pose problems. As of today the VMStools is not updated to include haul based information. Haul based information is expected to increase as the use of the electronic logbook provides the means to more easily collect this information. For EU vessels operating in Norwegian waters the haul by haul information is already mandatory, but the collection of the haul by haul information in EU waters seems to differ between countries (see ToR c).

The VMStools include several different functions and method for some of the analysis. As an example spatial mapping and aggregations can be done using either c-squares or raster grids. The c-square notation is a spatial reference that simplifies the aggregation of data and but the grid is not an equal area grid which needs to be taken into consideration for possible users of standardized data products.

The FishFrame format has been suggested as the standard format for VMS data products but as of today the VMStools function for creating the output format is tied to a specific method, not necessarily the method to be used to produce standardized products. The SGVMS recommend that the FishFrame format function should be developed into a stand-alone function (see Annex 7).

5.2 Other progress in VMS analysis

Analysis of seiners' effort

Walker and Bez (2010) have applied a Bayesian state-space model to investigate fishing patterns for seiners in the Indian Ocean. Validation by observers was essential to define a) activity states of stopping (meaning standstill or fishing), tracking (targeting fish schools) and cruising, b) their respective prior distributions with regards to speed and changing of course and c) the probability of transition from one state to the other.

They found 10 % overestimation of model based effort as compared to observer data, a value comparable to overestimation found for trawlers by means of a linear statistical model (Fock, 2008).

Analysis of resolution effects

Researchers from Bangor University (UK) and co-workers analysed the effect of resolution of VMS analysis on benthic impact assessments (Hinz *et al.*, 2012, Lambert *et al.*, 2012). With respect to scallop dredging and otter board trawling observed over 1 year, grids with cell sizes of c.a. 1.5 nm were considered as best resolution, identified through significant relationships in impact functions. They discuss, that, with respect to multi-annual variability of fishing activities, larger scales might also be appropriate to analyse their long-term and cumulative effects. They conclude that the selection of grid-cell resolution is a trade-off between the need to aggregate sufficient records to obtain a reliable index of intensity over an appropriate period and the need to ensure that the effect of patchiness is not overlooked.

6 References

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Annex 1: List of participants

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Annex 2: Agenda

SGVMS 2011 DRAFT AGENDA

Start of the Study Group

5 September 2012, 13:00 p.m.

End of the Study Group

7 September, 2012, ca. 12:00 a.m.

Wednesday

13:00	Introduction, Adoption of Agenda		[Chair]
	Housekeeping		[Rui]
	National presentations and from ICES	n.c.	[N.N.]
	Presentation Tor b)		[Schulte]
	Presentation ToR d)		[Carlos *et al.*]
15:00	Discussion of ToR's		

Assignment of participants to subgroups / subgroup leaders

Work in ToR subgroups

18:.00	End of day / Re-convening and Plenary discussion
19:00	Dinner in town

Thursday

09:00	Summary of Day 1 and short plenary
10:00	ToR Working in subgroups
15:00	Discussion and adoption of Resolution

Friday

09:00	Continue work
	Collate report material
12:00	Closing of meeting

Annex 3: SGVMS recommendations 2012

RECOMMENDATION	ADRESSED TO
1. SGVMS recommends establishing a working group on spatial fisheries data (WGSFD) to analyse and compile fisheries effort data such as VMS. The working group should be obliged to deliver its own suite of assessments equivalent to other ICES expert groups. As such, assessments as required by DCF with regards to fisheries impact indicators and MSFD with regards to seabed integrity could be undertaken. Further tasks are to prepare data ready-to-use for other ICES expert groups as part of the ICES data repository and to further develop and evaluate methodologies and software relevant to this field of work. As such, the timing of the meeting of the working group should be selected on the one hand to fit into the workflow of the preparation of ICES advice and on the other, to give the national laboratories sufficient time to work up last years' data. In the long-term, September as for SGVMS seems inappropriate in this respect, but limitations due to a tightly packed ICES meeting calendar are also acknowledged. As such, experts should be invited to this group to facilitate the required analysis of logbook data and VMS. As such, the performance of the working group should be reviewed on a regular basis. This is to ensure that it does not jeopardize its goals with respect to legal issues and insufficient workflow.	SSGSUE, SCICOM
2. SGVMS recommends repeating the VMStools training course upon request to provide basis for a standardized analysis of VMS data in the ICES community.	ICES Training Group
3. SGVMS recommends that the FishFrame format function in VMStools should be developed into a stand-alone function.	ICES Data Centre

Annex 4 Resolution for multi-annual ToR's

A **Working Group on Spatial Fisheries Data** (WGSFD), chaired by Heino Fock, Germany, will meet in Copenhagen, Denmark, 11–13 September, 2013, to work on ToRs and generate deliverables as listed in the Table below.

WGSFD will report on the activities of 2013 (the first year) by September 30, 2013 to SSGXX.

ToR descriptors

ToR	Description	Background	Science Plan topics addressed	Duration	Expected Deliverables
A	With regards to EU waters, to annually update an aggregated product based on VMS and logbook data giving the DCF environmental indicators 5, 6 and 7 and indicators for MSFD descriptor 6. The aggregated output will contain data from as many ICES member states as possible.	a) DCF requirement b) MSFD	123, 162, 21, 33	Annual	DCF environmental indicators 5, 6 and 7 MSFD descriptor 6
B	Work on standardized data products for inter alia WGDEEP, WGDEC, WGECO. Ensure standardized methods and quality assurance.		153, 34	Annual	
C	Review ongoing work for analysing VMS data and developing standardized data products. This might also include new technical solutions like e-logbook, AIS and CCTV data to improve the effort estimate			Annual	

Summary of the Work Plan

Year	Activities planned
Year 1	Analysis of TACSAT/EFLALO formatted data applying VMStools by country, compiling data in a FishFrame format, calculation of indices, forward data to database
Year 2	same

“Supporting information

Priority	Growing demand for fine scaled spatial fisheries information for Marine Spatial Planning, ICES working groups, estimation of environmental impacts of fisheries. ICES has a strategic goal to have a key position in relation to MSFD.
Resource requirements	Attendence by resentatives from as many countries as possible. VMS and logdata are provided to study group members through their national agencies. ICES platform to upload and distribute standardized products
Participants	The Group is attended by some 20–25 members and guests. If legal expertise is required, i.e. sufficient legal advice is not available beforehand, administrators from EC and others should also be invited.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	ACOM
Linkages to other committees or groups	WGDEEP, WGDEC, WGECO, WGDIM
Linkages to other organizations	

Annex 5: The ICES legal position towards using VMS data, by Poul Degnbol, ICES, May 2011

The DCF regulation established as from 1 January 2009 states that data collected under this framework AND data collected under other legislation including most control data such as VMS data are in practice public domain with a few limitations.

You can follow this by checking the steps:

Clause 15 makes reference to transparency legislation regarding data including the Aarhus Convention and states that this framework does not override such legislation (meaning that it applies to these data)

Definition g in article 2 defines 'detailed data' as primary data in a form which ensures anonymity – meaning that the former approach of never having to provide primary data but only data aggregated on a large-scale is gone – there is now access to primary data which opens the door to VMS primary data as well. This definition was largely introduced to ensure access to primary (but anonymised) VMS data since aggregated VMS data will be useless for most purposes such as studies of fishing activities around specific habitats.

Definition i in article 2 defines 'end-users' as bodies with a research or management interest in the scientific analysis of data. This opens for the scientific community at large, for scientific advisory bodies, public authorities and basically any stakeholder or citizen body with an interest in fisheries management. This means de facto public access – there are however limitations on what data can be used for in article 18 but this is equally open.

Article 1 states that the data framework applies to Community vessels inside and outside Community waters. Since NEAFC provides access to non-community vessel VMS data this should mean that we have complete access in the NE Atlantic, although I am not sure what applies to non-Community vessels in Community waters.

Article 15 explicitly mentions VMS data as a data category covered by this regulation including access.

Article 18 states that data (including detailed data as defined above) must provide data to end-users to support scientific analysis for three purposes: as basis for advice, in the interest of public debate and for scientific publication. This means that it will be very difficult to find a purpose which would not be covered by this. Combining the definition of detailed data and end-users with this article means that any scientist can request primary VMS data (although anonymised) for scientific analysis. There is a provision which member states may use to withhold such data namely that if necessary to ensure anonymity they may refuse to provide VMS data – this option needs testing in real cases but will be interpreted to mean that this would only apply if it is known only very few vessels have participated in a fishery and that removing the vessel ID from the primary data would not be enough to ensure anonymity.

Article 20 states stipulates that member states must submit data 1 or 2 months after a request is made dependent on the purpose. It also states that the release of data may be delayed for up to three years after the date of collection if the purpose is scientific publication – this was introduced as a response to claims made by member states during the negotiations that those collecting the data should have time to publish on basis of those data before they move into the public domain. It would make sense if the scientific community would consider whether it is in its interest to maintain this in the revision of the DCF, some may say that we have shot ourselves in our feet by claiming first publication rights here. This means in practice that member states may insist that they can only start to release data for scientific publication from 2012 since the first data collected under this regulation are from its entry into force on 1 January 2009 – but they don't have to, willing states can make data available immediately if they choose.

Article 21 finally provides a process of appeal: if a member state refuses to provide data to an end-user the Commission can intervene – and there are financial sanctions available if the member states insist on refusing access.

There is also a very significant change from the former data collection regulation that there is no more a requirement to delete data again after 20 days. This absence is what opens for the establishment of permanent databases for these data – such databases must however be equipped with some facility to distinguish between purposes of extracting data from them. For scientific advice and public debate/stakeholder participation all data should be available, for scientific publication the three year moratorium after collection will apply.

Unfortunately, in the negotiations of this the majority of Member States insisted on having discreete national programmes rather than regional frameworks within which MS would organize their data collection. However, the DCF opens for and encourages regional cooperation if MS choose to do so, so a move to regional approaches (including databases) can be accommodated within this framework.

Annex 6: Data exchange formats – TACSAT2 and EFLALO2

EFLALO2 format

TYPE	VARIABLE	CODE	FORMAT/UNIT
Vessel	Vessel ID	VE_REF	20 character string
	Fleet	VE_FLT	DCF regulation
	Home country	VE_COU	ISO 3166 – 1 alpha-3 codes.
	Vessel length	VE_LEN	Oal (m)
	Vessel power	VE_KW	kW
	Tonnage	VE_TON	GT (optional)
Fishing trip	Fishing trip reference number	FT_REF	20 character string
	Departure country	FT_DCOU	ISO 3166 – 1 alpha-3 codes.
	Departure harbour	FT_DHAR	International harbour codes. UN LOCODE
	Departure date	FT_DDAT	DD/MM/YYYY
	Departure time	FT_DTIME	HH:MM
	Landing country	FT_LCOU	ISO 3166 – 1 alpha-3 codes.
	Landing harbour	FT_LHAR	International harbour codes. UN LOCODE
	Arrival date	FT_LDAT	DD/MM/YYYY
	Arrival time	FT_LTIME	HH:MM
Log event	Log event ID	LE_ID	25 character string FT_REF_number (1,2,3,etc.)
	Catch date	LE_CDAT	DD/MM/YYYY
	Log event start time	LE_STIME	HH:MM (Optional)
	Log event end time	LE_ETIME	HH:MM (Optional)
	Log event start position latitude	LE_SLAT	Decimal degrees (Optional)
	Log event start position longitude	LE_SLON	Decimal degrees (Optional)
	Log event end position latitude	LE_ELAT	Decimal degrees (Optional)
	Log event end position longitude	LE_ELON	Decimal degrees (Optional)
	Gear	LE_GEAR	3 character string. DCF metiér level 4
	Mesh size	LE_MSZ	mm stretched mesh
	ICES rectangle	LE_RECT	37F5, NA=unallocated
	ICES division	LE_DIV	10 character string (see codes in Annex 1)
	Fishing activity (métier)	LE_MET	Filled in as output from Lot2 tool
	Landing weight estimate of species SP1 (FAO species codes)	LE_KG_<SP1>	Kg
	Landing value of species SP1 (FAO species codes)	LE_EURO_<SP1>	EURO
	…	…	…
	Landing weight estimate of species SPn (FAO species codes)	LE_KG_<SPn>	Kg
	Landing value of species SPn (FAO species codes)	LE_EURO_<SPn>	EURO

TACSAT2 format (VMS data)

Type	Variable	Code	Unit
Vessel	Vessel ID	VE_REF	20 character string
Sighting operation	Latitude	SI_LATI	Decimal degrees
	Longitude	SI_LONG	Decimal degrees
	Date	SI_DATE	DD/MM/YYYY
	Time	SI_TIME	HH:MM
	Instant speed delivered	SI_SP	Knots
	Instant heading delivered	SI_HE	Degrees
	At Sea/In Harbour	SI_HARB	0: In harbour 1: At sea
	Fishing/Steeming	SI_STATE	0: Steaming 1: Fishing Filled in as output from Lot2 tool
	Fishing trip reference (FT_REF)	SI_FT	20 character string Filled in as output from Lot2 tool

Codification:

Country codes: ISO 3166 – 1 alpha-3 codes

Harbour codes: International harbour codes based on the UN LOCODE format.Harbour codes and harbour positions have been collected for the EU project ERS (Electronic Reporting System), and these codes are available on the page:

http://ec.europa.eu/fisheries/cfp/control_enforcement/ers_en.htm

Gear codes: The FAO gear codes are used:
ftp://ftp.fao.org/FI/DOCUMENT/cwp/handbook/annex/AnnexM1fishinggear.pdf

Species codes: FAO species codes are used: http://www.fao.org/fishery/collection/asfis/en

Fishing activity codes: The fishing activity codes used in FishFrame for Nantes matrix level 6.

Annex 7: Exchange format for the FishFrame database

The FishFrame VE and VSL formats are outputs from the VMStools. The VE format contains the effort, landing weight and landing value calculated after combining the logbooks and VMS data. The VSL format contains weight and value by species. The two formats are interleaved.

Commercial fisheries effort statistics record (VE) based on eflalo and tacsat data.

Order	Name	Type	Req.	Basic checks	Comments
1	Record type *	String	M		Fixed value VE
2	Vessel Flag Country *	String	M	Code list#	ISO 3166-1 alpha-3 codes. The flag country of the vessel.
3	Year *	Integer	M	Code list#	1900 to 3000
4	Quarter *	Integer	M	Code list#	1 to 4.
5	Month *	Integer	M	Code list#	1 to 12
6	Area*	String	M	Code list#	Area level 3 (level 4 for Baltic, Mediterranean, Black Sea) in the data Collection regulation (EC, 2008a, 2008b).
7	C-square *	String	M	Code list#	0.05x0.05 degree, C-square reference XXXX:XXX:XXX:X
8	Fishing activity category National *	String	O	Code list#	Fishing activity category – National coding system. Bound to the Nantes matrix level 4 as children i.e. an alternative level 5+6.
9	Fishing activity category European lvl 6 *	String	M	Code list#	Fishing activity category – Level 6 in the Nantes matrix (SGRN 06-03)
10	Fishing hour	Decimal numeral	M	1 to 9999999999	Fishing hour calculated from VMS data.
11	kW*fishing hour	decimal numeral	M	1 to 9999999999	
12	Tot weight	Decimal numeral	M	1 to 9999999999	Total landings of all species caught. In kg
13	Tot value	Decimal numeral	M	1 to 9999999999	Total value of all species caught. In Euro

*** Key field**

 # Lists in the regular FishFrame exchange format description {ICES, 2009 #329}

SpeciesList record (VSL) in commercial fisheries based on tacsat and eflalo data.

Order	Name	Type	Req.	Basic checks	Comments
1	Record type *	String	M		Fixed value VSL.
2	Vessel Flag Country *	String	M	Code list#	ISO 3166-1 alpha-3 codes. The flag country of the vessel.
3	Year *	Integer	M	Code list#	1900 to 3000
4	Quarter *	Integer	M	Code list#	1 to 4.
5	Month *	Integer	M	Code list#	1 to 12
6	Area*	String	M	Code list#	Area level 3 (level 4 for Baltic, Mediterranean, Black Sea) in the data Collection regulation (EC, 2008a, 2008b).
7	C-square *	String	M	Code list#	0.05x0.05 degree, C-square reference XXXX:XXX:XXX:X
8	Fishing activity category National *	String	O	Code list#	Fishing activity category – National coding system. Bound to the Nantes matrix level 4 as children i.e. an alternative level 5+6.
9	Fishing activity category European lvl 6 *	String	M	Code list#	Fishing activity category – Level 6 in the Nantes matrix (SGRN 06-03) see appendix I.
10	Species	String	M	Closed list of species 1)	Scientific name in Latin (genus species).
11	Weight	Integer	M	1 to 9999999999	Whole weight in gram. Decimals not allowed.
12	Value	Integer	O	1 to 9999999999	In Euro. Decimals not allowed.

*** Key field**

 # Lists in the regular FishFrame exchange format description {ICES, 2009 #329}.

Annex 8: e-logbook questionnaire

Denmark

COUNTRY:	DENMARK
Access to e-Logbook data by fisheries institute	
How does the fisheries institute access e-Logbook data?	Through a VPN connection
Are the data processed in any way before they are made available?	Yes, they are combined with paper logbook information into a logbook register
For which years are data available?	e-Logbook data are available since 2010. Since 2012 available for all vessels >= 12 m oal
Are foreign e-Logbook data available?	?
e-Logbook: properties main data	
Minimum boat length for reporting	12 meters
Reporting procedures for different gear types	One procedure for active gears, and one for passive gears.
Regulation with detailed requirements in english (with url)	Logbook regulation 2807/83 Control regulation 404/2011 National regulation
Can the vessel ID be linked directly to the VMS and sales slips	Yes
Policy for sharing e-Logbook data	
What is the policy for sharing unaggregated e-Logbook data?	DTU Aqua can have access to the data, but the data are stored on a secured server where scientists need to apply for access. They should not remove raw data from this server.
What is the policy for sharing aggregated data with third parties?	Data where individual vessel can be recognized are not to be published. The general rule is that there has to be at least three vessels in an aggregation cell.

PARAMETER IN "EFLALO2" FORMAT (VMSTOOLS PACKAGE)	THE PARAMETER IS AVAILABLE IN OUR E-LOGBOOK NATIONAL DATA		
	yes	no	Comment
Fishing trip reference number	X		
Departure country	X		
Departure harbour	X		
Departure date	X		
Departure time	X		
Landing country	X		
Landing harbour	X		
Arrival date	X		
Arrival time	X		
Log event ID		x	Generated at DTU Aqua during data handling
Catch date	X		
Log event start time	X		Only mandatory when fishing in Norwegian EEZ
Log event end time	X		
Log event start position latitude	x		Only mandatory when fishing in Norwegian EEZ
Log event start position longitude	X		Only mandatory when fishing in Norwegian EEZ
Log event end position latitude	X		
Log event end position longitude	X		
Gear	X		
Mesh size	X		
ICES rectangle	X		
ICES division	X		
Fishing activity (métier)		x	Generated at DTU Aqua during data handling
Landing weight estimate of all species caught (FAO species codes)	x		If catching less than 50 kg of a species (10 kg for certain species) the species can be grouped in an "others" group.
Landing value of species all species caught (FAO species codes)		x	Can be found in the sales slips
Optional			
Does the e-Logbook data contain a substantial amount of information, which exceeds the EFLALO2 data requirements	x		Yes, except for the values.

Germany

COUNTRY:	GERMANY
Access to e-Logbook data by fisheries institute	
How does the fisheries institute access e-Logbook data?	Annually via control agency, first access in 2013
Are the data processed in any way before they are made available?	Will be processed according to protocol originally developed for paper logbooks
For which years are data available?	From 2012 on
Are foreign e-Logbook data available?	Only if cacth is landed in German ports
e-Logbook: properties main data	
Minimum boat length for reporting	12 m
Reporting procedures for different gear types	Except for shrimp fisher haul-by-haul, gillnetters must indicate setting and end position
Regulation with detailed requirements in english (with url)	http://www.ble.de/DE/02_Kontrolle/02_Fischerei/03_ElektronischesLogbuch/ElektronischesLogbuch_node.html
Can the vessel ID be linked directly to the VMS and sales slips	Yes
Policy for sharing e-Logbook data	
What is the policy for sharing unaggregated e-Logbook data?	Same as for paper logbooks, i.e. anonymised and aggregated
What is the policy for sharing aggregated data with third parties?	Same as for paper logbooks, i.e. anonymised and aggregated

Parameter in "EFLALO2" format (VMStools package)	The parameter is available in our e-Logbook national data		
	yes	no	Comment
Fishing trip reference number	X		
Departure country	X		
Departure harbour	X		
Departure date	X		
Departure time	X		
Landing country	X		
Landing harbour	X		
Arrival date	X		
Arrival time	X		
Log event ID	X		
Catch date	X		
Log event start time	X		
Log event end time	X		
Log event start position latitude		X	
Log event start position longitude		X	
Log event end position latitude	X		
Log event end position longitude	X		
Gear	X		
Mesh size	X		
ICES rectangle	X		
ICES division	X		
Fishing activity (métier)	X		
Landing weight estimate of all species caught (FAO species codes)	X		
Landing value of species all species caught (FAO species codes)	X		
Optional			
Does the e-Logbook data contain a substantial amount of information, which exceeds the EFLALO2 data requirements		X	

Portugal

COUNTRY:	PORTUGAL
Access to e-Logbook data by fisheries institute	
How does the fisheries institute access e-Logbook data?	
Are the data processed in any way before they are made available?	
For which years are data available?	Electronic logbooks have only been operational since the beginning of 2012.
Are foreign e-Logbook data available?	
e-Logbook: properties main data	
Minimum boat length for reporting	Available for vessels >= 12 m overall length with a few exceptions, namely those vessels between 12 and 15 according to Regulation 404/2011.
Reporting procedures for different gear types	Varies according to gear types*. For example, for trawl, fixed nets and gillnet, mesh size is recorded. For longline, average number of hooks is reported. For fixed nets in deep waters and Norwegian waters, average horizontal and vertical opening of nets (m) must also be recorded.
Regulation with detailed requirements in english (with url)	European: regulation 2807/83 and 404/2011.National: Portaria n.º 313/2011 de 28 de Dezembro. Diário da República, 1.ª série — N.º 248.
Can the vessel ID be linked directly to the VMS and sales slips	e-Logbook contains vessel ID.
Policy for sharing e-Logbook data	
What is the policy for sharing unaggregated e-Logbook data?	Raw data are not shared with third parties.
What is the policy for sharing aggregated data with third parties?	

Parameter in "EFLALO2" format (VMStools package)	The parameter is available in our e-Logbook national data		
	yes	no	Comment
Fishing trip reference number			
Departure country	X		
Departure harbour	X		
Departure date	X		
Departure time	X		
Landing country	X		
Landing harbour	X		
Arrival date	X		
Arrival time	X		
Log event ID			
Catch date	X		
Log event start time	X		
Log event end time	X		
Log event start position latitude	x		
Log event start position longitude	X		
Log event end position latitude	X		
Log event end position longitude	X		
Gear	X		
Mesh size	X		
ICES rectangle			
ICES division			
Fishing activity (métier)		x	
Landing weight estimate of all species caught (FAO species codes)			All species above a certain weight. Not necessary for ALL species, if the catch is under a certain weight (<50kg).
Landing value of species all species caught (FAO species codes)		x	Can be found in the landings information (sales slips).
Optional			
Does the e-Logbook data contain a substantial amount of information, which exceeds the EFLALO2 data requirements			

*Manual da Versão 1.0.4100.34550 do Diário de Pesca Electrónico . VERSÃO 1.3. 11p. http://www.dgrm.min-agricultura.pt/xportal/xmain?xpid=dgrm&selectedmenu=311402&xpgid=genericPage&conteudoDetalhe=311415

Norway

COUNTRY:	NORWAY
Access to e-Logbook data by fisheries institute	
How does the fisheries institute access e-Logbook data?	Raw data are owned by the Directorate of Fisheries and the Institute of Marine Research (IMR) gets data deliveries as agreed upon (per quarter year – but easy to deliver in higher frequency if need)
Are the data processed in any way before they are made available?	Yes, some fields are added (e.g. bottom depth, derived from geographic position and bathymetric models)
For which years are data available?	From October 2010 onwards for boats >21m, from January 2011 for boats > 15m. Quality, though, was variable at the beginning.
Are foreign e-Logbook data available?	Directorate of fisheries: yes; IMR: no. Applies only to EU-vessels.
e-Logbook: properties main data	
Minimum boat length for reporting	15m as for today, will decrease in future (12m in the Skagerrak area from 2013 onwards).
Reporting procedures for different gear types	Active gears: report per catch activity, passive gears: report per day
Regulation with detailed requirements in english (with url)	Agreed record between Norway and EU on Electronic Exchange of catch and activity data (Brussels, 14 November 2011) http://www.fiskeridir.no/content/download/25070/230839/version/1/file/Agreed+Record+ERS+14+November+2011+signed.pdf
Can the vessel ID be linked directly to the VMS and sales slips	To VMS yes, but more difficult for the sales slip.
Policy for sharing e-Logbook data	
What is the policy for sharing unaggregated e-Logbook data?	Raw data are not shared with third parties, but are exchanged between authorities in the flag state and the coastal state when Norwegian vessels are fishing in other zones.
What is the policy for sharing aggregated data with third parties?	Aggregated (gridded) data may be shared as long as individual confidenti- ality will not be breached. This is evaluated on a case-by case basis.

Parameter in "EFLALO2" format (VMStools package)	The parameter is available in our e–Logbook national data		
	yes	no	Comment
Fishing trip reference number		X	
Departure country	X		
Departure harbour	X		
Departure date	X		
Departure time	X		
Landing country	X		
Landing harbour	X		
Arrival date	X		
Arrival time	X		
Log event ID		X	
Catch date	X		
Log event start time	X		
Log event end time	X		
Log event start position latitude	X		
Log event start position longitude	X		
Log event end position latitude	X		
Log event end position longitude	X		
Gear	X		
Mesh size		X	Available from 2013
ICES rectangle	X		
ICES division	X		
Fishing activity (métier)		X	
Landing weight estimate of all species caught (FAO species codes)	X		
Landing value of species all species caught (FAO species codes)		X	Can potentially be obtained from sales slips
Optional			
Does the e-Logbook data contain a substantial amount of information, which exceeds the EFLALO2 data requirements	X		TRA (transhipment report – facilitates tracking of catches) LAN (landing declaration report – this is the actual amount of landed fish. This is not the same as the sales slip) Detailed gear specifications and reported gear problems

The Netherlands

COUNTRY:	THE NETHERLANDS
Access to e-Logbook data by fisheries institute	
How does the fisheries institute access e-Logbook data?	Data are obtained through the Ministry of Economic Affairs, Agriculture and Innovation.
Are the data processed in any way before they are made available?	The government carries out a basic quality check and the necessary amendments based on that, before the data are made available for the fisheries institute. IMARES carries out the more advanced checks and informs the Ministry about errors if necessary.
For which years are data available?	1995 onwards
Are foreign e-Logbook data available?	Only data from foreign vessels, when they land in the Netherlands
e-Logbook: properties main data	
Minimum boat length for reporting	None
Reporting procedures for different gear types	
Regulation with detailed requirements in english (with url)	
Can the vessel ID be linked directly to the VMS and sales slips	Yes
Policy for sharing e-Logbook data	
What is the policy for sharing unaggregated e-Logbook data?	Unaggregated data are available for IMARES research purposes only and is not shared with third parties, except one, which belongs to the same ‘umbrella’ organization as IMARES
What is the policy for sharing aggregated data with third parties?	The Centre for Fisheries Research (CVO) needs to give permission for data use by third parties. Data should be aggregated and the identity of single vessels should not be accessible.

Parameter in "EFLALO2" format (VMStools package)	The parameter is available in our e-Logbook national data		
	yes	no	Comment
Fishing trip reference number	X		
Departure country	X		
Departure harbour	X		
Departure date	X		
Departure time	X		
Landing country	X		
Landing harbour	X		
Arrival date	X		
Arrival time	X		
Log event ID		X	
Catch date	X		Not 100% reliable
Log event start time		X	
Log event end time		X	
Log event start position latitude		X	
Log event start position longitude		X	
Log event end position latitude		X	
Log event end position longitude		X	
Gear	x		No specifications. E.g. TBB can be all sorts of innovative flatfish gear like pulse trawl, sumwing, hydrorig, outrig etc.
Mesh size	X		
ICES rectangle	X		
ICES division	X		
Fishing activity (métier)		X	It is defined in our database VISSTAT, but it isn't in the government's database.
Landing weight estimate of all species caught (FAO species codes)	X		
Landing value of species all species caught (FAO species codes)		x	It is not part of e-Logbook data, but we receive price/kg from the Ministry of Economic Affairs, Agriculture and Innovation, based on auction data.
Optional			
Does the e-Logbook data contain a substantial amount of information, which exceeds the EFLALO2 data requirements			

Sweden

COUNTRY:	SWE
Access to e-Logbook data by fisheries institute	
How does the fisheries institute access e-Logbook data?	MS uses Webservice, Masters use online web access. Defined in in regulation 404/2011 and 1224/2009
Are the data processed in any way before they are made available?	No, not in SWE.
For which years are data available?	MS data are stored indefinitely. Other MS can query data up to a year from eventtime. As defined in in regulation 404/2011 and 1224/2009
Are foreign e-Logbook data available?	Yes, see previous question.
e-Logbook: properties main data	
Minimum boat length for reporting	Yes, defined in in regulation 404/2011 and 1224/2009
Reporting procedures for different gear types	Yes, Defined in in regulation 404/2011 and 1224/2009
Regulation with detailed requirements in english (with url)	Regulation 404/2011 and 1224/2009
Can the vessel ID be linked directly to the VMS and sales slips	Yes, defined in in regulation 404/2011 and 1224/2009
Policy for sharing e-Logbook data	
What is the policy for sharing unaggregated e-Logbook data?	Same restrictions as VMS applies. Defined in in regulation 404/2011 and 1224/2009
What is the policy for sharing aggregated data with third parties?	Same restrictions as VMS applies. Defined in in regulation 404/2011 and 1224/2009

Parameter in "EFLALO2" format (vmstools package)	The parameter is available in our e-Logbook national data		
	yes	no	Comment
Fishing trip reference number	Y		As defined in Annex XI to 404/2011
Departure country	Y		As defined in Annex XI to 404/2011
Departure harbour	Y		As defined in Annex XI to 404/2011
Departure date	Y		As defined in Annex XI to 404/2011
Departure time	Y		As defined in Annex XI to 404/2011
Landing country	Y		As defined in Annex XI to 404/2011
Landing harbour	Y		As defined in Annex XI to 404/2011
Arrival date	Y		As defined in Annex XI to 404/2011
Arrival time	Y		As defined in Annex XI to 404/2011
Log event ID			Log of what?
Catch date	Y		As defined in Annex XI to 404/2011
Log event start time			Type of event? If haul, then yes for SWE
Log event end time			Type of event? If haul, then yes for SWE
Log event start position latitude			Type of event? If haul, then yes for SWE
Log event start position longitude			Type of event? If haul, then yes for SWE
Log event end position latitude			Type of event? If haul, then yes for SWE
Log event end position longitude			Type of event? If haul, then yes for SWE
Gear	Y		As defined in Annex XI to 404/2011
Mesh size	Y		As defined in Annex XI to 404/2011
ICES rectangle	Y		As defined in Annex XI to 404/2011
ICES division	Y		As defined in Annex XI to 404/2011
Fishing activity (métier)	Y		As defined in Annex XI to 404/2011
Landing weight estimate of all species caught (FAO species codes)	Y		As defined in Annex XI to 404/2011
Landing value of species all species caught (FAO species codes)	Y		As defined in Annex XI to 404/2011
Optional			
Does the e-Logbook data contain a substantial amount of information, which exceeds the EFLALO2 data requirements			As defined in Annex XI to 404/2011