ICES WKBIFS–ACOU REPORT 2016

Report of the Workshop on Implementation and Use in IBAS of a New Common Acoustic Database (WKBIFS–ACOU)

6–8 December 2016

ICES Headquarters, Copenhagen, Denmark

International Council for the Exploration of the Sea
Conseil International pour l'Exploration de la Mer

Recommended format for purposes of citation:

Contents

Executive summary

The WKBIFS-ACOU workshop is part of the Horizon 2020 (H2020) project AtlantOS task 2.4.

ICES data portal is now operational allowing for uploading acoustic and biotic data from acoustic surveys into the central acoustic database. Validation is done using XML schema and schematron screening rules on top. Likewise, the acoustic and biotic data within the database can be downloaded in various formats feeding into the assessment software StoX and EchoR.

The current national computerization methods follow a very robust abundance estimation protocol which in addition allows diverse implementation nationally by combining the national survey estimates by ICES statistical rectangles within subdivisions into the final annual tuning indices.

However, the current computerization method is not transparent and also difficult to reproduce centrally even having a central acoustic database.

Abundance estimation done using the StoX framework is in contrast transparent and reproducible. In addition, StoX is very flexible as new methods can be developed at any time and as a tool, StoX makes it apparent how the national calculations are done and as such facilitate discussions to improve and share methods.

During the WKBIFS-ACOU workshop, the ICES Acoustic data format was adjusted in order to cope with the sampling methodology used during BIAS and BASS surveys and the possibilities in using StoX was introduced.

A task force from the Baltic International Fish Survey Working Group (WGBIFS) group was created to carry out the next steps - see section 5. The task force group will be the link between WGBIFS, the ICES Data Centre and the StoX team and will assure by testing that the ICES Acoustic data format and the StoX survey estimation software perform as expected in order for WGBIFS to use StoX for calculating their annual tuning indices going forward.

1   Opening of the meeting and adoption of the agenda

The WKBIFS-ACOU workshop started on 6 December at 13:00.

The proposed agenda was adopted.

2   ICES Acoustic data portal

ICES Acoustic data portal (Figure 2.1) at http://acoustic.ices.dk is now operational but still under development.
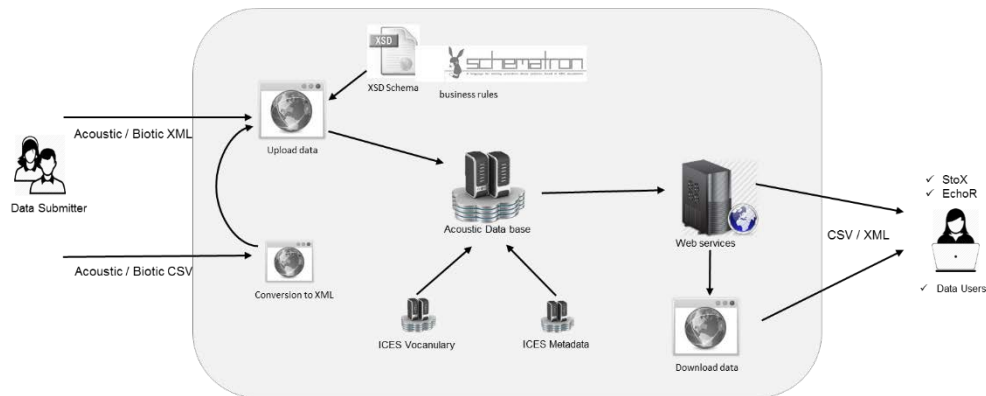

Figure 2.1. ICES Acoustic data portal

Currently used by…

1) WGIPS HERAS survey using StoX as assessment tool.

2) WGHANSA PELGAS survey using EchoR as assessment tool.

3) WGBIFS BIAS / BASS surveys using StoX as assessment tool?

Before the workshop, most of the BIAS / BASS acoustic trawl data were uploaded through the acoustic data portal for testing out StoX as assessment tool.

3   National computerization methods

The results from the Baltic Acoustic Spring Survey (BASS) and Baltic International Acoustic Survey (BIAS) are calculated in the national level and aggregated using ICES statistical rectangles as strata. Three different software is used by the national institutes to scrutinize the acoustic data (Figure 3.1). Some institutes have well developed national databases for storing the survey data, while others keep them in the MS Excel file format. Most of the national institutes use MS Excel worksheets for the standard fish abundance calculations (Figure 3.1). However, Sweden is using a R script and Germany a national software GERIBAS for that purpose.

Until 2009, BIAS and BASS results were stored by WGBIFS in MS Excel data sheets (using BAD1 database format). In 2010, these data tables were transformed into more database-oriented structure and transferred into MS Access databases (BASS_DB.mdb and BIAS_DB.mdb). These files include also queries with the used algorithms for creation of the report tables and the calculation of all different tuning fleets. The structure

of BIAS and BASS database format and standard data analysis methods are well described in the Manual of International Baltic Acoustic Surveys (IBAS) (ICES. 2014. Series of ICES Survey Protocols SISP 8 - IBAS. 24 pp.).
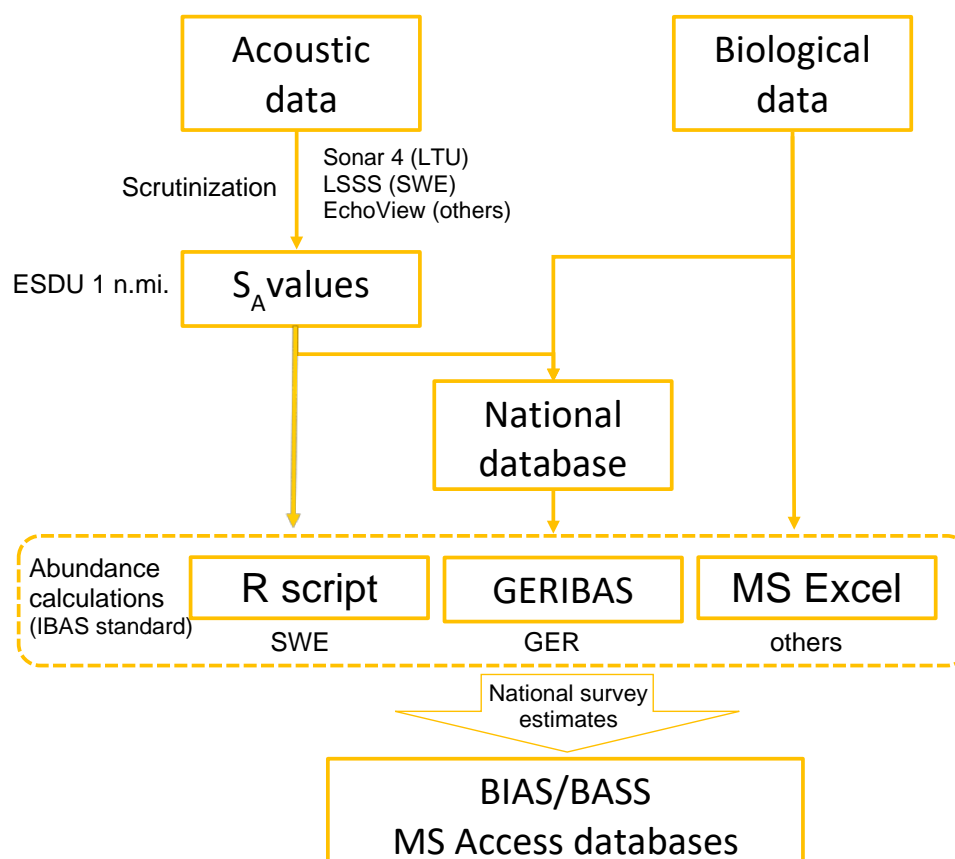

Figure 3.1. Standard data flow for the national data processing coordinated by WGBIFS.

The majority of the countries, who perform BASS and BIAS surveys, follow strictly IBAS standard calculation procedure, but there exist also some national and/or annual deviations from this standard. The most common deviations from IBAS standard calculation procedure are listed here below:

- Use of layers in abundance calculations: layer specific S_A and $< \sigma >$ (mean cross section) values are combined, when different species are shoaled in different layers and separate trawl hauls have been made for sampling them.
- Use of weighted (instead of unweighted) average values of species composition and length distribution in abundance calculations (catch weight or S_A values at haul position are used as weighting factors for combining the trawl catches within each ICES rectangle).
- Use of the "Nearest Haul" method for combining the S_A values and biological data (trawl catches are not combined, each S_A value is associated with the geographically nearest trawl haul, ICES rectangles are not used as discriminating factor for associating acoustic S_A values with trawl catches).
- Use of random sampling instead of length-stratified random sampling in length and age distribution calculations (age-at-length keys are not used).

4   StoX description (Espen/Atle)

Espen Johnsen presented the StoX software (Figure 4.1), including the data re-
quirements from the ICES Data Centre. Information about the software can be
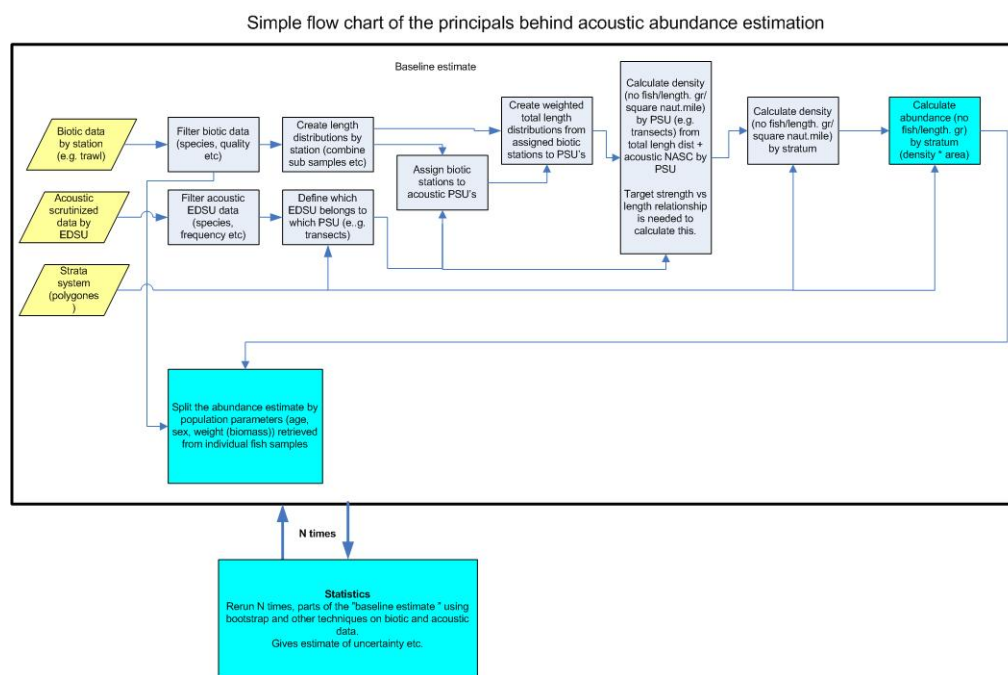found here: http://www.imr.no/forskning/prosjekter/stox/nb-no

**Figure 4.1. The flowchart of acoustic data processing: From interpreted acoustic data, trawl sam-
pling stations and strata system to abundance indices by population parameters.**

5   Next steps

A WGBIFS task force group was created during the workshop with Olavi Kaljuste (Sweden) and Juha Lilja (Finland) as contact persons from WGBIFS towards the ICES Data Centre and the StoX team.

1) WGBIFS task force group to produce one working input dataset uploaded to the ICES acoustic data portal and downloadable in StoX format for testing purposes.

2) WGBIFS task force group to provide StoX with list of all log distances, trawl hauls and values for fish target strength-length relationship constants for all species used for the calculation of fish abundances in specific ICES rectangle in order to test StoX split NASC function.

3) WGBIFS task force group should provide StoX developers with short description about the methodology used e.g. average in each rectangle with a minimum of at least two trawl stations or else manual assignment function to increase the flexibility of StoX software.

4) Abundance at length calculations for each ICES rectangle in StoX software should be done based on the same trawl hauls as in the split NASC function.

5) Age distributions should be calculated in StoX based on age length keys on the ICES subdivision level.

Action 1-5 to be done before the next WGBIFS meeting on 27–31 March 2017.

6) IMR[1] to document the StoX xml schema on order to make a correct mapping from the ICES acoustic database for both the acoustic and biotic part.

7) IMR to use ICES platform code instead of call sign within the StoX xml files.

Action 6-7 to be done As soon as possible in order to prevent misunderstandings.

---

[1] Institute of Marine Research, Norway

Annex 1: List of participants

NAME	INSTITUE	E-MAIL
Andrey Pedchenko (by correspondence)	State Research Institute on Lake and River Fisheries GosNIORh	pedchenko@niorh.ru
Atle Totland	Institute of Marine Research	atle.totland@imr.no
Elor Sepp	University of Tartu Estonian Marine Institute	elor.sepp@ut.ee
Espen Johnsen	Institute of Marine Research	espen.johnsen@imr.no
Grzegorz Kruk	National Marine Fisheries Research Institute	gkruk@mir.gdynia.pl
Henrik Degel	DTU Aqua - National Institute of Aquatic Resources	hd@aqua.dtu.dk
Hjalte Parner (chair)	International Council for the Exploration of the Sea	hjalte@ices.dk
Juha Lilja	Natural Resources Institute Finland - Jyväskylä	Juha.Lilja@luke.fi
Maksims Kovsars	Institute of Food Safety Animal Health and Environment (BIOR)	Maksims.Kovsars@bior.gov.lv
Marijus Spegys	Fisheries Service under the Ministry of Agriculture	marijus.spegys@zuv.lt
Olavi Kaljuste (chair)	Swedish University of Agricultural Sciences	olavi.kaljuste@slu.se
Perttu Rantanen	Natural Resources Institute Finland	Perttu.Rantanen@luke.fi
Rainer Oeberst	Thünen Institute	rainer.oeberst@thuenen.de
Tomas Gröhsler	Thünen Institute	tomas.groehsler@thuenen.de
Uwe Böttcher	Thünen Institute	Uwe.boettcher@thuenen.de
Viktoriia Amosova	AtlantNIRO	amosova@atlantniro.ru
Vladimir Severin	AtlantNIRO	vseverin@gmail.com
Wlodzimierz Grygiel	National Marine Fisheries Research Institute	wlodzimierz.grygiel@mir.gdynia.pl
Yuri Zablotski	Thünen Institute	yury.zablotski@thuenen.de

Annex 2: Agenda

ICES Workshop on Implementation and Use in IBAS of a New Common Acoustic Database (WKBIFS–ACOU)

Chairs: Hjalte Parner (ICES Secretariat) and Olavi Kaljuste (Sweden)

Venue: ICES Secretariat, Atlantic room, Copenhagen, Denmark

Date: 6 – 8 December 2016

Draft Agenda

<u>Tuesday 6 December</u>

13:00	Workshop opens / housekeeping / dinner?
13:15	Adoption of Agenda
13:30	Introduction of participants
13:45	IBAS surveys realized in 2016 (Wlodzimierz)
14:00	ICES Acoustic data portal (Hjalte)
14:15	Status of data call - do we have everything we need available?
14:30	Presentation of national computational tools/methods (Olavi)
15:30	Introduction to StoX (Espen)
16:30	Discussion on methods
17:30	End of day

<u>Wednesday 7 December</u>

09:00	Trial run with StoX
13:00	Lunch
14:00	Discuss output abundance estimates using StoX
17:30	End of day

<u>Thursday 8 December</u>

09:00	The new DB- outstanding issues, user requirements and development discussion StoX - IBAS user requirements discussion
	ICES Acoustic data format and Vocabulary (Anna)
	ICES Acoustic data format comments (Rainer / Tomas / Uwe)
13:00	Lunch
14:00	Report compilation
15:00	Workshop ends

Annex 3: WKBIFS–ACOU terms of Reference

WKBIFS-ACOU – ICES Workshop on Implementation and Use in IBAS of a New Common Acoustic Database

2016/2/SSGIEOM08

The **ICES Workshop on Implementation and Use in IBAS of a New Common Acoustic Database** (WKBIFS-ACOU), chaired by Hjalte Parner*, ICES Secretariat, and Olavi Kaljuste*, Sweden, will meet in Copenhagen – ICES HQ, Denmark, on 6-8 December 2016 to:

a) Evaluate the existing national computational tools used for the acoustic abundance estimations of sprat, herring and cod in the Baltic Sea.
b) Test run StoX estimation software using existing data reported into ICES new acoustic database before the workshop.
c) Establish baseline parameters within StoX for use during future BIAS/BASS surveys.
d) Provide feedback to the ICES Data Centre on the new acoustic trawl data format/database.
e) Provide feedback to StoX developers to address outstanding issues.

WKBIFS-ACOU will report by 30.12.2016 for the attention of the SCICOM and ACOM Committees.

Supporting information

Priority	The current activities of this WK will lead to implementation and use in practice of a new common acoustic database and StoX estimation software with the special attention to data from BIAS and BASS surveys. Consequently, the above-mentioned database and programme will be applied for IBAS 2016 surveys.
Scientific justification	The new acoustic database format and the StoX programme are widely being used in some Atlantic Ocean areas, hence we would like to implement the same standard for the Baltic Sea routine acoustic surveys.
Resource requirements	The methodology and structure of a new international acoustic database are already elaborated under the EU H2020 AtlantOS project and during the Workshop will be implemented to the IBAS surveys taking into account the routine Baltic acoustic surveys features. The additional resource required to implementation of a new acoustic database in the framework of this WK is negligible.
Participants	About 20 members of WGBIFS and guests will attend the Workshop.
Secretariat facilities	Conference room at ICES HQ.
Financial	No financial implications, with the exception of financial support from the EU H2020 AtlantOS project budget to some participants duty trip and fully accomodation in Copenhagen during the WKBIFS-ACOU.
Linkages to advisory committees	There are no obvious direct linkages with the advisory committees.
Linkages to other committees or groups	There is a very close working relationship with WGBIFS - the Baltic International Fish Surveys Working Group, WGFAST – the Working Group on Fisheries Acoustics, Science and Technology and SCICOM.
Linkages to other organizations	The tasks of this WK are closely aligned with the EU H2020 AtlantOS project.

Annex 4: Recommendations

RECOMMENDATION	ADRESSED TO
1. ICES acoustic data portal to persist StoX assessment configuration in order to perform the annual assessment looking back at any time. The assessment configuration need to be stored in a hierarchical way so individual multiple national target species assessments can be combined into complete annual survey assessments.	ICES Data Centre
2. Add LogBottomDepth in meters and LogValidity as a controlled vocabulary to the acoustic log entity and change to format of LogTime from YYYY-MM-DDTHH:MM to YYYY-MM-DDTHH:MM:SS e.g. adding the possibility of reporting seconds.	ICES Data Centre
3. Create a task group to follow implementation of the IBAS abundance estimation procedure using StoX.	WGBIFS
4. Produce polygones and areas by ICES subdivisions and rectangle deeper than 10 meters determined using a bathymetric dataset of the Baltic.	ICES Data Centre