



Outcome of the intersessional meeting of HELCOM – Baltic Earth Expert Network on Climate Change (EN CLIME 7-2021)

Introduction

- 0.1 The Intersessional Meeting of the HELCOM/Baltic Earth Expert Network on Climate Change (EN CLIME 6C-2020), was held as an online meeting on 18 January 2020.
- 0.2 The Meeting was attended by most of the EN CLIME Lead Authors and main contributors. The List of participants is contained in **Annex 1**.
- 0.3 The Meeting was co-chaired by Markus Meier and Jonas Pålsson, Co-Chairs of the Expert Network. Petra Kääriä, HELCOM Secretariat, acted as secretary of the Meeting.
- 0.4 The aim of the Meeting was to agree on the key messages and final report to be submitted for review and approval by HELCOM State and Conservation.

Agenda Item 1 Adoption of the Agenda

- 1.1 The Meeting adopted the Agenda.

Agenda Item 2 Information by the Chairs, Secretariat and Contracting Parties

- 2.1 The Meeting did not have any specific information to share.

Agenda Item 3 Finalization of key messages

- 3.1 The Meeting welcomed the update on the status of work on the revised key messages, as presented by the Lead/Co-Lead Authors (document 3-1) and thanked all the authors for their excellent work and devotion to the long process.
- 3.2 The Meeting agreed that the key messages that still need further work will be modified and submitted to the Secretariat (petra.kaaria@helcom.fi) as soon as possible and at latest **by 21 January 2021** for submission to HELCOM State and Conservation WG meeting (STATE & CONSERVATION 13F-2021) on 25 January 2021.
- 3.3 The Meeting clarified that the number of references does not need to be limited in the key messages.
- 3.4 The Meeting highlighted that the confidence assessment should be consistent through key messages and clearly described in the *Introduction*.
- 3.5 The Meeting noted the suggestion to consider the following aspects when deciding on confidence assessment: 1) is the record homogenous and long enough to judge long term changes 2) confidence level to be considered as high only if it is clearly related to climate change (temperature and sea ice).
- 3.6 The Meeting invited the co-Chairs to check for consistency between the key messages with the previous aspects in mind.
- 3.7 The Meeting clarified that confidence assessment can be included in different ways; either as an assessment per paragraph or as an assessment after a sentence.

3.8 The Meeting agreed that the following style of referring to publications should be used and suggested to use an automated system to harmonize the references (e.g. [Zotero](#)):

Wiklund, A.-K. E., Sundelin, B. & Rosa, R. Population decline of amphipod *Monoporeia affinis* in Northern Europe: consequence of food shortage and competition? *Journal of Experimental Marine Biology and Ecology* **367**, 81–90 (2008).

3.9 The Meeting considered the need for a short Glossary of terms to be included in the CCFS to include specific terms such as recruitment, biogeographical, NAO etc. and agreed to ask for the view by State and Conservation on the relevance of including such a Glossary.

3.10 The Meeting invited the Lead authors to review the author lists and to remove those authors who have not been active and to include their names under *Acknowledgements* instead.

3.11 The Meeting noted the following comments on the key messages:

Direct parameters (previously called primary parameters)

Air temperature

Jonas Pålsson will have another look at Policy relevance.

Water temperature

The second sentence was added under 'Policy relevance' for better readability and text added on climate refuges.

Large Scale Atmospheric Circulation

Summary text (document 4-2-Att.1) could be simplified and more directed to general audience. Jonas Pålsson agreed to have a look at the summary text.

Sea ice

Suggestion to make percentages clearer under mean change

"Fluid/gaseous" -> gaseous to be deleted

References to be checked

Jürgen Holfort will work on the text and send out a revised version shortly.

Solar radiation

Text on extremes to be deleted

Suggestion to change the title to either "Cloudiness and solar radiation" or solely "Cloudiness" – Petra Kääriä to check this would be OK with the authors.

Salinity and saltwater inflows

Word gradates was added but also previous formulation considered as OK

In case anyone would like to make changes, please comment on the [version available on the workspace](#) before end of business Thursday 21 Jan

Stratification

Not much known about water circulation -> deleted from title

Jonas Pålsson will check the Policy relevance part?

Markus Meier will check text on dimension of strengthening thermo- and halocline (should be density per meter) as well on horizontal stratification (under What is already happening).

Precipitation

The text still needs more work; a few sentences need to be added. Precipitation is an important parameter and should be included in the Fact Sheet.

Markus Meier will contact Erik Kjellström.

River run-off

Extremes under heading 2. *What is already happening*: Jukka Käyhkö would rather want to see a broader picture, literature is somewhat ambiguous about regional changes. Level of confidence should be kept as medium.

The deleted sentences will be kept and the messages under extremes will be combined. Jukka Käyhkö will adjust this.

Jukka Käyhkö will also reformulate the sentence on daily high flow over the past 100 years.

Jukka Käyhkö will refine the last part under *Policy relevance* to highlight the importance of incorporating climate change to management policies. Notion on canals can also be added under Policy relevance as important in Germany.

Jukka: fine with the text as is now, notion on canals can be added under Policy relevance, although it's relevance to the whole drainage basin was questioned.

Carbonate chemistry

The following sentence could be important to incorporate into the summary text: "Ocean acidification in the Baltic Sea is partially mitigated by the recently observed increase in total alkalinity (a measure of buffer capacity) (9)." Petra Kääriä to communicate with the author team.

Riverine nutrient loads and atmospheric deposition

The Meeting was of the opinion that this key message will be one of the most important and cited ones and needs to be carefully formulated to send a correct message.

The following sentence could possibly be reflected in the summary text:

"the northern Baltic Sea region river discharge will increase, while in the southern region the discharge will decrease, thus potentially increasing and decreasing waterborne nutrient inputs, respectively". Petra Kääriä to communicate with the author team.

Oxygen

Close to being finalized

Currently the confidence level refers more to nutrient loads than climate change (different approach from other texts). Level of confidence should be medium for *where is the change seen first*.

Sea level

References still to be clarified.

Peter Löwe and Andreas Lehmann to be deleted from the author list → to be moved to acknowledgements instead

In addition to percentages, exact numbers would be useful to have in the sentence: "Current projections estimate Baltic sea level rise to 80% of the global rate" -> Christian Dieterich can add another sentence with numbers.

Wind

Overall message to be the same for wind and waves: no evidence for change and impact of climate change for current state.

The last sentence will be rephrased by Jonas Pålsson:

“Future infrastructure planning would benefit from better wind models and the infrastructure itself a higher wind stress tolerance.”

Waves

Depends a lot on wind and for wind there are no robust projections.

It would also be interesting to add information on wind direction.

“Extreme waves” should be clarified to indicate that significant wave height is meant -> Christian Dieterich will clarify the text.

Markus Meier: decreasing sea ice cover will increase wave height -> include confidence statement after the sentence? Christian Dieterich to communicate with Ralf Weisse and to select best way forward.

Sediment transport

It needs to be checked whether peer review comments have been incorporated in the newest version

Jonas Pålsson will revise Policy relevance.

Indirect parameters

Microbial community

Co-Chairs and Secretariat to review the text before Thursday

Benthic habitats

Last minute changes to be added under heading 2.

Policy relevance: landscape aspects will be added back and changes will be marked.

Pelagic and demersal fish

explanation for the term recruitment (reproduction + survival) to be added as footnote

Coastal and migratory

No additional changes.

Waterbirds

No additional changes.

Marine mammals

GoF ringed seal data indicates a seriously depleted population, this data has not been published but is shared annually at HELCOM EG MAMA. There is no knowledge of ringed seal breeding on anywhere else than sea ice.

Non-indigenous species

As salinity decrease is still possible it would be of importance to NIS.

Acidification sentence under *What can be expected*: The level of confidence was turned to *low*, and the sentence kept in the text. In the south the change is more certain.

Track changes version can also be submitted for records.

MPAs

Will be provided by the Leads on 19 January.

Nutrient concentrations and eutrophication

The term *biogeochemical* could be added to a possible glossary.

Climate change impacts could not be separated from other pressures.

Cyanobacteria blooms level of confidence to be changed to *low*.

Ecosystem function

First sentence possibly to be adjusted by Örjan Östman.

Shipping OK

Medium confidence assessment will be changed for the whole paragraph under heading 2 *Where is the change seen first*.

Tourism OK**Fisheries**

Sea level, Offshore structures, Shipping and Aquaculture to be added under linked parameters.

Blue carbon

The Co-Chairs and Secretariat will review ASAP and initiate contact with the Lead author (it was e.g. considered whether blue carbon storage applies to the whole Baltic Sea).

Ecosystem services

The Co-Chairs and Secretariat will review ASAP.

Coastal protection – as a separate parameter

Link to the rising sea level to be added by Jukka Käyhkö.

Level of confidence to be checked.

The Co-Chairs and Secretariat will review ASAP.

Offshore structures – as a separate parameter

Will be renamed as “Windfarms”

Change MW to 83 GW by 2050

Sentence under knowledge gaps to be revised by Jukka Käyhkö: it is possible to predict effects of wind farms on biota with numerical modelling (e.g. VELMU data on biodiversity hot spots). Numerical modelling has been mainly done reg. small scale wind farms.

Jonas Pålsson will look at policy relevance and add a connection with windfarms and shipping.

Other offshore structures were considered (e.g. oil rigs and pipelines), however it was decided not to include them at this stage (but possibly in the next iteration).

The Co-Chairs and Secretariat will review ASAP.

Agenda Item 4 Layout and content for the final report

- 4.1 The Meeting considered the draft revised Introduction text for the report ([document 4-1-Rev.1](#)) and agreed to provide possible further comments to the Secretariat (petra.kaaria@helcom.fi) **by 21 January**.
- 4.2 The Meeting reviewed the summary and map view texts (document 4-2-Att.1) and agreed that the Lead Authors will provide the missing texts to the Secretariat (petra.kaaria@helcom.fi) **by 21 January**.
- 4.3 The Meeting invited the authors of map view texts to indicate which sub basins their texts apply to and to inform the Secretariat as soon as possible and at latest **by Thursday 21 January**.
- 4.4 The Meeting reviewed the links between parameters (document 4-3-Att.1-Rev.1) and agreed that the Lead authors will review the links and direction of arrows and inform the Secretariat of any needed changes **by Thursday 21 January**.
- 4.5 The Meeting took note of the revised layout of the final report (document 4-4) and thanked Information Secretary Dominik Littfass for preparing the new version.
- 4.6 The Meeting agreed to add a short summary in the beginning of the report including information on how climate change has affected and is expected to impact the Baltic Sea (key information from direct parameter(s), ecosystem parameter(s) and human parameter(s) to be included), what the CCFS is and who it is geared towards. The Meeting invited the Secretariat to modify the first proposal of this text and submit it to the EN for review.
- 4.7 The Meeting reviewed the Sankey diagram of linked parameters and noted that links will be depicted with single arrows colored by the parameter from which the arrow starts from and in case of interlinkage there will be two arrows with two different colours.
- 4.8 The Meeting highlighted that the order of the parameters will affect how the graph will look like in the end.
- 4.9 The Meeting agreed that Dominik Littfass will finalize the Sankey diagram of connected parameters by end of business **21 January** and comments will be provided by EOB **Friday 22 January**.
- 4.10 The Meeting suggested that the selection process for parameters on the map view would be described in the text on the map page.
- 4.11 The Meeting suggested that individual text boxes would only appear once on the map and reference to other relevant subbasins would be induced in the text.
- 4.12 The Meeting agreed to further work on the map via correspondence and agreed to finalize the work by the information deadline of S&C 13F-2021.
- 4.13 The Meeting agreed that those texts (key messages or summary texts) that go beyond the word limit would be dealt with a footnote/asterix and welcomed that these texts will be dealt one by one by Dominik Littfass and the end result communicated with a respective Lead Author.
- 4.14 The Meeting noted that the linked policies have been shortened into abbreviations to fit the layout.
- 4.15 The Meeting noted that the linked parameters will be shown without a direction under the key messages and called “affected parameters”.
- 4.16 The Meeting noted that in the current suggestion for list of references, several references would be repeated, however questioned the relevance of producing one comprehensive list of references due to the heavy workload of such an exercise.

4.17 The Meeting agreed on the following updated time schedule for the upcoming work:

Task	Deadline/period	Responsible
Key messages		
Ready text on key messages that still need editing	21 January	Lead Authors
Submission of ready peer reviewed key messages and report for HELCOM State & Conservation WG approval	25 January	Secretariat
Possible revision of key messages and report based on comments by S&C	15 Feb-23 Feb	Lead Authors, Co-Chairs, Secretariat
EN CLIME 8-2021	16 Feb-23 Feb	All
Submission of final key messages for adoption by HELCOM 42-2021	23 February	Lead Authors
Other texts/graphs for the Climate Change Fact Sheet Report		
Comments on third draft text for <i>Introduction</i>	21 January	All EN CLIME members
Missing texts on map view parameters	21 January	Lead Authors
Draft text on a short summary of the report	21 January	Secretariat and Co-Chairs
Comments on draft text on a short summary of the report	22 January	All EN CLIME members
Ready draft on the report	22 January	Secretariat

Agenda Item 5 Future work

5.1 The Meeting invited the Secretariat to prepare a doodle poll for the next EN CLIME meeting to be held between 16-23 February 2021 to discuss possible comments on the key messages and the report provided by STATE & CONSERVATION 13F-2021 as well as future work of EN CLIME.

Agenda Item 6 Outcome of the Meeting

6.1 The Outcome of EN CLIME 7-2021 was approved via correspondence and is available at the [EN CLIME 7-2021 Meeting Site](#), together with documents considered by the Meeting.

Annex 1 List of participants

Representing	Name of organization	E-mail address
Co-Chairs		
Co-Chair	Jonas Pålsson	Swedish Agency for Marine and Water Management
Co-Chair	Markus Meier	Baltic Earth
		markus.meier@io-warnemuende.de
Baltic Earth		
Baltic Earth	Christian Dieterich	SMHI
		christian.dieterich@smhi.se
Baltic Earth	Jani Särkkä	Finnish Meteorological Institute
		Jani.Sarkka@fmi.fi
Baltic Earth	Jukka Käyhkö	University of Turku
		jukka.kayhko@utu.fi
Baltic Earth	Jürgen Holfort	German federal maritime agency
		juergen.holfort@bsh.de
Baltic Earth	Marcus Reckermann	International Baltic Earth Secretariat at Helmholtz-Zentrum Geesthacht
		marcus.reckermann@hzg.de
HELCOM Contracting Parties		
Denmark	Anders Galatius	Aarhus Universitet
		agj@bios.au.dk

Estonia	Liis Kikas	Ministry of the Environment	Liis.Kikas@envir.ee
Finland	Ari O. Laine	Metsähallitus	ari.laine@metsa.fi
Finland	Sanna Kuningas	Natural Resources Institute Finland	sanna.kuningas@luke.fi
Finland	Markku Viitasalo	SYKE	
Germany	Jan H. Reißmann	Federal Maritime and Hydrographic Agency	jan.reissmann@bsh.de
Latvia	Ilga Kokorite	LEGMC	ilga.kokorite@lvgmc.lv
Lithuania	Arturas Razinkovas- Baziukas		
Poland	Tamara Zalewska	Institute of Meteorology and Water Management - National Research Institute	tamara.zalewska@imgw.pl
Sweden	Antonia Nyström Sandman	AquaBiota/EN BENTHIC	antonia.sandman@aquabiota.se
Sweden	Bärbel Muller-Karulis		
Sweden	Jens Olsson	Swedish university of agricultural science	jens.olsson@slu.se
Seden	Oleg Savchuk	Stockholm University Baltic Sea Center	oleg.savchuk@su.se
Sweden	Rahmat Naddafi	Swedish University of Agricultural Sciences	Rahmat.Naddafi@slu.se
HELCOM Secretariat			
Secretariat	Petra Kääriä	HELCOM	petra.kaaria@helcom.fi
Secretariat	Dominik Littfass	HELCOM	dominik.littfass@helcom.fi