Appendix A

Summary of workshop series

Workshop organisation

Title of workshop series: Towards a harmonised approach for the derivation of an EQS for copper in marine sediments

Organising committee:

- Chalmers University of Technology
  Anna Lunder Hermansson, Maria Lagerström, Erik Ytreberg
- Swedish Agency for Marine and Water Management
  Kerstin Varenius, Tobias Porsbring, Lina Gunnarsson Kearney
- Ministry of Environment of Denmark
  Anne Munch Christensen, Pernille Munch

Arrangement: 3 half-day online workshops with different themes were organised in March and April 2021.

- Workshop 1 (March 1st, 2021): Bioavailability (e.g. organic carbon, particle size fraction, etc.)
- Workshop 2 (March 15th, 2021): Natural background (e.g. added risk approach versus total risk approach)
- Workshop 3 (April 12th, 2021): Ecotoxicological data (e.g. data selection, availability, EC10 vs NOEC, etc.)

Typically, the first half of the workshop consisted of presentations on the topic by 2 – 3 invited speakers, followed by group discussions in groups of roughly 8-10 persons.

Attendants:

A total of 70 persons, organising committee excluded, attended one or several of the workshops (Table 1). Their affiliation and organisation countries are shown in Figure 1.

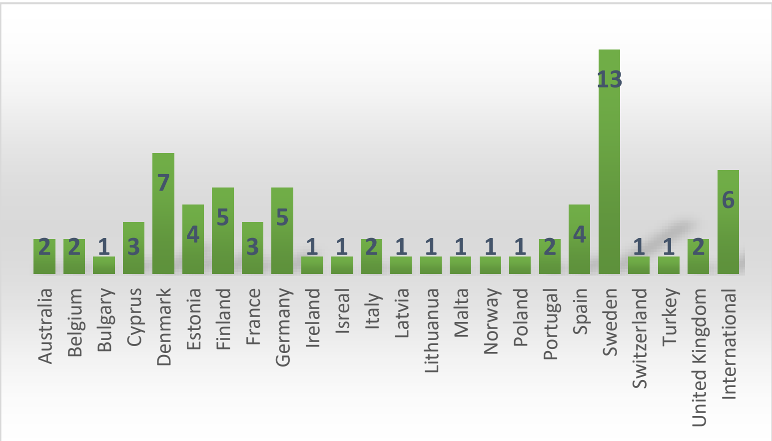


Figure 1. Affiliation of the participants (organising committee excluded) and represented countries.

Table 1. Participants at one or several of the workshops within the series and their affiliation.

First name and last name	Affiliation
Adam Peters	wca environment
Amalie Thit	Roskilde University, Denmark
Anette Christensen	Danish Environmental Protection Agency
Anja Duffek	German Environment Agency (UBA)
Ann-Kristin E Wiklund	Stockholms universitet
Ann-Sofie Wernersson	Swedish Geotechnical Institute
Bahar Ayse Aydin Iseri	Ministry of Agriculture and Forestry
Carl Rönnow	Svenska Båtunionen
Christian Schlekat	NiPERA Inc
Christiane Stark	Federal Environment Agency - DE (Biocides)
Clara Neuschutz	Naturvårdsverket
Daniel Ragnvaldsson	Envix Nord AB
Eivind A. Berg	Jotun
Elisa Bizzotto	Ca' Foscari University
Elisa Giubilato	Ca' Foscari University
Elisabeth Nyberg	Naturvårdsverket
Emmi Vähä	Finnish Environment Institute
Henning Clausen	Formerly Danish EPA
Ida-Maja Hassellöv	Chalmers University of Technology
Irina Karajova	University of Sofia
Ivan Kuprijanov	Department of Marine Systems, Tallinn University of Technology
Janni Larsen	DK EPA
Jelena Knezevic	Monitoring and Assessment Officer Mediterranean Pollution Assessment and Control Programme (MED POL), UN Environment/Mediterranean Action Plan
Johan Näslund	Swedish Environmental Protection Agency
Jon Petter Gustafsson	SLU
Joonas Virtasalo	Geological Survey of Finland
Juan Santos Echeandía	Spanish Institute of Oceanography
Kai Nykänen	ECI / Boliden Ab
Katri Siimes	Finnish Environment Institute
Kevin Long	RCL
Konstantinos Antoniadis	State General Laboratory, Cyprus
Lena Konovalenko	Scientific officer - Environmental Assessment
Lucía Viñas	Instituto Español de Oceanografia, Spain
M.Carmen Casado Martinez	Swiss Centre for Applied Ecotoxicology
Mailis Laht	Estonian Environmental Research Centre
Maj-Britt Bjergager	Danish EPA, Department of Water Environment and Outdoor Recreation
Maren Heß	North Rhine-Westphalia Office of Nature, Environment and Consumer Protection (LANUV)
Marge Muna	Estonian Environment Agency
Margherita Muscat	Environment and Resources Authority
Mariliis Sihtmäe	National Institute of Chemical Physics and Biophysics, Tallinn
Marnix Vangheluwe	ARCHE Consulting
Matti Leppänen	Finnish Environment Institute (SYKE)
Mélissa Dallet	INERIS
Melissa Goicoechea Feldtmann	IVL Svenska miljöinstitutet
Mette Bøhnke	Danish EPA
Nadezhda Drumeva	Black Sea Basin Directorate
Nicholas Pissarides	Ecotoxicology Lab, State General Laboratory, Cyprus
Nijolė Remeikaitė-Nikienė	PhD, Senior specialist, Marine Environment Assessment Division, Environmental Protection Agency, Lithuania
Nurit Kress	Israel Oceanographic & Limnological Res, Emerita; UNEP consultant
Olivier Perceval	French Biodiversity Agency
Paula Sánchez Marín	Instituto Español de Oceanografía
Paula Viana	APA - Portuguese Environmental Agency
Pia Voutilainen	Scandinavian Copper Development Association
Raquel Guerra	APA - Agência Portuguesa do Ambiente
Rasmus Nørregaard	Danish EPA
Rita Poikane	Latvian Institute of Aquatic Ecology
Ronny Blust	University of Antwerp
Sabina Hoppe	Swedish Maritime Administration
Sandrine Andres	Ineris (FR)
Sarah Josefsson	Geological Survey of Sweden (SGU)
Sascha Setzer	German Environment Agency (UBA)
Simon O'Toole	Environmental Protection Agency Ireland
Sofia Kozakou	State General Laboratory, Cyprus
Stijn Baken	European Copper Institute
Stuart Simpson	CSIRO Australia - evening (7-10 pm), so will try to attend.
Tamara Zalewska	Institute of Meteorology and Water Management - National Research Institute, Poland
Timo Tarvainen	Geological Survey of Finland
Torsten Schwanemann	German Environment Agency (UBA)
Victoria Besada	Senior researcher. Centro Oceanográfico de Vigo. Spanish Intitute of Oceanography
William Adams	Red Cap Consulting

Outcome of group discussions

In this section, the questions and notes from the group discussions are presented. In all workshops, participants were divided into 5 groups for discussions. Discussion leaders and note-takers were representatives from the organising committee from Chalmers University of Technology and the Swedish Agency for Marine and Water Management. Typically, 8-10 persons were present in each discussion group. The participants were randomly pre-assigned to a discussion group based on their affiliation, with the aim that the composition of each discussion group would reflect that of all workshop attendants. All participants names and affiliations were presented within the discussion group, for transparency.

Workshop 1

Topic: Bioavailability

Question 1: Is there enough scientific evidence to suggest that normalisation of copper concentrations to organic carbon should always be performed i.e. even if it does not reduce the variability of the ecotoxicological data?

<u>Add-on question</u>: do you see any practical issues related to the implementation with regards to this aspect?

Group	Notes
1	Scientific evidence to support that the bioavailability decreases with OC (in controlled lab experiments) Tiered approach Tier 1. Generic EQS without OC normalization (based on lab studies with low OC conc). Tier 2. EQS normalized to OC. If EQS exceeded at a specific site - investigate the impact of OC. You need the sites specific OC (high - low). If that is not available, estimates of minimal expected levels of OC.
2	No reduction in variability, unnecessary work Probable correlation More advanced model to predict toxicity rather than regression Grouping of data in Baltic? Within group correlation might not be scientifically significant There is scientific evidence that metal toxicity is affected by OC content Several factors are controlling toxicity Factors should be taken into account but can be hard to distinguish Laboratory data does not necessarily reflect the in-situ. Other factors might be masking Data limitation is a problem What varies the most? Concentration of OM or binding properties of OM? Binding and cation competition might also influence Other metals are also important. Doing nothing is not an option Would a tiered approach be better? Australian approach is tiered. Total conc - acid digestion. Use AVS Clear connection between toxicity and OC - how to be consistent? In laboratory - OC normalisation can be proven but in environment there are several aspects. Distinguish between ecotox data and bioavailability in environmental monitoring
3	Environmental data needs to be normalised to something. If we don't normalise lots of stations will exceed guidance values. What determines the bioavailability should determine the parameter for normalisation. Focus on determining bioavailability. OC not always a good parameter to do that. Different types of sediment - fine sediment with low OC in some coastal sediments. Normalising to OC seems to work in some areas but not everywhere. How to integrate the variability in derivation of ecotoxicological effect endpoints? Need to use diversity of sediment samples? Copper binding to TOC - could still be what biota is eating i.e. still a source. Good to try to have similar procedures with other metals No reduction in variability, no need to normalise. Only if that is a factor.
4	Depends on the quality of TOC- composition. Fresh sediment higher capacity to bind vs old sediment. Golden level to account for this would be good. Big knowledge gaps in this area today. More research is needed. Organic carbon is a factor in bioavailability. And there is also a high correlation to inputs, that copper is transported with DOC. Depends on geography. AVS could possibly be a more important factor for example where DOC is lower. Spain: Low TOC content in northern spain (below 1 percent). There normalisation introduces variability. Is probably overprotective. Also low TOC content in northern Baltic. Normalisation should be on a local scale rather than universal. Is the normalisation relevant? Extrapolation issues from tox data to geographical variability in TOC content and quality.
5	There is quite a bit of evidence supporting % OC normalisation The emphasis should be on the reduction in intraspecies variability. Linear correlation analysis is less useful as not many sediments were tested at higher OC levels. More at lower OC levels

Question 2: Should ecotoxicological data be related to Cu concentrations in the total sediment or to that of a specific particle size fraction be accounted for in EQS derivation (e.g. <63µm)?

<u>Add-on question</u>: do you see any practical issues related to the implementation with regards to this aspect?

Group	Notes
1	Stuart Simpson work - model taken into account OC and particle fraction (<63 µm). Bioavailable fraction is important - 63 µm
2	Sieving <2 mm is standard, some do <63 um. Most contaminants worrying in finer sediments. Atlantic coast - no fraction is used in monitoring If grain size is accounted for it is often in separate experiments % OC but this is not normalised to grain size. <2 mm sieving used to get rid of course material. Want to avoid extra work
3	Harmonisation of EQS requires harmonisation of monitoring. Guidance on what particle size fractions should be analyzed. Samples to be taken should be specified. OSPAR guidance is specific regarding particle size fraction (fine sediments). Good to stick to that so that Cu does not deviate from other monitoring. Accumulation areas should be chosen. Not possible to do sieving for all samples taken. Difficult to compare coarse sediment habitats with fine sediment habitats. Is one EQS enough? Specific EQS depending on the habitat/sediment properties? To avoid normalisation.
4	Also in PL monitoring in accumulation areas. Checking grain size. The EQS should be applicable to the same fraction that is monitored. Should be possible to normalise toxdata to this fraction? Unclear if grain size is always reported in all monitoring in Sweden. High correlation of contaminants with <63 microm. ES measures fraction below 2 mm. but sampling in accumulation areas.
5	For reg. purpose total is used. Opinion, we need a standardised fraction Ecotoxicity data are not yet there? Need to gather and assess data

Question 3: Are there any other parameters that should be considered to account for bioavailability and could be implemented today?

Group	Notes
1	
2	There are several factor influencing the availability We don't have the tools to consider other parameters Other metals Reduced form of sulphur but might not be as straight-forward as we want to. Could be helpful in an assessment. Do biology at site concur with the QS derivation Trigger value rather than direct remediation Reduced environment cannot be compared oxidised environment. How stable is the anaerobic conditions?
3	Oxygen content - are there multicellular benthic organisms present? How to take anoxic areas into account? AVS or sulfur - would be good to account for. If sulfur would be a good proxy for AVS it is easier to measure sulfur than AVS but not sure if that is. AVS tricky to measure since you have to avoid oxidation of samples.
4	pH, salinity. Matters for speciation of metals. Iron and other metals. AVS-SEM maybe as tier higher tiers.
5	AVS but very challenging in monitoring programs. Perhaps in local, refined assessments EQS derivation should be done on studies with worst case AVS Fe, Mn hydroxides, other metals Exchangeable fraction of Cu Passive samplers

Workshop 2

Topic: Natural background

Question 1: Should ARA (Added Risk Approach) or TRA (Total Risk Approach) be used for EQS derivation? Start by listing pros and cons of using ARA.

Group	Notes
1	Arguments for ARA: copper is an essential element - species dependent. Depends on regulation processes Site specific to account for local elevated concentrations Arguments against ARA: France would like to use TRA and use background for management options What is background concentration? Site specific. How differentiate between anthropogenic and natural concentrations and loads Problem when different methods (ARA/TRA) are used for different compounds. Biocidal product regulation - how to account for a generic EU background concentration Not based on scientific evidence Additional notes: Latvia does not have any EQS for sediment. But threshold values exist for dredging activities and dumping of dredged sediment.
2	Arguments for ARA: If an EQS is to conservative (pragmatic way) Arguments against ARA: Assumption that effect is linear No scientific evidence of linear response Assumptions can be a risk itself Other factors must be considered Acclimatisation is complicated Organism cannot distinct between anthropogenic vs. natural Additional notes: Assessment factor - consider that first. Can be seen as arbitrary method. Different metals result in different methods - can be hard to communicate the outcome. Masking of effect by other parameters Acid extraction with strong acid. How do we account for analytical methods used and derivation? Effects are often based on Aqua regia digested concentrations. Comparable data (using same method) vs. relevant methods (what is available?) Tiered approach 1) total concentration - generic to trigger Equilibration time is very important Local conditions are very important - O2, redox-potential, grain size etc. Generic EQS - is it possible to have one?
3	Arguments for ARA: used if you can't do anything else normalisations etc does not work Conceptually simple and easy to implement. can be applied under certain circumstances - some kind of tiered system to identify important sites etc used when NBC is high and there are no other alternatives Arguments against ARA: Difficult to do the ARA properly. Applied for default values for NBC - need to make sure you don't draw an unprotective conclusion. assumes that NBC is not toxicologically available - organisms may be adapted to a higher but assumption of no effect is probably not true assumption that bioavailability of metals is higher in lab tests - not supported avoid using when background conc in test media is much lower than EQS not possible to use since you would have to use local species - many experiments needed bioavailability approach more quantitative way of addressing organisms Additional notes: Canadian approach suggested. Based on data from field sites. Functional thresholds for risk assessments. Takes into account cocktail effect. Skeptical to approach.

	use NBC as EQS - could be done in a tiered approach. the Canadian approach is a site specific approach - applied after the stage of deriving EQS ARA good when you try to trace sources - in order to decide where the sources are coming from ARA should only be used when background in test media is low - information was missing in the last version distributed (from ECHA 2008) there are scientific evidence of adaptations to elevated metal conc - mainly for waters and soils
4	Arguments for ARA: Allows to account for NBC Lower risk of EQS < NBC Accounting for adaption to NBC is also not inherent in TRA NBC varies a lot. Depends on TOC, AVS etc. NBC needs to be accounted for somehow. Arguments against ARA: The ARA relies on the ability to determine the NBC of copper (If EQS is exceeded). How valid is the approach if generic values for NBC are mostly used during assessment? Organisms will not distinguish between natural background and added concentrations Overly complicated and poor scientific backing Does not account for differences in tolerance. Organisms at different sites are assumed to be able to cope with the same addition of copper, regardless of differences in background concentration. Has often been applied wrong (subtracting test background concentrations instead of cultivation medium) Time consuming to re-calculate ecotox data (same problem for bioavailability) In some areas NBC are low, ARA has been focused much on cases where NBC is high Additional notes:
5	Arguments for ARA: Used in the biocide reg. (water), kind off, but to hard to harmonize across framework simple Arguments against ARA: Scientifically not appropriate? Additional notes:

Question 2: If TRA is used for EQS derivation, what should be done if EQS < NBC?

<u>Add-on question</u>: what to do during implementation (i.e. state assessment) if there is reason to believe that EQS exceedance is caused by an elevated local NBC?

Group	Notes
1	Is background concentration a result of natural contribution only? What is the contribution of anthropogenic sources, is it high? If the anthropogenic sources are negligible - no measures should be implemented Need to have data on pre-industrial concentrations We need inputs from anthropogenic sources and historical loads Try to use EQS values that are not over-protective Choice of AF is reflecting the uncertainty of the data. Invest in more studies to reduce the uncertainty Location and distribution of sampling points used in status assessment Local assessments - taken into consideration local conditions Risk assessment of contaminated areas. Several threshold values is used in Sweden Also account for the biological responses.
2	Should we do anything? If NBC > EQS (and can be proved) that would be a characteristic of that environment. Field SSD's (location specific) to assess further AF are more difficult to decide for essential compounds. More realistic testing and chose relevant data How to deal with historically contamination? Can this be used as background concentration? Is it possible to change the analytical methods to analyze copper content in sediment? Is it realistic to have a generic EQS? Perhaps it should be used as trigger value. It will be difficult but "we have to start somewhere".
3	If EQS is below NBC -> then something is wrong. The EQS is not meaningful. Look at bioavailability. Multiple factors affecting that - organic matter, AVS etc. Hard to take into account in EQS setting. Test local organisms or use ARA. Difference in bioavailability in ecotox tests and field conditions due to variation in organic matter content. Look into such relationships - if correcting and normalising to those factors does not help, the only solution is the ARA. When looking at compliance - may need to find local solutions. One DE federal state use TRA and at local scale if EQS < NBC - NBC is used. Waiting for final version of metal guideline before deciding on national strategy.
4	Consider: Bioavailability (TOC, AVS). Does the area have high NBC locally? Consider anthropogenic sources. If NBC>EQS consider NBC as EQS (also consider bioavailable background). Field studies, assess biological effects/biomarkers (metallothionine (exposure marker for metals)); consider cumulative effects from other chemical stressors (holistic ecosystem assessment). Check retrospectively in sediment cores if there are trends, also regarding bioavailability factors. If NBC>EQS then use bioavailable NBC as threshold. What is a generic NBC? Use data across different geographical scales, and sediment cores, refine also on the basis of bioavailability factors (TOC AVS...), sedimentation areas. A range of NBC:s across different parts of the Baltic Sea. In some areas there are probably so high NBC that adverse effects are expected. SO it is not wrong to have cases where NBC>EQS, some exemptions would be needed in this case, replace EQS with NBC for this area. What are the legal consequences of NBC=EQS? Permits for users, industry etc. How often does such situations occur?
5	Gather data on different NBC and effects on biodiversity Look at adapted communities We need to set an EQS now A lot of work has been done on Ni, look as a model. Nickle example: https://doi.org/10.1002/ieam.1720 Focus on bioavailability, minimise the need to consider NBC Important to consider at local spots (regional) Possibility to use DGT filters??

Workshop 3

Topic: Ecotoxicological data

Ecotoxicological data selection, the treatment of the included data and the selection of an assessment factor will together determine the resulting EQS-value. During this workshop, attendants participated in an interactive exercise for EQS derivation to see how they reasoned when confronted with these choices. A decision tree resulting in EQS-values derived from four main approaches (one deterministic and 3 variations on an SSD approach) and various data treatment options and assessment factor selections was prepared (see Figure 2). Two paths along a decision tree were followed during the workshop: a deterministic approach and an SSD approach. To select the most relevant SSD approach to follow, participants were asked to rank the four approaches during Question 1 of the group discussions. The outcome (final derived EQS) was kept hidden from the participants until all final choices had been made. The decision tree was only revealed in full at the end of the workshop.

Apart from the group discussions which were held intermittently during the workshop, polls (P1 and P2) were also performed at the crossroads for both the deterministic and SSD approaches on the issue of whether to normalize to organic carbon. A final poll was also held at the end of the workshop, asking participants if, having revealed the outcome of all approaches, which approach they now preferred for EQS derivation. Polling results are shown after the group discussion notes.

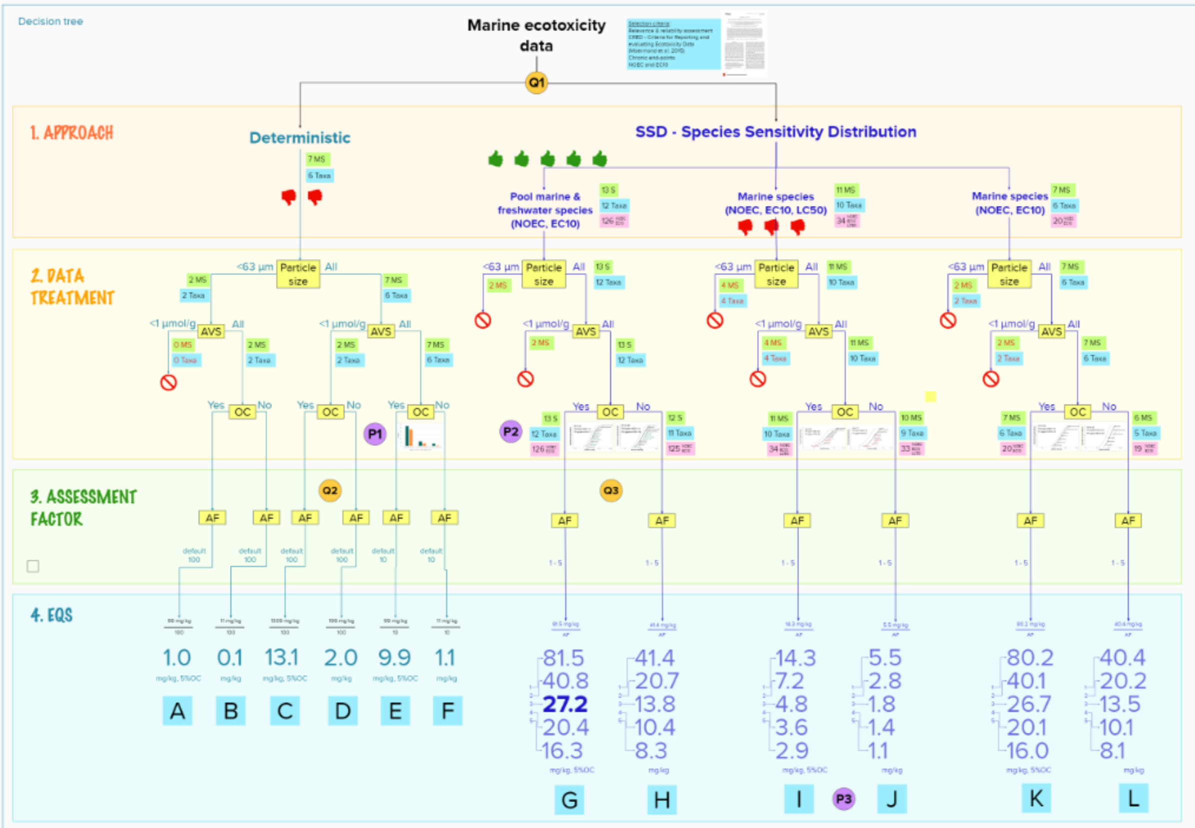


Figure 2. Decision tree prepared for workshop 3. Orange circles (Q1, Q2 and Q3) correspond to group discussion questions 1-3. Purple circles (P1, P2 and P3) correspond to polling performed in Zoom. The five thumbs up (in green) or down (in red) during step 1 show the top and bottom rankings of the four approaches, as voted during Question 1 (Q1).

Question 1: Which EQS derivation approach is preferred? Choice of: deterministic (marine species, based on NOEC/EC10), SSD (pooled marine & freshwater species, based on NOEC/EC10), SSD (marine species, based on NOEC/EC10 and LC50) or SSD (marine species, based on NOEC/EC10).

Discuss the following:

A. Is the SSD approach to be preferred over the deterministic one?

B. Do the TGD requirements for an SSD have to be met for sediment? (min 10 NOEC/EC10-values and 8 taxa)

C. Scientific relevance of pooling marine and freshwater species?

D. Scientific relevance of converting LC50 to EC10? (LC50 is simply divided by a factor)

Group	Notes
1	A. SSD preferred if the requirement is fulfilled no guidance available for sediment in the TGD goodness of fit important for the SSD curve Statistical comparison between pooled data set and the marine data set B. – C. Yes, but need to do both a pooled and a marine. Assess the impact of pooling For the Baltic, could be ok to pool D. skeptic
2	A. Compare deterministic and SSD and see how they agree. Preferring deterministic from ecotox B. Rarely see that data reaches requirements for an SSD Is a matter of quality instead of quantity. C. – D. How much will this influence your SSD. What to do with 10 day data? More focus on local conditions and Baltic Sea species. How to account for estuaries? How well does the ecotox data represent these conditions. Best case would be have estuary data in the Baltic - to high AFs would cause an issue.
3	A. if you have enough data SSD is better deterministic approach could also be scientifically relevant B. fair to lower the requirements not justified to lower. 10 taxa still needed C. In Baltic Sea it makes sense, especially northern part can be justified in general but specifically in Baltic sea D. scientifically problematic to apply a factor to acute data
4	A. Quantity of included information is greater in SSD Care in defining what endpoints represent (EC10/NOEC vs HC5) SSD statistical and biological requirements must be met Less influence from single study Deterministic means min AF 10 which may be overconservative B. The more data the better Can probably met requirements from available data C. Environmental variability greater than biological? D. Assuming that slopes are the same and always the same factor between aute and chronic Acute to chronic ranges typically low but may be higher than 10
5	A. – B. Compare to PPP guidance on sediment (2013)) 5 species Workshop by ECHA 2013 C. relevant for Baltic sea No dif. in tox salinity in Baltic sea Specific sensitive species in Baltic D. For Cu Acute to chronic ratio 3. Can be useful if not enough data

Ranking of approaches from 1 to 4:

Approach	Group 1	Group 2	Group 3	Group 4	Group 5
Deterministic (NOEC, EC10) Marine species	3	2	-	4	4
SSD (NOEC, EC10) Pooled marine & freshwater species	1	1	1	1	1
SSD (NOEC, EC10, LC50) Marine species	4	4	4	3	3
SSD (NOEC, EC10) Marine species	2	3	-	2	2

Question 2: What AF should be used for the deterministic approach? Discuss the following:

A. What additional information or tests could justify an AF<10?

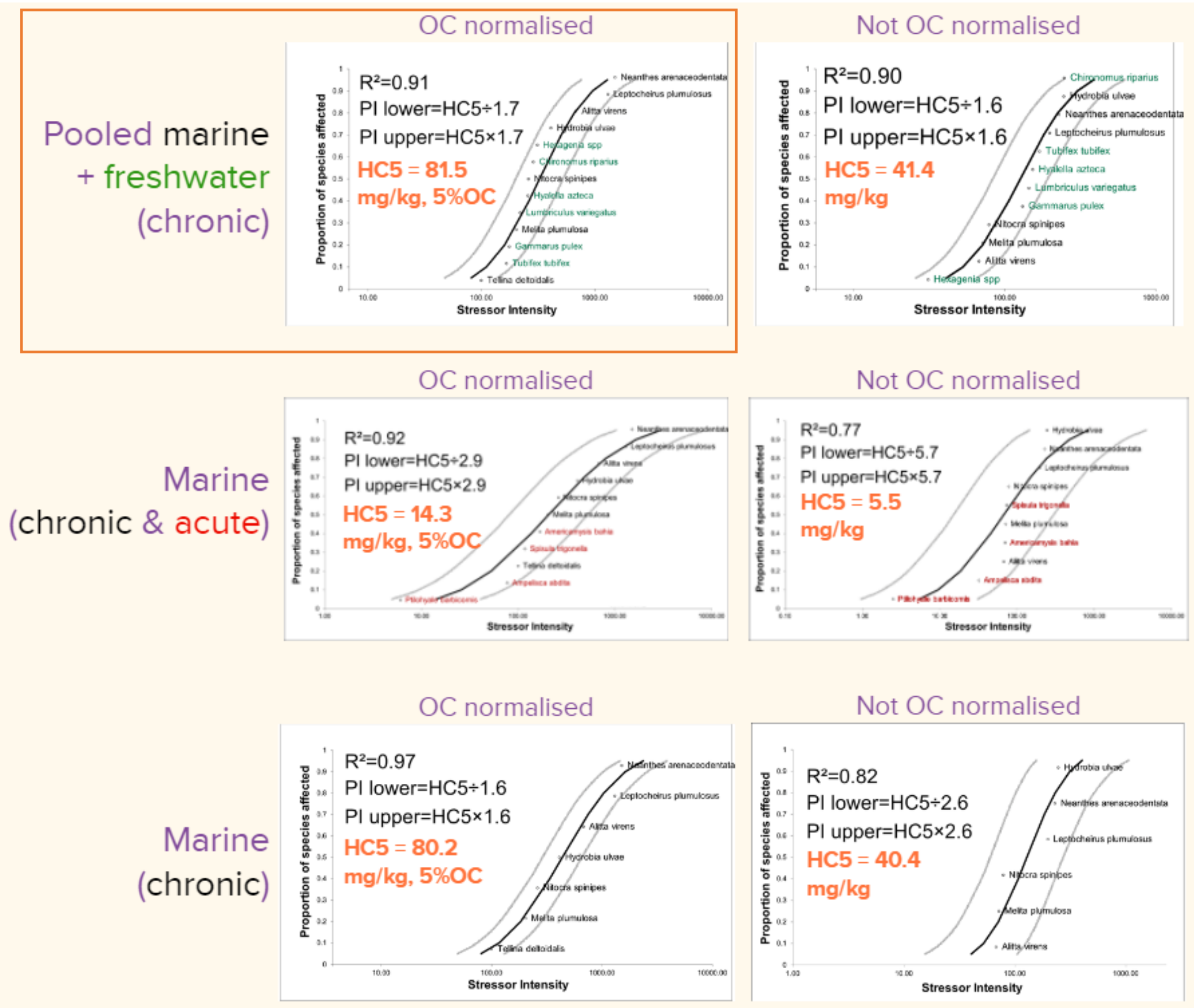
B. If there are two long term sediment tests with marine species representing different living and feeding conditions, the default AF is 100. However, if a test with a freshwater species was included, the AF could be lowered to 10. Is this approach desirable? This relates to previous question 1C.

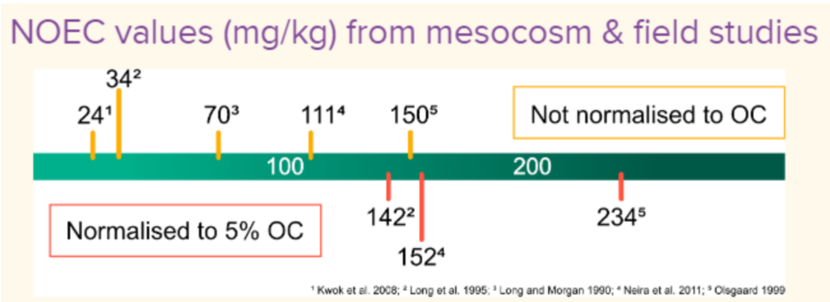
Group	Notes
1	A. Lowest should be 10 If field or mesocosm studies are available could justify a lower AF. But preferably an SSD should be used SSD - minimum 8 species and 6 taxa (level of order or greater) Important to cover variability in the differences in physiology, configuration of the species- thus important to have the taxa at "order level" B. If pooling should be during the SSD not deterministic
2	A. Based on background studies Compare with field studies If EQS is lower than background. How can EQS be lower than natural background? Preventative measures and remediation requires tiers. Generic background is challenging B. Bigger dataset is to prefer if local data is not available Cu values in sediments > threshold but below water column in sediment Need increased transparency when taking samples Implementing AND deriving EQS must be transparent
3	A. mesocosm studies natural background range between essentiality and toxicity is small tests with high bioavailability field data B. 3 species not appropriate to derive an EQS 3 taxa means you did the wrong considerations before how to take anoxic conditions into account
4	A. Not really, TGD is clear on this point Tentatively mesocosm study eg from vRAR B. Pooling is ok principally TGD then says AF can be 10 as long as enough trophic levels Evidence that copper sensitivity between FW and marine species the same is not complete
5	A. Just possible to lower in a SSD approach B. Need to look at the bigger picture and weight of evidence Full knowledge around compound and the environment that you want to protect.

Question 3: What AF should be used for the chosen SSD approach? (Here the chosen approach was the pooled one with organic carbon normalisation). Weigh in the following to suggest an AF:

How many species are represented? How good is the model fit? How large is the Prediction Interval (PI)? What does the mesocosm data suggest?

Groups were provided with the following two figures (the chosen SSD curve to discuss is the one outlined in orange, although some discussion notes relate to the other curves):





Group	Notes
1	The major taxonomic groups should be at least 6. The log normal curve appears to be skewed at the lower HC. Important to assess the goodness of fit No improvement in variation if OC normalization. If not OC norm an AF of 2, 4 or 1 is acceptable. Different opinion between group members regarding an appropriate AF AF selection: 1, 2, 3 or 4
2	Marine and chronic data are similar, freshwater are "in-between". Start with AF=5, TGD p. 46 uncertainty analysis. Deeper look in species. Are there any taxonomic groups missing. Step by step justification Difference between scientifical justification and practical reason Confidence interval AF selection: 2
3	pooling results in similar result as the marine SSD mesocosm studies speak for having lower AF e.g 2 2 instead of 1 due to precautionary principle 3 or 4 (acute results worrying but depends on how it was derived) important to look at all acute data together and evaluate this acute data - one species seems very sensitive! AF selection: 2 or 3
4	Prefer to use statistics from the SSD determine PNEC, eg 1 percentile Unclear and different opinions what range of species sensitivities is in the SSD Concept of AF from deterministic approach not comparable to SSD concept Confidence interval is 1.7 AF selection: 2, 3, 4 or 5
5	Compare to Vrar Transparent scientific reasoning Lead AF 3 Ni AF 1 Statistical fit is reasonably good Need to do proper analysis of statistical fit Mesocosm data vs field data. More weight to mesocosm data due to less confounding stressor Important to consider natural background! AF selection: 1, 2, 3, 4 or 5

Polling results

The figure below shows the polling results. The labels show the number of participants that voted for each option. To the right-hand side of each poll are graphs shown to the participants prior to voting. For P3, the participants were shown all EQS-values derived in the decision tree (Figure 2).