Annex 2. Comments from stakeholders to the first draft of the international evaluation report

Content

1. Comments from Danish Agriculture and Food Council (DAFC) (Landbrug & Fødevarer)

Comments from the Danish Agriculture and Food Council (DAFC) to the confidential draft: International evaluation of the scientific and legal basis for nitrogen reductions in the 3rd Danish river basin management plan

The DAFC would like to thank the Panel for their diligent work in analyzing and commenting on the complex background material for the Danish RBMP3.

We are familiar with the comments from SEGES, containing specific comments and questions to the report, and the DAFC finds it very important to assess these issues thoroughly.

Respecting spatial limits for commentating we will not here engage in a comprehensive assessment of the draft evaluation and all its recommendations but instead focus on asking the panel to clarify and elaborate on assessments and recommendations within each chapter, to ensure a correct interpretation of, and an understanding of the reasoning behind, the Panels' conclusions.

Chapter 1: Reference conditions, G/M boundary target and intercalibration Supporting the questions and remarks by SEGES we here add the following questions:

A) We agree with the Panel that a major change in RBMP3 has been the calculation of water body specific, instead of type specific, reference conditions (p. 10). We also note that the Panel finds that misclassifications of water bodies into an unfit type have entailed that reference conditions for the water bodies in RBMP2, although "generally valid", were "far off in some cases". Does the Panel thus agree that when a 10 pct. uncertainty of the RBMP2 MAIs was reported to stakeholders and government; this was far off in some cases? (see also questions regarding uncertainty below).

B) It is mentioned that DHI/DCE have remarked that reference nitrogen concentrations in undisturbed streams, used as reference, have been underestimated by, on average, 13.5 pct. (p. 9). This is quite a lot and could potentially affect MAI. Revisiting the DCE comments to the COWI/NIRAS report, where the remark is done, it is not clear how data has been treated since the discovery. It seems that the concentrations have been corrected, but no recalculation of reference loads has been carried out.

Has the Panel assessed whether the reference values have been updated since the finding that measurements were underestimated?

C) The Panel describes how G/M target values in open waters have been changed from intercalibrated values in RBMP2 to values below the intercalibrated ones in RBMP3 (p. 14), and the Panel recommends using intercalibrated values instead (p. 15).
When target values thus are changed in open waters, how could this affect target values in the adjacent more enclosed waters that interchange water with the open waters? (Noting that the Panel (p. 12) does not expect that model changes have impacted the G/M boundaries of the enclosed waters).

When using the intercalibrated G/M values in open waters, while maintaining the new RBMP3 reference values, this entails a change of the EQR. Should or could this lead to a reassessment of EQR values in adjacent closed waters/fjords? Are there scientific arguments for having different EQRs for G/M target values for the same quality elements in open waters and adjacent closed waters / fjords?

Chapter 2: Marine models and their use in setting maximum allowable input Supporting the questions and remarks by SEGES we here add the following questions:

A) For the biogeochemical models, in particular the central parameters chl-*a* and Kd, performances are assessed, by DHI/DCE, as "poor" for almost all models. Nevertheless, the Panel concludes that "it is reasonable to expect that the response of the chl-*a* and Kd to changes in nutrient loading are relatively accurate" (p. 20).
Considering that "poor" performance is not very good, can the Panel be more specific on the term "relatively accurate"? And does the assessment of "relatively accurate" apply also on a local scale, i.e. in a single fjord or coastal water?

B) From RBMP2 to RBMP3, a number of river basins have experienced quite enormous changes in MAI. Examples count Genner Bugt (from MAI of 45.0 to 18.8 tonnes N, a 58 pct. reduction), Lillestrand (from 26.1 to 6.6 tonnes N, a 74 pct. reduction) and Stege Nor (from 6.7 to 15.5 tonnes N, a 131 pct. increase), to mention a few.
In practice, the shift from RBMP2 to RBMP3 means that some areas go from no nitrogen reduction demand to very high demands – and the other way round.
Uncertainty estimates are relatively similar in RBMP2 and 3. The assessment was rounded to 10 pct. in RBMP2, and in RBMP3, confidence intervals are estimated to be less than +/-10 pct. in 94 out of 98 models with mechanistic models[1]. This does not fit easily with the large changes we see from RBMP2 to RBMP3. And it gives rise to serious concerns amongst stakeholders who, despite their best efforts, fail to understand how the nitrogen reduction demands they meet can change so drastically, when the marine environment is essentially in an unaltered condition, and nutrient leaching has been rather constant through recent years.

How does the Panel evaluate the uncertainty assessments of the MAIs in RBMP2 vs RBMP3, when both determine confidence intervals / uncertainty at +/- 10%?
If changes in local MAIs from one RBMP to the next occur at the magnitudes that we see, how can stakeholders trust the MAIs in RBMP3? What evidence do we have that not last time, but *this* time, the uncertainties are estimated correctly? And if they are, would the Panel support a recommendation to authorities to concede that MAIs in RBMP2 were far off in a number of water bodies, in order to gain confidence from stakeholders who for good reasons fail to understand that both RBMPs including uncertainty assessments can be accurate, despite major changes to MAIs?
Is it correctly understood that uncertainties at waterbody level may be higher than the uncertainty at model level?

C) In the DAFC input to the Panel, we raised the question of pressure-impact response for the models. Especially concerning Kd, the response is concerningly low in most areas, including many fjords (see p. 5 of input). Kd was previously, in the international evaluation of RBMP2, pointed out as a less than ideal parameter. Reasons given included that no strong dependence of Kd on nutrient loading could be found, as is the case now again, and the expert panel then recommended "reviewing the approach for this WFD indicator by starting from the basic observation that not Kd, but survival and restoration of aquatic angiosperm vegetation is the real criterion", and it was recommended to "relatively downweigh the importance of Kd in the final calculations of reductions needed."[2]

Does the Panel agree with this assessment of the 2017 International Evaluation, and if not, how does the Panel's evaluation differ? Does the Panel find that Kd responds better to changes in nitrogen level in the updated models?

Chapter 3: Status load, baseline, and effectiveness of measures

A) It is concluded by the Panel that "the methodology for calculating the status load has improved and is of high quality" (p. 27). While it may have been improved, it is unfortunately still a fact that substantial errors are found on local levels.

[1] Application of the Danish EPA's Marine Model Complex and Development of a Method Applicable for the River Basin Management Plans 2021-2027 Estimating Confidence Intervals for Maximum Allowable Inputs (MAIs), p. 8

[2] International evaluation of the Danish marine models *Performed by the Panel of international experts* (2017). Quotes from chapter 4, pages not numbered.

Aarhus University has looked further into Nakskov Fjord[3] and Rødsand/Bredningen[4], as local stakeholders wondered how status loads could have increased as dramatically as numbers indicated, since no significant changes in land use had occurred. In both cases it was concluded that the calculations contained errors of significance to the status load.

For Nakskov Fjord, correcting the error meant that status load decreased from 534 tons N to only 391 tons N, more than halving the nitrogen reduction demand. For Rødsand/Bredningen the report describing the problems with assessment of status load was finished after the hearing period of RBMP3, and hence, no correction has been made here.

Has the Panel looked into the details of the methodology for calculations of status loads?

The authorities' reply to the Nakskov Fjord report was that it was a special case and errors would not be expected elsewhere. The Rødsand/Bredningen report demonstrates that this is not true.

B) On page 28 the Panel states that "a full decade was virtually lost for lowering nutrient loads to coastal water bodies.", with reference to the fact that Danish nitrogen load has been relatively unaltered during the last ten years.

Although assessing reduction measures is beyond the remit of the evaluation, the DAFC would like to express that we fully agree with this statement. Despite repeated calls by the DAFC and other stakeholders, implementation of permanent, efficient measures to reduce nitrogen loss to coastal waters is simply too slow.

During the last decades, measures have been and are still continuously taken in the field to reduce nitrogen loss from plant production. This way, Danish agriculture has obtained a nitrogen use efficiency (NUE) amongst the very highest in Europe. Further substantial reductions in nitrogen leaching are thus best obtained through permanent and efficient measures such as e.g. wetlands and rewetting of peatlands which also deliver on biodiversity and climate gas emission goals.

Chapter 4: Burden distribution

A) On p. 31, the Panel states that burden distribution is only a discussion relevant for water bodies with significant inputs from other Member states, and that "These are the open coastal waters." It is true that only open coastal waters, and Flensborg Fjord, are shared with other Member states. But the question may not be limited to them.

Along with RBMP2, DHI prepared both a map (Figure 1) and a table describing the share of chl*a* and Kd, respectively, that could be explained by Danish nitrogen loads[5]. It demonstrates that many water bodies including a number of fjords are heavily affected by non-Danish loads, why the discussion on burden distribution also seems relevant here.

[3] Thodsen & Tornbjerg (2022): Årsager til år til år forskelle i de beregnede tilførsler af vand og næringsstoffer til havet imellem forskellige NOVANA-opgørelser.
https://dce.au.dk/fileadmin/dce.au.dk/Udgivelser/Notater_2022/N2022_72.pdf

[4] Thodsen & Tornbjerg (2023): Udredning af næringsstoftilførslen til Vandplankystvandet Rødsand og Bredningen imellem forskellige NOVANA-opgørelser. https://dce.au.dk/fileadmin/dce.au.dk/Udgivelser/Notater_2023/N2023_19.pdf

[5] DHI (2015): Modeller for Danske Fjorde og Kystnære Havområder – del 2: Mekanistiske modeller og metode til bestemmelse af indsatsbehov. https://edit.mst.dk/media/lspfqzss/312-modeller-fordanske-fjorde-og-kystnaere-havomraader-del-2.pdf

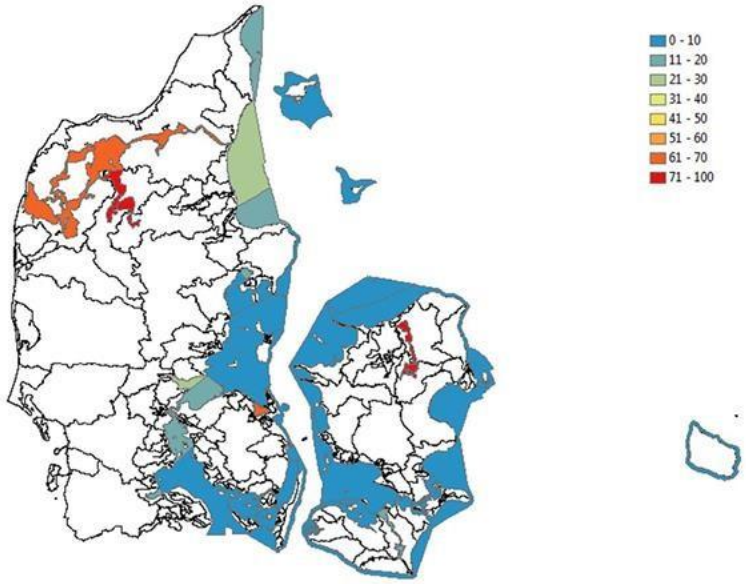


Figure 1 (translated from text in report) Share of the phytoplankton indicator, for the 45 areas covered by mechanistic models, that can be explained by nitrogen load from Danish land. The color scale is in percent.

Has the Panel been presented with such data regarding RBMP3? This data has not been published in the current RBMP3 reports and it would be useful to include this in the present report to get an understanding of where and to what extent international collaboration is needed in order to obtain good ecological status.

B) The Panel finds that a discussion in the report by Suykens & van Calster, provided as input by the DAFC, is "irrelevant" as it addresses a planned amendment to the WFD (p. 33). In a reply to this, Suykens & van Calster note that obviously they do not suggest that proposed legislation, which has not yet been finally adopted, is binding. However, they do find that the draft gives a good indication of the approach the Commission will take regarding the mediation / escalation provision included in Article 12 of the WFD.

Does the Panel agree that the planned amendment can be viewed as an indication that the Commission wants to strengthen the use of Article 12? And could Article 12 be of relevance to the challenges Denmark meets in terms of burden distribution?

Chapter 5: Seasonality

Supporting the questions and remarks by SEGES we here add the following questions:

Overflow of sewage systems is notoriously underreported in Denmark; both the number of physical overflow-points as well as the frequency and amount of both water and concentrations of nutrients and pollutants. Whereas we do not question that diffuse sources are dominant in volume, as also stated by the Panel, we support the Panel's view that overflows have received almost no attention despite actual increases, in volume and number of incidents.

Does the Panel agree that mapping and monitoring of stormwater overflows should be improved to ensure an overview of the stressor? It should be noted that overflows are not a challenge limited to coastal waters. Most likely, lakes are affected to a higher degree.

Chapter 6: Phosphorus efforts

Supporting the questions and remarks by SEGES we here add the following questions:

Concerning possible phosphorus limitation in spring, the Panel concludes that nitrogen and phosphorus will become "co-limiting" in spring, when nitrogen-load is reduced sufficiently. SEGES has looked into this in more detail and argues that data suggests that even with very reduced nitrogen load, phosphorus will still be the limiting nutrient during spring months.

With a focus on reducing algal growth as much as possible and as soon as possible, we encourage the Panel to look into SEGES' arguments and describe whether implementation of phosphorus measures could mean reaching good ecological status faster than through nitrogen reductions alone?

Chapter 7: Pressures and stressors other than nitrogen

A) The Panel concludes that in addition to nutrient load, other stressors will have to be considered, to reach good ecological status. This leads to the overarching question: Should these stressors not be addressed at the same time as nutrient load? If the goal is to reach good ecological status, there seems to be little point in holding back measures.

B) Internal load can be significant especially in the most eutrophicated areas. Reducing the internal load directly can, thus, improve the environmental status at a much faster rate than by using land-based measures exclusively. Does the Panel find that restauration of the marine environment through for instance sand capping and mussel production could reduce the expected time delay to reach good ecological status, when combined with sufficient measures to reduce nutrient load from land?

C) Throughout the 20th century, removal of stones ("stone fishing") reduced the number of stone reeves in Danish coastal waters with up to 90 percent. Adding to this disaster was the eelgrass disease, which killed vast areas of eelgrass meadows during the 1930's. Even though both stressors have been brought to a stop, and therefore they are not included in the work by Petersen (2021)[6], the effects are still evident in the marine environment.

Losing eelgrass meadows and stone reeves and getting mud instead of sand at the bottom of most fjords have changed the ecosystem. The Panel does not endorse substituting nitrogen reductions for marine restauration efforts, but what is the Panel's view on combining efforts? Is it possible that with no restauration of the physical environment, some coastal waters may not be able to reach good ecological status, through nitrogen reductions alone, within a reasonable time frame?

Chapter 8: Possibilities for further use of exemptions

We thank the Panel for a comprehensive illumination of the possibilities and reasons for using exemptions wisely as a part of a strategy to achieve the environmental goals in an orderly and socially acceptable way.

[6] J.K. Petersen. 2021. *Andre presfaktorer end næringsstoffer og klimaforandringer – sammenfatning*. DTU Aqua-rapport nr. 381-2021

2. Comments from The Danish society for Nature Conservation (Danmarks Naturfredningsforening)

The Danish Society for Nature Conservations/Danmarks Naturfredningsforenings (DNs) comments to Draft version of International evaluation of the scientific and legal basis for nitrogen reductions in the 3rd Danish river basin management plan (version 21. Sept. 2023)

General remarks

*DN endorse "*The Panel assessed whether the modelling and analysis was fit for purpose, i.e. formed a sufficiently robust basis for concrete implementation of measures and significant steps forward on the way to achieving the goals of the WFD. Also, in recommendations on future work, the Panel emphasized gaps in knowledge for these future steps, rather than successive refinements of modelling tools that had already proven their value as a sufficient basis for action."

Chapter 1 – Reference conditions, G/M boundary target, and intercalibration

Chapter 1 – Comments

DN take note

- that the RBMP3 approach rely on waterbody specific modelling of reference conditions and reduction needs rather than the former typology bound approach
- that nutrient loading can be used for ensuring consistency between nutrients and biological quality elements rather than nutrients concentrations which may vary significantly in time and codependency of other factors
- that the Panel disagrees with the view that transparency and confidence are not increased by using different approaches for calculating MAI and reference values or by alternative methods that increase uncertainty.
- That reference conditions set by the water body specific method in RBMP3 gives more stringent results for open waters and less for most enclosed waters but that the effect on HG and G/M boundaries need to be checked for being in accordance with EU Commission-approved intercalibration results as well as CIS Guidance Document No. 30.
- that if offshore concentrations are above the G/M target values, there is no way to reach the Good Environmental Status by changing Danish land-based inputs into the coastal water body.
  DN comment: That it is crucial to the success of the WFD goal of good ecological coastal status that all countries reach their goals for nutrient reduction in their coastal waters and thereby reduce their contribution to the offshore concentrations influencing not only into their own coastal waters but also neighboring countries coastal waters. Also this is a prerequisite for achieving the goals in the MSFD for the open waters.

DN endorse the Panels overall conclusions and recommendations

Chapter 2 – Marine models and their use in setting maximum allowable input

Chapter 2 – Comments

DN take note

- that the current approach to estimate and distribute the effort required to reach Good Environmental Status in coastal waters is now quite mature and provides decision support on a level of detail and quality that, to our knowledge, is not available in any other country.
- That models show examples that GES cannot be reached even with zero nutrient input from land – either due to inflow from adjacent waters or the coastal water being eutrophicated to an extend

where neither N or P is ever limiting for the production (due to excess input from land based sources, internal historic load) or combinations thereof. Setting relevant MAIs may therefore be impossible now but must be done in an iterative process following huge limiting efforts.
- That stakeholders have addressed concern that placing the N-MAI on the G/M boundary as a median target will result in GES only half the time and MES the other half, but that the Panel have addressed the issue only by stating: "If for some reason, a higher degree of certainty to reach Good Environmental Status would be required, it is straightforward to perform N-MAI calculation requiring indicators to reach to mid-point between Good and High status."

DN endorse the Panels conclusions and recommendations as a whole.

Chapter 3 – Status load, Baseline effects, and effectiveness of measures

Chapter 3 – Comments

DN take note

- That "Compared to the models linking N-load to the coastal waters to the Biological Quality Elements, the models linking measures in the field to N-loading of the coastal waters have a smaller underlying data base and less empirical foundation. It is to be expected that, when more measures are taken or taken at larger scale, this empirical basis for modelling the effectiveness of measures will improve. The Panel is of the opinion that this constitutes one of the priority knowledge gaps in the program as a whole."
- that during the last decade, little or no reduction of N-load to coastal waters has taken place. And that the Panel concludes that it is not due to inherent ineffectiveness of the measures, but to political changes in the 2010s that have led to delay in implementation.

DN cannot share the Panels optimism for the RBMP3 but agree that the problem is not lack of technical measures, but lack of political will and stamina having resulted in a lost decade.

DN also find that it must be taken into consideration, that the models have a small underlying data base, that dos not and cannot reflect field management in practice, where there will be a bigger loss of nutrient.

It is also DN's opinion that the model used to calculate the marginal leaching should be questioned. Reference is made to the fact that in connection with the Food and Agriculture Package of 2015, there was a drastic and unjustified minimization of marginal leaching from around 30 per cent. to around 20 per cent.

Chapter 4 –Burden distribution

Chapter 4 – Comments

DN take note

- that the Panel identifies consistency between MSFD and WFD targets as a point of concern and a subject for further international action in the coming years.
- That "With respect to international diplomatic action, Denmark has weakened its position by lowering unilaterally the G/M boundary values that had previously been agreed upon in intercalibration exercises. If Danish waters cannot reach a target value that lies significantly below the concentrations of inflowing open sea water, chances are high that this will be considered by other countries as a self-inflicted problem."
- That the Panel emphasizes that only in the open coastal waters, e.g. around Bornholm, transboundary pollution constitutes a decisive influence that prevents the achievement of the WFD objectives.

DN endorse the Panels conclusions and recommendations

Chapter 5 – Seasonality

Chapter 5 – Comments

DN take note

- That "Only in three out of 18 investigated water bodies, the diffuse loading is less than 70 per cent of the total summer loading (table 6-2 in Erichsen et al. 2021). Addressing point sources may therefore only make sense in a few well-selected water bodies."
- That it is highly unlikely to find significant alternatives to a strategy of decreasing diffuse loading and that "The Panel is convinced that maximal effectivity of these local initiatives can be obtained if they can concentrate on the planning and execution of concrete measures within clearly defined, and well monitored objectives to be reached in fixed time periods."

DN endorse the Panels conclusions and recommendations.

Chapter 6 – Phosphorus efforts

Chapter 6 – Comments

DN endorse the Panels conclusions and recommendations.

Chapter 7 – Pressures and stressors other than nitrogen

Chapter 7 – Comments

DN take note

- That "The pressures from sand extraction, dumping, dredging, physical structures and hazardous substances on the biological quality elements (Chl-a and eelgrass) can be modelled to a relatively high degree with existing tools. It is found that the impacts of these pressures are mostly limited in mass, space and time and that their impacts are therefore of smaller scale than the impacts of N-and P-load as long as the impacts are within the orders of magnitude that have been experienced until now.
- That the pressures fishery, ship traffic, plastic and invasive species was "…evaluated based on expert judgement. The most important of the pressures was physical disturbance from fishery. Nevertheless, the pressure from fishery is secondary compared to nutrient load, although fishery cannot be modelled to the degree of validity of the N-and P-models. Furthermore, fishery has mainly a local impact, especially on eelgrass."
- That the Panel agrees with COWI and NIRAS that no evidence has been found or brought forward showing that the need for nutrient reduction is dependent on the level of other stressors. Therefore, no change in the priority scheme is required.

DN endorse the Panels conclusions and recommendations.

Chapter 8 – Possibilities for further use of exemptions

Chapter 8 – Comments

DN take note

- Of the significant effort and analysis from the Panel to explore the possible use of exemptions in the Danish RBMP3
- That the Panel is not in agreement with COWI and NIRAS in their judgement on room for maneuvering for exemptions, *BUT DN also want to add that legal interpretation of the WFD is not an exact discipline and must await clarifying rulings from ECJ. And it still remains to be seen how stringent the EU Commissions standpoint are:*

" After 2027, the possibilities for exemptions are reduced, as time extensions under Article 4(4) can only be authorized in cases where all the measures have been put in place but the natural conditions are such that the objectives cannot be achieved by 2027." (2019 EU Commission fitness check).

- That the Panel refer to extensive uses of exemptions in Sweden and Germany for open coastal waters but have no reflections on whether that can be justified nor accepted by the EU Commission under the general preconditions for the WFD that the precautionary principle must be upheld, and no deterioration allowed.
- That the Panel emphasize that exemptions as well as the justifications for using them should be used for single waterbodies
- That use of the exemption does not entitle Denmark to manage a water body merely to maintain the status quo. *DN wish to point to the fact that the overall trend for the state of coastal waters has moved from moderate towards bad during the last RBMP period.*

DN endorse the Panels conclusions and recommendations.

Chapter 9 – General conclusions

Chapter 9 – Comments

DN notice that the Panel recommends taken advantage of the local/regional efforts in Kystvandrådene to streamline the use of implementation options the Panel stresses that the local knowledge should be incorporated within firm, nationally consistent, constraints and reduction targets to be effective. DN see this recommendation as a warning not to continue relying on voluntary means and no time frames to reach the goal.

DN also notice that even though during the 2010s almost a decade has been lost, in which no N-load reduction has been realized, effective measures are available and only need firm political will to be decided and implemented during the VMP3 period.

The panel points out that there is little or no evidence that reducing other stressors, rather than reducing nutrients, can achieve good ecological status. DN's agree that there is no such evidence and calls on the panel to emphasize this point in its final reporting.

As DN has also emphasized above, it is important that the sub-model regarding the marginal washout in the N model is analyzed in more detail and updated. DN has therefore also taken note of the panel's call for an update of the N model and suggests to the panel that it underlines the importance of speeding up this work.

It is obvious for the Panel (as it has also been for a long time for most stakeholders in Denmark) that achieving Good Environmental Status in all Danish waters by 2027 will not be possible and that exemptions at least for the time line (Art.4.4) will be necessary due to natural causes, but that it can In no way lead to the abandonment of well-defined plans to significantly improve the water quality in Danish waters, with a clear time path to achieving these goals as demanded by the WFD and its guidelines. Use of exemptions for less stringent objectives (Art. 4.5) seems to DN more dubious and with little potential taking into account that the knowledge base (as developed during RBMP1 and RBMP2) so far indicate that more time for improvement is justified for natural causes (especially for lakes and coastal waters) but not for setting less stringent targets than GES. In DNs view arguments concerning cost-effectiveness of measures and socio-economic acceptance still needs clarification and justification as basis for use of exemptions in each single waterbody.

The Panel finally state, that it sees room for maneuvering in the use of exemptions, which offer more flexibility than previously estimated. DN encourages the panel to elaborate on what kind of flexibility it deems possible considering a negative trend of the ecological state of the coastal waters during the last

RBMP period and taking into the account the precautionary principle and the no deterioration demand in the Water Framework Directive as well as other directive obligations.

October 2. 2023

3. Comments from Landsforeningen Bæredygtigt Landbrug

Remarks from Bæredygtigt Landbrug to the International draft evaluation report

General Remarks:

Bæredygtigt Landbrug received the international evolution report of the 2nd Opinion on September 21, 2023, as a confidential document. Here are our comments on the report.

While we agree with the conclusions on several points, there are key areas where we disagree.

We have noticed an inconsistency between the Panel's comments and the final conclusions in many chapters. For example, in Chapter 2.4.4 regarding MAI levels near or below background levels (p. 23), important remarks about unattainable MAI levels are not reflected in the chapter's conclusions.

Chapter 1 – Reference Conditions, G/M Boundary Target, and Intercalibration:

The year 1900:

The year 1900 was a praised and recognized reference tool in the international research evaluation – and it must therefore still be evaluated with expert opinions. Because the only characteristic of natural streams is that they have low N discharges, i.e., amplifies the thesis that nitrogen emissions from agriculture must be reduced. It is obviously nonsensical because there are also natural streams that discharge a lot of nitrogen. The watercourses are selected for the purpose and therefore not scientifically. It is strongly criticizable. That way you get a good reference for eelgrass but a reference for chlorophyll that has never existed.

We know with certainty from Aarhus University what the level of nitrogen was in the year 1900. A standstill which has been in force for several decades before the year 1900. It is therefore totally unscientific not to use the same starting point. For reference. If we were talking about delays in the system's effect, we are really talking about delays of up to 50 years, which is not true. The reason is rather that the water bodies in 1900 were probably P limited for most of the year, as the P supply was very small, among other things there were no discharges of P-rich wastewater.

Eelgrass:

It is a well-known fact that the distribution of eelgrass has been significantly reduced throughout the northern hemisphere, from the USA over Europe to (other species in) Asia due to human impact on the aquatic environment (Frederick T. Short, ... Christine

Pergent- Martini, in Global Seagrass Research Methods, 2001). Replanting has been described for over 20 years and was proposed by Bæredygtigt Landbrug 10 years ago, as there are positive results from both east and west. However, the replanting of eelgrass is not mentioned in the report as a means of achieving a good ecological condition.

It is strongly criticized because the eelgrass (everywhere in the world eelgrass grow) died of eelgrass disease in the 1930s. In Denmark, 92% of all eelgrass disappeared, and since the 1930s it has been at very low levels. In relation to the monitoring, it has slightly decreased for the past 20-30 years. However, the remaining few percent of the eelgrass has been strongly challenged by wastewater, flapping, bottom scraping, which since the 1930s has exploded in scope and intensity - in addition to the rising sea temperatures, which lead to increased biological activity and more algae formation.

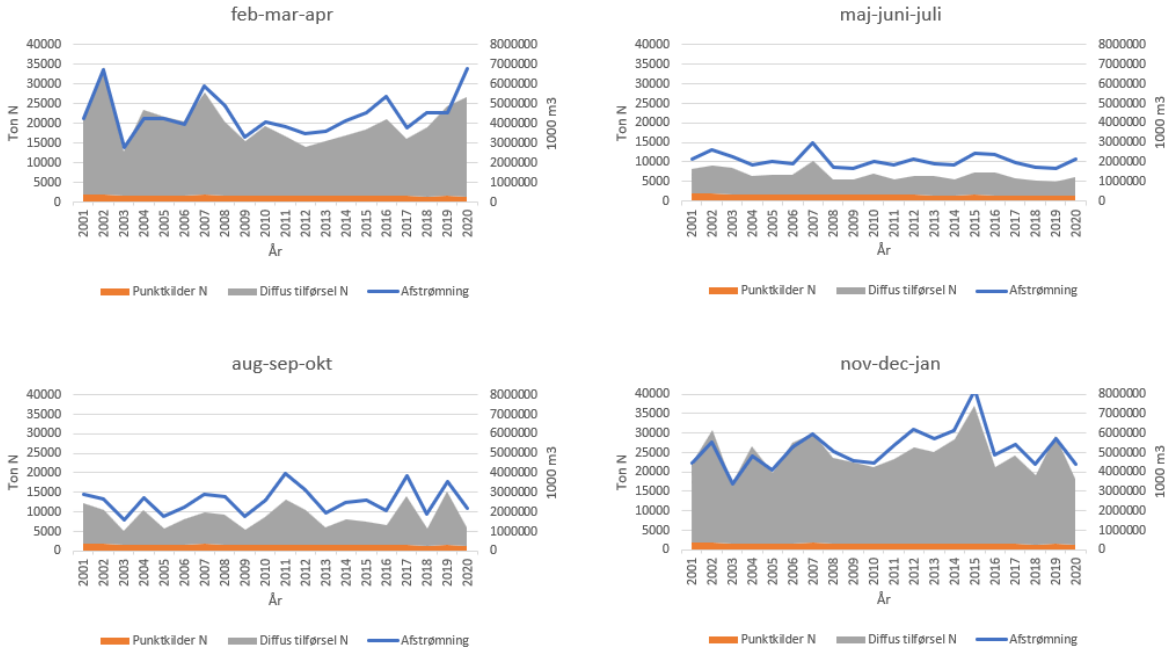
The overall problems in fjords and coastal waters are that the ecosystem was destroyed with the eelgrass disease in the 30s - and since then the pressure factors have grown massively due to wastewater, flapping, bottom scraping, etc.

In Denmark, we have chosen the 'Eelgrass depth limit' as one of the indicators for the ecological state of the coastal areas. A distinction is made between the depth limit for the main distribution of eelgrass, here defined as the greatest depth where eelgrass covers 10% of the seabed, and the maximum depth limit of eelgrass, which is the depth where the deepest-growing shoots grow.

Chapter 5 – Seasonality:

We suggest that, instead of solely focusing on the total nitrogen amounts, the report should consider a broader perspective, including the timing of nitrogen and phosphate discharge and the effectiveness of nitrogen-regulating agents. Seasonal variations in nitrogen emissions from diffuse sources should be taken into account.

The figures underlying the NOVANA reports show that emitted nitrogen from diffuse sources is relatively low and stable in summer and is therefore technically difficult to measure, whereas emissions are higher in winter and spring, where larger fluctuations are driven by the amount of precipitation. The figures below are regulated for precipitation. The present targeted regulation on agricultural areas seems to have increased nitrogen discharge in Feb. – Mar. and Apr.



We believe that targeted regulation should consider the periods when nitrogen discharge has the most significant impact, especially during algae growth periods. For more details, please refer to the attached report titled 'Optimization of Nitrogen Loadings to Karrebæk Fjord - Seasonal Effects from Nitrogen Reductions.'

The Panel concludes with respect to managing point sources rather than diffuse sources, that this only seems to make sense in those few water bodies where point sources make up a significant part of the total summer load.

Questions to the Panel: Have You received information about the individual fjords and tried to evaluate the natural diffuse nutrient contents in the rivers and the point sources including sewage by-passes?

Chapter 6 – Phosphorus Efforts:

While Danish wastewater treatment has improved since the 1990s, it's essential to acknowledge that phosphorus and sludge have accumulated in sediment in fjords and coastal areas over the past 100 years. Therefore, it's crucial to distinguish between particle-bound phosphorus and water-soluble orthophosphate, as the latter is more biologically available. Restrictions on phosphorus are essential for achieving a good ecological condition, as phosphorus limitation occurs in the spring and nitrogen limitation in the summer. It's inaccurate to claim that nitrogen emissions from Danish agriculture are the sole factor contributing to environmental problems in coastal waters; water-soluble orthophosphate is a primary factor. The impact of water-soluble phosphate from point sources should be evaluated relative to complex-bound phosphate from erosion.

Figure 6.1-6.3 shows that Chl-a for the years 2010-2020 in Skive Fjord where DIN concentrations only in June are low enough to cause nitrogen limitation. However, DIP in the summer seems to be a limiting factor as DIN in Skive/Karup Å is evaluated as being close to a background level. How do You evaluate the effect of water-soluble phosphate from point sources compared to complex bound phosphate from brink erosion?

Chapter 7 – Pressures and stressors other than nitrogen

Quote by Prof. Karen Timmermann, at DTU Aqua, on April 28, 2015, to “Naturstyrelsen”:

"However, as a general rule, it is the phosphorus input that controls the chlorophyll concentration in the spring period, but since this period is not included in the intercalibrated chlorophyll indicator, it is the nitrogen input that is most often selected as the explanatory variable for chlorophyll concentration."

Chapter 8 – Possibilities for Further Use of Exemptions:

We have stressed the need for an economic impact assessment, which is currently not covered in the report. While voluntary measures are an option, politicians must be aware of the potential costs associated with these measures to make informed decisions. The 2nd Opinion report also emphasizes the importance of using economic impact analysis when considering exceptions.

We wish to emphasize that conducting an economic assessment is not feasible, as the necessary measures to attain the desired reduction effect in coastal waters are not within reach.

4. Comments from Green Transition Denmark (Rådet for Grøn Omstilling)

General remarks

General remarks

Rådet for Grøn Omstilling finds that the Expert Panel's report is thorough and to the point. We welcome the conclusion that the Danish marine models are state of the art and provide unparalleled political decision support, even though minor adjustments to the model can be made.

Unfortunately, both a scientific and legal discussion addressing the issue of setting the Good / Moderate boundary as a target for Good Ecological Status (GES) is absent. In our opinion it is necessary to assess thoroughly, since we currently aim for Good Ecological Status in only 50 pct. of our fjords and coastal waters.

In our opinion, and along the conclusion of the Panel that "a full decade was virtually lost" due to political inaction, there has not been and there is no reason not to act on the reduction targets produced by the models. We therefore find it unfortunate, that much needed action has been delayed, due to continuous questioning of the models' capabilities by organizations serving the interests of the agricultural sector.

We endorse that some individual water body target loads might be adjusted, which can help resolve some of the issues stemming from transboundary pollution, but it should not remove focus from the fact, that the models are, and has been, capable.

Furthermore, we agree with the Panel's conclusion that some adjustment proposals are not worth carrying out, since it will unnecessarily delay action as well as require disproportionate resources resulting in insignificant changes to the final reduction targets and even further delayed action.

Rådet for Grøn Omstilling will in conclusion like to underline, that we now have a Second Opinion which confirms that profound measures directed at the agricultural sector which has well-documented effectivity needs to be taken swiftly.

Lastly, we would like to point to a concrete way forward for decision-makers.
The authorities should implement the New Model for Targeted Regulation (Ny Reguleringsmodel) as fast as possible with the current N-retention map. When the updated N-retention map is ready, it can then be implemented in the model.
This would provide the possibility of issuing nitrogen quotas based on each water bodies maximum allowable input of nitrogen (N-MAI).
Doing this could swiftly reduce nitrogen loads in a cost-effective manner.

Chapter 2 – Marine models and their use in setting maximum allowable input

Chapter 2 – Comments

Assessment of Good/Moderate target in the chosen Scenario 2e

Rådet for Grøn Omstilling is concerned, that despite numerous mentions of the need to discuss and assess the decision to set the water body status target at the boundary between Good Ecological Status (GES) and Moderate Ecological Status, resulting in a 50 pct. chance of actually reaching Good Ecological Status, is almost absent in the report. It is briefly addressed by the panel, that the decided target will statistically result in only half of the water bodies actually reaching Good Ecological Status, but no discussion of possible legal implications with the Water Framework Directive (WFD) or a wider scientifical discussion on the consequences of doing so is provided. COWI and NIRAS concluded in their Phase I report[7] that the current target set on the Good/Moderate boundary is not aligned with the objectives in the Water Framework Directive.

Rådet for Grøn Omstilling urges the Panel to include such a discussion, since we urgently need to stabilize all our marine ecosystems – not only 50 pct. of them. Also, we need the legal assessment for decision-makers to operate within the legal boundaries of the Water Framework Directive.

Rådet for Grøn Omstilling would in general like to point to the fact, that the aim of the WFD is to *actually* achieve GES in the fjords and in our coastal waters, and not solely achieving a theoretical GES, which may or may not meet the minimum scientific and legal requirements stated in the WFD.

Chapter 4 –Burden distribution

Chapter 4 – Comments

Transboundary pollution

Rådet for Grøn Omstilling welcomes that the Panel stresses the need to also address nutrient pollution through strengthening international collaboration via e.g. HELCOM and OSPAR, in order to bring down transboundary pollution and eliminate the need to use exemptions for water bodies for which burden distribution is an issue.

Denmark should, in our opinion, exercise political will to decrease national nitrogen and phosphorous loads significantly, thus setting an example and at the same time increasingly facilitate dialogue and implementation of measures with neighboring countries to jointly decrease transboundary pollution.

Chapter 6 – Phosphorus efforts

Chapter 6 – Comments

Phosphorous reductions

Rådet for Grøn Omstilling endorses the Panel's conclusions on phosphorous-nitrogen relation and would like to add the following for further – and much needed – discussions.

While the discussions on phosphorous here concerns exchanging nitrogen reductions with phosphorus reductions, there should in general be a larger focus on reducing phosphorous inputs to agricultural soils and increasing recycling of phosphorous simultaneously with reducing nitrogen loss. This should be done, not only to reduce loss of phosphorous to water bodies, but due to a range of reasons set out below.

1. We have a very high soil content of phosphorous in western Denmark[8] and we lose around 1300 tons annually from diffuse sources[9].

2. Phosphorous is a scarce resource in contrary to nitrogen, which means that circular usage is essential. Despite many – often technical – efforts to recycle phosphorous, we still lose large quantities to waterways, lakes and the marine environment.

3. We import large quantities of phosphorous from especially animal feed and mineral fertilizer which causes an overload of phosphorous that end up on agricultural soil in especially the Western part of Denmark. This overload increases the risk of phosphorous leaching to water bodies.

4. Our dependency on imports poses risks concerning security of supply. 85% of the world's mineral phosphorous is located in Marocco, Russia, China and USA[10], and the global supply chain was severely impacted after the Russian invasion of Ukraine.

5. Continuous and large loss of phosphorus causes severe impact to lake ecology, and Danish lakes are very impacted by this. Phosphorous has built up in lake sediment and when released it can be carried further to our fjords and coastal waters.

6. A high phosphorous content in soils can negatively impact important fungi-plant symbiosis (mykhorizza), which also impacts yields[11].

7. We have pooled enough phosphorous on some agricultural soils, that soils can keep producing crops without further phosphorous inputs, thus slowly bringing down the phosphorous soil content, for 60-180 years[12].

Chapter 7 – Pressures and stressors other than nitrogen

Chapter 7 – Comments

Eelgrass

Rådet for Grøn Omstilling endorses the conclusion of the Panel, that nutrient pollution is the primary pressure to be tackled regarding reaching Good Ecological Status.

Rådet for Grøn Omstilling will also like to point out, that the faster and the more we lower our nutrient loads, the faster Good Ecological Status is reached which entails conditions under which eelgrass may again thrive. Eelgrass recovery is important in the light of the climate crisis since eelgrass in Danish waters can help store up to 47 mio. tons of CO_2[13].

It is furthermore essential, that we stop bottom trawling in areas where eelgrass must recover. Eelgrass recovery is in some areas a Sisyphean task, if we continue bottom trawling, since this fishing technique simply destroys the ocean bottom, including eelgrass.

The Panel points out that chemicals, including pesticides, could inhibit eelgrass growth. Rådet for Grøn Omstilling agrees with the Panel that this issue calls for a wider political discussion regarding better wastewater treatment and limiting the use of pesticides in agriculture and/or prohibiting use of pesticides within a thoroughly risk-assessed proximity of waterbodies connected to coastal waters.

Chapter 8 – Possibilities for further use of exemptions

Chapter 8 – Comments

Use of exemptions

Rådet for Grøn Omstilling endorses the Panel's conclusion, that the WFD clearly states, that before a less stringent target is used as an exemption for a water body a profound set of measures must have been implemented and evaluated and that the target of achieving good ecological status remains, even if a less stringent target is set for a RBMP-period.

In general, Rådet for Grøn Omstilling endorses the view, that profound and effective measures must be implemented before exemptions are even considered. Considering the lack of effectivity of the voluntary schemes (kollektive virkemidler) - i.e. wetting of land and afforestation – introduced in recent Danish RBMP, these schemes can in our opinion not be deemed sufficient. We urgently need especially rewetting of peatland and afforestation and we cannot wait for a voluntary take up of the measures.

[10] https://www.sdu.dk/da/nyheder/alle_artikler/2021/kampen-om-fosfor
[11] Edlinger et al. 2022. Agricultural management and pesticide use reduce the functioning of beneficial plant symbionts. Link: https://www.nature.com/articles/s41559-022-01799-8

Rådet for Grøn Omstilling would like to underline that the objective of the Water Framework Directive is to achieve Good Ecological Status in 2015, with the possibility of extending until 2027. 23 years have passed since the adoption of the Water Framework Directive and 2027 is approaching fast. Past measures and regulation have clearly not been sufficient. Along the same statement as put forward by the Panel, we urge decision-makers to use exemptions wisely and with great consideration for the Danish legacy of ineffective measures.

Exemptions simply must not be used to further delay effective measures.

[12] Rådet for Grøn omstilling, 2021. Fremtidens Landbrug 2.0: Fosforscenariet. Link: http://fremtidenslandbrug.dk/wp-content/uploads/2021/03/210305-RGO-P-scenarie-rapport.pdf
[13] Tænketanken HAV, 2022. Blue carbon: Potentialet for CO2-fangst og lagring i marin biomasse i Danmark. Link: https://cdn.sanity.io/files/bo7el0jo/production/9c7031d48a8fac59718a6fe3d5055adb9509180b.pdf

5. Comments from SEGES Innovation

General remarks

SEGES acknowledges the substantial work undertaken by the international panel and that it can have been difficult for the Panel to uncover all important details in the many water bodies in a relative short time. Nevertheless, SEGES finds that the panel draw some problematic conclusions which we will discuss below. The panel makes an overall assessment of the work, with which SEGES only partly can agree due to the fact that many details, which locally can create major difficulties but also often more meaningful solutions, are not included. SEGES agrees with the panel that improvements have been made to the models, but there are still many problems which are not sufficiently illuminated or understood by the panel. It is our assessment that if the recommendations from the panel, in their current form, are followed, it will lead to a significant increase in conflict locally, depending on the problems and there will be a reduced willingness to enter into voluntary agreements, which is currently the basis of taking out land for wetlands, extensification, etc. Therefore, reviewing models together with stakeholders and making improvements is a key task for building ownership to the nutrient reduction targets among stakeholders. At present, there is a very low trust to the existing predominantly "topdown" made RBMPs (all 3 RBMPs) and N-reductions targets - particularly among farming community - and the Panel's report in the present form, will in no sense change that perspective. The panel recommends not to waste time on more model reviews but use the time to find potential measures in the catchment. It its SEGESs hope that the comments below will add to the understanding, that even though improvements have been made, there are still many issues that will have a big impact locally and give raise to conflicts if not solved. Therefore, a process for locally based water plans could be one of the recommendations if there is a general agreement of this approach locally. In the last few years we have seen locally based partnerships between agriculture, green organisations, local authorities, water companies etc. several places in Denmark with the purpose of achieving good ecological status in coastal waters and the experience shows that it is possible to find solutions together based on trust and ownership but this also includes fundamental discussions concerning coastal waters including status and measures as well as solutions and measures in the catchment. Further remarks on this in Chapter 9 – General conclusions.

Chapter 1 – Reference conditions, G/M boundary target, and intercalibration

1.4.3 Change of reference conditions with respect to RBMP2: Panel writes: "*However, it also shows that by taking into account the specific hydrographical conditions of the water bodies, reference values for many enclosed waters are now higher than they used to be. This trend is also confirmed in a map of differences in reference conditions, prepared by the Ministries".* This is an example of generalization from the Panel and there are examples of the opposite – one example is Nissum Fjord lagoon with a sluice connection to the North Sea consisting of 3 small interconnected basins (Waterbody ID 129,130,131). In RBMP2 the chlorophyll reference value and border between good/moderate were respectively 4,8 µg/l and 8 µg/l (same in all basins). Also same values as in the lagoon (Ringkøbing Fjord, ID 132) just south of Nissum Fjord. In RBMP3 this has changed for Ringkøbing Fjord where the values went up as generally described by the panel to respectively 5,4 µg/l (ref) and 8,4 µg/l (good/mod) but in Nissum Fjord the values went down in the 3 basins to 1,6 µg/l / 1,6 µg/l / 3,0 µg/l for ref. values and for the 3 basins the values for good/moderate border are 2,5 µg/l / 2,4 µg/l / 4,7 mg/l. It is very difficult to understand and explain why the basin in direct connection with the North Sea and less directly impacted by loads from the catchment has higher values (2,5) than the middle basin (2,4) with no direct connection to the North Sea and closer to the high loads from the catchment. Looking at current conditions the best conditions are in the basin with direct contact to the North Sea. Further, it is even more difficult to explain why both ref. values and good/moderate border values are significant lower in Nissum Fjord than in the water just outside in the North Sea. The values along the shore on the west coast of Jutland (both Norh and south, ID 119 and 133) are 3,0 µg/l (ref value) and 6,8 µg/l (good/mod border). Nissum Fjord have a catchment of 1615 km^2 and the lagoon an area of 65 km^2 giving a catchment to fjord ratio of 24:1 and reflecting a significant freshwater load so it is difficult to understand why the chlorophyll references should be significantly lower in the lagoon compared to North Sea water and also significantly lower compared to Ringkøbing Fjord.

Concerning eelgrass depth limit. In areas with no historical eelgrass data, a model has been used to set the reference value. In many areas the depth limit reference value and also the border between good/moderate is larger than the actual water depth in the area. According to AU, the explanation is that the depth limit is calculated to a Kd not depending on water depth. In SEGESs view this is difficult to understand, and it is even more difficult to explain to stakeholders. From our experience with stakeholders this results in serious distrust to RBMP3. From a legal perspective SEGES is questioning whether it is legally correct according to WFD to use supporting quality elements (Kd) and exclude biological quality elements (eelgrass) just because the water depth in an area is not large enough to get in line with a model calculated depth limit. The problem has been raised to AU and national authorities several times over the last years. Most recently a stakeholder raised the question in the consultation process to RBMP3 and the answer from The Danish Environmental Protection Agency in the official consultation report was (page 507, Vandområdeplanerne 2021-

2027 Høringsnotat, Juni 2023: "*In some water areas, typically shallow areas, the real depth of a water area will be lower than the theoretically calculated environmental target for depth limit of eelgrass. If in these cases one simply accepted that rooted benthic plants should grow to the greatest depth in the water area, this would mean that one risked accepting a water quality e.g. a clarity in the water that was worse than it should be, to be in GES. In cases where eelgrass grows to the greatest depths in the water area, but where the environmental target for depth limit for eelgrass is deeper than the real depth in the water area, the depth distribution for eelgrass cannot be used to determine the environmental condition. Here, instead, data is used for the clarity of the water, measured as light penetration in the water. It therefore appears from the "Retningslinjer for vurdering af overvågningsresultater og klassificering af tilstand i kystvande (*Danish Guideline*) that if there is a main distribution of flowering plants to the bottom of all investigated transects in a water area, the state of flowering plants is determined as an unknown state because it is not known how deep the eelgrass could have grown if there had been greater bottom depths in the water area. Instead, supporting quality elements must be used to the extent that data is available*" (Translated to English by SEGES). To SEGES's knowledge there are 11 waterbodies that have depth limits (kd) for good/moderate larger than the water depth and 17 have reference depth limit (kd) larger than the actual depth.

Eelgrass abundance: Concerning the remark made by the Panel: "*Some stakeholders also criticize that the report does not reflect on whether there is an issue with "angiosperms" being measured by "eelgrass depth limit" in a Danish context and thereby ignoring "abundance" ("eelgrass cover"), as described in the WFD*" – It would be good to have the Panels view on this question in the report from the Panel.

Section 1.4.4 Validity of the new reference conditions: It is not taken into consideration that the effect of reduced P-loads to the Baltic Sea (BS) have approx. 50 years' time lack for improvements of environment in the BS. In the models the current environment status in BS is used when making burden distribution calculations. The consequence is that Danish Famers in the current model-setup are paying in N-reduction for that time gap. This important choice in the calculations is not made clear. Whether the farmers should make N-reduction for compensating for the time lack is probably a more political question but nevertheless it should be pointed out.

1.4.5 Consistency between the new reference conditions and the Intercalibration: SEGES is in line with the Panel opinion concerning RBMP3 and the problem when RBMP3 G/M boundary values are significantly below the HELCOM targets and values are not in line with WFD intercalibrated values.

1.4.6 The year 1900 discussion and consistency between reference conditions: It is surprising to read: "*it appeared from interviews by the Panel that this estimate* (N-load 1900) *is not supported by all scientists active in the area*." The most recent report concerning N-load 1900 involves a range of the most important institutes in DK.

SEGES are in line with the Panel opinion when the Panel finds that the update on 1900 N-load raises a problem of consistency concerning "*reference values for Chl a (situated well before 1900) and for Kd/eelgrass depth limit, derived from observations around 1900*". But SEGES finds it highly surprising that the panel concludes that consistency is no problem due to a delayed response in eelgrass meadows. This delay would then span a period of many hundreds of years. The N-load input to chlorophyll references is based on very small nature catchments. Denmark has not had a landuse like that in maybe 1000 years or more. An earlier study for SEGES in 2021 by Geert van Calster, Professor of Law, KU Leuven, Belgium concludes: "*The study concludes that the legal detail for reference conditions under the Directive leaves much to be desired. Yet that under the core statutory obligation of 'consistency', the historical method for reference conditions is inferior. It also concludes that the reference conditions as set out for Danish coastal waters are legally problematic as likely not meeting with the requirement of consistency*." And "*It rules out proper implementation efforts for the surface water body type concerned*." In the same study Professor Joao G. Ferreira writes: "*Timmermann (2020) refers that "The apparent discrepancy between the historical eelgrass observations and the preliminary results from the 1900 project, which indicate extensive human impact, may be due to the time delays in the manifestation of the effects. It takes time (several years) before increased nutrient inputs fully impact light conditions." This is certainly a possibility, but the nutrient loads remain roughly constant until 1920, and there is no decline reported in eelgrass distribution until the wasting disease of the 1930s. As an alternative, the same author proposes a "reference input is based on concentrations in smaller watercourses, which drain catchment areas with a very small level of cultivation multiplied by a present-day waterflow." This methodology aims to arrive at a lower nitrogen loading than that determined for the year 1900, although no quantitative data are presented, but it is impossible to understand how the link between the ecosystem conditions in 1900 and the loading calculated from 'smaller watercourses' is established.".* Further in the same study Professor One Onema writes "*Evidently, choosing a baseline year, where the environment was 'unaffected or only slightly affected by human activity' largely depends on the definition of 'unaffected or only slightly affected by human activity'. Depending on the definition, one may argue that the baseline or RCs should be defined before the first agricultural revolution, i.e., for Denmark some 4000 years ago, or before the 2nd agricultural revolution, i.e. before the 18th century, or before the 3rd agricultural revolution and especially before the advent of synthetic N fertilisers, i.e. around 1900."*

It is SEGES's view that setting the reference conditions is a difficult task and the above inputs from respected scientists add to this view. Nevertheless, the reference values have significant importance and one of the basic ideas in the WFD was to make similar approaches to achieve GES across EU. Therefore, a huge effort was made, and still is, to make intercalibration but it seems that concerning setting references there is no good instructions in the WFD (Calster 2021). In several countries around DK the year 1900 is used to set reference conditions. It is SEGES's suggestion that the

panel more clearly justify why they think it is appropriate using N-loads that are equal to a landscape more than 1000 years ago or more, when other countries use reference conditions approx. from the year 1900. This incoherence between Denmark and neighboring countries clearly has a political perspective. Further, SEGES will point out that there was a second method for setting the reference for chlorophyll but that was abandoned by the authorities in favor of the N-load method. That second method does not have the same consistency issues. In the light of the discussions on consistency, which was not on the table when the decision was made more than 10 years ago using the N-load method, SEGES would like to see the Panels comments on the other method. (page 111-112, Carletti A, Heiskanen A, editors. Water Framework Directive Intercalibration Technical Report - Part 3: Coastal and Transitional Waters. EUR 23838 EN/3. Luxembourg (Luxembourg): OPOCE; 2009. JRC51341)

Chapter 2 – Marine models and their use in setting maximum allowable input

2.4.2 The models reliability and quality: SEGES agrees with the panel that it is an improvement that the MECH models are more widely used. But SEGES strongly disagrees with the panel that all the MECH models are well calibrated. Maybe they are in general, but we have looked closer at the model calibration in 4 locations and find 2 of the MECH models to be not usable in the current calibration (Hjarbæk and Mariager), 1 partly well calibrated but used wrong (Ringkøbing) and 1 well calibrated (Skive). Maybe they are the only locations where that is the case but nevertheless at these 3 locations the models have significant flaws. **1)** Skive Fjord (ID 157, model validation on station: VIB3727-00001, see validation here: https://rbmp2021-2027.dhigroup.com/) in general the model can simulate stratification, oxygen depletion, internal load. In a year, like 2014, when the model is not simulating oxygen depletion correct the internal loading goes wrong. In general, the model seems capable to simulate the important processes most years and SEGES finds it suitable for further work. **2)** Hjarbæk Fjord (ID 158, model validation on station: VIB3729-00001, see validation here: https://rbmp2021-2027.dhigroup.com/) the model at Hjarbæk Fjord does not simulate the oxygen depletion at any of the modelled years hence the model does not simulate the massive internal load – hence the chlorophyll-a is simulated by the wrong reasons (or at least partly) in the model. SEGES does not find that the model correctly simulates the processes controlling the summer chlorophyll. The importance of the internal loading is underlined by the STAT model made by AU – in this model AU includes a salinity and Brunt-Väisälä buoyancy frequency factor and gets a R^2=0,74. This is probably the best STAT model fit of all AU´s STAT models for Chlorophyll, but only when the above factors are included. SEGES has demonstrated that with only N-load to chlorophyll relation the R^2 does not exceeds 0,16. (SEGES could handover documentation). **3)** Mariager Fjord (ID 159, model validation on station: NOR5503, see validation here: https://rbmp2021-2027.dhigroup.com/). The model does not simulate DIN correct in summer. The model simulates DIN limitation in summer period but monitoring data gives values in summer well above limitation levels (approx. 28 µg/l) in almost all samples all years. It can be a bit difficult to see using the provided link because it's not possible to zoom in on details anymore – in an earlier version it was possible, and the details can be seen in these documents which SEGES has sent to the panel. Ref22. Gertz F, 2023. DIN calibration - Mariager Fjord - MECH model. Technical note from SEGES Innovation. Based on data analysis by SEGES and a small study done by University of Southern Denmark (SDU), including a workshop, it is SEGES's and also SDU's advice to mainly focus on P reductions to achieve GES in Mariager Fjord. AU stat model for Kd point out a relation to P-limitation, but this seems not to be included in the "surrogate model" and therefore not either in RBMP3. **4)** Ringkøbing Fjord (ID 132, model validation on station: RKB1, see validation here: https://rbmp2021-2027.dhigroup.com/) The model simulates the overall seasonally variation in salinity, but the model includes too much dynamic. This could be due to the fact that the model is not calibrated with the actual sluice operations, but with permanently open gates up to a specific water level difference between North Sea and Ringkøbing Fjord. This introduces much more flow through the sluice and therefore more dynamic in salinity. DIN and DIP variations are well simulated, but the Chlorophyll simulation have systematic problems. In general, is the model concerning chlorophyll too dynamic in the summer and underestimate chlorophyll in winter. The main problem here is besides the calibration the way the model is used. Ringkøbing Fjord is clearly a very top-down controlled system due to filtration from Mya arenaria – this is well known and published (Petersen J K, et al. REGIME SHIFT IN A COASTAL MARINE ECOSYSTEM. Ecological Applications Vol. 18, No. 2 (Mar, 2008), pp. 497-510 (14 pages) https://doi.org/10.1890/07-0752.1). There is no statistical relation between N-loads and Chlorophyll (STAT model AU and also tested by SEGES, documentation can be distributed to the panel) due to filtration, instead the eutrophication is expressed in amounts of Ulva, epiphytes etc. This introduces a problem because there is no solid monitoring on Ulva and epiphytes and these algae's are not an official quality element. Nevertheless, the management in RBMP3 is based on a relation between N-load and Chlorophyll (MECH model) and N-load to Kd relation (STAT model). It is simply scientifically flawed to correlate N-load to Chlorophyl and to Kd due to the filtration - Kd is highly depending on Chlorophyl and resuspension (wind). The above 3 out of 4 examples SEGES has investigated clearly demonstrates that not all models are fit for purpose in the current state. SEGES agrees with the panel that DHI´s modelsystem is superior to the simpler STAT models, but ONLY if the models arrive at the results in the right way – are calibrated well on all parameters and in general can describe the functionality of the systems. In the calibration reports from DHI statistics on summer DIN and DIP is missing – only winter and yearly statistics are available, and it is clearly problematic to review whether the models are well calibrated on DIN/DIP summer limitations. Examples like the ones above gives no reason to

trust the reduction targets from the RBMP3 and therefore this trust must be rebuilt. It is SEGES 's assessment that this trust is not established just because the panel states that all models are fit for purpose in this current state.

2.4.3 Methodology to calculate N: The MECH and STAT models are simplified into a simple response curve (called surrogate model by the Panel). The Panel writes: "*The documentation and justification of this model is rather poor. Compared to the huge effort invested in developing the STAT and MECH models, refining typology, and setting reference conditions, it is surprising how little attention has been paid to this important submodel*". And further: "*However, we cannot help to reflect that it would have been comforting to confirm the final N MAI results by investigating the resulting eutrophication state from a simulation with the MECH model forced by N MAI and other loads as in the chosen management scenario*". Nevertheless, the Panel concludes that the method using surrogate models is fit for purpose. This is surprising for SEGES because it removes important information from complex ecosystems and with that a high risk of not including important processes. For example, this method will exclude proper use of seasonality.

(Ref25 page 22 is not correctly cited, and link does not work)

Chapter 3 – Status load, Baseline effects, and effectiveness of measures

SEGES agrees that it is reasonable to use a 3-year average from 2016-18 to set the status load because these years show a rather constant N transport. But the methodology would not be optimal for all years. E.g. for the period for 20192021 the N-load varies a lot, and for these years it will not be relevant to base the status load on a 3 year average. SEGES also agrees with the panel, that the data from N-load 2010-2020 cannot be used to conclude that the measures to reduce N-load have been ineffective. SEGES encourages that the panel suggest that the effect of different measures should be better monitored in the future.

Chapter 4 –Burden distribution

It is not taken into consideration that the effect of reduced P-loads to the Baltic Sea (BS) have approx. 30-50 years' time lack for improvements of environment in BS. In the models the current environment status in BS is used when making burden distribution calculations. The consequence is that Danish Famers in the current model-setup are paying in Nreduction for that time gap. This important choice in the calculations is not made clear. Whether farmers should make Nreductions to compensate for the time lack is probably a more political question but nevertheless it should be pointed out.

Chapter 5 – Seasonality

Seasonality is not relevant in all coastal waters. It is SEGES's view that it is mainly relevant in the eastern part of the country, but the potential should be investigated for each location.

- Including seasonality in the management practice is first about making measures with an actual impact in the specific downstream estuary. The report concerning this topic from 2017 (Karrebæk Fjord) and already part of the Panel evaluation in 2017 demonstrated that reducing nitrate loads in winter months to Karrebæk Fjord had almost no impact.
- The argument 'that because it is difficult to reduce nitrate in summer, then it's better to continue using yearly loads' is a mistake for two reasons. 1) If reducing nitrate in summer is not possible why reduce nitrate in winter if it does not have any effect or a minor effect? - as demonstrated by DHI in 2017 in Karrebæk Fjord – this is a potential theme for farmers legal action against the state 2) The model setup in RBMP3 – as far as SEGES is aware - includes Nreductions in summer in all models. In the STAT models N-loads January-September is related to summer Chlorophyll May-September (page 10 AU report 2021 on Chlorophyll models). The MECH models run in timesteps of 1 day or less and reductions in the scenarios are equally distributed all year round. Meaning that a 30% reduction scenario actually includes 30% reduction of nitrate loads each day. Using Karrebæk Fjord as an example – if only a 30% reduction scenario (year around) was made no one would know if the effect on chlorophyll was coming from summer reductions or winter reductions. We now know because of the 2017 report the effect is coming from the reduction in summer period and reductions in winter are more or less pointless when it comes to improvements in Karrebæk Fjord (SEGES made unpublished statistical analyses supporting this statement – documentation can be distributed to the panel). If SEGES is right about the method of using year around reduction in the STAT models, it introduces major flaws between chlorophyll decrease and pressures - in some areas the decrease in the modelled summer chlorophyll would be due to reduction in summer and not in winter and at the same time most measures for agriculture diffuse nitrate are targeting winter loads – clearly a mismatch between model output (summer reduction effect) but targeting winter loads (catch crops etc.). As stated above this is a potential theme for farmers legal action against the state.
- To include phosphorus in this otherwise nitrate seasonality discussion is highly relevant because of P-limitation in all Danish estuaries in the spring (ref SEGES report on limitation). P-limitation starts as early as February or Marts and in April, May or June the limitation shifts to N-limitation depending on location. This is important because the effect of

reducing N-loads from the catchment is postponed from early spring with approx. 2-4 month depending on location. There is no valid documentation that it will ever be possible to reduce N-loads to a level where DIN will make colimitation with P as suggested by the Panel in Chapter 6. More on this in Chapter 6.

- Concerning where seasonality could be relevant. 1) There must be a relatively fast water exchange days or weeks and probably not more than 1-2 months. Most Danish estuaries fulfills this criterion. See report (The physical oceanographic conditions in a range of fjords and coastal areas in Denmark) and appendix. 2) Short travel time for nitrate from field to coastal water. This excludes the western part of Denmark with sandy soils and long travel time for nitrate, while in the eastern drained parts of Eastern Jutland, Funen and Zealand incl. surrounding islands there is a fast track due to draining from fields to streams to coastal waters – time scale of days. Based on this, it is SEGES's opinion that seasonality is relevant in most coastal waters in the eastern part of Denmark. This includes the local pilot Kystvandråd Odense Fjord where seasonality will be included due to fast nitrate transport in the catchment (drainage) and low residence time in the fjord.
- As mentioned above seasonality will probably have a low potential in the western part of Denmark due to sandy soils and long nitrate travel time. In local Kystvandråd for Vadehavet (watten sea) the possibility of optimising on seasonality by placing wetlands to maximize N-reductions in the summer period has been discussed. The nature of the Vadehav is a low residence time due to significant impacts from tide. The hypothesis is that placing wetlands more downstream in the catchments will introduce more ground water (with nitrate) into the wetlands in the summer period than when placing wetlands in the upper part of streams.
- Further, in some locations it might be relevant to include measure on organic nitrogen. While dissolved inorganic nitrogen in winter will have same residence as water in the estuaries (if not incorporated in algae's) org. N will as phosphorus to a higher degree accumulate in the estuary due to sedimentation during autumn and winter and in summer converted to dissolved inorganic nitrogen and being part of the internal load. The accumulative effect of orgN in estuaries has, in SEGES's opinion, not been sufficiently investigated.
- Measures to reduce N-loads. Preliminary analysis, carried out by SEGES Innovation, shows that it is difficult to reduce N-loads in summer from drained fields – this is in line with reported result by AU and others. But there is a difference between different in-field measures' effect on the nitrogen loads. Analysis based on suction cell measurements year-round in field trials with different nitrogen measures shows for example that reduced N application has a greater effect in autumn and a smaller effect in winter and spring compared to catch crops that are terminated in early spring. In general, drainage water measures have a high N removal rate in spring and summer. Effectivity of measures in spring and summer is highly depending on water runoff in spring and summer and therefore likely to be more effective in the western part of drained areas (eastern Jutland) than areas with less precipitation and dryer in summer, Zealand.

Chapter 6 – Phosphorus efforts

The Panel writes: "*When nitrogen inputs are curbed and winter DIN concentrations are reduced, N and P will become co-limiting in spring, and specific phosphorus reductions will have less and less controlling effect on the spring productivity and consequently on the indicators.* SEGES is surprised by this conclusion. Changes in DIN concentrations in estuaries over the last decades suggest that DIN will never become limiting factor in the first months in spring in estuaries (Open waters are different). Viewing the DIN figure 6.1, Panel report – Skive Fjord, DIN concentrations are way above the potential for limitation (28 µg/l) in all months February to May – this includes a time scale from the 1980ies until today including 50 % reduction from land in that period. From a SEGES point of view it's difficult to see how DIN can ever become limiting in spring in most estuaries. In our view a dual strategy for reducing both N and P is obvious to cover limitation in both summer and spring and SEGES needs documentation from the Panel on how it would be possible to reduce N-loads to a level where DIN can become limiting in spring. The dual N and P reduction strategy – Denmark have done in the 1980ies and 90ies - have been highly regarded by scientist like Professor Hans W. Paerl and Professor Patricia Glibert on the conference *"Danish Coastal Waters - Conference on significant factors controlling eutrophication in Danish coastal waters*" in 2013. There is no evidence in data that this strategy is no longer superior to an "only N strategy" and as explained above there is no signs in data that N in general can ever become co-limiting with P in spring as suggested by the Panel. Concerning Skive Fjord, specifically the main river to the Fjord is "Karup Å" and the nitrate concentrations in that river are relatively low due to high retention in ground water and the concentrations varies between 2,5 mg/l DIN in winter and 1,5 mg/l DIN in summer.

Minimizing growth of plankton algae, Ulva, epiphytes in spring is therefore a matter of reducing P-loads and this could be an important factor for the ecosystem due to the fact that eelgrass in some locations is struggling with epiphytes already in the spring – epiphytes on eelgrass is an issue that the models do not describe. It's obvious by viewing data that DIN is the primary limiting factor over the summer in most estuaries and when WFD are defining the quality element chlorophyll from May-September it does not include the eutrophication problematic with epiphytes on eelgrass.

Chapter 9 – General conclusions

Trust is a cornerstone of Danish culture, and according to political science professor Gert Tinggaard Svendsen up to a quarter of Denmark's wealth can be attributed to the high level of trust in Danish society. A major problem with the Danish Government system concerning water environment, coastal waters and regulation of the agriculture is a general lack of trust between stakeholders and between stakeholders and the national authorities. Over the WFD period the lack of trust seems to have increased specially concerning the reduction targets of nutrients. SEGES has presented the new map of mandatory catch crops for 2024 which is based on the new model used in RBMP3 for nearly all advisors in plant production in Denmark. Advisers are really surprised that some catchments go from a mandatory demand for 32 percent catch crops to 0 percent while other catchments go from 0 to a demand for 44 percent. It is hard to explain why, and there is no explanation why such large changes are seen from one WFD cycle to another. Only explanation given for each cycle is that now the models are good and better than the ones before. There is no trust to the targets from a broad agricultural perspective and the panels advice that they are 'fit for purpose' will not change that perspective. It is SEGES's opinion that if the trust is to be rebuilt the governance structure must be changed to a more local based perspective. Trust is not necessary for mandatory measures – the procedure used in Denmark for the last decades. But the last 10 years stagnation in N-load reduction has demonstrated that the potential for using mandatory measures is very limited today. The main road forward to reduce N significant is in SEGES opinion a change of landuse, including wetlands, forests etc. and with that perspective trust will definitely be important. Involvement is a pillow in the WFD and a change to more involvement from the very top-down regulation we have experienced in Denmark the last decades would be very much in line with article 14 in WFD: "*Member States shall encourage the active involvement of all interested parties in the implementation of this Directive, in particular in the production, review and updating of the river basin management plans*".

6. Comments from Limfjordsrådet

The Limfjord Council representing the Danish municipalities acknowledges that the review of the scientific and legal aspects of the Danish river basin managements plans is both comprehensive and thorough.

We note that the expert panel have concluded that the Danish marine models are trustworthy and are excellent tools to set MAI targets. This gives us confidence that the river basin plans, and the associated nutrient targets are based on a solid scientific foundation. We acknowledge that for some waterbodies, both N and P reduction can will benefit the waterbodies, and notes that this includes parts of the Limfjord. We also acknowledge the panels statement, that while the reduction of stressors other than nutrient input can be beneficial to the marine environment, such reductions cannot replace reductions in nutrient loading, which remain the predominant measure to achieve good ecological status

The panel approves of the methodology used to establish the baseline 2027. While we agree that the methodology is sound, we are, however, concerned that the effects of previous baselines have not been detectable in the nutrient loadings. There is a need to evaluate the baseline 2021 and baseline 2027 after 2027.

In general, we agree with the panel that the Danish river basin managements is based on a strong scientific foundation. Therefore, we also support the expert panels conclusion that the focus should now be on implementing the proposed nutrient reductions. The task is very challenging indeed, in particular in parts of the Limfjord catchments, where very substantial reductions in nitrogen loads must be achieved. However, as lead in one of four pilots of locally based community management plans, we experience an understanding from all stakeholders of the size of the effort needed. In the pilot we have focussed on analysing the local opportunities to implement the national river basin management plans achieving the targets set while at the same time retaining as much agricultural production as possible. This will require both new nutrient reduction measures, a transformation of the remaining agriculture to low nutrient emission rotations and a catchment planning effort that involve local stakeholders and require that substantial funding is allocated to pursue these activities.

The Limfjord Council is looking forward executing a broad range of measures to achieve the set goals in the RBMP for The Limfjord.

7. Comments from Ocean Institute (Tænketanken Hav)

General remarks

Ocean Institute has no comments on this section.

Chapter 1 – Reference conditions, G/M boundary target, and intercalibration

Chapter 1 – Comments

Ocean Institute notes that the panel find the new approach in RBMP3 to calculate water body specific, rather than type specific, refence conditions fit for purpose. Ocean Institute agrees with this, and notes that this new approach is in accordance with an overall approach for achieving good ecological status in coastal waters based on local hydrographical and other conditions and with the involvement of local stakeholders. Furthermore, Ocean Institute agrees with the panel that further elaborations of the ecological models will not be worthwhile, and that this also goes for the suggestion to base the modelling and subsequent actions on nitrogen concentrations rather than nitrogen loadings.

Chapter 2 – Marine models and their use in setting maximum allowable input

Chapter 2 – Comments

As above, Ocean Institute agrees with the panel that no further model development is warranted and that current model tools are fit for use. Ocean Institute has no further comments on this section.

Chapter 3 – Status load, Baseline effects, and effectiveness of measures

Chapter 3 – Comments

Ocean Institute notes that the panel finds the methodology to establish the status load and 2027 baseline to be inherently sound and fit for purpose. Ocean Institute agrees with this assessment. Ocean Institute also notes – with thanks – the very precise and to the point notion by the panel that at least a full decade has been lost when it comes to implementing measures to reduce the nutrient loading to the Danish coastal waters.

Ocean Institute agrees agrees that the focus going forward should be on implementing measures rather than refining the methodology. The measures so far have not been sufficiently effective, partly because of the voluntary approach.

Chapter 4 –Burden distribution

Chapter 4 – Comments

Ocean Institute notes – and agrees with - several points, made by the panel. Among these especially that improving the water quality of the Baltic and North Seas is a long-term effort, but that this fact and any question on burden distribution does not change the fact that Denmark has the obligation to achieve Good Ecological Status in its waters.

Chapter 5 – Seasonality

Chapter 5 – Comments

Ocean Institute agrees with the point made by the panel that nutrients may be retained in the sediment nutrient pools and therefore have a longer residence time in the water bodies than the water itself. Because of that, the question of seasonality is much more complex than just considering the water bodies to be flushed for nutrients during the winter before the growth season of phytoplankton starts. Seasonality should not, therefore, just be used as an argument for releasing more nutrients during the autumn and winter.

Ocean Institute also agrees with the statement that local initiatives – the “Kystvandråd” should not duplicate the entire RBMP process. Ocean institute does, however, see Kystvandråd or similar initiative as an interested road forward, that should be further investigated, tested and implemented.

Chapter 6 – Phosphorus efforts

Chapter 6 – Comments

Ocean Institute has no comments on this chapter.

Chapter 7 – Pressures and stressors other than nitrogen

Chapter 7 – Comments

Ocean Institute strongly agrees that other stressors should be addressed in addition to – and definitively not instead of – nutrients (nitrogen) as a stressor. However, Ocean Institute sees the approach made by the panel as highly formalistic

and not adequate: Just because a stressor is also treated under other directives, such as the MSFD, it does not mean that this stressor is irrelevant for the ecological status of the water body in question under the WFD. The coastal waters are affected by several different stressors, and the fact that we describe and address these in different contexts does not change this fact. The question of the effects of multiple stressors must be handled in the future to achieve good ecological status in Danish waters, and thus the scope of measures under the WFD should be broadened.

Several stressors impact the status of the Danish coastal waters. For example, it is clearly described in the WFD, annex V that pollution by priority substances and other substances identified as being discharged in significant quantities must be used as quality elements for the classification of ecological status of coastal waters and not just as a part of chemical status.

Furthermore, stressors such as dredging, extraction of sand and gravel, land reclamation and offshore structures also have significant impact on the status of some of the Danish coastal waters. In this regard, we refer to the article by Andersen et. al. from August 2023:

Are European Blue Economy ambitions in conflict with European environmental visions?
Jesper H. Andersen , Zyad Al-Hamdani, Jacob Carstensen, Karen Edelvang, Josefine Egekvist, Berit C. Kaae, Kathrine J. Hammer, Eva Therese Harvey, Jørgen O. Leth, Will McClintock, Ciara´n Murray, Anton S. Olafsson, Jeppe Olsen, Signe Sveegaard, Jakob Tougaard. Ambio.
https://www.researchgate.net/publication/373452735_Are_European_Blue_Economy_ambitions_in_conflict_with_European_environmental_visions

Chapter 8 – Possibilities for further use of exemptions

Chapter 8 – Comments

Ocean Institute notes that Denmark has 104 of the 109 coastal water bodies that are subject to the use of exemptions in relation to reach GES. No further water bodies than the 5 already in GES are expected to reach GES in 2027. Ocean Institute finds it relevant to investigate whether this is in accordance with the overall objective with the WFD and questions whether a more widespread use of exemptions is possible at all.

Chapter 9 – General conclusions

Chapter 9 – Comments

Ocean Institute commends the panel for making a number of very clear and to the point statements, that should be able to serve as a good and solid foundation for the future Danish efforts to reduce nutrient emissions. Again, Ocean Institute stresses that reducing other impacts of the Danish coastal waters will also be necessary in order to achieve a good ecological status.

8. Comments from Danish Sports Fishing Association (Danmarks Sportsfiskerforbund)

Second opinion phase II
Denmark's Sports Fishing Associations comments to the draft of the international evaluation report

General remarks

The Danish Sports Fishermen's Association considers these statements/recommendations to be very significant in the report:

1. *Between RBMP2 and RBMP3, considerable effort has been devoted to improving the quality and the spatial resolution of the modelling underlying the plans. The Panel estimates that the current state of the models has resulted in tools for estimating MAI that are not only fit for purpose, but that are exemplary in the way they reflect the specificities of the different water bodies while maintaining coherence and consistency across the landscape.*
   For that reason, the Panel is of the opinion that, overall, a robust basis for estimating required reductions of nutrient inputs into the different water bodies has been realized and no further improvement of these models is needed.

2. *The Panel observes with concern, that during the 2010s almost a decade has been lost, in which little N load reduction has been realized. However, the Panel remains convinced that the types of measures proposed have an inherent potential to lead to reduced N input into coastal systems. The Panel expresses the hope that during the coming years of the RBMP3 period, a steadfast and sustained political environment will implement the necessary measures to realize the ambitious goals of the WFD.*

Chapter 1 – Reference conditions, G/M boundary target, and intercalibration

Chapter 1 – Comments

In phase two of Second opinion, the main task for the panel of experts was to evaluate the Danish management approach from both a scientific and legal perspective and to evaluate, whether there are other potential approaches within the scientific and legal boundaries of the Water Framework Directive. The Danish Sports Fishermen's Association finds that the Panel finds the Danish approach adequate and at a high scientific level - the following are statements and recommendations from the report:

In terms of regulation of nutrients, the panel endorses the focus on annual N loads as a basis for calculation of MAI and thus as a foundation of the management. Efforts to also develop boundary values for nutrient concentrations should not replace the currently applied methodology for MAI estimation.

Do not further elaborate models and approaches on reference conditions, both for Chl a (model based) and eelgrass (observation based), as the two sets can be considered to be sufficiently consistent for application.

Chapter 2 – Marine models and their use in setting maximum allowable input.

Chapter 2 – Comments

The panel gives a lot of praise for the scientific work that forms the basis of the Danish modeling work and the calculated MAIs:

The Panel is impressed by the progress made in developing the modelling scheme that produced a country wide. distribution of water body specific need for reduction of nitrogen (NFR) that represents the minimal effort required. to achieve Good Environmental Status across Danish coastal waters. The evolution from the previous management cycle is remarkable. The extrapolation across water bodies in RBMP2 using a coarse typology caused inconsistencies in nutrient reduction demand for especially fjords and enclose d water bodies, and we can now see that the huge investment in time and effort to make the N MAI calculation framework water body specific has paid off in RBMP3. Resulting demands with respect to need for reduction (NFR) of nitrogen appears to be qualitatively and quantitatively

consistent with the spatial distributions of both eutrophication problems as well as catchments with high proportion of anthropogenic nutrient inputs.

In summary, the current approach to estimate and distribute the effort required to reach Good Environmental Status in coastal waters is now quite mature and provides decision support on a level of detail and quality that, to our knowledge, is not available in any other country.

Recommendations that praise the Danish approach and there is no room for maneuvering from a scientific perspective:

Substantial improvements have been made to all components of the N MAI calculations since RBMP 2 and the quality of the results has improved. The N MAIs computed by the models are of sufficient quality to be used within RBMP 3 without further improvements.
There is no room for maneuvering in the sense of increased N MAIs, since the most optimistic scenario is chosen concerning water quality improvement due to other countries' efforts in reducing nutrient inputs.
There are no indications that further model development or improvements would lead to N MAIs at a significantly different level than the ones derived. It would be interesting to investigate a predictive simulation with the MECH model with respect to how close the final set of N MAIs will get the water bodies in relation to Good Environmental Status

Chapter 3 – Status load, Baseline effects, and effectiveness of measures

Chapter 3 – Comments

The Danish Sports Fishermen's Association agrees that the poor condition and the lack of effort is due to political uncertainty or even a lack of political courage. The real vulnerability lies in the political options to implement and sustain these measures.

We read the following sections of the report as examples of this:

'*It is clear that measures in agriculture and wastewater treatment taken during the 1980s, 1990s and into the first decade of the 20 Th Century caused major reductions in nutrient loads, and subsequent considerable improvement in the coastal ecosystems. However, no or very minor reductions in nutrient loads have been observed during the past decade.*

This gives rise to concerns regarding the prospects of achieving improved environmental status in the coastal water bodies. As this concern has also been raised by some stakeholders, the issue on the so far adopted measures and their effectiveness is shortly discussed in this chapter.
Overall, then, it appears to the Panel that political uncertainty about the way forward and the measures to take, has slowed down the effective and consistent implementation of nutrient load reducing measures in the 2010's, explaining that a full decade was virtually lost for lowering nutrient loads to coastal water bodies. This has raised the impression with stakeholders that many efforts have been discussed and sometimes also (briefly) applied, without much effect. The Panel sees no reason, however, to doubt that measures can be found that have the potential to be effective, if applied at scale, and therefore does not express doubt as to the technical possibility of achieving the RBMP3 goals with appropriate measures. It can be deplored that valuable time has been lost in the 2010s, but this is balanced by the observation that the past experiences have been built into the more ambitious plans for measures in RBMP3. The real vulnerability is in the political possibility to implement and sustain these measures. The Panel expresses hope that sufficient political support for a sustained and coherent implementation of measures will be provided within RBMP3. Many measures take time to be effective, and there is no room for changing policy too often.

In view of the late implementation of measures, including more wetlands and catch crops, experience from the field on the effectiveness of these measures under different conditions remains limited. The Panel advises to closely monitor the realized projects and quickly expand the empirical basis for further development of nitrogen reduction strategies and measures.

Effectiveness of measures: The Panel expresses concern that during the last decade, little or no reduction of N load to coastal waters has taken place. In analyzing different possible causes for this halting of progress, the Panel concludes that it is not due to inherent ineffectiveness of the measures, but to political changes in the 2010s that have led to delay in implementation. Therefore, there is still hope for further N load reduction in RBMP2 and RBMP3, but this will require steadfast and ambitious policy decisions and sustained implementation. The Panel advises to closely monitor the measures that are currently being implemented, in order to further enhance the empirical basis needed for further development of reduction programs.

Chapter 4 –Burden distribution

Chapter 4 – Comments

Denmark's Sports Fishermen's Association agrees with the panel that Denmark has weakened its position by not complying with previous agreements. The way forward is to enter wholeheartedly into the international work to ensure that the effects of transboundary pollution are minimized as quickly as possible together with the other states cooperating in the Regional Sea Conventions OSPAR and HELCOM.

Statements and recommendations from the report:

With respect to international diplomatic action, Denmark has weakened its position by lowering unilaterally the G/M boundary values that had previously been agreed upon in intercalibration exercises. If Danish waters cannot reach a target value that lies significantly below the concentrations of inflowing open sea water, chances are high that. this will be considered by other countries as a self-inflicted problem. It is highly unlikely that other countries would engage in achieving a water quality better than their own intercalibrated quality goals, just because Denmark has later revised its calculation and deviated from the intercalibrated (i.e. internationally agreed) goals.

The Panel concludes that Denmark has to fulfil its WFD obligations for the achievement of Good Environmental Status in coastal waters. There is no legal evidence for arguing that the influence of transboundary pollution on achieving the Good Environmental Status results in decreased obligations under WFD. On the other hand, the Panel also concludes that the influence of transboundary pollution on the achievement of Good Environmental Status is an essential element in the decision-making process on the utilization of exemptions.

Denmark should use the existing legal framework to minimize the effects of transboundary pollution as quickly as possible together with the other states cooperating in the Regional Sea Conventions OSPAR and HELCOM. Denmark should invite the other Member States to intensify cooperation in the preparation of the programs of measures under MSFD, and aim at achieving as much consistency as possible between the WFD and MSFD targets.

It is recommended to update the identification of reductions in nutrient inputs from other Member States based on their RBMP3 in the further course of the Danish RBMP3. This will ensure that the current efforts of the other Member States are determined.

Chapter 5 – Seasonality

Chapter 5 – Comments

The Danish Sports Fishing Association agrees with the Panel that no more valuable time should be lost in prolonged investigations and discussions about Seasonality.
We have knowledge but lack action and political courage.

Statements and recommendations from the report:

The Panel noted a certain ambiguity with respect to the aims of the local initiatives. Where they focus on analyzing the causes and possible remediations of eutrophication, this seems to be a duplication of the entire RBMP process and an unattainable goal within the given time frame. One should not lose more valuable time in prolonged studies and discussions, especially because it is highly unlikely to find significant alternatives to a strategy of decreasing diffuse loading. It would also be very counterproductive if every region could modify the aims of the river basin management plans. The Panel is convinced that maximal effectivity of these local initiatives can be obtained if they can concentrate on the planning and execution of concrete measures within clearly defined, and well monitored objectives to be reached in fixed time periods.

In order to obtain a coherent and convincing national strategy to address the WFD challenges in a reasonably short time span, the Panel is convinced that it is necessary to establish year-round MAIs for every water body. Only within such an overall strategy, would it be possible to open options for an adjusted local/regional strategy. Such a strategy should primarily aim at incorporating valuable local knowledge in the design and implementation of locally adapted measures.

Chapter 6 – Phosphorus efforts

Chapter 6 – Comments

Denmark's Sports Fishermen's Association does not believe there is a basis for proceeding in this direction when the panel recommends:

Modelling results can provide the basis for converting P reductions in equivalent N reductions, thus opening possibilities for combined N P load reductions in planning and implementing measures in the current RMBP. Since there is agreement that the model results show that this can only be a profitable strategy in a limited set of water bodies and will not replace most of the necessary N reduction.

Chapter 7 – Pressures and stressors other than nitrogen

Chapter 7 – Comments

There is an important thing to address as described in the Panel's recommendation:

No convincing evidence shows that alleviating other pressures can be considered instead of nutrient load reductions. The nutrient load reductions calculated by the models and reflected i n the MAIs have been calculated without taking account of other stressors. The Panel agrees with COWI and NIRAS that consideration of other stressors does not change the top priority attached to reducing N loads.

The Danish Sports Fishing Association strongly agrees with the conclusion from COWI and NIRAS and the Panel that concluded “it is expected that measures towards other press factors will not lead to changes in MAI. This does not mean that other pressures are not relevant. For instance, it could be considered to have a more systematic approach regarding other pressures to support achieving Good Environmental Status.

Other import statements/recommendations from the report where we agree:

Very few impacts of other pressures on phytoplankton Chl a have been documented by the DTU Aqua studies, the COWI and NIRAS report, or the stakeholders. This BQE seems relatively insensitive to other pressures than eutrophication.

In general, it can be stated that good nutrient conditions do not guarantee the realization of Good Environmental Status, if other stressors would be such that they inhibit the realization of the ecological potential. For example, recovery of eelgrass is not possible in areas that are intensively dredged for mussels, even if nutrient conditions would allow for eelgrass development. In as far as beam trawling takes place within the eelgrass habitat, this may also be limiting. These examples show that reaching Good Environmental Status cannot solely depend on improving eutrophication in the different water bodies. As eutrophication problems come under control, more attention will be needed for other stressors. However, although locally strong effects by other stressors have been documented, no evidence is presented that these effects are equally strong everywhere. Also, the stressors mentioned and studied can, in principle, be kept under control or be alleviated.

Fisheries, affecting directly or indirectly the depth limit of eelgrass, stands out as potentially the most important other stressor. Invasive species are insufficiently documented but could also be important in some cases.

Relatively little attention has been paid to chemical stressors, in particular herbicides and organotin compounds, that have been documented to have detrimental effects on the development of eelgrass at relatively low concentrations. Especially in catchments that are under strong agricultural pressure, good control for herbicides and their potential effect on reaching Good Environmental Status is important.
In addition, we draw attention to the effects of aquaculture. Fish cages are important sources of organic matter and nutrients, that have become relatively important in coastal waters. Other forms of aquaculture, e.g. mussel culture, constitute a net sink for nutrients, but may enhance the transfer of organic matter to the sediment in the form of faecal pellets, leading to longer residence times of nutrients in the enclosed water bodies.

Chapter 8 – Possibilities for further use of exemptions

Chapter 8 – Comments

The Danish Sports Fishing Association finds this section confusing and can give rise to many discussions and political interpretations. However, one of the recommendations is very specific and important, when the Panel writes:

For the utilization of exemptions, the introduction of effective measures to achieve WFD´s ecological objectives are mandatory. The use of the exemption does not entitle Denmark to manage a water body merely to maintain the status quo. WFD´s objectives are to enhance the status of the water bodies and the measures required to achieve this continue to apply, only with modified temporal or qualitative requirements.

We consider that the Danish need for a deadline extension - and for deviations from the applicable environmental requirements for "good condition" - must be seen in the light of the fact that the efforts during the first two water planning periods (RBMP and RBMP2) have been neither ambitious nor successful.

We believe this section is essential as a guideline for the Danish efforts:
It is obvious and repeatedly stated in the CIS Guidance Documents that utilizing time extensions do not allow to fall short on Denmark´s obligations to start implementation of necessary measures for achieving the Good Environmental Status by 2027 or later. An approach that aims to implement insufficient measures assuming that an applied time extension results in a lower ecological objective is not compliant with WFD. However, it´s the panel´s interpretation that Denmark is allowed to enact further measures in the course of RBMP3 and during future RBMP if an evaluation shows that the measures implemented initially will not lead to a Good Environmental Status in a water body.

The time required to consider the use of exemptions shall not result in the non-implementation of measures necessary to achieve an improvement in water body status. The effectiveness of these measures must be regularly reviewed with the aim of assessing whether they enable the achievement of the objectives applicable to the water body. Even if WFD requires a water body approach, this does not mean that measures must be implemented based on such as a scale. A cost-effective measure can be removing an activity and restore the area in one place and implement mitigation measures in another.

Chapter 9 – General conclusions

Chapter 9 – Comments

The Danish Sports Fishing Association finds all recommendations really important and good. We have applied several of the recommendations in our comments to the other chapters. We wish to commend the Panel for a thorough and well-executed job.

9. Comments from Fair Spildevand

Rural districts are imposed burdens for at least 20 years without legal authority

Consultation response to International evaluation report DRBM Plan from "Fair Spildevand" (Wastewater)

This reply is not wrapped up in normal diplomatic terms, as we find that we get to the bottom of the problems more quickly with blunter language and also sensed at the meeting on 11 September at Sauntehus that the chairman Peter Herman had the same attitude.

Follow-up to the meeting on 11 September at Sauntehus Slotshotel

We have scrutinized the chairman's, Peter Herman's, positions on restrictions on nitrogen and phosphorus, respectively, in order to keep algae growth to a minimum.

It is exactly the same discussion we have had with our own professor Karen Timmermann. This discussion concluded that the optimum N/P ratio of 7:1 (weight basis) should be avoided as much as possible, as algae thrive best at this nutrient ratio.

According to Redfield, the ocean will always strive for a balance of exactly 7:1. Therefore, it is our opinion that Karen Timmermann and Peter Herman are from the same school. Namely the school that will constantly be in conflict with the laws of nature.

The diagnosis is made

We argued that it was concentrations that were the best indicator to act on when assessing the environmental condition of our marine environment. That position was rejected by Peter Herman on the basis of the claim that concentrations in isolation had little informational value and that one should instead relate to total amounts in order to get the true picture of the environmental impact. With that, we agree on what we disagree on. The diagnosis is made.

But first a little about the role of nitrogen in the marine environment

The hypothesis that has never been scientifically verified/falsified

We know that:

- Photosynthesis in the water phase creates oxygen that corresponds to the oxygen consumption during the decay of excess plant parts and algae
- When oxygen depletion is observed, nitrate nitrogen is barely measurable in the water phase
- Without nitrogen, no photosynthesis (no binding of CO2) and the carbon cycle stops
- Without nitrogen, neither nourishment for healthy algae for the ocean's food chain nor basis for eelgrass.

With the right ratio of N/P 7:1, it is the basis for healthy algae that can be absorbed into the food chain. At a N/P ratio of 4:1 or below, there is a basis for "skid algae" (toxic blue-green algae and algae with a low protein content).

In 1981, increased oxygen depletion and fish deaths were observed in inland Danish waters. Decades before, our waste water was collected in central treatment plants and, after a rough cleaning, discharged into current-filled waters.

Øresund alone was discharged approx. 1 million tons of sludge every year.

But almost simultaneously appeared a biologist with the hypothesis[14], that agriculture's increasing consumption of commercial fertilizers did not benefit the crops, but flowed directly into the sea via the drainage pipes, resulting in a sharp increase in algae growth, which later used up much of the oxygen in the water phase when the excess algae later rotted on the seabed.

The biologist's hypothesis has never been verified/falsified by recognized scientific methods, which must be said to be a mortal sin. What this failure has cost both financially, in terms of resources and in terms of people, history will probably not look lightly on at some point.

In any case, after 4-5 decades we are today faced with both questionable conditions in our water environment and a resource-intensive waste water management.

From 1996 to 2014, according to statistikbanken.dk/FISK2, 650,000 tonnes to 230,000 tonnes of fish have been landed. So a reduction of 420,000 tonnes or 65 per cent. fewer fish from the sea around Denmark, excl. North Sea. In the same period, 85,000 and 55,000 tonnes of nitrogen were emitted respectively. A reduction of 35 per cent.

Emission of nitrogen compared to landed fish/year	1996	2014
According to Aarhus University: Emission of nitrogen in thousand ton	85	55
Fish landed in one thousand ton, excluding the North Sea …..	650	230
A drop of 85 per cent. over 18 years with landed fish combined		
with a reduction of one third (35 %) of emitted nitrogen		
from https://www.statistikbanken.dk/FISK2		

Today, no one would probably conclude that we should simply discharge some more nitrogen into the sea so that we could land a few more fish without further analysis. Except maybe if it was a view some of the national media supported media wanted to promote.

Cand. agro. Poul Vejby-Sørensen explains here: Understand the meaning of nitrogen in ten minutes[15], how important it is to do away with Justus von Liebig's minimum law, which only applies in controlled laboratory experiments, but does not belong in the open sea environment. Here it is Redfield's balance theory that is relevant.

It is substantiated in the most elegant way.

Academic deroute or perhaps signs of insanity

14 https://www.fairspildevand.dk/wp-content/uploads/Marin-eutrofiering-Gunni-Aertebjerg-fra-1960-til-2018-EN.pdf

15 https://www.fairspildevand.dk/wp-content/uploads/Understand-the-importance-of-nitrogen-in-ten-minutes.pdf

There are serious signs of a deroute in Western academia and large parts of the media-supported press, unfortunately.

For a human age, nitrogen has been singled out as the main cause of poor ecological condition in surface water.

A lighter paraphrasing of Einstein's description of insanity probably sums it up very well: Designating nitrogen as a problem over and over and expecting a different result.

There is more evidence that too little rather than too much nitrogen is discharged into streams and coastal waters in relation to the amount of phosphorus present. Or that it is primarily phosphorus and waste water that we must focus on, where the ecological condition of surface water is unsatisfactory.

The open land has been burdened for at least 20 years without legal authority

We expect that everyone will first and foremost respect the legislation

Back to Sauntehus on 11 September

Total quantities make no sense if you do not know the volume that will receive the quantity. There is a difference between whether a given quantity is discharged into a bathtub or a swimming pool! Therefore, it also does not make sense to relate to total quantities discharged into the waters around Denmark, as it is an undefinable volume together with strong incoming and outgoing sea currents.

Total amounts, concentrations and the role of nitrogen in nature's cycle probably cannot be broadly agreed upon in this circle.

But we expect that everyone is prepared to comply with the applicable law. Therefore, we would once again draw attention to what is actually stated in the Water Framework Directive and Nitrates

Directive.

The Water Framework Directive has nothing to do with nitrogen, but sets requirements for nutrient conditions, see Annex V.

Where nitrate is mentioned, reference is made to the Nitrates Directive and here only requirements are set for concentrations and never total quantities.

Therefore, total quantities must henceforth be relegated to the world of models and current legislation based on measurable concentrations exactly as prescribed in the Water Framework and Nitrates Directive.

In the evaluation report under chapter 8, reference is made several times to article 4.1. where it says several times: "in accordance with the provisions laid down in Annex V".

The fact that the misinterpretation has taken place for at least 20 years since the directive's implementation in Danish law does not justify continuing with the mistake. In the same way that a patient should not continue with the same medication when a completely new diagnosis has been made.

With the realization that it is concentrations that are the basis and applicable law for future water planning, our comments to the COWI report hopefully make more sense. Therefore, reference is again made to the following:

- Comments on the COWI report[16]
- Questions from "Fair Spildevand" for the experts regarding "Second opinion", March 2023 [17]
- and to ours speaking paper for the meeting on 11 September[18] with some extra text.

Danish authorities have spoiled the task solution

We also find it relevant to explain to the panel our experiences throughout the process up to today.

Right from the start of this second opinion process, we tried to get through with the good news by sending the note The happy news[19] to COWI before they started preparing the report. But the impression of this COWI report was a long list of the water plan policy that has been carried out in Denmark over the last 3 decades.

In addition, there is also sloppiness with the translation, consciously/unconsciously, it is not known.

The text marked in red has been added to the task the panel has been given.

A second opinion will include an assessment of the scientific basis for the calculated need for reduction of nitrogen with a focus on exploring whether assumptions, preconditions or choices have been made that could lead to adjustments of the estimated need for reduction of the nitrogen load on coastal waters within the legal and scientific framework of the Water Framework

Directive."

Yes, or maybe nitrogen need an increase.

Danish water plans rest on the virtual model world

We (Brønserud) have presented and documented with reference to Aarhus University that measurements of Nitrate-N in Danish streams have been 2 to 4 times cleaner than the requirement for drinking water. And Fair Wastewater cannot, despite a month-old access to documents, be given figures for measured N concentrations and water volumes for the 109 water catchments. We must therefore conclude that they simply do not exist. In other words, Danish water plans are not based on data from the real world, but are left to the virtual model world.

More of a "second confirmation" than a "second opinion"

16 https://www.fairspildevand.dk/wp-content/uploads/Comments-on-the-COWI-report-Second-opinion-fra-Fair-S pildevand.pdf

17 https://www.fairspildevand.dk/wp-content/uploads/Second-opinion-fase-II-2-questions-to-the-expert-from-Fair -Spildevand.pdf

18 https://www.fairspildevand.dk/wp-content/uploads/Input-to-second-opinion-expert-panel-on-11-September-20 23-fra-Fair-Spildevand.pdf

19 https://www.fairspildevand.dk/wp-content/uploads/Happy-news-about-nitrogen-to-second-opinion-GB-DK.pdf

The COWI report and thus the framework for the panel has been created under the strict guidance of responsible Danish authorities with narrow frameworks for new thinking, so the concept of "second opinion" is strongly invalidated.

For example, it has led to a completely banal and redundant legal discussion about Articles 4.4 and

4.5, which the panel had to spend time on. Pure waste of time in our opinion.

We would go so far as to say that the authorities have done their part so that the end result will not be a "second opinion" but a "second confirmation" that the water plans must continue to be administered on the basis of models and total amounts of nutrients.

In the second opinion report from 2017, the settlement was not taken either. Is that why three people on the panel have been re-selected since then, one might provocatively ask?

Kudos to the panel

Due to language difficulties, it is possible that we have done the panel, including Peter Herman, wrong, and it may also be that we have overlooked good points in the preliminary report. We haven't had time to go into much detail.

We would, however, unconditionally praise the remark in the last paragraph: *"That includes making use of socio-economic information to prevent that the applied measures lead to 'disproportionate cost'*".

The real "second opinion" and optimistic message

The real second opinion, which at the same time does not conflict with the Water Framework Directive, “Fair Spildevand” has in all modesty been the biggest contributor to including decriminalizing nitrogen.

A big help for rural areas and the marine environment

In conclusion, we would therefore strongly urge the panel to put an end to at least 20 years of misinterpretation of the Water Framework Directive and Nitrates Directive and point out that measurements of physical-chemical quality elements are the basic data that must be available before other management tools are put into use.

Those who live in the open country both in Denmark and indirectly the rest of the EU, including agriculture in the Netherlands, are guaranteed to be very pleased with this.

A lovely planet

After all, it is a lovely planet we live on, especially if we humans recognize that we will never be able to uncover all of nature's secrets and instead simply conform to its laws and whims.

Fair Spildevand 2. oktober 2023

10. Comments from University of Aarhus - Danish Centre For Environment And Energy (DCE - Nationalt Center for Miljø og Energi)

General remarks

DCE acknowledge the huge and solid effort of the panel in analyzing and describing the scientific background which the river basin management plans are based on and have read the report and suggestions from the panel with great interest.

We have a few remarks concerning the catchments science part of the report, whereas the comments regarding the marine science part are send as a common briefing from DHI, DTU and AU in a separate document.

Chapter 3 – Status load, Baseline effects, and effectiveness of measures

Section 3.4.2: The 2027 baseline

The Panel in this section refers to a N-model "*The N-model has been developed to translate measures in the field into rates of nitrogen loading of the coastal waters. The N-model represents the important processes taking place between the moment of application of fertilizer or manure in the field, and the moment N leaches to the coastal waters. This includes leaching in soils and N-retention in the landscape and reflects local conditions and catchment characteristics. Some complicated aspects of this modelling could be better explained and communicated. These include: the changes in the catchment boundaries; further adjustments for measures that may be necessary; long-time lags*".

We are not sure about what kind of N-model there is referred to in the Panel's report that has been used for establishing the 2027 baseline. However, it would be an important issue that might be considered by the Panel to add to the baseline chapter, that there seems to be older lacking responses for implemented nitrogen measures in agriculture that has not fully appeared in surface waters due to the long-time lags that is already referred to by the Panel in their report.

Section 3.4.3: The effectiveness of measures

The apparent lack of significant reduction of nitrogen concentrations and loads in rivers within the agricultural landscapes during the past decade has been noted with worry by the Panel.

DCE agrees with the panel, that in the coming years, it is important to focus on measures and the effectiveness of measures, but also finds that the changes in temperature and seasonal precipitation (climate) during the last 15 years, together with problems with analysis of total nitrogen at laboratories (now been bias-corrected for the period 2009-2015), as well as new evidence with a bias introduced in flow because of changes in flow measurement instruments in rivers are important factors to investigate further. These factors might have a 'shading' effect on trends in nitrogen concentrations and loads during the last 15 years.

In the coming years DCE finds, that the following topics would also be relevant to investigate further:

1. The long-term lag effects of implemented nitrogen measures on agricultural fields in coastal catchments.
2. The effects of climate change (even for the last two decades) for nitrogen leaching losses – looking more into effects of seasonal changes.
3. The need for including into the annual reporting of trends in nitrogen loadings an in-depth analysis of the expected effects of the implemented mitigation measures being it targeted or collective measures. The expected effects of the implemented targeted and collective measures should then be compared with the trends in normalized nitrogen concentrations and loads. Such an analysis should be conducted coastal water catchment by coastal water catchment – meaning more regional reporting.

11. Comments from Danish Hydraulic Institute (DHI), Technical University of Denmark (DTU), and University of Aarhus (AU) (Coastal modelling group)

Karen Timmermann (DTU), Anders Erichsen (DHI), Jesper Christensen (DCE/AU), Jacob Carstensen (DCE/AU)

Chapter 1 – Reference conditions, G/M boundary target, and intercalibration

Chapter 1 – Comments

Page 7, second paragraph: It should also be mentioned that reference conditions can be based on historical observations according to CIS guidance document #5

Chapter 9 – General conclusions

Chapter 9 – Comments

Page 63, paragraph 4: The panel acknowledges that the revised Reference Conditions are based on an improved scientific basis but that the revised G/M boundary values has led to inconsistencies with G/M boundary values intercalibrated with Sweden and suggest to use a refitting procedure described in Guidance #30.

As we are convinced that the revised reference conditions are more scientifically sound and realistic compared to the reference conditions used in the intercalibration process, we propose to initiate a dialogue with Sweden on revising the Reference Conditions for Chla as part of a re-intercalibration process. It is worth noting that the revised reference conditions and targets appear to be in better agreement with recent developed targets from Germany and OSPAR as well as those obtained with the BALTSEM model for the TARGREV project, whereas the Swedish Reference Conditions for Chla have been based on log-log relationships between Chla and Secchi depth, developed almost two decades ago, a method that was abandoned by Denmark a decade ago due to the poor relationships between Chla and Secchi depth.

It might be possible to develop a consistent re-fitting procedure aligning the revised G/M boundaries with the intercalibrated G/M boundaries, however, we don't consider the procedure described in guidance #30 as being scientifically valid and suitable for refitting.