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DHI

Application of the Danish EPA's Marine Model Complex and Development of a Method Applicable for the River Basin Management Plans 2021-2027

Water Framework Directive Scenario 1a – Increased likelihood for achieving GES

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Water Framework Directive Scenario 1a – Increased likelihood for achieving GES

Prepared for Danish EPA (Miljøstyrelsen, Fyn)

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Eelgrass in Kertinge Nor

Photo: Peter Bondo Christensen

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Preface

This report is commissioned and funded by the Danish Environmental Protection Agency (EPA). The data, methods and results included in the report are intended to be an integrated part of the material behind the Danish River Basin Management Plans (RBMP) 2021-2027.

The work reported was managed and performed by DHI and AU/DCE. During the project, a steering committee followed the development, and was involved through dialogue and follow-up on progress, etc. The steering committee consisted of members from the Danish Ministry of Environment and Food (MFVM), the Danish EPA (MST), DHI and AU.

In addition, a follow-up group consisting of members from The Danish Agriculture & Food Council, SEGES, Sustainable Agriculture (BL), the Danish Society for Nature Conservation, the Danish Sports Fishing Association, Danish Fishermen PO (DFPO), the Danish Ports, and KL/municipalities was affiliated with the project. The follow-up group has been continuously informed about the progress of the project at meetings convened by the MFVM.

Choice of methods, data processing, description and presentation of results have been solely AU's and DHI's decision and responsibility. A draft version of this report has been reviewed by MST and the follow-up group.

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1 Introduction

When preparing the Danish River Basin Management Plans 2015-2021 (RMBP 2015-2021), DHI and Aarhus University (AU) developed a number of mechanistic (DHI) and statistical (AU) models that were used for calculating chlorophyll-a target values defining the threshold (GM) between 'Good Ecological Status' (GES) and 'Moderate Ecological Status'. The models were also used for calculating Maximum Allowable Inputs (MAIs) of total nitrogen (N) from Danish catchments based on the GM threshold value and a proxy for eelgrass depth limit. Hence, the development aimed at both the model development and the development of a method for calculating the MAIs.

As part of the political, regulatory package 'The Food and Agriculture Agreement from 2015' an international evaluation of the procedures used in the RBMP 2015-2021 was conducted. The evaluation was finalised autumn 2017 with a report (Herman *et al.* 2017) including a number of recommendations for improving the scientific background behind the RBMP 2021-2027.

To follow up on the international evaluation, the Danish EPA facilitated a range of research and development projects (R&D) projects with the overall aim of developing methods to calculate robust, transparent and differentiated chlorophyll-a reference values (and corresponding GM values) and MAIs in as many water bodies as possible for implementation into the RBMP 2021-2027.

Two central R&D projects relate to the continued model development in the assessment of reference chlorophyll-a values (and corresponding target values) and final MAI calculations. Other projects support different aspects of the final MAI calculations, but here we focus on the following two central R&D projects:

- 'Recommendations for the continued development of models and methods for use in the River Basin Management Plan 2021-2027. Follow-up on the international evaluation of marine models behind the River Basin Management Plan 2015-2021' (Erichsen & Timmermann 2018)
- 'Application of the Danish EPA's Marine Model Complex and Development of a Method Applicable for the River Basin Management Plans 2021-2027'.

The outcome of the above research projects is a set of MAIs based on a range of scenarios reflecting different assumptions regarding future developments in nutrient loading from neighbouring countries and the atmosphere as described in Erichsen *et al.* 2020. These management scenarios are based on assumptions defined by the Danish EPA and they are related to either 1) assumptions regarding international adopted treaties related to nutrient management 2) assumptions regarding future development in land-based loadings from other countries 3) assumptions regarding future development in atmospheric deposition and 4). different levels of compliance with the Water Framework Directive (WFD). In the present technical note, the assumptions behind the Water Framework Directive (WFD) scenario 1a and corresponding results are presented. In the WFD scenario 1a we calculate the Danish MAIs that will result in an ecosystem classification status between "high-good" and "good-moderate" status, whereas we in other scenarios have aimed for the boundary between "moderate" and ”good” status. Hence, the resulting MAIs in the present scenario will increase the likelihood of achieving good ecological status.

2 Preconditions for MAI Calculations

The Danish MAIs will, among other things, also depend on future loadings from neighbouring countries and atmospheric N-depositions as described in more detail in Erichsen *et al.* 2020. In addition, some water bodies may also respond to Danish land-based P loadings, which is why one set of Danish land-based N-MAIs corresponds to a set of Danish land-based P-MAIs.

In order to calculate a set of Danish land-based N-MAIs with the developed models, we need to make assumptions on future loadings and management strategies from neighbouring countries (management scenarios), and Danish land-based P loadings.

With respect to reductions in neighbouring countries, the Danish EPA has defined a set of preconditions to be used for constructing management scenarios defining potential developments in future non-Danish land-based loadings and atmospheric deposition. For each scenario, Danish land-based N-MAIs are calculated based on 0%, 10%, 20%, 30% and 50% Danish land-based P reductions, respectively.

In this technical note, we have not assessed the feasibility of the scenarios defined by the Danish EPA, but solely provided N-MAIs that will ensure that the targets are reached given that the preconditions related to nutrient loading from other countries, atmospheric N deposition and P loading from Danish catchments are fulfilled.

2.1 WFD-Scenario Definitions

As mentioned above, the Danish EPA has defined a set of assumptions regarding nutrient inputs from other countries and the atmosphere to be used as a precondition for the Danish land-based N-MAI calculations. The assumptions are grouped into three management scenarios and one scenario related to the interpretation of the Water Framework Directive (WFD-scenario). The different assumptions are described in general terms in Erichsen *et al.* 2020, whereas the present technical note describes WFD Scenario 1a in more details (also see 'bold' description below).

2.1.1 WFD-Scenarios

The method for estimating land-based MAIs applicable for RBMP 2021-2027 (Erichsen *et al.* 2020) include averaging between indicators and model-results (statistical and mechanistic model results, respectively). The method aims at estimating an individual N-MAI for each indicator that would bring the indicator from the present status to the boundary between “good” and “moderate” status and it include the system contribution in the calculation of Danish land-based N-MAIs. The system contribution covers delays or lag-time in response, feedback mechanisms, climate changes and uncertainties (see Erichsen *et al.* 2020 for details).

In the WFD-scenarios the implications of the different aspect of the method for calculating MAI are addressed by making scenarios based on:

a) Increasing the likelihood of achieving GES by changing the indicator target values from the good-moderate boundary to a target value between good and high status.

b) One-out-all-out principles. This approach will use average model results per indicator but include the lowest MAI between the two indicators.

c) MAI calculations are performed without taking the system contribution into account.

The present technical note describes scenario 1a where we likelihood of achieving GES by changing the indicator target values from the good-moderate boundary to a target value between good and high status. Generally, averaging ensures a more robust estimate of the individual MAIs as it dampens the effect of extreme values. However, this approach does not ensure GES in all water bodies. In theory, only 50% (assuming normal distribution) will achieve GES when averaging indicators and model results (Figure 2-1).

For the above three sub-scenarios, the land-based nutrient loadings and atmospheric N depositions will be kept as described in management scenario 1.

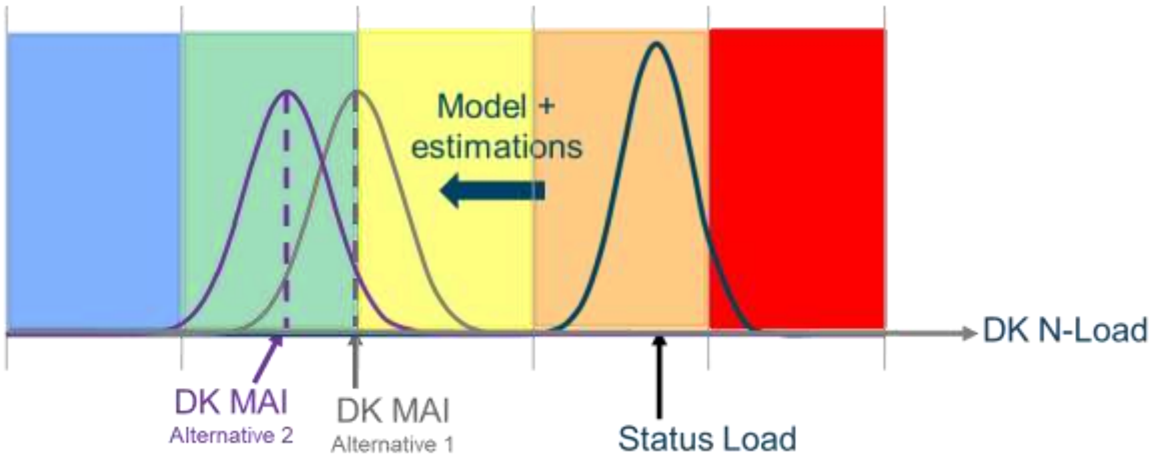

Figure 2-1 Calculation of MAI when the target is defined as the boundary separating “moderate” and “good” status classes (alternative 1) or when the target is in the middle of “good” ecological status class (alternative 2). The present-day loading results in an indicator status value (curve placed in the orange field).
The status value is determined with a certainty represented by the curve (normal distribution). The alternative 1 curve represents the method described in Erichsen *et al.* (2020) where the resulting MAI equals an indicator values matching the boundary between moderate and good. Given the uncertainty the indicator values might however be moderate (GES is not reached). The alternative 2 curve represents a situation where we aim at a target between high-good and good-moderate, which will increase the likelihood of reaching GES.

2.1.2 Scenario Loadings

The full overview of the scenario reductions applied for WFD-scenario 1a in other countries than Denmark and atmospheric depositions are summarised in Table 2-1, and explained briefly in the following sections. The data on present-day Danish loadings can be found in *Erichsen & Birkeland 2020a.*

Baltic Sea Action Plan (BSAP)

In Management scenario 1, the land-based nutrient loadings to the Baltic Sea are based on the BSAP. All countries around the Baltic Sea have adopted the BSAP as the regional treaty that governs nutrient reductions to the Baltic Sea. Germany has, however, adopted stricter reductions as part of the German RBMP 2015-2021, and these will be described in the following section.

The BSAP consists of national MAIs including both land-based nutrient loadings of N and P and atmospheric depositions (or Country Allocated Reduction Targets – CART). It is necessary to distinguish between land and atmospheric nutrient loading from other countries than Denmark. In order to split the total nutrient loading from the CART, we used data on land-based nutrient loading on a country-by-country level from 1997-2003. This period is consistent with the BSAP baseline period, and allows us to calculate how much of the baseline nutrient loading for each country derives from land-based sources, and how much is atmospheric deposition. We have then assumed that this relationship is constant under the BSAP future conditions, and calculated the country-specific MAIs by subtracting the atmospheric part from the CART, providing us with information on atmosphere and land-based nutrient loading under the BSAP. This calculation has been done for both total nitrogen and phosphorous.

The present-day average loading (average of 2014-2018 loadings) is then compared to the land-based MAIs within the two basins Baltic Proper (BAP) and Danish Straights (DS) and converted into a need for reduction (in %). This estimation is done excluding Danish land-based loadings, as they are the target of the present exercise.

RBMP 2015-2021

As mentioned above, Germany is the only country (besides Denmark), that has adopted N reductions that are stricter than the CART defined in the BSAP.

According to the German RBMP 2015-2021, nutrient targets for TN are defined as average TN concentrations of 2.6 mg N/l in rivers discharging to the Baltic Sea and 2.8 mg N/l in rivers discharging to the North Sea (COWI 2018). For TP, no new targets have been defined in the RBMP 2015-2021 why German TP concentrations in rivers discharging to the North Sea are similar to present-day TP concentrations, and TP concentrations in rivers discharging to the Baltic Sea follow the reductions determined by BSAP.

Based on Gadegast & Venohr (2015), the average concentration in the rivers discharging to the North Sea was 4.04 mg N/l in 2005 why a change in concentrations to 2.8 mg N/l corresponds to an average reduction of 31% of German land-based N-loads. For comparison, COWI (2018) estimated a reduction need from German rivers of 30-48% based on 2001-2005 loadings. Here we use the 31%, as the data reported in Gadegast & Venohr (2015) also relates to the reductions used for defining reference loadings from German and Dutch rivers discharging into the German Bight.

The 31% reduction is applied to all German rivers discharging to the North Sea as well as other North Sea rivers (due to lack of knowledge) in the simulations. Applying the same reduction on all North Sea rivers is an assumption; however, as the German rivers are the governing source of nutrients impacting Danish waters, it is considered to be a good assumption.

Concerning concentrations in rivers discharging to the Baltic Sea, COWI (2018) reports a target of 2.6 mg N/l, and according to COWI (2018), this corresponds to a reduction of 44%. For management scenario 1, we adopt this reduction from German rivers discharging to the Baltic Sea.

Allocation of Reductions

To estimate the dose-response, ie. how much the GES indicators respond to a change in nutrient load, we used model simulations based on a 30% nutrient reduction (N or P on land-based, respectively, and atmosphere N load), with the exception of Danish land-based nutrient loadings. These simulations provided us with information on the dose-response for each of the GES indicators for the 30% reduction. Using these results, we can estimate the dose-response to a given reduction in local nutrient loading to the Baltic Proper (BAP) and Danish Straits (DS) depending on the source of the nutrient load and the location of the responding GES indicator.

According to HELCOM (2020), we can allocate reductions from BAP to DS and estimate the resulting dose-response from the above scenarios. However, we will have to assume that the impact from reductions differs between the Danish water bodies, as, eg. German reductions will have a profound impact on Flensburg Fjord, whereas the impact on the Sound is regarded as less profound. Hence, we operate with different reductions depending on the individual water bodies.

Assuming no difference in impact from reductions in BAP and DS, the combination of BSAP and German RBMP 2015-2021 equals a reduction of 4% for TN loadings and 27% for TP loadings.

Assuming difference in impacts as described in HELCOM (2020)[1] the corresponding TN reductions equal a 35% reduction whereas a full impact from German RBMP 2015-2021 equals a reduction of 44%.

As HELCOM (2020) defines a reduced impact from reductions as we move from one water body to another (e.g. from BAP to DS), we need to distribute the above reductions from Germany and other countries. This distribution is done according to Figure 2-2 and Table 2-1.

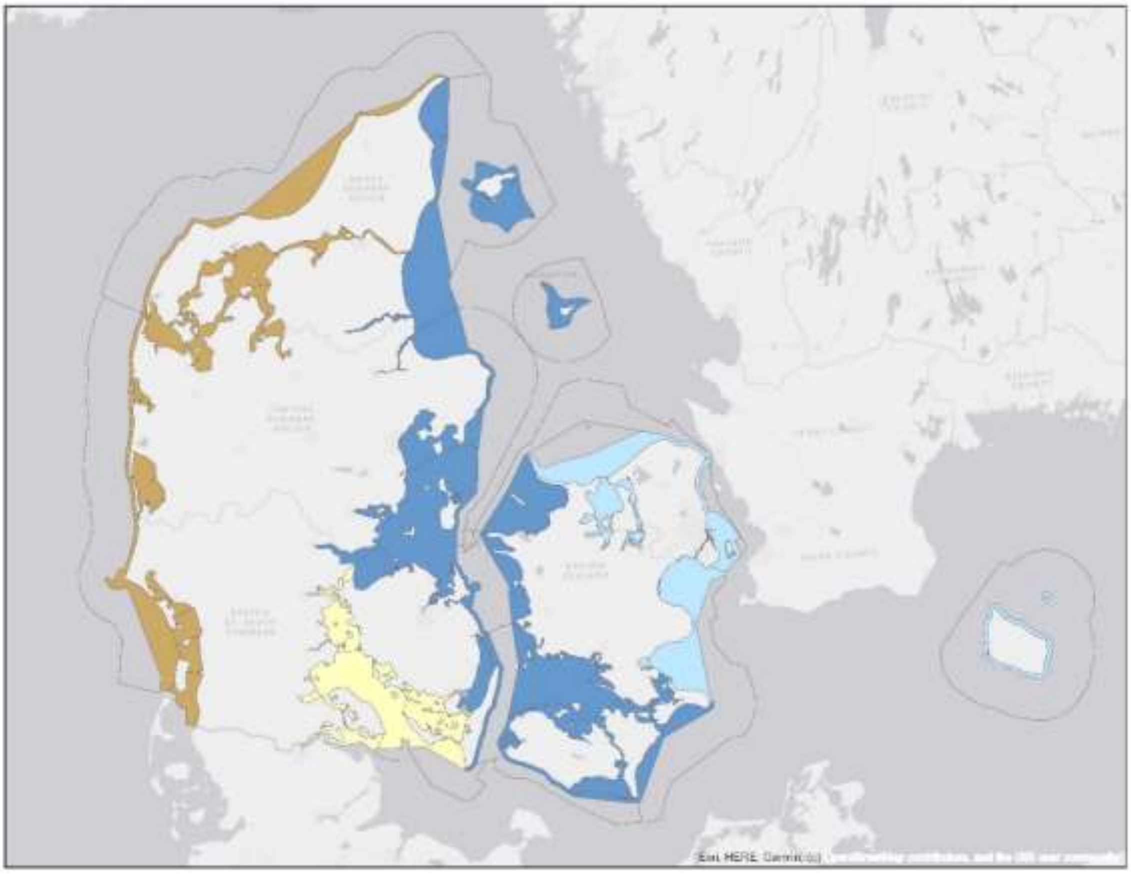

Figure 2-2 Distribution of reductions applied in WFD scenario 1a. Nutrient reductions resulting from the German implementation of the RBMP (2015-2021) to the North Sea and Baltic Sea are applied in water bodies marked with brown and yellow, respectively. Nutrient reductions resulting from implementation of the BSAP to the BAP and DS are applied to water bodies marked in light blue. In dark blue areas BSAP reductions to BAP and DS are applied after taking into account effect of transport processes accounted for by the HELCOM (2020) allocation scheme.

NEC-directive

According to Blicher-Mathiesen & Sørensen (2020), the reductions in atmospheric N deposition after full implementation of the NEC-directive altogether amount to 16% or a 10% reduction in 2027, if the different countries' predictions are implemented. The full reduction of 16% is used for management scenarios 1 and 2, whereas the prediction of 10% reduction is used for management scenario 3a (see Erichsen *et al.* 2020 for details).

Data are delivered by AU, and the reductions are resolved on an overall water body scale and implemented in the Danish land-based N-MAIs calculations (see Figure 2-3 for data).

[1] Here we assume that the difference in %-reductions can be translated into a %-reduction according to HELCOM (2020). In HELCOM (2020) the effects, however, relate to tons of N and P why this is not entirely correct. As we operate in %-reductions this assumption will likely overestimate the effects of the German reductions.

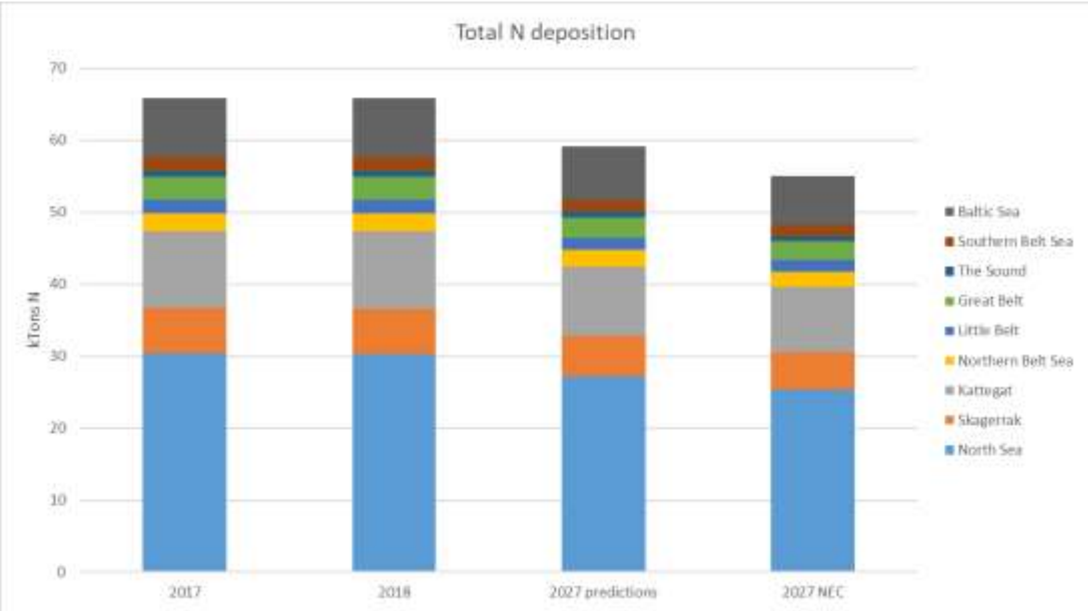

Figure 2-3 Atmospheric N depositions summarised at overall water body level. '2017' and '2018' represent present-day atmospheric N-depositions whereas '2027 NEC' represents agreement behind the directive, and '2027 predictions' represent the different country prognosis.

Table 2-1 Overview of input data used to construct WFD scenario 1a.

Danish water areas affected	N load reduction in WFD scenario 1a. Reductions are in % of current (2014-2018) load	P load reduction applied in WFD scenario 1a. Reductions are in % of current (2014-2018) load	Adopted treaties
Western Baltic Sea (Light blue area, Figure 2-2)	4%	27%	Effect of BSAP to DS and BAP
Great belt and Kattegat (dark blue area, Figure 2-2)	35%	27%	Effect of BSAP and German RBMP, using Helcom allocation scheme
Southern Little Belt (yellow area, Figure 2-2)	44%	27%	Effect of German RBMP
North Sea water bodies and Limfjorden (brown area, Figure 2-2)	31%	0%	Effect of German RBMP
Atmospheric deposition, all Danish water bodies	16%	0%	NEC directive

2.2 Method for Calculating Danish N-MAI

Based on the assumed future load reductions from neighbouring countries and atmospheric deposition as described above, N-MAIs from Danish catchments to each of the 109 water bodies is calculated. This is based on the status value of the indicators in each water body, as well as a defined target value (*Erichsen & Birkeland 2020b*). The status values for the two indicators are based on measurements. Target values are defined as a “slight deviation from reference conditions", where reference conditions refer to a state with minimal human influence. Based on the method described in Erichsen *et al*. (2020), each target value will have a MAI which will support the system to achieve GES.

Since all Danish water bodies are connected to a higher or lesser degree, the reduction needed for a single water body cannot be assessed in isolation. In addition, it is necessary to consider the load reduction requirement estimated for nearby water bodies. To account for connected water bodies, the following scheme was applied:

1) Catchments are assigned to each water body. Local catchments are assigned to the inner part (sub-catchments) of estuaries (upstream water bodies), whereas two or more local catchments (main-catchments) are assigned for downstream water bodies (e.g. the outer part of estuaries) and more open water bodies.

2) Load reductions (in %) for each individual water body are calculated as described in Erichsen *et al.* (2020) and transformed into a N-reduction requirement in tons using the load of the assigned catchment.

3) For up-stream water bodies (with local catchments) the calculated reduction is a minimum requirement that should be obtained independently of downstream waterbody requirements.

4) Reduction requirements for downstream water bodies are corrected, considering any minimum reduction handled by up-stream water bodies.

5) Reduction requirements are transformed into MAIs by subtracting the required load reduction from the average annual load and aggregated to the corresponding local and/or regional catchment.

2.3 Results

Based on the above-described assumption (implementation of the Baltic Sea Action Plan, German nutrient reductions according to RBMP 2015-2021 and reductions in atmospheric N deposition according to the NEC directive) the different reduction requirements and corresponding MAIs are calculated.

The different reduction requirements (%-wise and in actual tons) based on the different indicators and different models are included in Appendices A-E, whereas the aggregated MAIs are reported in Table 2-2.

Table 2-2 Maximum Allowable Nitrogen Inputs (N-MAIs) for Danish water bodies given the implementation of BSAP, German nutrient reductions according to RBMP 2015-2021 and reductions in atmospheric N deposition according to the NEC directive and aiming at indicator values in the middle between high and good ecological status.
The table shows N-MAIs in tons N per year, where 'main' denotes main-catchment and 'sub' denotes sub-catchments being part of a main-catchment. The table shows average annual loads as well as N-MAIs calculated for 5 different phosphorus reduction scenarios designated P0, P10, P20, P30 and P50, where phosphorus loadings from Danish catchments are reduced by 0%, 10%, 20%, 30% and 50%, respectively. The column 'aggregated' denotes sub-catchments included in specific MAIs.

No.	Name	Aggregation	Average annual (main)	Average annual (sub)	P0 (main)	P0 (sub)	P10 (main)	P10 (sub)	P20 (main)	P20 (sub)	P30 (main)	P30 (sub)	P50 (main)	P50 (sub)
1	Roskilde Fjord, ydre	1,2		764		478		480		482		484		487
2	Roskilde Fjord, indre	2		388		314		316		318		320		324
6	Nordlige Øresund	6	1,098		616a		616a		616a		616a		616a	
16	Korsør Nor	16		40		24		25		25		26		27
17	Basnæs Nor	17		69		40a		40a		40a		40a		40a
18	Holsteinborg Nor [c)]	18		22		21		21		21		22		22
24	Isefjord, ydre	24,165		899		308		317		326		335		353
25	Skælskør Fjord og Nor	25		44		27		28		29		30		32
28	Sejerø Bugt	28	164		108a		108a		108a		108a		108a	
29	Kalundborg Fjord	29	69		21b		22a		23a		25a		28a	
34	Smålandsfarvandet, syd [c)]	34	523		318a		318a		318a		318a		318a	
35	Karrebæk Fjord	35		1,272		866		898		929		959		1,015
36	Dybsø Fjord	36		61		59		60		61		61		61
37	Avnø Fjord	37		238		156		158		161		163		168
38	Guldborgsund [c)]	38	419		419		419		419		419		419	

No.	Name	Aggregation	Average annual (main)	Average annual (sub)	P0 (main)	P0 (sub)	P10 (main)	P10 (sub)	P20 (main)	P20 (sub)	P30 (main)	P30 (sub)	P50 (main)	P50 (sub)
44	Hjelm Bugt	44	91		57		58		58		59		60	
45	Grønsund	45	278		161a		161a		161a		161a		161a	
46	Fakse Bugt	46,47	509		107b		107b		107b		107b		107b	
47	Præstø Fjord	47		208		100		103		107		110		117
48	Stege Bugt [c)]	48,49	259		178		178		178		178		178	
49	Stege Nor	49		24		11		11		11		11		12
56	Østersøen, Bornholm	56	860		184b		184b		184b		184b		184b	
57	Østersøen, Christiansø	57	3		0b		0b		0b		0b		0b	
59	Nærå Strand	59		98		22b		22b		28		37		56
62	Lillestrand	62		11		5a		5a		5a		5a		5
68	Lindelse Nor	68		50		39		39		39		39		39
72	Kløven	72		43		32		32		32		32		32
74	Bredningen	74		128		42b		42b		44a		49		60
80	Gamborg Fjord	80		80		62		62		62		62		62
82	Aborg Minde Nor	82		152		34b		34b		34b		34b		41a
83	Holckenhavn Fjord	83		290		84a		89a		95a		106		129
84	Kerteminde Fjord	84,85		50		37		37		37		37		37
85	Kertinge Nor	85		24		17		17		18		18		19
86	Nyborg Fjord	83,86		308		102a		108a		114		125		148

No.	Name	Aggregation	Average annual (main)	Average annual (sub)	P0 (main)	P0 (sub)	P10 (main)	P10 (sub)	P20 (main)	P20 (sub)	P30 (main)	P30 (sub)	P50 (main)	P50 (sub)
87	Helnæs Bugt	87		216		109a		109a		109a		109a		109a
89	Lunkebugten	89		16		7a		7a		7a		7a		7a
90	Langelandssund	83,86,89,90	768		387a		387a		387a		387a		387a	
92	Odense Fjord, ydre	92,93		1,358		768		779		784		802		824
93	Odense Fjord, Seden Strand	93		1,288		711a		711a		714		732		767
95	Storebælt SV	95	188		115a		115a		115a		115a		115a	
96	Storebælt NV	96, 84, 85	227		132a		132a		132a		132a		132a	
101	Genner Bugt	101		35		13b		13b		13b		13b		13b
102	Åbenrå Fjord	102		130		59b		59b		59b		59b		59b
103	Als Fjord	103,104,105		269		70a		70a		70a		70a		70a
104	Als Sund	104		68		68		68		68		68		68
105	Augustenborg Fjord	105		62		39a		39a		39a		39a		39a
106	Haderslev Fjord	106		239		122a		123a		123a		124a		126
107	Juvre Dyb	107		349		119a		119a		119a		119a		119a
108	Avnø Vig	108		60		24a		25a		27		29		34
109	Hejlsminde Nor	109		138		84a		90a		97		103		113
110	Nybøl Nor	110		66		33		34		36		37		40
111	Lister Dyb	111		2,155		714a		714a		714a		714a		714a
113	Flensborg Fjord, indre	113		51		20a		20a		20a		20a		20a

No.	Name	Aggregation	Average annual (main)	Average annual (sub)	P0 (main)	P0 (sub)	P10 (main)	P10 (sub)	P20 (main)	P20 (sub)	P30 (main)	P30 (sub)	P50 (main)	P50 (sub)
114	Flensborg Fjord, ydre	110,113,114		219		102b		111b		122b		132b		142b
119	Vesterhavet, syd	119, 107, 111, 121, 120	8,538		2,720a		2,720a		2,720a		2,720a		2,720a	
120	Knudedyb	120		2,910		841a		841a		841a		841a		841a
121	Grådyb	121		2,920		842a		842a		842a		842a		842a
122	Vejle Fjord, ydre	122,123		968		516a		518a		519a		521		532
123	Vejle Fjord, indre	123		561		407		414		421		429		445
124	Kolding Fjord, indre	124		493		203a		206a		210a		224		261
125	Kolding Fjord, ydre	124,125		528		238a		242a		246a		259a		296a
127	Horsens Fjord, ydre	127,128		833		281		288		294		299		311
128	Horsens Fjord, indre	128		782		353		355		358		361		366
129	Nissum Fjord, ydre	129,131,130		2,412		1,005		1,076		1,214		1,342		1,775
130	Nissum Fjord, mellem	130,131		2,083		675a		747		885		1,080		1,593
131	Nissum Fjord, Felsted Kog	131		1,938		1,300b		1,300a		1,321a		1,385a		1,474a
132	Ringkøbing Fjord	132		4,748		2,446a		2,446		2,539aa		2,659a		2,897a
133	Vesterhavet, nord	133,129,130 ,131, 132	7,237		1,175a		1,175a		1,175a		1,175a		1,175a	
136	Randers Fjord, indre	136		2,925		2,201a		2,201a		2,201		2,222		2,402
137	Randers Fjord, ydre	136,137		3,078		1,936		2,035		2,133		2,230		2,422

No.	Name	Aggregation	Average annual (main)	Average annual (sub)	P0 (main)	P0 (sub)	P10 (main)	P10 (sub)	P20 (main)	P20 (sub)	P30 (main)	P30 (sub)	P50 (main)	P50 (sub)
138	Hevring Bugt	138, 137, 136	3,235		2,093		2,192		2,290		2,387		2,579	
139	Anholt [c)]	139	9		9		9		9		9		9	
140	Djursland Øst	140	856		538a		538a		538a		538a		538a	
141	Ebeltoft Vig [c)]	141	14		14		14		14		14		14	
142	Stavns Fjord	142		5		3a		3a		3a		3a		3a
144	Knebel Vig	144		18		8		8		8		8		8
145	Kalø Vig	144,145		190		158		161		165		168		173
146	Norsminde Fjord	146		140		58a		74a		91a		100		115
147	Århus Bugt og Begtrup Vig	144,145,147	656		425a		437a		448a		468		497	
154	Kattegat Læsø [c)]	154	78		78		78		78		78		78	
157	Bjørnholms Bugt, Riisgårde Bredning, Skive Fjord og Lovns Bredning	157,158		3,632		992b		1,101a		1,216a		1,327a		1,589
158	Hjarbæk Fjord	158		1,795		441a		499		573		648		803
159	Mariager Fjord, indre	159		516		97a		117		137		157		198
160	Mariager Fjord, ydre	159,160		963		519		564		584		604		644
165	Isefjord, indre	165		812		397		399		401		403		406
200	Kattegat Nordsjælland	1,2,24,165,200	1,857		980a		991a		1,002a		1,013a		1,035a	
201	Køge Bugt	201	1,109		419b		427b		436b		444b		461b	

No.	Name	Aggregation	Average annual (main)	Average annual (sub)	P0 (main)	P0 (sub)	P10 (main)	P10 (sub)	P20 (main)	P20 (sub)	P30 (main)	P30 (sub)	P50 (main)	P50 (sub)
204	Jammerland Bugt og Musholm Bugt	204	1,327		818a		818a		818a		818a		818a	
206	Smålandsfarvandet, åbne del	16,17,18,25,35,36,37,206	2,014		1,183		1,183		1,183		1,183		1,183	
207	Nakskov Fjord	207		454		250		252		254		257		262
208	Femerbælt	207,208,209	1,530		891a		891a		891a		891a		891a	
209	Rødsand og Bredningen	209		521		243		243		243		243		243
212	Fåborg Fjord	212		30		14a		14a		14a		14a		14a
214	Det sydfynske Øhav	68,72,212,214	633		187b		188b		189b		190b		191b	
216	Lillebælt, syd	87,101,102,103,104,105,110,113,114,216	1,309		793a		803a		813a		824a		834a	
217	Lillebælt Bredningen	74,82,106,108,109,217	956		303a		303a		303a		303a		303a	
219	Århus Bugt, syd, Samsø og Nordlige Bælthav	59,62,92,93,127,128,142,146,219	2,810		952a		952a		952a		952a		952a	
221	Skagerrak	221	1,423		1,423		1,423		1,423		1,423		1,423	
222	Kattegat Ålborg Bugt [c)]	222,159,160	2,026		1,582		1,627		1,647		1,667		1,707	
224	Nordlige Lillebælt	122,123,224	1,588		988a		988a		988a		988a		988a	

No.	Name	Aggregation	Average annual (main)	Average annual (sub)	P0 (main)	P0 (sub)	P10 (main)	P10 (sub)	P20 (main)	P20 (sub)	P30 (main)	P30 (sub)	P50 (main)	P50 (sub)
225	Nordlige Kattegat Ålbæk Bugt	225	706		529		529		529		529		529	
231	Lillebælt Snævringen	231,124,125 ,80	789		134a		134a		134a		134a		150a	
232	Nissum Bredning	232	880		335b		344b		353b		361b		381b	
233	Kaas Bredning og Venø Bugt	232,233		1,955		837a		864a		933		1,042		1,262
234	Løgstør Bredning	157,158,234 , 233, 236		4,336		2,127a		2,240a		2,353a		2,466a		2,691a
235	Nibe Bredning og Langerak	157, 158, 233, 234, 235, 236, 238	11,064		6,183a		6,296a		6,419		6,577		6,978	
236	Thisted Bredning	236		1,091		292a		302a		312a		322a		342a
238	Halkær Bredning	238		620		114b		114b		123a		168a		345
	Danish N-load ***(National MAI)***		58,100		27,555	27,863	28,157	28,493	29,245	27,555	27,863	28,157	28,493	

[a] Truncated at land-based reference N-load for one indicator

[b] Truncated at land-based reference N-load for two indicators

[c] Chlorophyll-a and light GM target obtained based on measurement (and independent of reductions from neighbouring countries or atmospheric depositions

2.4 Closing remarks

The estimated Maximum Allowable Nitrogen Input (N-MAI) to Danish water bodies presented in this report is based on the preconditions that the BSAP, the RBMP 2015-2021, and the NEC directive will be fully implemented. These treaties have been adopted but not yet fully implemented. These assumptions, which have not been assessed as part of this study, are accepted as preconditions.

If the preconditions are fulfilled, and the MAI for Danish water bodies is reached by the end of 2027, all Danish water bodies will most likely not have reached Good Ecological Status (GES) as defined in the WFD. This is because:

- The MAI estimation is based on the depth of light as a proxy for the indicator eelgrass depth limit. Hence, even if light has reached the target value, recovery of eelgrass after light improvements may take years to decades. In addition, other factors, such as sediment suitability, lack of seedlings, etc., may delay or prevent eelgrass recovery.

- With the given preconditions in management scenario 1, one or both of the indicators (chlorophyll-a and light) may not reach the target value despite reductions from Danish catchments. In these situations, the reduction requirement for that indicator is cut off/truncated at the reference loading. A cut-off at reference loading indicates that due to the scenario and associated preconditions, a specific MAI for that water body that ensures GES cannot be obtained, and administrative choices have to be made, like applying an average reduction from neighbouring water bodies, reductions to down-stream water bodies or a general MAI (kg/ha) for those water bodies. However, the implication is that GES for both indicators cannot be expected in these water bodies, even if MAI is obtained.

- The method is not based on the one-out-all-out principle as required in the WFD, but on an average of two indicators. Hence, it is expected that both indicators will be as close to the target value as possible, but one will theoretically be above and one below the target value.

- In this management scenario, we are using the boundary between good and moderate status as the target value for each of the indicators. Due to uncertainties, there is a 50% chance that the indicator value will end in good status and a 50% chance that the indicator value will end in moderate status, if MAI for that indicator is reached, assuming the measured indicator follows a symmetrical distribution.

- As some ecosystems respond with significant time-lags to changes in loadings, it will take years before the full environmental effects of nutrient reductions can be observed. Hence, reaching MAI will provide the conditions for obtaining GES but the achievement of GES will likely be delayed.

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Appendix A – Maximum Allowable Nitrogen Inputs (N-MAIs) based on WFD scenario 1a and assuming 0% reduction in Danish land-based P-loads

Table A- 1 Water body-specific MAIs based on the two individual indicators chlorophyll-a (Chl-a) and light penetration depth (light) estimated from statistical models (STAT) and mechanistic models (MEK), respectively.
The table shows both the individual calculations and the averaged water-specific MAIs (without any aggregation) and the corresponding need for reduction in %. The data in this table are based on WFD scenario 1a and Danish land-based P-reductions set at 0%.

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
1	Roskilde Fjord,ydre	1,2	764			604	351		478	478	37
2	Roskilde Fjord, indre	2	388	297		370	292	297	331	314	19
6	Nordlige Øresund	6	1,098			1,098	134		616	616	44
16	Korsør Nor	16	40			40	9		24	24	39
17	Basnæs Nor	17	69			69	10		40	40	42
18	Holsteinborg Nor	18	22			22	20		21	21	5
24	Isefjord, ydre	24,165	899	255	302	319	355	278	337	308	66
25	Skælskør Fjord og Nor	25	44			33	22		27	27	37
28	Sejerø Bugt	28	164			164	53		108	108	34
29	Kalundborg Fjord	29	69	13	13	18	38	13	28	21	70
34	Smålandsfarvandet, syd	34	523			523	112		318	318	39
35	Karrebæk Fjord	35	1,272			1,272	460		866	866	32
36	Dybsø Fjord	36	61			57	61		59	59	4
37	Avnø Fjord	37	238			238	74		156	156	34
38	Guldborgsund	38	419			419	419		419	419	0
44	Hjelm Bugt	44	91			23	91		57	57	37
45	Grønsund	45	278			278	44		161	161	42

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
46	Fakse Bugt	46,47	509			107	107		107	107	79
47	Præstø Fjord	47	208			133	67		100	100	52
48	Stege Bugt	48,49	259			259	97		178	178	31
49	Stege Nor	49	24			17	5		11	11	55
56	Østersøen, Bornholm	56	860			184	184		184	184	79
57	Østersøen, Christiansø	57	3			0	0		0	0	97
59	Nærå Strand	59	98			22	22		22	22	77
62	Lillestrand	62	11			7	3		5	5	57
68	Lindelse Nor	68	50			50	28		39	39	22
72	Kløven	72	43			43	22		32	32	25
74	Bredningen	74	128			42	42		42	42	67
80	Gamborg Fjord	80	80			44	80		62	62	23
82	Aborg Minde Nor	82	152			34	34		34	34	78
83	Holckenhavn Fjord	83	289			81	87		84	84	71
84	Kerteminde Fjord	84,85	50			23	50		37	37	27
85	Kertinge Nor	85	24	20		21	6	20	14	17	29
86	Nyborg Fjord	83,86	308			130	190		160	160	48
87	Helnæs Bugt	87	216			67	150		109	109	50
89	Lunkebugten	89	16			5	10		7	7	53

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
90	Langelandssund	83,86,89,90	768			197	577		387	387	50
92	Odense Fjord, ydre	92,93	1,359	620	861	853	738	741	796	768	43
93	Odense Fjord, Seden Strand	93	1,288		583	1,288	390	583	839	711	45
95	Storebælt SV	95	188			41	188		115	115	39
96	Storebælt NV	96, 84, 85	227			38	227		132	132	42
101	Genner Bugt	101	35			13	13		13	13	62
102	Åbenrå Fjord	102	130	59		59	59	59	59	59	55
103	Als Fjord	103,104,105	269			67	72		70	70	74
104	Als Sund	104	68			68	68		68	68	0
105	Augustenborg Fjord	105	62	29		42	55	29	49	39	38
106	Haderslev Fjord	106	239			104	139		122	122	49
107	Juvre Dyb	107	349			119			119	119	66
108	Avnø Vig	108	60			28	20		24	24	60
109	Hejlsminde Nor	109	138			111	58		84	84	39
110	Nybøl Nor	110	66			34	32		33	33	50
111	Lister Dyb	111	2,155			714			714	714	67
113	Flensborg Fjord, indre	113	51	19		19	21	19	20	20	62
114	Flensborg Fjord, ydre	110,113,114	219	137		66	66	137	66	102	54

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
119	Vesterhavet, syd	119, 107, 111, 121, 120	8,538			3,934			3,934	3,934	54
120	Knudedyb	120	2,910	841		841		841	841	841	71
121	Grådyb	121	2,920			842			842	842	71
122	Vejle Fjord, ydre	122,123	968			403	629		516	516	47
123	Vejle Fjord, indre	123	561	475	308	470	376	391	423	407	28
124	Kolding Fjord, indre	124	493	188		220	216	188	218	203	59
125	Kolding Fjord, ydre	124,125	528			278	318		298	298	44
127	Horsens Fjord, ydre	127,128	833			416	146		281	281	66
128	Horsens Fjord, indre	128	782			375	330		353	353	55
129	Nissum Fjord, ydre	129,131,130	2,412			1,294	798		1,046	1,046	57
130	Nissum Fjord, mellem	130,131	2,083			852	498		675	675	68
131	Nissum Fjord, Felsted Kog	131	1,938	1,938		662	662	1,938	662	1,300	33
132	Ringkøbing Fjord	132	4,747		1,679	4,748	1,679	1,679	3,213	2,446	48
133	Vesterhavet, nord	133,129,130 ,131, 132	7,239			1,176			1,176	1,176	84
136	Randers Fjord, indre	136	2,925	2,925	1,477	2,925	1,477	2,201	2,201	2,201	25
137	Randers Fjord, ydre	136,137	3,078	3,078	793	3,078	793	1,936	1,936	1,936	37
138	Hevring Bugt	138, 137, 136	2,822		3,235	1,770	3,235		2,503	2,503	11

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
139	Anholt	139	9			9	9		9	9	0
140	Djursland Øst	140	856			219	856		538	538	37
141	Ebeltoft Vig	141	14			14	14		14	14	0
142	Stavns Fjord	142	5			5	1		3	3	37
144	Knebel Vig	144	18			6	11		8	8	56
145	Kalø Vig	144,145	190	163	143	152	174	153	163	158	17
146	Norsminde Fjord	146	140			69	47		58	58	59
147	Århus Bugt og Begtrup Vig	144,145,147	656	250	539	254	656	395	455	425	35
154	Kattegat Læsø	154	78			78	78		78	78	0
157	Bjørnholms Bugt, Riisgårde Bredning, Skive Fjord og Lovns Bredning	157,158	3,633			992	992		992	992	73
158	Hjarbæk Fjord	158	1,795			411	471		441	441	75
159	Mariager Fjord, indre	159	516			79	115		97	97	81
160	Mariager Fjord, ydre	159,160	963			730	309		519	519	46
165	Isefjord, indre	165	812	263		287	773	263	530	397	51
200	Kattegat Nordsjælland	1,2,24,165,200	1,857			1,857	629		1,243	1,243	33
201	Køge Bugt	201	1,109	589		249	249	589	249	419	62
204	Jammerland Bugt og Musholm Bugt	204	1,327			1,327	308		818	818	38

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
206	Smålandsfarvandet, åbne del	16,17,18,25,35,36,37,206	2,014			1,684	681		1,182	1,182	41
207	Nakskov Fjord	207	454			341	158		250	250	45
208	Femerbælt	207,208,209	1,530			252	1,530		891	891	42
209	Rødsand og Bredningen	209	521			255	231		243	243	53
212	Fåborg Fjord	212	30			10	18		14	14	53
214	Det sydfynske Øhav	68,72,212,214	633	176	220	176	176	198	176	187	70
216	Lillebælt, syd	87,101,102,103,104,105,110,113,114,216	1,309			462	1,309		885	885	32
217	Lillebælt Bredningen	74,82,106,108,109,217	956	276		276	386	276	331	303	68
219	Århus Bugt, syd, Samsø og Nordlige Bælthav	59,62,92,93,127,128,142,146,219	2,810			626	1,278		952	952	66
221	Skagerrak	221	1,423			1,423			1,423	1,423	0
222	Kattegat Ålborg Bugt	222,159,160	2,026			2,026	2,026		2,026	2,026	0
224	Nordlige Lillebælt	122,123,224	1,588			389	1,588		988	988	38
225	Nordlige Kattegat Ålbæk Bugt	225	706			353	706		529	529	25
231	Lillebælt Snævringen	231,124,125,80	789		134		134	134	134	134	83

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
232	Nissum Bredning	232	880	297	449	297	297	373	297	335	62
233	Kaas Bredning og Venø Bugt	232,233	1,955			1,062	611		837	837	57
234	Løgstør Bredning	157,158,234, 233, 236	6,502			1,980	2,274		2,127	2,127	67
235	Nibe Bredning og Langerak	157, 158, 233, 234, 235, 236, 238	11,063		6,897	2,442	5,836	6,897	4,139	5,518	50
236	Thisted Bredning	236	1,091			269	314		292	292	73
238	Halkær Bredning	238	620			114	114		114	114	82

Appendix B – Maximum Allowable Nitrogen Inputs (N-MAIs) based on WFD scenario 1a and assuming 10% reduction in Danish land-based P-loads

Table B- 1 Water body-specific MAIs based on the two individual indicators chlorophyll-a (Chl-a) and light penetration depth (light) estimated from statistical models (STAT) and mechanistic models (MEK), respectively.
The table shows both the individual calculations as well as the averaged water-specific MAIs (without any aggregation) and the corresponding need for reduction in %. The data in this table are based on WFD scenario 1a and Danish land-based P-reductions set at 10%.

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
1	Roskilde Fjord,ydre	1,2	764			604	355		480	480	37
2	Roskilde Fjord, indre	2	388	297		374	296	297	335	316	19
6	Nordlige Øresund	6	1,098			1,098	134		616	616	44
16	Korsør Nor	16	40			40	10		25	25	38
17	Basnæs Nor	17	69			69	10		40	40	42
18	Holsteinborg Nor	18	22			22	20		21	21	4
24	Isefjord, ydre	24,165	899	275	317	319	356	296	338	317	65
25	Skælskør Fjord og Nor	25	44			33	23		28	28	35
28	Sejerø Bugt	28	164			164	53		108	108	34
29	Kalundborg Fjord	29	69	13	17	18	39	15	28	22	69
34	Smålandsfarvandet, syd	34	523			523	112		318	318	39
35	Karrebæk Fjord	35	1,272			1,272	525		898	898	29
36	Dybsø Fjord	36	61			59	61		60	60	2
37	Avnø Fjord	37	238			238	79		158	158	33
38	Guldborgsund	38	419			419	419		419	419	0
44	Hjelm Bugt	44	91			24	91		58	58	37

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
45	Grønsund	45	278			278	44		161	161	42
46	Fakse Bugt	46,47	509			107	107		107	107	79
47	Præstø Fjord	47	208			135	72		103	103	50
48	Stege Bugt	48,49	259			259	97		178	178	31
49	Stege Nor	49	24			17	5		11	11	54
56	Østersøen, Bornholm	56	860			184	184		184	184	79
57	Østersøen, Christiansø	57	3			0	0		0	0	97
59	Nærå Strand	59	98			22	22		22	22	77
62	Lillestrand	62	11			7	3		5	5	57
68	Lindelse Nor	68	50			50	29		39	39	21
72	Kløven	72	43			43	22		32	32	25
74	Bredningen	74	128			42	42		42	42	67
80	Gamborg Fjord	80	80			44	80		62	62	23
82	Aborg Minde Nor	82	152			34	34		34	34	78
83	Holckenhavn Fjord	83	290			81	98		89	89	69
84	Kerteminde Fjord	84,85	50			23	50		37	37	27
85	Kertinge Nor	85	24	20		21	6	20	14	17	28
86	Nyborg Fjord	83,86	308			130	193		162	162	48
87	Helnæs Bugt	87	216			67	150		109	109	50

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
89	Lunkebugten	89	16			5	10		7	7	53
90	Langelandssund	83,86,89,90	768			197	577		387	387	50
92	Odense Fjord, ydre	92,93	1,358	620	861	861	774	741	818	779	43
93	Odense Fjord, Seden Strand	93	1,288		583	1,288	390	583	839	711	45
95	Storebælt SV	95	188			41	188		115	115	39
96	Storebælt NV	96, 84, 85	227			38	227		132	132	42
101	Genner Bugt	101	35			13	13		13	13	62
102	Åbenrå Fjord	102	130	59		59	59	59	59	59	55
103	Als Fjord	103,104,105	269			67	72		70	70	74
104	Als Sund	104	68			68	68		68	68	0
105	Augustenborg Fjord	105	62	29		42	55	29	49	39	38
106	Haderslev Fjord	106	239			104	141		123	123	49
107	Juvre Dyb	107	349			119			119	119	66
108	Avnø Vig	108	60			30	20		25	25	58
109	Hejlsminde Nor	109	138			122	58		90	90	35
110	Nybøl Nor	110	66			35	34		34	34	48
111	Lister Dyb	111	2,155			714			714	714	67
113	Flensborg Fjord, indre	113	51	19		19	21	19	20	20	62
114	Flensborg Fjord, ydre	110,113,114	219	157		66	66	157	66	111	49

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
119	Vesterhavet, syd	119, 107, 111, 121, 120	8,538			3,934			3,934	3,934	54
120	Knudedyb	120	2,910	841		841		841	841	841	71
121	Grådyb	121	2,920			842			842	842	71
122	Vejle Fjord, ydre	122,123	968			403	633		518	518	46
123	Vejle Fjord, indre	123	561	488	322	470	377	405	423	414	26
124	Kolding Fjord, indre	124	493	188		224	226	188	225	206	58
125	Kolding Fjord, ydre	124,125	528			278	326		302	302	43
127	Horsens Fjord, ydre	127,128	833			425	151		288	288	65
128	Horsens Fjord, indre	128	782			376	334		355	355	55
129	Nissum Fjord, ydre	129,131,130	2,412			1,370	885		1,128	1,128	53
130	Nissum Fjord, mellem	130,131	2,083			936	558		747	747	64
131	Nissum Fjord, Felsted Kog	131	1,938	1,938		662	662	1,938	662	1,300	33
132	Ringkøbing Fjord	132	4,747		1,679	4,748	1,679	1,679	3,213	2,446	48
133	Vesterhavet, nord	133,129,130 ,131, 132	7,239			1,176			1,176	1,176	84
136	Randers Fjord, indre	136	2,925	2,925	1,477	2,925	1,477	2,201	2,201	2,201	25
137	Randers Fjord, ydre	136,137	3,078	3,078	992	3,078	992	2,035	2,035	2,035	34
138	Hevring Bugt	138, 137, 136	2,823		3,235	1,772	3,235		2,504	2,504	11

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
139	Anholt	139	9			9	9		9	9	0
140	Djursland Øst	140	856			219	856		538	538	37
141	Ebeltoft Vig	141	14			14	14		14	14	0
142	Stavns Fjord	142	5			5	1		3	3	37
144	Knebel Vig	144	18			6	11		8	8	56
145	Kalø Vig	144,145	190	170	150	152	174	160	163	161	15
146	Norsminde Fjord	146	140			101	47		74	74	47
147	Århus Bugt og Begtrup Vig	144,145,147	656	250	587	254	656	418	455	437	33
154	Kattegat Læsø	154	78			78	78		78	78	0
157	Bjørnholms Bugt, Riisgårde Bredning, Skive Fjord og Lovns Bredning	157,158	3,632			992	1,209		1,101	1,101	70
158	Hjarbæk Fjord	158	1,795			418	580		499	499	72
159	Mariager Fjord, indre	159	516			82	152		117	117	77
160	Mariager Fjord, ydre	159,160	963			765	398		581	581	40
165	Isefjord, indre	165	812	263		287	781	263	534	399	51
200	Kattegat Nordsjælland	1,2,24,165,200	1,857			1,857	629		1,243	1,243	33
201	Køge Bugt	201	1,109	605		249	249	605	249	427	61
204	Jammerland Bugt og Musholm Bugt	204	1,327			1,327	308		818	818	38

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
206	Smålandsfarvandet, åbne del	16,17,18,25, 35,36,37,206	2,014			1,684	681		1,182	1,182	41
207	Nakskov Fjord	207	454			343	161		252	252	44
208	Femerbælt	207,208,209	1,530			252	1,530		891	891	42
209	Rødsand og Bredningen	209	521			255	231		243	243	53
212	Fåborg Fjord	212	30			10	18		14	14	53
214	Det sydfynske Øhav	68,72,212,214	633	176	223	176	176	200	176	188	70
216	Lillebælt, syd	87,101,102, 103,104,105,110,113,114,216	1,309			462	1,309		885	885	32
217	Lillebælt Bredningen	74,82,106,108,109,217	956	276		276	386	276	331	303	68
219	Århus Bugt, syd, Samsø og Nordlige Bælthav	59,62,92,93, 127,128,142,146,219	2,810			626	1,278		952	952	66
221	Skagerrak	221	1,423			1,423			1,423	1,423	0
222	Kattegat Ålborg Bugt	222,159,160	2,026			2,026	2,026		2,026	2,026	0
224	Nordlige Lillebælt	122,123,224	1,588			389	1,588		988	988	38
225	Nordlige Kattegat Ålbæk Bugt	225	706			353	706		529	529	25
231	Lillebælt Snævringen	231,124,125,80	789		134		134	134	134	134	83

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
232	Nissum Bredning	232	880	297	484	297	297	391	297	344	61
233	Kaas Bredning og Venø Bugt	232,233	1,955			1,117	611		864	864	56
234	Løgstør Bredning	157,158,234, 233, 236	6,502			1,980	2,500		2,240	2,240	66
235	Nibe Bredning og Langerak	157, 158, 233, 234, 235, 236, 238	11,064		7,122	2,442	6,518	7,122	4,480	5,801	48
236	Thisted Bredning	236	1,091			269	335		302	302	72
238	Halkær Bredning	238	619			114	114		114	114	82

Appendix C – Maximum Allowable Nitrogen Inputs (N-MAIs) based on WFD scenario 1a and assuming 20% reduction in Danish land-based P-loads

Table C- 1 Water body-specific MAIs based on the two individual indicators chlorophyll-a (Chl-a) and light penetration depth (light) estimated from statistical models (STAT) and mechanistic models (MEK), respectively.
The table shows both the individual calculations and the averaged water-specific MAIs (without any aggregation) and the corresponding need for reduction in %. The data in this table are based on WFD scenario 1a and Danish land-based P-reductions set at 20%.

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
1	Roskilde Fjord,ydre	1,2	764			604	359		482	482	37
2	Roskilde Fjord, indre	2	388	297		377	300	297	339	318	18
6	Nordlige Øresund	6	1,098			1,098	134		616	616	44
16	Korsør Nor	16	40			40	11		25	25	36
17	Basnæs Nor	17	69			69	10		40	40	42
18	Holsteinborg Nor	18	22			22	21		21	21	3
24	Isefjord, ydre	24,165	899	294	333	319	356	314	338	326	64
25	Skælskør Fjord og Nor	25	44			34	25		29	29	33
28	Sejerø Bugt	28	164			164	53		108	108	34
29	Kalundborg Fjord	29	69	13	23	18	39	18	28	23	67
34	Smålandsfarvandet, syd	34	523			523	112		318	318	39
35	Karrebæk Fjord	35	1,272			1,272	586		929	929	27
36	Dybsø Fjord	36	61			61	61		61	61	0
37	Avnø Fjord	37	238			238	84		161	161	32
38	Guldborgsund	38	419			419	419		419	419	0
44	Hjelm Bugt	44	91			25	91		58	58	36
45	Grønsund	45	278			278	44		161	161	42

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
46	Fakse Bugt	46,47	509			107	107		107	107	79
47	Præstø Fjord	47	208			137	76		107	107	49
48	Stege Bugt	48,49	259			259	97		178	178	31
49	Stege Nor	49	24			17	5		11	11	54
56	Østersøen, Bornholm	56	860			184	184		184	184	79
57	Østersøen, Christiansø	57	3			0	0		0	0	97
59	Nærå Strand	59	98			27	28		28	28	72
62	Lillestrand	62	11			7	3		5	5	56
68	Lindelse Nor	68	50			50	29		39	39	21
72	Kløven	72	43			43	22		32	32	25
74	Bredningen	74	128			45	42		44	44	66
80	Gamborg Fjord	80	80			44	80		62	62	23
82	Aborg Minde Nor	82	152			34	34		34	34	78
83	Holckenhavn Fjord	83	290			81	110		95	95	67
84	Kerteminde Fjord	84,85	50			23	50		37	37	27
85	Kertinge Nor	85	24	21		21	7	21	14	18	25
86	Nyborg Fjord	83,86	308			134	198		166	166	46
87	Helnæs Bugt	87	216			67	150		109	109	50
89	Lunkebugten	89	16			5	10		7	7	53

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
90	Langelandssund	83,86,89,90	768			197	577		387	387	50
92	Odense Fjord, ydre	92,93	1,358	620	861	871	811	741	841	791	42
93	Odense Fjord, Seden Strand	93	1,288		583	1,288	401	583	844	714	45
95	Storebælt SV	95	188			41	188		115	115	39
96	Storebælt NV	96, 84, 85	227			38	227		132	132	42
101	Genner Bugt	101	35			13	13		13	13	62
102	Åbenrå Fjord	102	130	59		59	59	59	59	59	55
103	Als Fjord	103,104,105	269			67	72		70	70	74
104	Als Sund	104	68			68	68		68	68	0
105	Augustenborg Fjord	105	62	29		42	55	29	49	39	38
106	Haderslev Fjord	106	239			104	142		123	123	49
107	Juvre Dyb	107	349			119			119	119	66
108	Avnø Vig	108	60			31	22		27	27	55
109	Hejlsminde Nor	109	138			135	59		97	97	30
110	Nybøl Nor	110	66			36	35		36	36	46
111	Lister Dyb	111	2,155			714			714	714	67
113	Flensborg Fjord, indre	113	51	19		19	21	19	20	20	62
114	Flensborg Fjord, ydre	110,113,114	219	177		66	66	177	66	121	44

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
119	Vesterhavet, syd	119, 107, 111, 121, 120	8,538			3,934			3,934	3,934	54
120	Knudedyb	120	2,910	841		841		841	841	841	71
121	Grådyb	121	2,920			842			842	842	71
122	Vejle Fjord, ydre	122,123	968			403	636		519	519	46
123	Vejle Fjord, indre	123	561	502	336	471	377	419	424	421	25
124	Kolding Fjord, indre	124	493	188		228	237	188	233	210	57
125	Kolding Fjord, ydre	124,125	528			278	332		305	305	42
127	Horsens Fjord, ydre	127,128	833			433	155		294	294	65
128	Horsens Fjord, indre	128	782			378	338		358	358	54
129	Nissum Fjord, ydre	129,131,130	2,412			1,476	971		1,223	1,223	49
130	Nissum Fjord, mellem	130,131	2,083			1,071	699		885	885	58
131	Nissum Fjord, Felsted Kog	131	1,938	1,938		662	745	1,938	703	1,321	32
132	Ringkøbing Fjord	132	4,748		1,679	4,748	2,052	1,679	3,400	2,540	47
133	Vesterhavet, nord	133,129,130 ,131, 132	7,239			1,176			1,176	1,176	84
136	Randers Fjord, indre	136	2,925	2,925	1,477	2,925	1,477	2,201	2,201	2,201	25
137	Randers Fjord, ydre	136,137	3,078	3,078	1,188	3,078	1,188	2,133	2,133	2,133	31
138	Hevring Bugt	138, 137, 136	2,823		3,235	1,772	3,235		2,504	2,504	11

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
139	Anholt	139	9			9	9		9	9	0
140	Djursland Øst	140	856			219	856		538	538	37
141	Ebeltoft Vig	141	14			14	14		14	14	0
142	Stavns Fjord	142	5			5	1		3	3	37
144	Knebel Vig	144	18			6	11		8	8	56
145	Kalø Vig	144,145	190	177	157	152	174	167	163	165	13
146	Norsminde Fjord	146	140			136	47		91	91	35
147	Århus Bugt og Begtrup Vig	144,145,147	656	250	633	254	656	442	455	448	32
154	Kattegat Læsø	154	78			78	78		78	78	0
157	Bjørnholms Bugt, Riisgårde Bredning, Skive Fjord og Lovns Bredning	157,158	3,632			992	1,440		1,216	1,216	67
158	Hjarbæk Fjord	158	1,795			459	687		573	573	68
159	Mariager Fjord, indre	159	516			87	188		137	137	73
160	Mariager Fjord, ydre	159,160	963			806	481		643	643	33
165	Isefjord, indre	165	812	263		287	790	263	538	401	51
200	Kattegat Nordsjælland	1,2,24,165,200	1,857			1,857	629		1,243	1,243	33
201	Køge Bugt	201	1,109	622		249	249	622	249	436	61
204	Jammerland Bugt og Musholm Bugt	204	1,327			1,327	308		818	818	38

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
206	Smålandsfarvandet, åbne del	16,17,18,25,35,36,37,206	2,014			1,684	681		1,182	1,182	41
207	Nakskov Fjord	207	454			345	164		254	254	44
208	Femerbælt	207,208,209	1,530			252	1,530		891	891	42
209	Rødsand og Bredningen	209	521			255	231		243	243	53
212	Fåborg Fjord	212	30			10	18		14	14	53
214	Det sydfynske Øhav	68,72,212,214	633	176	227	176	176	201	176	189	70
216	Lillebælt, syd	87,101,102,103,104,105,110,113,114,216	1,309			462	1,309		885	885	32
217	Lillebælt Bredningen	74,82,106,108,109,217	956	276		276	386	276	331	303	68
219	Århus Bugt, syd, Samsø og Nordlige Bælthav	59,62,92,93,127,128,142,146,219	2,810			626	1,278		952	952	66
221	Skagerrak	221	1,423			1,423			1,423	1,423	0
222	Kattegat Ålborg Bugt	222,159,160	2,026			2,026	2,026		2,026	2,026	0
224	Nordlige Lillebælt	122,123,224	1,588			389	1,588		988	988	38
225	Nordlige Kattegat Ålbæk Bugt	225	706			353	706		529	529	25
231	Lillebælt Snævringen	231,124,125,80	789		134		134	134	134	134	83

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
232	Nissum Bredning	232	880	297	519	297	297	408	297	353	60
233	Kaas Bredning og Venø Bugt	232,233	1,955			1,174	693		933	933	52
234	Løgstør Bredning	157,158,234, 233, 236	6,502			1,980	2,727		2,353	2,353	64
235	Nibe Bredning og Langerak	157, 158, 233, 234, 235, 236, 238	11,065		7,345	2,653	7,195	7,345	4,924	6,134	45
236	Thisted Bredning	236	1,091			269	355		312	312	71
238	Halkær Bredning	238	620			114	133		123	123	80

Appendix D – Maximum Allowable Nitrogen Inputs (N-MAIs) based on WFD scenario 1a and assuming 30% reduction in Danish land-based P-loads

Table D- 1 Water body-specific MAIs based on the two individual indicators chlorophyll-a (Chl-a) and light penetration depth (light) estimated from statistical models (STAT) and mechanistic models (MEK) respectively.
The table shows both the individual calculations and the averaged water-specific MAIs (without any aggregation) and the corresponding need for reduction in %. The data in this table are based on WFD scenario 1a and Danish land-based P-reductions set at 30%.

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
1	Roskilde Fjord,ydre	1,2	764			604	363		483	483	37
2	Roskilde Fjord, indre	2	388	297		381	304	297	342	320	18
6	Nordlige Øresund	6	1,098			1,098	134		616	616	44
16	Korsør Nor	16	40			40	12		26	26	35
17	Basnæs Nor	17	69			69	10		40	40	42
18	Holsteinborg Nor	18	22			22	21		22	22	2
24	Isefjord, ydre	24,165	899	314	348	319	357	331	338	335	63
25	Skælskør Fjord og Nor	25	44			34	26		30	30	31
28	Sejerø Bugt	28	164			164	53		108	108	34
29	Kalundborg Fjord	29	69	13	29	18	39	21	28	25	64
34	Smålandsfarvandet, syd	34	523			523	112		318	318	39
35	Karrebæk Fjord	35	1,272			1,272	646		959	959	25
36	Dybsø Fjord	36	61			61	61		61	61	0
37	Avnø Fjord	37	238			238	89		163	163	31
38	Guldborgsund	38	419			419	419		419	419	0
44	Hjelm Bugt	44	91			26	91		59	59	36

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
45	Grønsund	45	278			278	44		161	161	42
46	Fakse Bugt	46,47	509			107	107		107	107	79
47	Præstø Fjord	47	208			139	81		110	110	47
48	Stege Bugt	48,49	259			259	97		178	178	31
49	Stege Nor	49	24			17	5		11	11	53
56	Østersøen, Bornholm	56	860			184	184		184	184	79
57	Østersøen, Christiansø	57	3			0	0		0	0	97
59	Nærå Strand	59	98			34	40		37	37	63
62	Lillestrand	62	11			7	3		5	5	56
68	Lindelse Nor	68	50			50	29		39	39	21
72	Kløven	72	43			43	22		32	32	25
74	Bredningen	74	128			49	49		49	49	62
80	Gamborg Fjord	80	80			44	80		62	62	23
82	Aborg Minde Nor	82	152			34	34		34	34	78
83	Holckenhavn Fjord	83	289			91	121		106	106	63
84	Kerteminde Fjord	84,85	50			23	50		37	37	27
85	Kertinge Nor	85	24	22		21	8	22	14	18	23
86	Nyborg Fjord	83,86	308			139	201		170	170	45
87	Helnæs Bugt	87	216			67	150		109	109	50

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
89	Lunkebugten	89	16			5	10		7	7	53
90	Langelandssund	83,86,89,90	768			197	577		387	387	50
92	Odense Fjord, ydre	92,93	1,358	620	861	878	848	741	863	802	41
93	Odense Fjord, Seden Strand	93	1,288		583	1,288	472	583	880	732	43
95	Storebælt SV	95	188			41	188		115	115	39
96	Storebælt NV	96, 84, 85	227			38	227		132	132	42
101	Genner Bugt	101	35			13	13		13	13	62
102	Åbenrå Fjord	102	130	59		59	59	59	59	59	55
103	Als Fjord	103,104,105	269			67	72		70	70	74
104	Als Sund	104	68			68	68		68	68	0
105	Augustenborg Fjord	105	62	29		42	55	29	49	39	38
106	Haderslev Fjord	106	239			104	143		124	124	48
107	Juvre Dyb	107	349			119			119	119	66
108	Avnø Vig	108	60			34	25		29	29	51
109	Hejlsminde Nor	109	138			138	69		103	103	25
110	Nybøl Nor	110	66			37	37		37	37	44
111	Lister Dyb	111	2,155			714			714	714	67
113	Flensborg Fjord, indre	113	51	19		19	21	19	20	20	62
114	Flensborg Fjord, ydre	110,113,114	219	199		66	66	199	66	132	39

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
119	Vesterhavet, syd	119, 107, 111, 121, 120	8,538			3,934			3,934	3,934	54
120	Knudedyb	120	2,910	841		841		841	841	841	71
121	Grådyb	121	2,920			842			842	842	71
122	Vejle Fjord, ydre	122,123	968			403	639		521	521	46
123	Vejle Fjord, indre	123	561	516	350	472	378	433	425	429	24
124	Kolding Fjord, indre	124	493	207		233	248	207	240	224	55
125	Kolding Fjord, ydre	124,125	528			278	339		309	309	42
127	Horsens Fjord, ydre	127,128	833			441	158		299	299	64
128	Horsens Fjord, indre	128	782			379	342		361	361	54
129	Nissum Fjord, ydre	129,131,130	2,412			1,629	1,056		1,342	1,342	44
130	Nissum Fjord, mellem	130,131	2,083			1,323	838		1,080	1,080	48
131	Nissum Fjord, Felsted Kog	131	1,938	1,938		711	953	1,938	832	1,385	29
132	Ringkøbing Fjord	132	4,748		1,679	4,748	2,530	1,679	3,639	2,659	44
133	Vesterhavet, nord	133,129,130 ,131, 132	7,239			1,176			1,176	1,176	84
136	Randers Fjord, indre	136	2,925	2,925	1,520	2,925	1,520	2,222	2,222	2,222	24
137	Randers Fjord, ydre	136,137	3,078	3,078	1,382	3,078	1,382	2,230	2,230	2,230	28
138	Hevring Bugt	138, 137, 136	2,824		3,235	1,774	3,235		2,505	2,505	11

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
139	Anholt	139	9			9	9		9	9	0
140	Djursland Øst	140	856			219	856		538	538	37
141	Ebeltoft Vig	141	14			14	14		14	14	0
142	Stavns Fjord	142	5			5	1		3	3	37
144	Knebel Vig	144	18			6	11		8	8	56
145	Kalø Vig	144,145	190	184	163	152	174	174	163	168	11
146	Norsminde Fjord	146	140			140	60		100	100	29
147	Århus Bugt og Begtrup Vig	144,145,147	656	304	656	254	656	480	455	468	29
154	Kattegat Læsø	154	78			78	78		78	78	0
157	Bjørnholms Bugt, Riisgårde Bredning, Skive Fjord og Lovns Bredning	157,158	3,632			992	1,662		1,327	1,327	63
158	Hjarbæk Fjord	158	1,795			504	792		648	648	64
159	Mariager Fjord, indre	159	516			92	222		157	157	69
160	Mariager Fjord, ydre	159,160	963			856	557		706	706	27
165	Isefjord, indre	165	812	263		287	798	263	543	403	50
200	Kattegat Nordsjælland	1,2,24,165,200	1,857			1,857	629		1,243	1,243	33
201	Køge Bugt	201	1,109	639		249	249	639	249	444	60
204	Jammerland Bugt og Musholm Bugt	204	1,327			1,327	308		818	818	38

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
206	Smålandsfarvandet, åbne del	16,17,18,25,35,36,37,206	2,014			1,684	681		1,182	1,182	41
207	Nakskov Fjord	207	454			346	167		257	257	43
208	Femerbælt	207,208,209	1,530			252	1,530		891	891	42
209	Rødsand og Bredningen	209	521			255	231		243	243	53
212	Fåborg Fjord	212	30			10	18		14	14	53
214	Det sydfynske Øhav	68,72,212,214	633	176	230	176	176	203	176	190	70
216	Lillebælt, syd	87,101,102,103,104,105,110,113,114,216	1,309			462	1,309		885	885	32
217	Lillebælt Bredningen	74,82,106,108,109,217	956	276		276	386	276	331	303	68
219	Århus Bugt, syd, Samsø og Nordlige Bælthav	59,62,92,93,127,128,142,146,219	2,810			626	1,278		952	952	66
221	Skagerrak	221	1,423			1,423			1,423	1,423	0
222	Kattegat Ålborg Bugt	222,159,160	2,026			2,026	2,026		2,026	2,026	0
224	Nordlige Lillebælt	122,123,224	1,588			389	1,588		988	988	38
225	Nordlige Kattegat Ålbæk Bugt	225	706			353	706		529	529	25
231	Lillebælt Snævringen	231,124,125,80	789		134		134	134	134	134	83

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
232	Nissum Bredning	232	880	297	553	297	297	425	297	361	59
233	Kaas Bredning og Venø Bugt	232,233	1,955			1,233	851		1,042	1,042	47
234	Løgstør Bredning	157,158,234, 233, 236	6,501			1,980	2,952		2,466	2,466	62
235	Nibe Bredning og Langerak	157, 158, 233, 234, 235, 236, 238	11,063		7,566	3,270	7,867	7,566	5,569	6,567	41
236	Thisted Bredning	236	1,091			269	375		322	322	70
238	Halkær Bredning	238	620			114	222		168	168	73

Appendix E – Maximum Allowable Nitrogen Inputs (N-MAIs) based on WFD scenario 1a and assuming 50% reduction in Danish land-based P-loads

Table E- 1 Water body-specific MAIs based on the two individual indicators chlorophyll-a (Chl-a) and light penetration depth (light) estimated from statistical models (STAT) and mechanistic models (MEK), respectively.
The table shows both the individual calculations and the averaged water-specific MAIs (without any aggregation) and corresponding need for reduction in %. The data in this table are based on WFD scenario 1a and Danish land-based P-reductions set at 50%.

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
1	Roskilde Fjord,ydre	1,2	764			604	370		487	487	36
2	Roskilde Fjord, indre	2	388	297		388	313	297	350	324	17
6	Nordlige Øresund	6	1,098			1,098	134		616	616	44
16	Korsør Nor	16	40			40	14		27	27	33
17	Basnæs Nor	17	69			69	10		40	40	42
18	Holsteinborg Nor	18	22			22	22		22	22	1
24	Isefjord, ydre	24,165	899	354	380	319	358	367	339	353	61
25	Skælskør Fjord og Nor	25	44			35	29		32	32	27
28	Sejerø Bugt	28	164			164	53		108	108	34
29	Kalundborg Fjord	29	69	13	40	18	39	27	28	28	60
34	Smålandsfarvandet, syd	34	523			523	112		318	318	39
35	Karrebæk Fjord	35	1,272			1,272	759		1,015	1,015	20
36	Dybsø Fjord	36	61			61	61		61	61	0
37	Avnø Fjord	37	238			238	99		168	168	29
38	Guldborgsund	38	419			419	419		419	419	0
44	Hjelm Bugt	44	91			28	91		60	60	35

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
45	Grønsund	45	278			278	44		161	161	42
46	Fakse Bugt	46,47	509			107	107		107	107	79
47	Præstø Fjord	47	208			145	90		117	117	44
48	Stege Bugt	48,49	259			259	97		178	178	31
49	Stege Nor	49	24			17	6		12	12	52
56	Østersøen, Bornholm	56	860			184	184		184	184	79
57	Østersøen, Christiansø	57	3			0	0		0	0	97
59	Nærå Strand	59	98			49	63		56	56	43
62	Lillestrand	62	11			7	3		5	5	55
68	Lindelse Nor	68	50			50	29		39	39	20
72	Kløven	72	43			43	22		32	32	25
74	Bredningen	74	128			58	62		60	60	53
80	Gamborg Fjord	80	80			44	80		62	62	23
82	Aborg Minde Nor	82	152			49	34		41	41	73
83	Holckenhavn Fjord	83	290			115	144		129	129	55
84	Kerteminde Fjord	84,85	50			23	50		37	37	27
85	Kertinge Nor	85	24	24		21	9	24	15	19	19
86	Nyborg Fjord	83,86	308			149	210		179	179	42
87	Helnæs Bugt	87	216			67	150		109	109	50

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
89	Lunkebugten	89	16			5	10		7	7	53
90	Langelandssund	83,86,89,90	768			197	577		387	387	50
92	Odense Fjord, ydre	92,93	1,358	620	861	896	919	741	907	824	39
93	Odense Fjord, Seden Strand	93	1,288		583	1,288	614	583	951	767	40
95	Storebælt SV	95	188			41	188		115	115	39
96	Storebælt NV	96, 84, 85	227			38	227		132	132	42
101	Genner Bugt	101	35			13	13		13	13	62
102	Åbenrå Fjord	102	130	59		59	59	59	59	59	55
103	Als Fjord	103,104,105	269			67	72		70	70	74
104	Als Sund	104	68			68	68		68	68	0
105	Augustenborg Fjord	105	62	29		42	55	29	49	39	38
106	Haderslev Fjord	106	239			106	145		126	126	47
107	Juvre Dyb	107	349			119			119	119	66
108	Avnø Vig	108	60			39	30		34	34	43
109	Hejlsminde Nor	109	138			138	87		113	113	19
110	Nybøl Nor	110	66			40	39		40	40	40
111	Lister Dyb	111	2,155			714			714	714	67
113	Flensborg Fjord, indre	113	51	19		19	21	19	20	20	62
114	Flensborg Fjord, ydre	110,113,114	219	219		66	66	219	66	142	35

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
119	Vesterhavet, syd	119, 107, 111, 121, 120	8,538			3,934			3,934	3,934	54
120	Knudedyb	120	2,910	841		841		841	841	841	71
121	Grådyb	121	2,920			842			842	842	71
122	Vejle Fjord, ydre	122,123	968			418	645		532	532	45
123	Vejle Fjord, indre	123	561	549	377	474	379	463	427	445	21
124	Kolding Fjord, indre	124	493	266		243	269	266	256	261	47
125	Kolding Fjord, ydre	124,125	528			278	353		315	315	40
127	Horsens Fjord, ydre	127,128	833			457	166		312	312	63
128	Horsens Fjord, indre	128	782			383	350		366	366	53
129	Nissum Fjord, ydre	129,131,130	2,413			2,327	1,223		1,775	1,775	26
130	Nissum Fjord, mellem	130,131	2,083			2,083	1,103		1,593	1,593	24
131	Nissum Fjord, Felsted Kog	131	1,938	1,938		662	1,358	1,938	1,010	1,474	24
132	Ringkøbing Fjord	132	4,747		1,679	4,748	3,479	1,679	4,113	2,896	39
133	Vesterhavet, nord	133,129,130 ,131, 132	7,239			1,176			1,176	1,176	84
136	Randers Fjord, indre	136	2,924	2,925	1,879	2,925	1,879	2,402	2,402	2,402	18
137	Randers Fjord, ydre	136,137	3,078	3,078	1,765	3,078	1,765	2,422	2,422	2,422	21
138	Hevring Bugt	138, 137, 136	2,824		3,235	1,774	3,235		2,505	2,505	11

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
139	Anholt	139	9			9	9		9	9	0
140	Djursland Øst	140	856			219	856		538	538	37
141	Ebeltoft Vig	141	14			14	14		14	14	0
142	Stavns Fjord	142	5			5	1		3	3	37
144	Knebel Vig	144	18			6	11		8	8	56
145	Kalø Vig	144,145	190	190	177	152	174	183	163	173	9
146	Norsminde Fjord	146	140			140	90		115	115	18
147	Århus Bugt og Begtrup Vig	144,145,147	656	421	656	254	656	539	455	497	24
154	Kattegat Læsø	154	78			78	78		78	78	0
157	Bjørnholms Bugt, Riisgårde Bredning, Skive Fjord og Lovns Bredning	157,158	3,632			1,097	2,080		1,589	1,589	56
158	Hjarbæk Fjord	158	1,795			608	998		803	803	55
159	Mariager Fjord, indre	159	516			106	289		198	198	62
160	Mariager Fjord, ydre	159,160	963			963	694		828	828	14
165	Isefjord, indre	165	812	263		287	812	263	549	406	50
200	Kattegat Nordsjælland	1,2,24,165,200	1,857			1,857	629		1,243	1,243	33
201	Køge Bugt	201	1,109	672		249	249	672	249	461	58
204	Jammerland Bugt og Musholm Bugt	204	1,327			1,327	308		818	818	38

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
206	Smålandsfarvandet, åbne del	16,17,18,25,35,36,37,206	2,014			1,684	681		1,182	1,182	41
207	Nakskov Fjord	207	454			350	174		262	262	42
208	Femerbælt	207,208,209	1,530			252	1,530		891	891	42
209	Rødsand og Bredningen	209	521			255	231		243	243	53
212	Fåborg Fjord	212	30			10	18		14	14	53
214	Det sydfynske Øhav	68,72,212,214	633	176	237	176	176	206	176	191	70
216	Lillebælt, syd	87,101,102,103,104,105,110,113,114,216	1,309			462	1,309		885	885	32
217	Lillebælt Bredningen	74,82,106,108,109,217	956	276		276	386	276	331	303	68
219	Århus Bugt, syd, Samsø og Nordlige Bælthav	59,62,92,93,127,128,142,146,219	2,810			626	1,278		952	952	66
221	Skagerrak	221	1,423			1,423			1,423	1,423	0
222	Kattegat Ålborg Bugt	222,159,160	2,026			2,026	2,026		2,026	2,026	0
224	Nordlige Lillebælt	122,123,224	1,588			389	1,588		988	988	38
225	Nordlige Kattegat Ålbæk Bugt	225	706			353	706		529	529	25
231	Lillebælt Snævringen	231,124,125,80	789		166		134	166	134	150	81

No.	Name	Aggregation	Average annual N-load	Chl-a (STAT)	Light (STAT)	Chl-a (MEK)	Light (MEK)	N-MAI (STAT)	N-MAI (MEK)	Avg. MAI	Avg. reduction [%]
232	Nissum Bredning	232	880	307	622	297	297	464	297	381	57
233	Kaas Bredning og Venø Bugt	232,233	1,955			1,358	1,166		1,262	1,262	35
234	Løgstør Bredning	157,158,234, 233, 236	6,502			1,980	3,401		2,691	2,691	59
235	Nibe Bredning og Langerak	157, 158, 233, 234, 235, 236, 238	11,064		8,004	4,628	9,198	8,004	6,913	7,458	33
236	Thisted Bredning	236	1,091			269	415		342	342	69
238	Halkær Bredning	238	620			291	400		345	345	44