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Annex

REPORT ON THE IMPLEMENTATION OF THE WATER FRAMEWORK DIRECTIVE

ASSESSMENT OF NORWAY'S
RIVER BASIN MANAGEMENT PLANS

April 2025

Contents

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Executive summary

Norway has produced 12 river basin management plans (RBMPs) for the period 2022-2027, which constitutes Norway's second full planning cycle for the implementation of the Water Framework Directive (WFD).

Norway has a well organised governance structure for its water management, with coordination among relevant sectoral authorities. National guidance documents give a good overview of legal and administrative tools and division of responsibilities.

Of Norway's 32,399 surface water bodies, 23,301 are river water bodies, 6,803 lake water bodies, 2,284 coastal water bodies and 11 territorial water bodies. Norway has not delineated any transitional water bodies.

71% of Norway's surface water bodies are in good or better ecological status, well above the EU average of 38%.[1] The chemical status of surface water bodies remains largely unknown (92%).

Groundwater pollution and abstraction is not considered a significant issue. All of Norway's 1,401 groundwater bodies are in good quantitative status. The chemical status is good in the 67% of the groundwater bodies with known chemical status.

The most significant pressures are diffuse pollution from agriculture, atmospheric deposition from air pollution, wastewater discharges not connected to the sewage system, hydrological alterations from hydropower and introduced species and diseases. All of these are also significant pressures in the EU.

A distinct challenge in Norway concerns the environmental impacts of aquaculture. Aquaculture production in Norway exceeds that of the EU as a whole.[2] As such, its environmental impact is far more prevalent in Norway than in the EU. Diffuse pollution from aquaculture affects a quarter of Norway's coastal area. Other important impacts are the spread of diseases and impacts on the genetic integrity of wild fish.

11.6% of Norway's surface water bodies are heavily modified, slightly below the EU average of 12.3%. Most of these are highly modified for hydropower production. While providing renewable energy, hydropower plants also negatively impact ecological status due to the disruption of river continuity with major impacts on fish migration and mortality. Norway should ensure authorisations are periodically reviewed, to ensure adequate mitigation measures are in place and adapted to changing environmental conditions such as those linked to climate change.

Measures have been assigned to all significant pressures, indicating good knowledge of the gap to be bridged to reach good status. The RBMPs may improve on a clear prioritisation of measures based on cost-effectiveness analyses, building on experience from the hydropower sector.

The use of exemptions generally lacks sufficiently detailed explanations. Norway has applied exemptions to extend the deadlines to achieve the objectives for 2,808 surface water bodies, and to set less stringent objectives for 1,003 surface water bodies. Exemptions for new projects are reported for 30 water bodies, although a complete overview is lacking.

All in all, Norway is making good progress but there is still further work to be done.

[1] Based on data reported to WISE by 22 EU Member States.
[2] According to Eurostat, Norway's aquaculture production in 2022 exceeded that of the EU as a whole: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Aquaculture_statistics#EU_Aquaculture.

Acronyms and abbreviations used in the assessment

Acronym / Abbreviation	Expanded Term	Norwegian translations[3]
AWB	Artificial Water Body	Kunstig vannforekomst
CIS	Common Implementation Strategy for the Water Framework Directive	Felles strategi for gjennomføring av vanndirektivet
EEA	European Economic Area	Det europeiske økonomiske samarbeidsområde (EØS)
EFTA	European Free Trade Association	Det europeiske frihandelsforbund
EQS	Environmental Quality Standard	Miljøkvalitetsstandard
EQSD	Environmental Quality Standards Directive	Direktiv om miljøkvalitetskrav for prioriterte stoffer
ESA	EFTA Surveillance Authority	EFTAs overvåkingsorgan
EU	European Union	Den europeiske union
GWB	Groundwater Body	Grunnvannsforekomst
HMWB	Heavily Modified Water Body	Sterkt modifisert vannforekomst
IED	Industrial Emissions Directive	Industriutslippsdirektivet
KTM	Key Types of Measures	Nøkkeltiltak
PoM	Programme of Measures	Tiltaksprogram
RBD	River Basin District	Vannregion
RBMP	River Basin Management Plan	Regional vannforvaltningsplan
RBSP	River Basin Specific Pollutant	Vannregionspesifikt stoff
SWB	Surface Water Body	Overflatevannforekomst
WFD	Water Framework Directive	Vanndirektivet (EUs rammedirektiv for vann)
WISE	Water Information System for Europe	Europeisk system for vanninformasjon

[3] Translations provided by Norway.

Basis for the assessment and general information

Norway covers a total area of 384,482 km² and has 5.6 million inhabitants[4].

At the time of preparing the 2nd River Basin Management Plans (RBMPs) Norway had 15 river basin districts (RBDs) including 10 international RBDs.

Norway is implementing the WFD one full cycle (six years) behind the EU Member States, two and a half years ahead of its legal obligations under the Agreement on the European Economic Area (EEA Agreement). Norway actively participates in the EU's Common Implementation Strategy for the implementation of the Water Framework Directive.[5]

Norway has the largest amount of surface water bodies in the EEA with 32,399 surface water bodies (SWBs) and 1,401 groundwater bodies (GWBs).

The basis for the assessment presented in this report is Norway's 2nd RBMPs covering the years 2022-2027. This assessment includes, where relevant, a comparison of progress since the previous RBMPs (2016-2021), as well as progress with recommendations and action points following the assessment of Norway's pilot RBMPs (2010-2015)[6].

The assessment has been made based on the PDF documents reported to the Eionet Central Data Repository (CDR)[7] and the electronic data reported to the European Environment Agency. The electronic data was downloaded from Discodata[8] which is the European Environment Agency's data dissemination platform.

Norway adopted the finalised RBMPs on 31 October 2022 and uploaded them along with national background documents to Eionet in July 2023. Norway reported its RBMP data electronically in WISE (Water Information System for Europe)[9], and formally notified its reporting to the EFTA Surveillance Authority (ESA) in November 2023.

ESA has been assisted in the preparation of this report by WSP E&IS GmbH. Norway was invited to provide comments on an earlier draft, which have been taken into account where appropriate.

[4] Available at: https://ec.europa.eu/eurostat/databrowser/view/tps00001/default/table?lang=en.
[5] Information on the Common Implementation Strategy is available at: https://circabc.europa.eu/ui/group/9ab5926d-bed4-4322-9aa7-9964bbe8312d/library/dd9b4484-2935-4ee8-b3ce-72f844f3644c.
[6] A summary of the feedback following the pilot RBMPs is available at: https://www.vannportalen.no/organisering2/europeisk-vannsamrbeid/norge-og-esa-rapportering-klager-og-tilbakemeldinger/esa-sin-tilbakemelding-til-og-oppfolging-av-norge/norges-vannforvaltningsplaner-2010-2015/
[7] Available at: https://cdr.eionet.europa.eu/no/eu/wfd2022/
[8] Available at: https://discomap.eea.europa.eu
[9] WISE is an electronic reporting system developed by the European Commission, the European Environment Agency and the EU Member States. Its use is voluntary.

Recommendations following assessment

The following have been identified as recommendations based on the assessment of Norway's RBMPs:

Topic 1 – Governance and public participation

- Norway should ensure a six-month period for public consultation on the RBMPs.
- Norway should work on harmonisation with Finland for ecological status classification.

Topic 2 – Characterisation of the River Basin District

- Norway should delineate transitional water bodies.
- The tools used to assess significant pressures from point source pollution, diffuse source pollution, water abstraction, and other pressures should be reported in all RBMPs.
- Norway should develop emissions inventories for priority substances for all required substances in each RBD.

Topics 3 and 4 - Monitoring, assessment, and classification of ecological and chemical status in surface water bodies

- More information is needed on the assessment methods for physico-chemical quality elements and hydromorphological quality elements. These supporting quality elements should be included in the monitoring of ecological status.
- Norway should improve on the surface water chemical status classifications to reduce the number of water bodies in unknown status.
- Norway should elaborate on the approaches to be used to classify the chemical status of water bodies where monitoring data is not available.
- Norway should improve the level of confidence in the classification of ecological and chemical status.
- Norway should provide justifications where the monthly monitoring is not carried out for all 45 priority substances.
- Norway should provide long-term trend analysis for named priority substances (20 in total) in biota and sediment.

Topics 5 and 6 - Monitoring, assessment, and classification of quantitative status and chemical status of groundwater bodies

- Norway should improve the level of confidence in the classification of groundwater quantitative and chemical status, including better monitoring.
- Norway should improve the groundwater quantitative and chemical status assessment methodology.

Topic 8 - Environmental objectives and exemptions

- Norway should provide detailed water body specific explanations for the use of exemptions including details on justifications associated with e.g. technical feasibility, disproportionate costs and natural conditions.
- Norway should ensure a complete overview of all projects where Article 4(7) WFD has been applied and provide explanations for these, with references to permits where relevant.

Topics 9, 10, 11, 12, and 13 – Programme of Measures (overview) and measures for abstractions and water scarcity, measures for pollution from agriculture and other sectors, and measures for hydromorphology.

- Norway should provide further details on **funding sources for the measures** included in the Programmes of Measures (PoMs).
- Norway should provide further details concerning how specific measures will be **implemented**.
- Norway should clearly describe how measures are **prioritised** based on a **cost-effectiveness analysis** for all significant pressures, drawing on experience from the hydropower sector.
- Norway should provide further measures that will have a demonstrable effect on addressing the pressures caused by **aquaculture**.
- Norway should ensure a clear requirement of **periodic review of abstraction and impoundment permits** as well as other permits related to hydromorphological changes and describe how this review is implemented in the following RBMPs. The reviews should ensure that the hydromorphological conditions of the water bodies are consistent with the achievement of the required ecological potential or status.
- Norway should **define and implement ecological flows** in all relevant water bodies, also in cooperation with neighbouring countries, in line with relevant planned measures.
- The **analysis of water abstraction** in the RBMPs should be based on concrete data for all relevant uses, especially if some of them are identified as significant pressures for national water bodies.
- Norway should specify the **impact that measures addressing pollution from agriculture** will have on achieving the environmental objectives.
- **Clearer directions should be set for agriculture** to ensure that measures are funded and carried out.
- A clearer link should be made between **chemical status failures** and **measures** to address them.
- Norway should assess which **mitigation measures** for **hydromorphological improvement** are appropriate and whether there will be an ecological improvement after the measure has been completed.

Topic 14 – Economic analysis

- Norway should provide an update on the **economic analysis of water uses** in accordance with Article 5 of the WFD.
- Norway should calculate and report **financial cost recovery rates** for water services.
- Norway should work on developing the methodology and data basis for assessing **environmental and resource costs**.
- Norway should provide an explicit analysis on **incentive properties** of the current water pricing system and implementation of the **polluter pays principle**.

Topic 15 - Considerations specific to protected areas (identification, monitoring, objectives and measures)

- Norway should provide information on any **additional measures** to achieve the additional objectives of protected areas.

Topic 16 - Adaptation to drought and climate change

- Norway should demonstrate how **climate change** projections have informed assessments of WFD pressures and impacts; how monitoring programmes are configured to detect climate change impacts; and how selected measures are robust enough to cope with projected climate conditions.

1 Governance and public participation

Robust, appropriate and effective multi-level governance structures are essential pre-requisites for successful integrated river basin management[10]. Key aspects of water governance include ensuring "an adequate territorial approach, the clear identification of responsibilities, coordination and cooperation across sectors, interests and borders as well as ensuring adequate human and financial resources are allocated".[11]

Under the Water Framework Directive (WFD), the EEA EFTA States are to ensure consultation and access to background information used for the development of RBMPs and also to encourage active involvement of all interested parties. By involving the public and stakeholders, participation can strengthen their commitment and engagement, including in the implementation of measures.

1.1 Assessment of implementation and compliance with WFD requirements

1.1.1 Administrative arrangements – River Basin Districts

At the time of preparing the 2nd RBMPs Norway was divided into 15 River Basin Districts (RBDs), including 10 international RBDs:

- Innlandet og Viken RBD (NO5107),
- Västerhavet RBD (Norwegian part) (NO5),
- Vestfold og Telemark RBD (NO5108),
- Agder RBD (NO5103),
- Rogaland RBD (NO5104),
- Vestland RBD (NO5109),
- Møre og Romsdal RBD (NO1101),
- Trøndelag RBD (NO1107),
- Bottenhavet RBD (Norwegian part) (NO2),
- Nordland og Jan Mayen RBD (NO1108),
- Bottenviken RBD (Norwegian part) (NO1),
- Troms og Finnmark RBD (NO1109),
- Tornionjoki (NOVHA6) / Torneälven (NO1TO) RBD (Norwegian part),[12]
- Norsk-Finsk RBD (Norwegian part)(NO1106), and
- Kemijoki RBD (Norwegian part) (NOVHA5).

Of these, 10 RBDs drain into the Norwegian coast. Five of these RBDs include areas in Sweden and / or Finland that flow into Norway, necessitating coordinated management with neighbouring countries. Additionally, there are geographical areas in Norway that drain into Sweden or Finland, forming part of 5 international RBDs primarily located in the neighbouring countries.

Norway has prepared 12 RBMPs (PDF documents). Three very small Norwegian parts of international RBDs do not have separate RBMPs but are included in the RBMPs for larger, neighbouring RBDs.[13] Some RBD competent authorities have responsibility for more than one RBD, due to the fact that RBDs'

[10] Commission Staff Working Document, European Overview – River Basin Management Plans, page 33, available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=SWD:2019:30:FIN&qid=1551267381862&from=EN.
[11] Ibid.
[12] Norway considers this to be one RBD as it concerns the basin of one single river with Finland on the northern shore and Sweden on the southern shore, as well as some small parts in Norway. Torneälven drains into Sweden and Tornionjoki into Finland. Data has been reported separately for the two areas.
[13] Bottenviken (NO2) and Torneälven (NO1TO) is covered by the RBMP of Nordland og Jan Mayen. Kemijoki (NOVHA5) and Tornionjoki (NOVHA6) are covered by the RBMP of Troms og Finnmark.

delineations follow the river basins and not the national borders. For instance, one RBD competent authority may have responsibility for one RBD mainly in Norway, as well as Norwegian parts of international RBDs (areas bordering Sweden and / or Finland).

Sub-plans have been reported in three RBDs covering the following:

- Møre og Romsdal (NO1101): climate change, coastal erosion,
- Troms og Finnmark (NO1109): transport, climate change, rural planning, urban planning,
- Rogaland (NO5104): climate change.

In addition to the reported PDF RBMPs and electronic data, Norway provides the Vann-Nett online database and map viewer providing information on water bodies including condition, impacts, measures and environmental objectives. Information is also provided at various levels: at the water body level, catchment level and RBD level.

1.1.2 Administrative arrangements – competent authorities

The competent authorities are shown in Table 1.1. Norway lists one RBD competent authority for each RBD and 14 sector authorities who participate in the RBD boards, where relevant.

TABLE 1.1 COMPETENT AUTHORITIES AND OTHER AUTHORITIES AND ORGANISATIONS

Name	Role
The county appointed as responsible for the RBD	RBD competent Authority with overall responsibility for planning, including the update of the RBMPs.
Other counties which are covered by the RBD geographical area	
Norwegian Water Resources and Energy Directorate (NVE)	Manages water resources, flood control, hydropower regulation.
Norwegian Environment Agency (NEA)	Oversees environmental protection, including water quality monitoring and implementing measures to achieve good water status.
County Governors	Environmental departments coordinate monitoring and updates the knowledge base for the RBMPs including status assessments.
Municipalities	Implement local measures and ensure compliance with WFD standards in their land use planning.
Norwegian Food Safety Authority	Controls all aspects of food safety, including water quality related to food production, as well as fish parasites, for example sea lice on salmon, and other infections, such as salmon fluke and crayfish plague.
Directorate of Fisheries	Manages aquaculture, including pollution and escaped fish, fisheries and marine resources, including king crab as an invasive species.
Public Roads Administration	Manages pollution runoff and physical interventions related to roads.
Coastal Administration	Manages coastal water issues.
Directorate of Mining	Provides remediation after mining.

Defence Estates Agency	Manages areas used by the Norwegian Defence Forces.
Railway Directorate	Manages pollution runoff and physical interventions related to railways.
Airport Authority (Avinor)	Manages pollution runoff related to airports.
Directorate for Cultural Heritage	Manages cultural heritage in and alongside rivers and lakes in some RBDs.

The work on the RBMPs has been performed at different levels. In each RBD, the Competent Authority is an appointed county, which has the overall responsibility for developing and updating the RBMPs. This includes coordinating efforts between various sector authorities, counties, local municipalities in the River Basin District Board (*vannregionutvalg*), as well as the information and participation of and other relevant stakeholders.

The RBDs are further divided into local catchments (*vannområder*) with local Water Boards (*vannområdeutvalg*). The local Water Boards carry out a significant part of the practical work on a local level through characterisation, developing environmental objectives and measures, evaluating costs and benefits, developing and carrying out monitoring, and developing the local plan as part of the RBMPs. All interested parties are invited to take part in the local Water Board to take advantage of local knowledge, increase the motivation to carry out the work, identify undesired effects and to develop trust, ownership and support. However, the participation differs between the RBDs. For some of the RBDs, such as Trøndelag, the local Water Board has been replaced by a representative board.

National sector authorities, counties, county governors, and municipalities have actively participated in the planning work. Interested organisations and voluntary organisations have contributed and provided input both regionally and locally in the catchments. Non-governmental Organisations (NGOs) participate in an RBD reference group.

1.1.3 International coordination and cooperation

Norway has 10 international RBDs shared with Finland and Sweden.

Cooperation with Swedish Authorities

A strategy document for the joint management of international RBDs between Norway and Sweden was prepared in 2011.[14]

Regular meetings to follow up the joint strategy, address experienced challenges and secure a good dialogue have been organised, mainly at RBD-level across the border, but also at bi-national level.

Since 2018, there has been an agreement on cooperation[15] for WFD implementation between the Norwegian Environment Agency and the Swedish Agency for Marine and Water Management.[16] At the end of 2020, a new cooperation agreement was signed for the years 2021-2027. The agreement covers cooperation on classification and monitoring of ecological status, hydromorphology and acidification, as well as cooperation concerning chemical status, climate change and coordination in international RBDs.

Cooperation with Finnish authorities

Norway and Finland have a long tradition of transboundary water cooperation, as exemplified by the establishment of a Norwegian-Finnish Border Water Commission in 1980. The Commission, which works as an advisory body for the respective governments, holds annual meetings, where WFD cooperation is one of several topics discussed.

[14] *Gränsvatten Norge och Sverige. Strategi för internationellt samarbete*.
[15] Information on the cooperation between Swedish and Norwegian authorities are available at https://www.vannportalen.no/aktuelt/2023/stadig-bedre-samarbeid-med-sverige-om-vannforvaltningen/.
[16] Available at: https://www.havochvatten.se/en.

A cooperation agreement[17] was signed in 2013 on the Norsk-Finsk RBD, establishing a framework for bilateral cooperation and administrative arrangements, and to meet the requirements of the WFD. Attached to the agreement is a Memorandum of Understanding[18], detailing the cooperation on issues like characterisation, monitoring, classification, use of exemptions, elaboration of RBMPs and Programme of Measures (PoMs), as well as reporting. Joint Roof Reports summarising the Norwegian and Finnish parts of the RBD into one single document were issued for the 2015-2021 RBMP cycle, as well as for the 2022-2027 RBMP cycle[19].

No cooperation agreement has yet been concluded with Finland regarding the additional small areas (Kemijoki and Tornionjoki) close to the Finnish border that are geographically not part of the Norsk-Finsk RBD[20].

Cooperation with Russia

Norwegian, Russian and Finnish authorities have developed a joint "multi-use plan" for the transboundary rivers of Pasvik and Grense Jakobselv.[21] The plan contains a descriptive part and a Programme of Measures (PoM) for the years 2021-2030.[22] The cooperation with Russia is currently on hold due to the political and security situation.

1.1.4 Public Participation

Each County sent out a consultation letter and posted information online, requesting input on the RBMP and associated PoMs for each RBD. The national consultation period was from 1 March to 31 May 2021. It is possible to see the individual consultation responses and how they have been addressed on a national website dedicated to the implementation of the WFD.[23]

1.2 Main changes, previous recommendations and gaps

Norway has a well organised governance structure for its water management, with coordination among relevant sectoral authorities. National guidance documents give a good general overview of legal and administrative tools and division of responsibilities.

Following the assessment of Norway's pilot RBMPs, Norway was recommended to show tangible results of the international cooperation in terms of common analysis of pressures and impacts, monitoring, assessment of status, public consultation and measures. Since then, a more robust strategy has been developed for cooperation with Sweden, covering aspects of status and risk assessment, measures and public consultation. For cooperation with Finland, there are different approaches to ecological classification and so harmonisation of this is not yet in place.

Norway has 15 RBDs but has prepared 12 RBMPs (PDF documents). This asymmetry is explained as small international RBDs are included in the RBMPs for larger, neighbouring RBDs. However, the inclusion of these areas in the other RBMPs, and the associated reporting, could be made clearer.

[17] Available at: https://www.vannportalen.no/sharepoint/downloaditem?id=01FM3LD2SFURBGPT6G2RG2JYIVROE2OYFV.
[18] Available at: https://www.vannportalen.no/sharepoint/downloaditem?id=01FM3LD2UFYBVOD6YEGNFLQY3C4KD2IXOE.
[19] The most recent joint Roof Report is available at: https://circabc.europa.eu/ui/group/1c566741-ee2f-41e7-a915-7bd88bae7c03/library/ca912a95-af37-4074-bc59-ad7eab871e8b/details.
[20] Norway has explained that these consist of various small parts on the Norwegian side, totalling an area of 210 km^2 and draining into Finland. This area contains almost no population and anthropogenic pressures. Norway considers this area as too small to justify the use of resources to produce a separate RBMP.
[21] Available at: https://www.statsforvalteren.no/nb/troms-finnmark/miljo-klima/internasjonalt-samarbeid/multiuseplan-pasvik-grense-jakobselv/
[22] Norway has clarified that the first version of the multi-use plan was prepared in 1996. In 2019, work began to revise the plan, but formal cooperation is now on hold.
[23] https://www.vannportalen.no/.

The national consultation period lasted only for three months. Appropriate changes to national legislation have since been made to ensure a six-month consultation period as set out in Article 14(2) of the WFD.[24]

2 Characterisation of the River Basin District

Article 5 of the WFD requires EEA EFTA States to undertake an analysis of the characteristics of each RBD or portion of an international RBD falling within their territory. Characterisation includes the delineation of surface water bodies (SWBs) and groundwater bodies (GWBs). Characterisation should identify all relevant categories and types of water bodies within the RBD. For SWBs, characterisation includes the identification of heavily modified water bodies (HMWBs) and artificial water bodies (AWBs).

Water bodies should be delineated at a size that allows the identification and quantification of significant pressures. Characterisation also requires the assessment of the risk that a water body may fail the objectives of the WFD unless appropriate measures are taken.

2.1 Assessment of implementation and compliance with the WFD requirements

2.1.1 Delineation of water bodies and designation of heavily modified and artificial water bodies

The number of SWBs is shown in Table 2.1. There is an overall increase of 4,159 SWBs (14.7 % increase) in Norway since the 1st RBMPs. The biggest increases are in rivers and lakes.

The national guidance document on characterisation[25] provides information on the update to delineation. This states that if investigations, monitoring, or other information shows that the water type, environmental condition or the reason for designation deviates from what was initially assessed, then the delineation may change. Water bodies divided as a result of different water types can be converted into one water body if the water type is assessed to be the same. If new knowledge shows that there are different water types in significant areas within a water body, then the water body may be divided. Water bodies that are divided based on differences in environmental status should be converted back into a single water body if environmental improvement measures or other conditions result in them achieving the same status.

Figure 2.1 shows the percentage of SWBs in Norway designated as natural, heavily modified or artificial in the 2nd and 1st RBMPs. As was the case in the 1st RBMPs, Norway has designated HMWBs but has not designated AWBs. In the 2nd RBMPs, 11.6% of SWBs in Norway are designated as HMWBs[26]. The number of HMWBs has increased from 3,268 in the 1st RBMPs to 3,764 in the 2nd RBMPs. There are changes in the numbers of HMWBs in river, lakes, and coastal water bodies but the overall percentage in each category remains similar to the previous RBMPs. The leading water use for HMWB designation is energy (hydropower) and further details of HMWB designation can be found in Topic 7 of this report.

[24] Since 1 February 2024, Section 28 of the Norwegian Water Regulation requires a minimum six-month consultation period for the RBMPs.
[25] Direktoratsgruppen for gjennomføringen av vanndirektivet 2018. *Veileder 1:2018 Karakterisering.* Available at: https://www.vannportalen.no/veiledere/veileder-12018-karakterisering-metodikk-fora-karakterisere-og-vurdere-miljooppnaelse-etter-vannforskriften--15/.
[26] In the EU, 12.4% of surface water bodies are designated as HMWBs.

FIGURE 2.1 PERCENTAGE OF SURFACE WATER BODIES IN NORWAY DESIGNATED AS NATURAL, HEAVILY MODIFIED OR ARTIFICIAL IN THE 2ND AND 1ST RBMPS

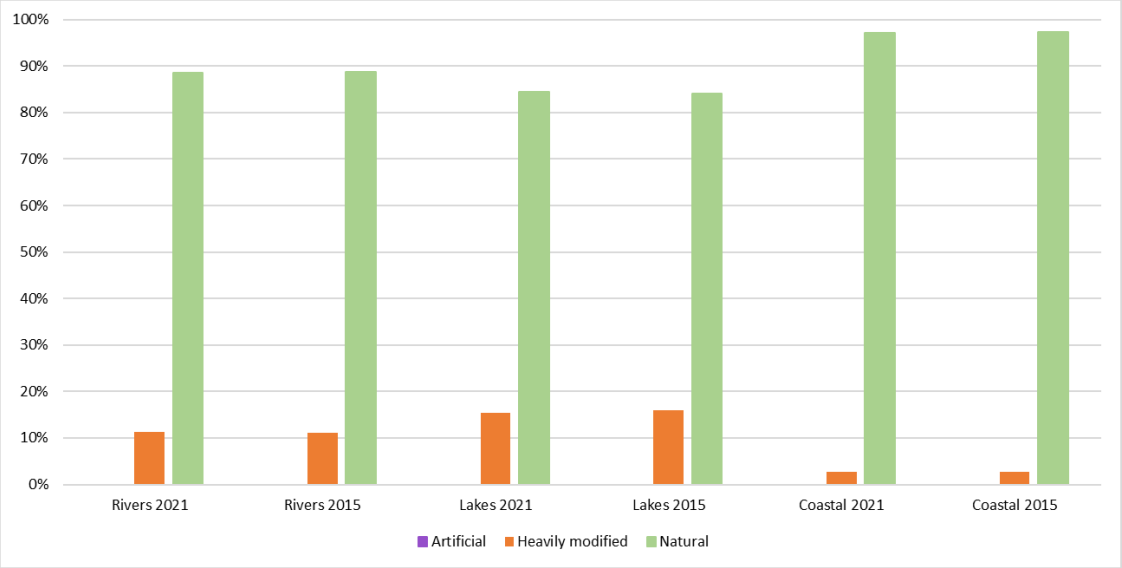


Table 2.1 shows the number of GWBs in Norway. There is a slight increase of 7 GWBs (0.5% increase) since the 1st RBMPs. The changes are due to splitting of existing GWBs and delineation of new GWBs. The GWBs are registered in the database Vann-Nett. There are generally limitations in mapping and monitoring, so several of these GWBs in different RBDs are not classified, and information is lacking.

TABLE 2.1 NUMBER OF DELINEATED SURFACE WATER BODIES AND GROUNDWATER BODIES IN NORWAY IN THE 2ND RBMPS

RBD code	RBD name	Rivers	Lakes	Transitional	Coastal	Territorial	Groundwater
NO1	Bottenviken	86	40	0	0	0	1
NO1101	Møre og Romsdal	1690	407	0	232	1	118
NO1106	Norsk-Finsk	715	301	0	38	1	43
NO1107	Trøndelag	2515	724	0	338	1	178
NO1108	Nordland og Jan Mayen	2651	795	0	581	2	74
NO1109	Troms og Finnmark	3186	809	0	402	1	165
NO1TO	Torneälven	20	9	0	0	0	0
NO2	Bottenhavet	251	92	0	0	0	13
NO5	Västerhavet	320	109	0	0	0	24
NO5103	Agder	1810	558	0	164	1	38

NO5104	Rogaland	1347	415	0	125	1	40
NO5107	Innlandet og Viken	3751	979	0	42	1	310
NO5108	Vestfold og Telemark	1754	479	0	79	1	63
NO5109	Vestland	3194	1083	0	283	1	334
NOVHA5	Kemijoki	2	2	0	0	0	0
NOVHA6	Tornionjoki	9	1	0	0	0	0
Total		23301	6803	0	2284	11	1401

Small water bodies

The WFD protects all waters independently of their size, but for operational purposes it defines a water body as a 'discrete and significant' element of water. The water body is the scale at which status is assessed.

The national guidance document on characterisation states that a water body is the smallest management unit in RBMPs, and it is delineated into appropriate units based on geographical and hydrological criteria.

The RBMPs note that water bodies should initially not be too small. At the same time, it must be ensured that significant environmental challenges are not concealed in affected water bodies. The parameter values for small water bodies are set as follows:

- Small rivers (catchment area): < 10 km²
- Larger lakes (surface area): > 0.5 km²

Lakes with an area smaller than this are included as part of the river water body. In such cases, the river water body will consist of a line that runs through the midpoint of the lake.

2.1.2 Identification of transboundary water bodies

Norway has 212 transboundary SWBs present in 8 RBDs. These comprise 133 river water bodies and 79 lake water bodies.

Norway has 3 transboundary GWBs present in 2 RBDs.

2.1.3 Typology of surface water bodies

The WFD has two systems for classification.[27] The classification in the Norwegian Water Regulation aligns more closely with System B of the WFD rather than System A, by employing a detailed and flexible approach to classifying surface water, incorporating physical, chemical, and biological criteria. The typology methodology used also has elements of System A as types are defined by ecoregions, altitude, catchment size (rivers), size (lakes, coastal waters) and depth (lakes, coastal waters) and mean annual salinity (coastal waters).

Typology is described in the national guidance documents on characterisation and classification. In the RBMPs, information on the types common in each RBD and a figure showing distribution of typology factors for rivers, lakes and coastal waters are provided.

Table 2.2 shows the number of SWB types. There have been increases in the number of surface water body types in the river and lake categories, and a decrease of types in the coastal category.

[27] As set out in Annex II to the WFD.

TABLE 2.2 NUMBER OF SURFACE WATER BODY TYPES AT RBD LEVEL IN NORWAY IN THE 2ND AND 1ST RBMPS

	Rivers		Lakes		Transitional		Coastal		Territorial	
	2015	2021	2015	2021	2015	2021	2015	2021	2015	2021
Total national types	27	29	21	30	0	0	23	8	0	1

2.1.4 Establishment of reference conditions for surface water bodies

Annex II of the WFD sets out a requirement to establish type-specific reference conditions for biological, hydromorphological and physico-chemical quality elements. These represent the values of such quality elements at high ecological status.

Reference conditions for biological quality elements and supporting elements have been established for national water types in rivers, lakes and coastal waters and are described in the national guidance document on classification.

However, not all water bodies have been assigned reference conditions. An overview of the number of water bodies with a type assigned with reference conditions and without reference conditions and a reference to the national classification system are provided in some of the RMBPs.[28]

Intercalibration of reference conditions

Norway has intercalibrated methods as established in Commission Decision (EU) 2018/229 of 12 February 2018.[29] This includes methods on phytoplankton (lakes, coastal waters), macrophytes (rivers, lakes), phytobenthos (rivers), fish (lakes)[30], macroalgae (coastal waters), benthic invertebrate fauna (rivers, very large rivers, lakes, coastal waters).

2.1.5 Characteristics of groundwater bodies

Norway has reported porous aquifers (highly productive) and insignificant aquifers (local and limited groundwater). Norway has reported no GWBs linked with surface water and 60 GWBs linked with terrestrial ecosystems.

2.1.6 Significant pressures and impacts on water bodies

Figure 2.2 shows the most significant pressures on SWBs and GWBs, based on Norway's electronic reporting. While this data shows the most significant pressure on SWBs are unknown anthropogenic pressures affecting 70% of SWBs, Norway has explained that this is most likely due to a reporting error. As such, the most significant pressures affecting the most SWBs are diffuse pollution from agriculture, atmospheric deposition and discharges not connected to the sewerage network. Other significant pressures include hydropower and introduced species and diseases. In the 1st RBMPs, the most significant pressures were sewage treatment, landfills, agriculture, forestry, fish farms, hydropower, mines and atmospheric deposition of pollutants from other countries.

The RBMPs report no significant pressures on GWBs.

[28] For example, in Appendix 1, Chapter 1.4 of the Nordland og Jan Mayen RBMP.
[29] Available at: https://eur-lex.europa.eu/eli/dec/2018/229/oj/eng#:~:text=Commission%20Decision%20(EU)%202018%2F,%2F480%2FEU%20(notified%20under.
[30] Norway has clarified that the national Water Regulation was last updated on 8 July 2024 to include the latest Commission Decision on intercalibration (Commission Decision (EU) 2024/721 (available at https://eur-lex.europa.eu/eli/dec/2024/721/oj/eng), including intercalibrating methods for fish in very large rivers.

FIGURE 2.2 THE MOST SIGNIFICANT PRESSURES ON SURFACE WATER BODIES IN NORWAY IN THE 2ND (EXPRESSED AS PERCENTAGES OF NUMBERS OF WATER BODIES) [31]

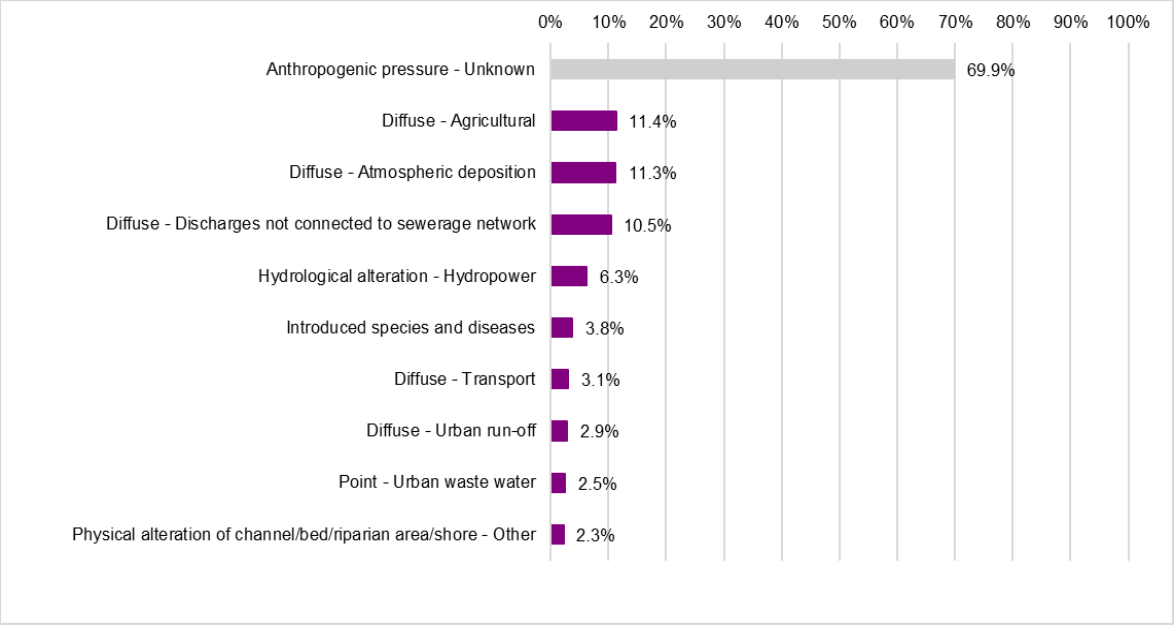


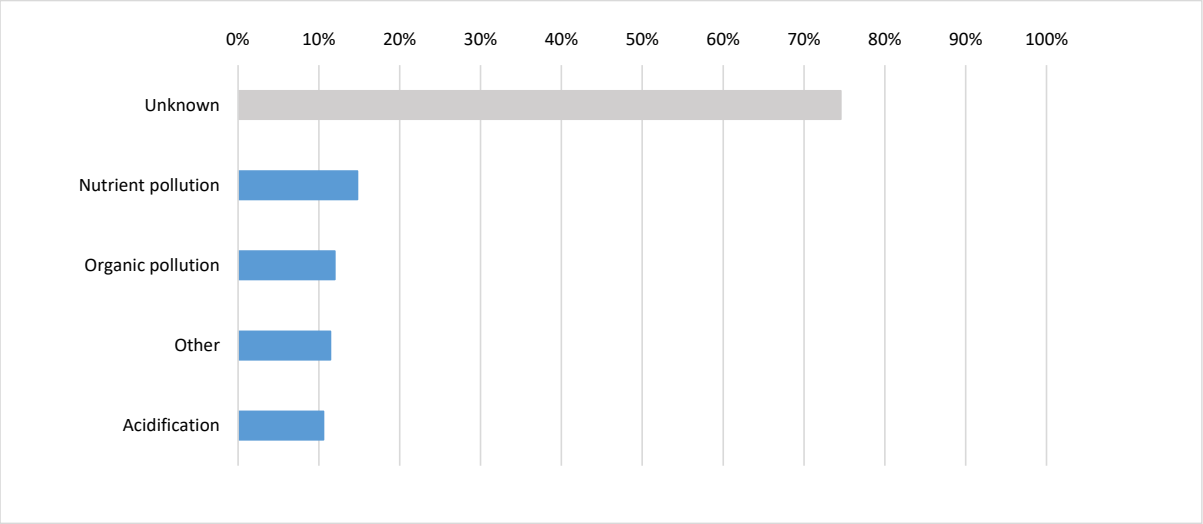
Figure 2.3 shows the most significant impacts on SWBs. While this data shows the most significant impacts on SWBs are unknown, Norway has explained that this is most likely due to a reporting error. As such, the most significant impacts affecting the most SWBs are nutrient pollution, organic pollution, other impacts and acidification.

In the PDF RBMPs, the main challenges described vary somewhat between RBDs. For example, in the Innlandet and Viken RBD, the main issues are agriculture, wastewater, introduced species and diseases, hydropower, and urban development. Further north in the Finnmark and Troms RBD, the main impacts on water bodies are hydropower, introduced species and diseases, fisheries and aquaculture, and urban development.

The RBMPs report no significant impacts on GWBs.

[31] The data presented in this figure for unknown anthropogenic pressures is based on the electronically reported data which has been considered in this assessment. Norway has clarified that this differs to that presented in the Vann-Nett database, most likely due to a reporting error, and has stated that 69% of all surface water bodies have registered one or more pressure and at the most 6% of water bodies are affected by an unknown pressure. As such, the line representing unknown anthropogenic pressures is shown in a different colour.

FIGURE 2.3 THE MOST SIGNIFICANT IMPACTS ON SURFACE WATER BODIES IN NORWAY IN THE 2ND RBMPS (EXPRESSED AS PERCENTAGES OF NUMBERS OF WATER BODIES)[32]



2.1.7 Definition and assessment of significant pressures on surface and groundwater

Significant diffuse source pressures, point source pressures, water abstraction, water flow and other pressures are mostly identified using a combination of numerical tools and expert judgment. For some GWBs, only numerical tools or expert judgment are used. Significant pressures are defined in terms of thresholds and are linked with status failure except for groundwater in Bottenviken (NO1).

2.1.8 Groundwater bodies at risk of not achieving good status

There are no GWBs at risk of not achieving good quantitative status or good chemical status.

2.1.9 Quantification of the gap and assignment of pressures

The RBMPs report information on the gaps to good status as a result of pressures. The gap indicators are the number of water bodies in which the pressure contributes to a failing status and the number of water bodies failing the environmental quality standard (EQS) as a result of a chemical substance.

Pressures have been assigned to the responsible drivers although some water bodies are affected by unknown anthropogenic pressures as detailed in section 2.1.6, meaning the understanding of drivers of pressures on Norway's water bodies could be further developed.

2.1.10 Inventories of emissions, discharges and losses of chemical substances

The Environmental Quality Standards Directive (EQSD[33]) requires the establishment of an inventory of emissions, discharges and losses of all priority substances and eight other pollutants listed in Part A of Annex I to the EQSD for each RBD. This inventory should allow EEA EFTA States to further target measures to tackle pollution from priority substances. It should also inform the review of the monitoring networks, and allow the assessment of progress made in reducing (or suppressing) emissions, discharges and losses for priority substances.

[32] The data presented in this figure is based on Norway's electronic reporting. Norway has explained that the large share share of unknown impacts is likely due to a reporting error. As such, the bar representing the unknown impacts is shown in a different colour.
[33] Directive 2008/105/EC.

Emissions inventories have been established for anthracene, lead, mercury, nickel and cadmium in the following RBDs: Møre and Romsdal (NO1101), Agder (NO5103) and Rogaland (NO5104). There are 13 further substances that are determined to not be relevant at RBD scale.

2.2 Main changes, previous recommendations, and gaps

The main change since the previous RBMPs is a large increase in the number of SWBs, in particular river water bodies. These changes are due to updates in the methodology for delineation. There have also been significant increases in the number of surface water body types in the river, lake, and coastal categories.

Norway has not delineated transitional water bodies, despite this being identified as an action point in 2014. The status assessment of transitional waters includes fish fauna as a biological quality element whereas coastal waters does not. By not delineating the transitional water bodies, the status assessment for such waters cannot be undertaken using all of the required quality elements.

Norway has reported the significant pressures on SWBs and assigned these to the responsible drivers (with some exceptions as some water bodies are affected by unknown anthropogenic pressures), which is an improvement from the pilot RBMPs.

An important gap in the pilot RBMPs was that the biological impacts of salmon lice, escaped farm fish and alien species had not been considered. The 2nd RBMPs now refer to populations of salmonids in rivers being affected by the occurrence of sea lice from coastal aquaculture. Moreover, Norway has electronically reported introduced species and diseases as a pressure on SWBs. The Vann-Nett database includes introduced species, *Gyrodactylus salaris,* pressure due to escaped fish and pressure due to sea lice. This is the first time these pressures are considered in the RBMPs.

The establishment of emissions inventories has only been completed for a limited number of substances and only in three RBDs. Since the pilot RBMPs, Norway appears to have improved its methodologies for assessing the significance of point source and diffuse source pressures, making greater use of numerical tools as opposed to expert judgment. However, information on the tools used for assessing these pressures is lacking in several RBDs.

3 Monitoring, assessment and classification of ecological status / potential in surface water bodies

Ecological status is an expression of the quality of the structure and functioning of aquatic ecosystems associated with surface waters. There are five classes for ecological status; 'high', 'good', 'moderate', 'poor', and 'bad'. The main objective of the WFD is that all surface waters should be at least in good ecological status or potential by 2024 for the EEA EFTA States (unless exemptions are applied).[34] Ecological status is determined through the monitoring and assessment of biological, physico-chemical and hydromorphological quality elements.

3.1 Assessment of implementation and compliance with the WFD requirements

3.1.1 Monitoring of ecological status / potential of surface water bodies

Article 8 of the WFD requires the establishment of monitoring programmes to assess the ecological status of surface water and groundwater, in order to provide a coherent and comprehensive overview of water status within each RBD. The WFD distinguishes between surveillance and operational monitoring.[35] Surveillance monitoring is carried out for one year, once per six-year cycle and is mainly aimed at assessing long-term changes in natural conditions or resulting from anthropogenic pressures and is used for the purpose of designing future monitoring programmes. Operational monitoring is carried out throughout the cycle and aims mainly at establishing the status of bodies identified as

[34] See Topic 8 of this report.
[35] Annex V, Point 1.3 of the WFD.

being at risk of failing to meet their environmental objectives and assessing any changes in status resulting from the Programmes of Measures.

Monitoring programmes

The monitoring programme as set out in the national guidance document for monitoring is intended to provide a comprehensive overview of the need for knowledge acquisition in the RBD. The programme is divided into surveillance monitoring, operational monitoring, and investigative monitoring:

- Surveillance Monitoring: The objective is to obtain baseline data to assess the impact of extensive human activities on water bodies. The aim is also to determine the natural state in nearly "untouched" Norwegian nature to strengthen the data basis and establish reference values for quality elements for further development of the classification system.[36]
- Operational Monitoring: The objective is to determine the status of water bodies that are at risk of not achieving environmental objectives, to serve as a basis for any new environmental measures, and to assess any changes in the status of such water bodies as a result of the Programmes of Measures.
- Investigative Monitoring: Investigative monitoring consists of short-term monitoring or research and development studies conducted when there is a need to identify the cause and extent of an environmental problem in water bodies that do not meet or are at risk of not achieving environmental objectives.

In the previous RBMP cycle, the regional monitoring programmes were separated into their own documents, with a brief summary in the RBMP itself. The monitoring programmes consisted of both ongoing and planned monitoring. In the 2nd RBMPs, monitoring is presented as its own background document showing current monitoring and areas where planned revisions might be made.

In the years since the previous RBMPs were approved in 2016, there has been a focus on both monitoring and implementing measures in line with the plan. The knowledge base has therefore been strengthened in recent years, resulting in a higher number of water bodies being classified based on actual knowledge, and many water bodies have had their environmental status classification changed.

In 2020, a major subdivision of several water bodies was carried out. This means that the figures from previous years are not directly comparable.

Selection of monitoring sites

The ecological monitoring includes 2,132 river water bodies, 811 lake water bodies and 464 coastal water bodies.

For surveillance monitoring, there are 419 monitoring sites in river water bodies, 211 monitoring sites in lake water bodies, and 282 monitoring sites in coastal water bodies. In the 1st RBMPs, no surveillance monitoring was in place.

For operational monitoring, there are 1,860 monitoring sites in river water bodies, 676 monitoring sites in lake water bodies, and 371 monitoring sites in coastal water bodies.

The percentage coverage for surveillance and operational monitoring is shown in Table 3.1.

TABLE 3.1 PERCENT OF WATER CATEGORY LENGTHS OR AREAS MONITORED UNDER SURVEILLANCE OR OPERATIONAL MONITORING

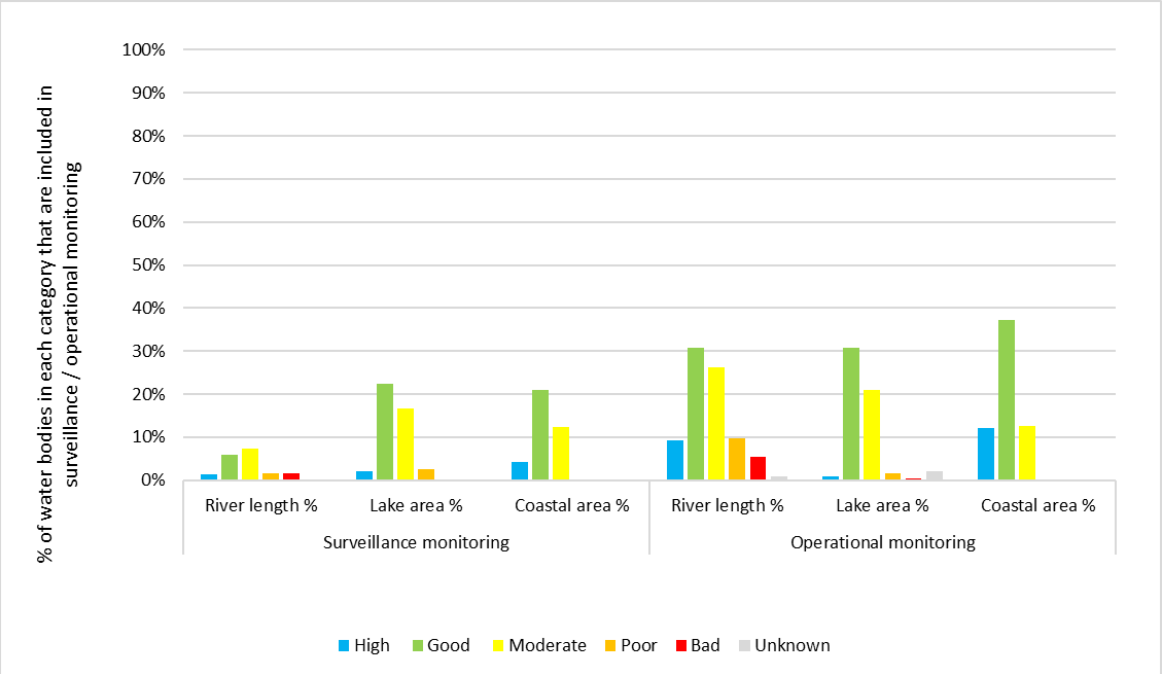
Ecological status monitoring		2021
River length %	Surveillance monitoring	1.9%
River length %	Operational monitoring	8.6%
Lake area %	Surveillance monitoring	19.7%

[36] Direktoratsgruppen vanndirektivet, 2018. *Veileder 02:2018. Klassifisering av miljøtilstand i vann*.

Lake area %	Operational monitoring	25.5%
Coastal area %	Surveillance monitoring	17.5%
Coastal area %	Operational monitoring	28.9%

The percentage of SWB length / area and status included in surveillance and operational monitoring is shown in Figure 3.1. This figure shows that good and moderate is the dominant status classification for water bodies covered by the monitoring.

FIGURE 3.1 PERCENTAGE (%) OF SURFACE WATER BODY LENGTH / AREA AND STATUS INCLUDED IN SURVEILLANCE AND OPERATIONAL MONITORING IN THE 2ND RBMPS



Grouping

The WFD allows the grouping of water bodies for monitoring and assessment. Only similar types of water bodies can be grouped, for example, where the ecological conditions are similar, or almost similar, and in terms of the magnitude and type of pressure or combination of pressures on the water bodies.

The national guidance document on characterisation states that water bodies can be grouped and monitoring data from one of the water bodies in the group can be used to classify the others. However, the extent to which grouping has been used is unclear.[37]

Selection of quality elements monitored

The biological, hydromorphological and general physico-chemical quality elements used for the monitoring of each water category in the 2nd RBMPs are listed in Table 3.2. There are some quality elements where the monitoring coverage is low, for example macrophytes in rivers and thermal conditions and salinity in all water categories. Phytobenthos has not been monitored in lakes.[38]

[37] Norway has explained that grouping has been used to some extent, where water bodies of the same type and category with the same anticipated pressures are assessed based on monitoring data in only one or a few of them.
[38] According to an explanation from Norway, phytobenthos is shown not to give any additional information about the ecological status of Norwegian lakes compared to macrophytes, which are included in the monitoring of lakes. Not monitoring phytobenthos in lakes has since been accepted by a Commission Decision in 2024. See Part 3 of Annex 1 in Commission Decision 2024/721, available at: https://eur-lex.europa.eu/eli/dec/2024/721/oj/eng.

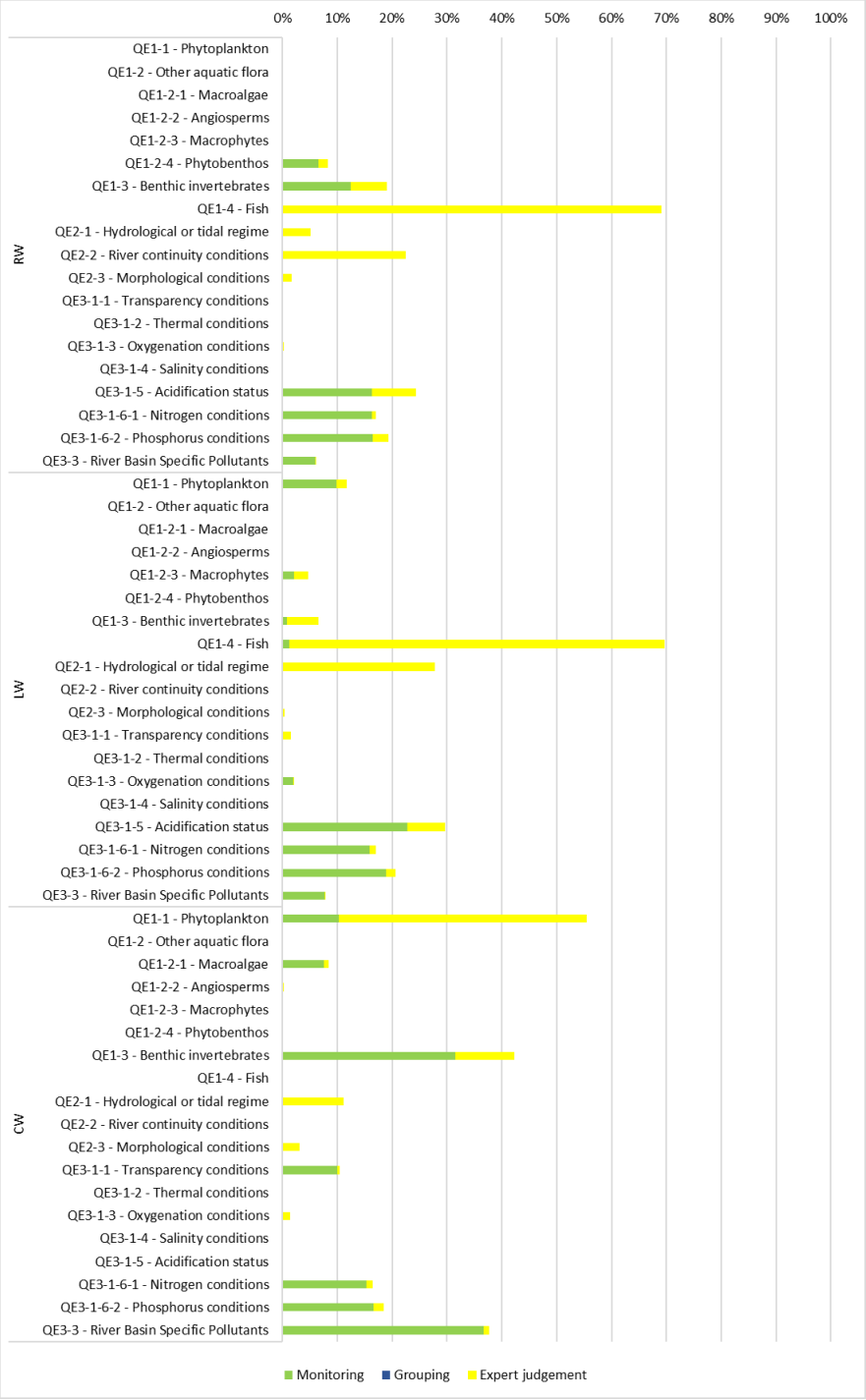
TABLE 3.2 BIOLOGICAL, HYDROMORPHOLOGICAL, AND GENERAL PHYSICO-CHEMICAL QUALITY ELEMENTS WHICH ARE MONITORED FOR EACH WATER CATEGORY

		Biological quality elements								Hydromorphological quality elements			General physico-chemical quality elements						
		Phytoplankton	Macrophytes	Phytobenthos	Benthic invertebrates	Fish	Angiosperms	Macroalgae	Other aquatic flora	Hydrological or tidal regime	Continuity conditions	Morphological conditions	Transparency conditions	Thermal conditions	Oxygenation conditions	Salinity conditions	Acidification status	Nitrogen conditions	Phosphorus Conditions
2021	RW	No	Yes (0%)	Yes (2.23 %)	Yes (6.24 %)	Yes (25.07%)	No	No	No	Yes (0.1 %)	Yes (21.84%)	Yes (0.04 %)	Yes (0%)	Yes (0%)	Yes (0.12 %)	Yes (0%)	Yes (10.67%)	Yes (9.09 %)	Yes (10.69%)
	LW	Yes (7%)	Yes (1.43 %)	No	Yes (2.18 %)	Yes (18.57%)	No	No	No	Yes (21.87%)	Yes (0%)	Yes (0%)	Yes (0.44 %)	Yes (0%)	Yes (0.46 %)	Yes (0%)	Yes (13.54%)	Yes (11.01%)	Yes (10.6 %)
	CW	Yes (10.51%)	No	No	Yes (14.97%)	No	Yes (0.13 %)	Yes (2.15 %)	No	Yes (11.03%)	Yes (0%)	Yes (0%)	Yes (6.61 %)	Yes (0%)	Yes (0.22 %)	Yes (0%)	Yes (0%)	Yes (7.22 %)	Yes (9.63 %)
2015	RW	No	Yes (0.1 %)	Yes (2.9 %)	Yes (9.6 %)	Yes (9.2 %)	No	No	No	Yes (4.0 %)	Yes (0.3 %)	Yes (0.4 %)	Yes (0.1 %)	Yes (0.0 %)	Yes (1.3 %)	Yes (0.0 %)	Yes (8.5 %)	Yes (7.9 %)	Yes (7.6 %)
	LW	Yes (6.0 %)	Yes (3.8 %)	No	Yes (5.9 %)	Yes (12.0 %)	No	No	No	Yes (5.6 %)	No	Yes (0.1 %)	Yes (2.5 %)	Yes (0.1 %)	Yes (0.3 %)	Yes (0.2 %)	Yes (14.5 %)	Yes (8.8 %)	Yes (10.6 %)
	CW	Yes (5.4 %)	No	No	Yes (11.7 %)	No	Yes (0.0 %)	Yes (3.0 %)	No	No	No	Yes (0.3 %)	Yes (0.7 %)	Yes (0.6 %)	Yes (1.0 %)	Yes (0.6 %)	No	Yes (3.9 %)	Yes (1.5 %)

Notes: RW = river water bodies, LW = lake water bodies, CW = coastal water bodies.
Macroalgae and angiosperms are not required in monitoring for river and lake water bodies. Macrophytes, phytobenthos and fish are not required to be monitored for coastal water bodies.

Figure 3.2 shows whether classification of quality elements is based on monitoring results, grouping, or expert judgment. Both monitoring and expert judgment are used, but there are large gaps in the data for many of the quality elements. Monitoring and modelling are more accurate tools for assessment, but expert judgment is also widely used in other European states. Data is missing for macrophytes, thermal conditions and oxygenation conditions in rivers; morphological conditions, and thermal conditions in lakes; and angiosperms, thermal conditions, and salinity conditions in coastal water bodies.

FIGURE 3.2 THE USE OF MONITORING, GROUPING, OR EXPERT JUDGMENT FOR THE ESTABLISHMENT OF ECOLOGICAL STATUS OF SURFACE WATER BODIES IN THE 2ND RBMPS[39]



[39] The use of grouping is not reported electronically but the PDF RBMP documents state that grouping is used in the ecological status classification of surface water bodies.

Monitoring frequencies

Annex V, Point 1.3.4, of the WFD provides guidance on the frequency of monitoring of the different quality elements.

For biological or hydromorphological quality elements, monitoring shall be carried out at least once during the surveillance monitoring period. Monitoring for physico-chemical quality elements should be in line with the frequencies set out in the table of Annex V, Point 1.3.4 unless greater intervals are justified on the basis of technical knowledge and expert judgment.

Operational monitoring should be carried out at intervals that do not exceed the frequencies as set out in the table of Annex V, Point 1.3.4 unless greater intervals are justified on the basis of technical knowledge and expert judgment.

For phytoplankton this should be done twice during the monitoring year and for the other biological quality elements once during that year. For river basin specific pollutants (pollutants that are discharged in significant quantities into the body of water, RBSPs) this should be done four times for the surveillance year, and for operational monitoring four times a year for each year of the cycle. As a guideline, operational monitoring should take place at intervals which do not exceed once every six months for phytoplankton and once every three years during the six-year cycle for the other biological quality elements. Greater intervals may be justified based on technical knowledge and expert judgment.

The Norwegian Water Regulation generally reflects the monitoring requirements of the WFD. The most comprehensive operational monitoring is carried out within the activities of authority-mandated monitoring, coordinated monitoring of multiple impacts, and local monitoring of limed sites.[40] Many water bodies are affected by several different sources, and it is said to be appropriate for multiple stakeholders to collaborate on a monitoring programme to achieve comprehensive monitoring and status assessment.

In some of the RBMPs, it is stated that not all water bodies can be monitored due to high costs. Therefore, monitoring models and more indirect methods have been developed to determine the status of some water bodies where there are no or very few sources of impact.

The monitoring frequencies in the RBMPs appear to be in accordance with the WFD.

Surveillance and operational monitoring for river basin specific pollutants (RBSPs)

Annex VIII of the WFD sets out an indicative list of the main pollutants that States should use to identify RBSPs.

Norway is monitoring RBSPs in the river, lakes, and coastal water categories. The number of water bodies where RBSPs are monitored is shown in Table 3.3.

TABLE 3.3 RIVER BASIN SPECIFIC POLLUTANTS MONITORED IN THE 2ND RBMPS

RBSP	RW	LW	CW	TW	TeW
Number of SWBs where RBSPs are monitored	1402	524	838	n/a	n/a

Transboundary SWB monitoring

The County Governors and the corresponding Swedish County Administrative Boards have collaborated to achieve consistent classification in waters that cross the border. The classification is done using monitoring data, models based on collected data, impact analyses and risk assessments, as well as expert evaluations and local knowledge. In cases where the ecological status has been good or very good, achieving a consistent classification has not been prioritised. The difference between

[40] Some water bodies are limed to increase the pH to address historic acidification.

good and very good status in water bodies is mainly based on differences in the Norwegian and Swedish classification methods. Usually, no measures are required in these water bodies.

Monitoring of water bodies in transboundary river basins is generally conducted according to the principles of the downstream country. Any deviations from this principle require agreement between the relevant authorities.

3.1.2 Assessment of ecological status / potential of surface water bodies

Assessment methods for the biological quality elements

The assessment methods for the biological quality elements are not described in the RBMPs, but they refer to the national guidance document on classification[41], which specifies which quality elements with associated indices and parameters are suitable for measuring the effects of various impacts in rivers, lakes, and coastal waters. This guide forms the basis for the development of monitoring programmes.

The guide describes that indices have been developed for each biological quality element that are suitable for measuring the response to a given impact (e.g., eutrophication, acidification, hydromorphological changes). It provides a thorough description of how to determine the status in lakes and rivers using various fauna and flora for different impacts.

Intercalibration of biological quality element methods

To ensure comparable definitions of good ecological status across Europe, the EEA EFTA States are obliged to intercalibrate the good ecological status class boundaries of their methods for each biological quality element in each water category with other EEA States having common types of water bodies.[42] Intercalibration is a distinct obligation at EEA level in addition to the obligation to develop national ecological status methods[43], i.e. the lack of success of intercalibration does not exempt the EEA EFTA States from the obligation of developing assessment methods for all biological quality elements.

The intercalibration of biological quality element methods is described in the national guidance document on classification. Within the EU, intercalibration has been carried out over several years to compare the class boundaries of different countries and to ensure consistent class boundaries for similar pressures. Norway participates in this work and has intercalibrated its classification together with other Northern European countries that shares similar water body types.

The RBMPs state that the intercalibration of class boundaries and further development of national class boundaries will be revised as the data basis improves.

Assessment methods for hydromorphological quality elements

Measurements of hydromorphological conditions are included as supporting elements in the assessment of ecological status in the RBMPs, and the methodology is described in the national guidance document on classification. However, the monitoring and classification based on hydromorphological quality elements have so far only been applied to a relatively small number of water bodies.[44]

Assessment methods for general physico-chemical quality elements

Measurements of physico-chemical and hydromorphological conditions are included as supporting elements in the assessment of ecological status in the RBMPs. The national guidance document on classification describes the methodology for assessing physico-chemical quality elements. These

[41] Veileder 02:2018, Klassifisering av miljøtilstand i vann, available at: https://cdr.eionet.europa.eu/no/eu/wfd2022/documents/national/envzkamow/Classification_chem_ecol_status.pdf.
[42] Annex V, Section 1.4.1 WFD.
[43] Methods for the assessment of the quality elements set out in the WFD to establish ecological status / potential.
[44] Norway has stated that work is ongoing to include more hydromorphological quality elements to better comply with Annex V of the WFD.

parameters include general water quality indicators such as phosphorus, nitrogen, biochemical oxygen demand (BOD), oxygen, pH, and RBD-specific substances like pollutants.

Physico-chemical supporting parameters are used to monitor and assess the impact of various pressures such as eutrophication, acidification, and hydromorphological changes. This contributes to a more comprehensive assessment of the water body's status and ensures that all relevant factors are considered.

Selection of river basin specific pollutants and use of environmental quality standards (EQS)

Annex V of the WFD establishes the principles to be applied by the EEA EFTA States to develop EQSs for RBSPs. Compliance with EQSs for RBSPs forms part of the assessment of ecological status. EQS values for RBSPs in water, sediment and biota are provided in the national guidance document on classification.

Annex VIII to the Norwegian Water Regulation lists the EU priority substances and their EQS-values, in accordance with the Environmental Quality Standards Directive (Directive 2013/39/EU).

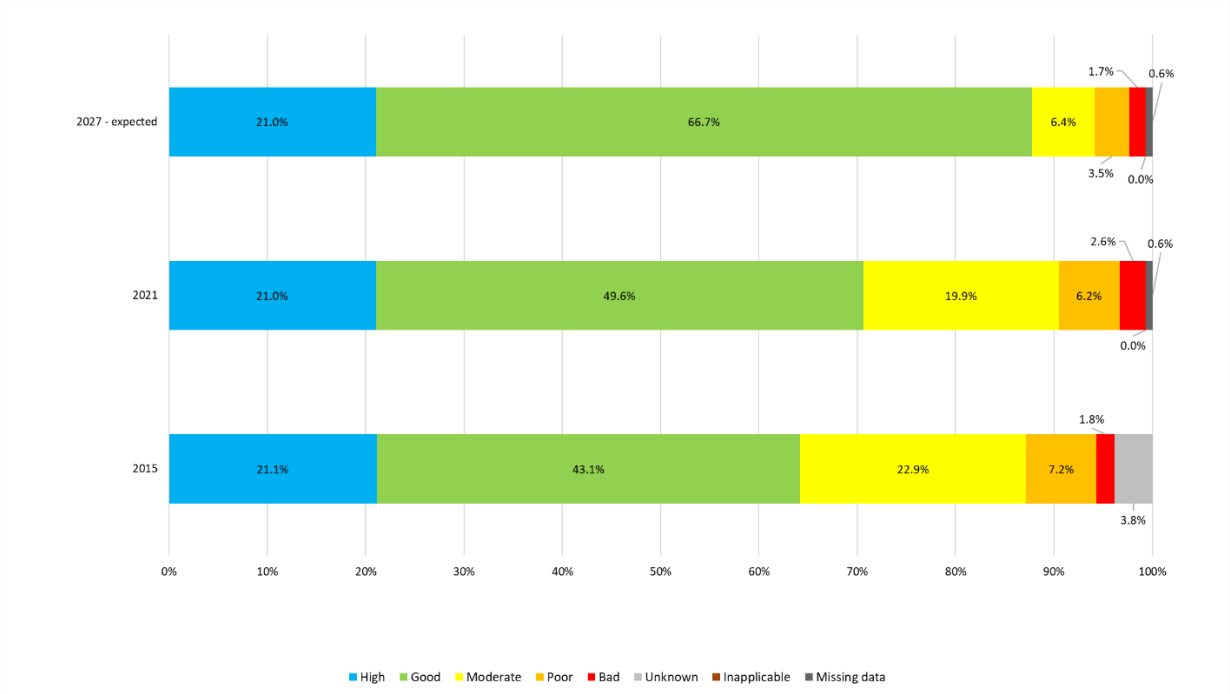
3.1.3 Classification of ecological status / potential of surface water bodies

Ecological status and potential of SWBs

The ecological status of a SWB is determined on the basis of the biological quality elements and with the physico-chemical and hydromorphological quality elements framework supporting the biological quality elements. The ecological status of a SWB is determined by the worst biological quality element. The status class will be downgraded to moderate if the worst biological quality element is good and one of the supporting physico-chemical quality elements is less than good. The physico-chemical quality elements can only downgrade a water body to good or moderate. A poor or bad status classification will be determined by a biological quality element. For a water body to be at high status, all quality elements (biological, physico-chemical, specific pollutants and hydromorphological) must be at high status. This is described as "one-out-all-out".

Figure 3.3 shows the ecological status of SWBs in Norway. There is improvement since the previous RBMPs, with more surface water bodies in good status and fewer water bodies in unknown status.

FIGURE 3.3 ECOLOGICAL STATUS OR POTENTIAL OF SURFACE WATER BODIES IN THE 2ND (2021) AND 1ST (2015) RBMPS, AND EXPECTED STATUS BY 2027

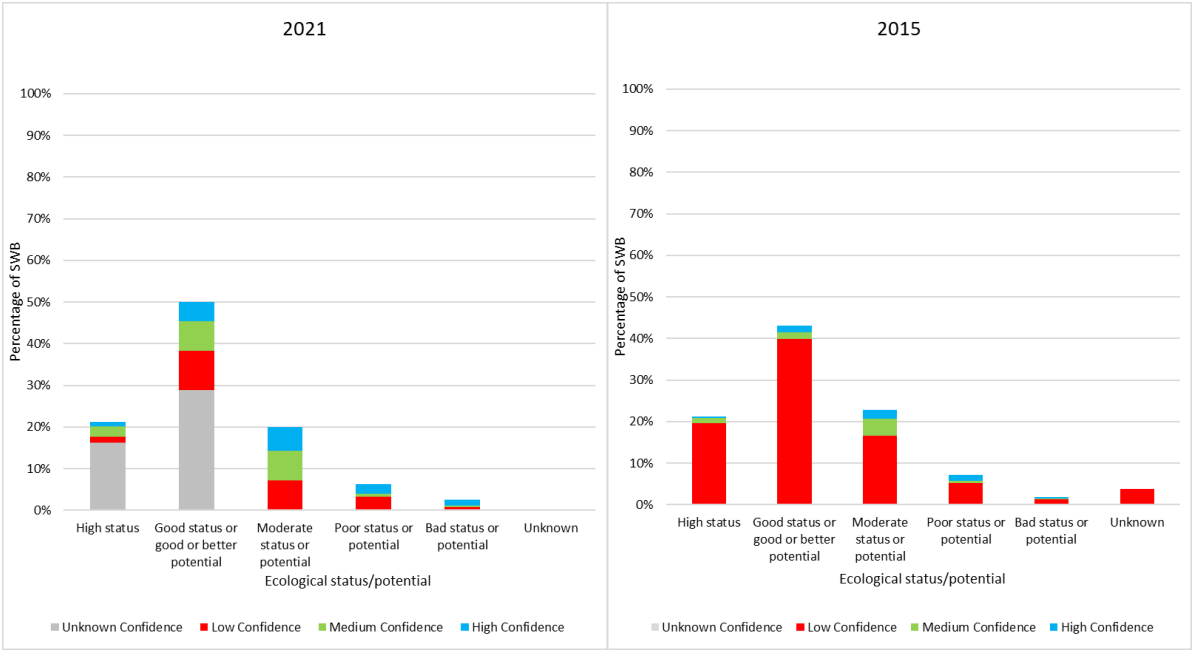


Confidence in ecological status assessment

According to the WFD Reporting Guidance[45], the confidence rating based on a four-point scale (0-3) should be added to each water body status assessment. Additionally, there is a quality control system in place to ensure the reliability of the collection and analysis of monitoring data / water samples (certification, accreditation, standards, methods and regulatory requirements).

Figure 3.4 below shows the confidence in the classification of ecological status / potential of SWBs. The most notable change is a shift from water bodies being classified with "low" confidence to "unknown" confidence.[46] Although a majority of water bodies are still classified with low or unknown confidence, there has been an increase in the percentage of SWBs assessed with medium and high confidence, demonstrating clear improvements in monitoring and knowledge.[47]

FIGURE 3.4 CONFIDENCE IN THE CLASSIFICATION OF ECOLOGICAL STATUS / POTENTIAL OF SURFACE WATER BODIES IN THE 2ND RBMPS AND THE 1ST RBMPS.[48]



Reasons for failing to achieve good ecological status / good ecological potential of SWBs

The ecological status of SWBs by quality elements is shown in Figure 3.5. From the information available, more quality elements are in high and good status rather than moderate, poor, or bad. However, there are a lot of unknowns in the data, making it difficult to draw full conclusions. For example, for phytobenthos in rivers, status data is only available for less than 10% of SWBs.

[45] WFD Reporting Guidance, page 47. Available at: https://cdr.eionet.europa.eu/help/WFD/WFD_715_2022/Guidance%20documents/WFD%20Descriptive%20Reporting%20Guidance.pdf.

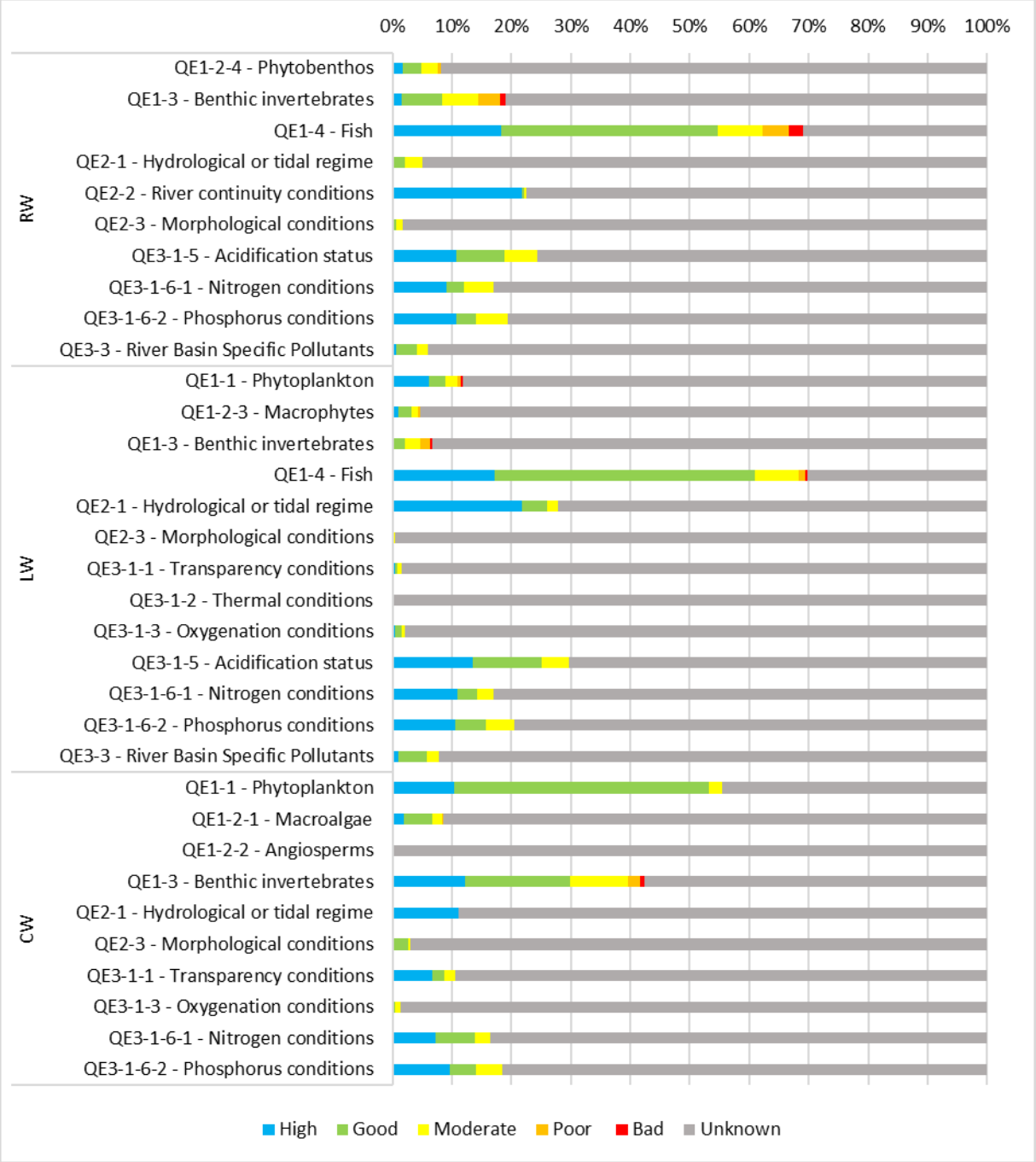
[46] Norway has suggested that the shift from low to unknown confidence between 2015 and 2021 is likely due to changes in how the categories were used / applied and could also be due to differences in how confidence has been reported in the two periods / the reporting format.

[47] According to an explanation by Norway, the improvement is supported by data from the national database, Vannmiljø, which demonstrates that the knowledge base has increased significantly in terms of datapoints (records) since 2009.

[48] High confidence = good data for at least one BQE and the most relevant supporting QE, Medium confidence = data for supporting QE and / or limited data for one BQE, Low confidence = no monitoring data.

Based on the available data, the quality elements most associated with failure (i.e. those which have a moderate, poor or bad status) are benthic invertebrates and fish in rivers; fish, acidification status and phosphorus conditions in lakes; and benthic invertebrates and RBSPs in coastal waters.

FIGURE 3.5 ECOLOGICAL STATUS OF SURFACE WATER BODIES BY QUALITY ELEMENTS.

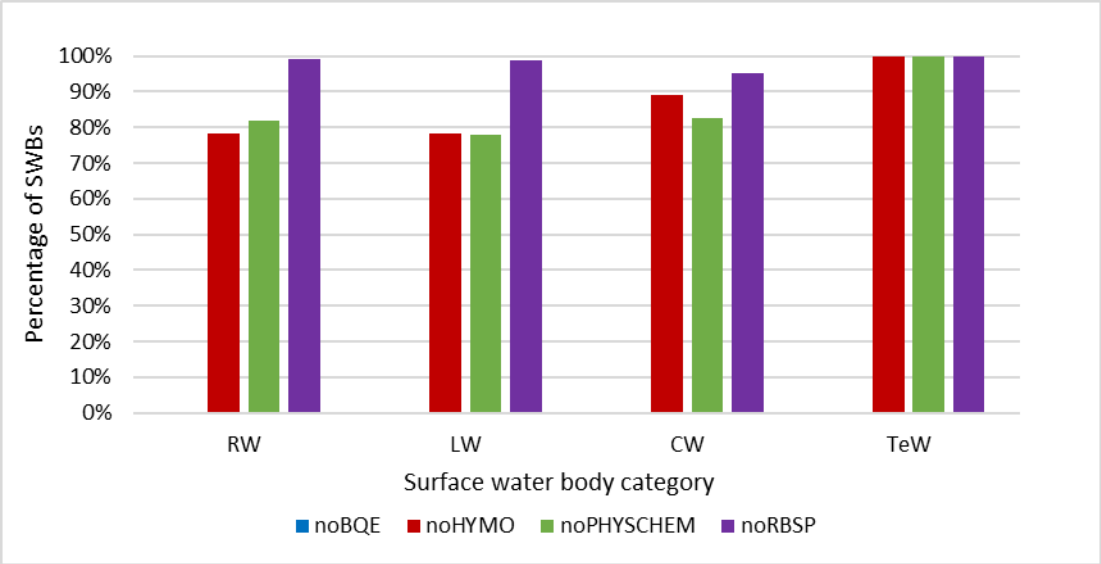


Application of the one-out-all-out principle

The "one-out-all-out" principle described above is used to classify ecological status in Norway and is described in the national guidance document on classification.

Figure 3.6 shows the percentage of SWBs which are classified in the 2nd RBMPs without a particular quality element group (biological, hydromorphological, general physico-chemical quality elements or RBSPs). A large proportion of SWBs across all categories do not use the supporting quality elements for the status assessment.

FIGURE 3.6 PERCENTAGE OF SURFACE WATER BODIES FOR WHICH NO BIOLOGICAL QUALITY ELEMENTS (NOBQE), NO HYDROMORPHOLOGICAL QUALITY ELEMENTS (NOHYMO), NO GENERAL PHYSICO-CHEMICAL QUALITY ELEMENTS (NOPHYSCHEM) OR NO RIVER BASIN SPECIFIC POLLUTANTS (NORBSP) ARE USED IN THE CLASSIFICATION OF ECOLOGICAL STATUS / POTENTIAL IN THE 2ND RBMPS



3.2 Main changes, previous recommendations, and gaps

Norway was previously recommended to expand and improve its monitoring to ensure comprehensive and reliable data and thus be able to select the most efficient measures.

Overall, monitoring has improved significantly. The proportion of water bodies classified with respect to ecological status based on monitoring data has improved substantially. The number of surveillance monitoring sites has increased. However, improvements should still be made, in particular as regards the inclusion of supporting quality elements in the monitoring and assessment of ecological status.

Although Norway has a high proportion of water bodies in good ecological status, the confidence in this data is largely unknown. Further efforts should therefore be made to improve the extent of monitoring.

4 Monitoring, assessment, and classification of chemical status in surface water bodies

Good surface water chemical status means the chemical status required to meet the environmental objectives for surface waters established under Article 4(1)(a) of the WFD. This means the chemical status achieved by a SWB in which concentrations of pollutants do not exceed the environmental quality standards (which are the concentration of a particular pollutant or group of pollutants in water, sediment or biota which should not be exceeded to protect human health and the environment). Monitoring is used to determine the concentrations of pollutants and subsequently establish the chemical status of a SWB.

4.1 Assessment of implementation and compliance with WFD requirements

4.1.1 Monitoring of chemical status in surface water bodies

Monitoring

Article 8(1) of the WFD requires the EEA EFTA States to establish monitoring programmes for the assessment of the chemical status of surface water. As a caveat, the intention is not that every single water body within a RBD should be subject to monitoring, but that the monitoring network should be sufficiently comprehensive, in order to provide a coherent and thorough overview of the chemical water status within each RBD.

The ultimate aim of the status assessment is to identify which water bodies are at risk from the potential impacts of priority substances, to further inform what kind of measures are needed to mitigate the risk. Precise and reliable monitoring results are therefore a prerequisite for sound planning of investments in the PoMs.

Chemical status is divided into two classes: good and poor. In accordance with the 'one-out-all-out' principle, a water body is only considered in good status if it meets all the EQSs (maximum concentration thresholds) set out in Annex VIII of the Norwegian Water Regulation. Conversely, if one or more substance exceeds the quality standard the water body is determined as being in poor chemical status and at risk of impacts. The quality standard does not define specifically what the impacts will be or the magnitude of those impacts, but rather indicates a risk of impact where measures are warranted to intervene to mitigate the risk.

Information from several RBMPs indicates that a large number of water bodies have unknown status. The RBMPs state that monitoring is largely tied to discharges, and the high number of water bodies in unknown status is due to the fact that chemical status is only classified in water bodies where measured values of the priority substances exist, either in water, sediments, or biota.[49] Measured values are typically found in water bodies affected by discharges of the relevant substances from various types of human activity.

Norway has chosen to classify water bodies lacking data as having unknown status, and when data is available, they are classified as either good or poor. This results in differences in chemical status for water bodies that cross the border. On the Swedish side, the water bodies are classified as "does not achieve good chemical status", while on the Norwegian side, they are usually classified as having unknown status.

While information on the specific approach to surface water monitoring networks is relatively limited within the RBMPs, supplementary reports published by the Norwegian Environment Agency do provide some further detail.[50] The reports on the priority substance monitoring programme highlight that 15 rivers have been selected across Norway with monitoring for priority substances alternating annually on a three-year cycle (five rivers per year). Monitoring was conducted on a quarterly basis and spanned a total of 21 priority substances[51], mainly metals and long-term persistent organic pollutants. The reports indicate that the monitoring programme aims to fulfil both the requirements of the WFD and the obligations under the Oslo and Paris (OSPAR) Convention[52], which includes determining loads that

[49] For example, see the RBMP for Nordland (NO1103).
[50] Norwegian Environment Agency, 2018, Priority substances and emerging contaminants in selected Norwegian rivers, M-1166; Norwegian Environment Agency, 2021, Priority substances and emerging contaminants in selected Norwegian rivers, river monitoring programme for 2019, M-1818; and Norwegian Environment Agency, 2022, Priority substances and emerging contaminants in selected Norwegian rivers, the Norwegian river monitoring programme, M-2140.
[51] Anthracene, brominated diphenyl ethers, cadmium, chlorinated alkanes (C10-C13), chlorfenvinphos, chlorpyrifos, di(2-ethylhexyl)phthalate (DEHP), fluoranthene, hexachlorobenzene, hexachlorocyclohexane, lead, mercury, naphthalene, nickel, nonylphenols, octylphenols, pentachlorobenzene, polyaromatic hydrocarbons (PAHs), perfluorooctancesulphonic acid (PFOS), cybutryne, and hexabromocyclododecane. The monitoring also includes a number of polychlorinated biphenyls, but no evidence that this matches the dioxins and dioxin like PCB entry.
[52] The Oslo and Paris Convention (OSPAR) was adopted in 1992, with the aim to protect the marine environment in the North-East Atlantic. It was born out of a series of developments relating to marine pollution incidents. This

reach the marine environment. This is in part why there has been a specific focus on rivers as the main conduit to releases at coastal locations.

The monitoring network includes potential points of discharge and the selected river monitoring programme, which together amount to 8.6% of rivers (by length) in Norway. Priority substance monitoring takes place in lakes and coastal water bodies, but the percentage coverage by area is not available from the data.

Recent knowledge and monitoring results provide the foundation for ongoing assessments of conditions in water bodies and watercourses. The close connections and ties between commitments under the WFD and OSPAR Convention have also shaped the approach to monitoring. The status classification is always reliant on the available knowledge base. However, in many water bodies, there has been minimal or no monitoring of the water environment's status. Consequently, the classification of environmental status in these cases has been based solely on impact analyses and local knowledge.

Long-term trend monitoring and monitoring of priority substances in water, sediment and biota for status assessment

Article 3(6) of the Environmental Quality Standards Directive requires EEA EFTA States to monitor priority substances listed in Part A of Annex I, giving particular consideration to 20 substances[53] that tend to accumulate in sediment and / or biota, for the purpose of long-term trend assessment. Monitoring should be carried out at least every three years, unless technical knowledge and expert judgment justify another interval.

The RBMPs do not provide the results of any long-term trend analysis.

In the RBMPs themselves, there is only limited information on monitoring for long-term trends, and often the RBMP (e.g., see Trøndelag (NO1107)) refers to monitoring in a more general sense, which spans both ecological and chemical monitoring, in the same passages.

The priority substance monitoring programme for selected rivers published by the Norwegian Environment Agency[54] mentions monitoring in both sediment and biota on an annual basis. However, it is unclear whether the data reported to WISE specifically covers the data from the Norwegian Environment Agency reports, or a different dataset.

Data from the electronic reporting to Water Information System Europe (WISE), based on the 2022 monitoring year, indicates that:

- Spatial coverage (i.e., number of monitoring sites) is greater for biota than sediment.
- The metals (cadmium, lead, and mercury) have the greatest coverage for biota and sediment.
- Poly aromatic hydrocarbons (anthracene, fluoranthene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3,c-d)perylene, and benzo(g,h,i)anthracene) are also well covered for both biota and sediment.

included the Torrey Canyon oil spill (in 1967) off the coast of the UK and loss of 117,000 tonnes of crude oil. The Oslo Convention (1974) aimed to address marine pollution from dumping at sea by ships and aircraft. The subsequent Paris Convention (1978) aimed to protect marine pollution from land sources. The combined OSPAR Convention expands and solidifies these commitments to protect the marine environment, which includes Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, and The United Kingdom as member countries.

[53] Anthracene, brominated diphenylether, cadmium, C10-13 chloroalkanes, Di(2-ethylhexyl) phthalate (DEHP), fluoranthene, hexachlorobenzene, hexabutadiene, hexachlorocyclohexane, lead, mercury, pentachlorobenzene, polyaromatic hydrocarbons (PAHs), Tributyltin, Dicofol, PFOS, Quinoxyfen, Dioxins and dioxin-like compounds, Hexabromocyclododecane, and Heptachlor and heptachlor epoxide.

[54] Norwegian Environment Agency, 2018, priority substances and emerging contaminants in selected Norwegian rivers, report by the Norwegian Institute for Water Research ref M-1166. Norwegian Environment Agency, 2019, Priority substances and emerging contaminants in selected Norwegian rivers – The river monitoring programme 2019, report by the Norwegian Institute for Water Research ref M-1818. Norwegian Environment Agency, 2022, Priority substances and emerging contaminants in selected Norwegian rivers, The Norwegian river monitoring programme, report by the Norwegian Institute for Water Research ref M-2140.

- The least well covered substances are dicofol, quinoxyfen, and Di(2-ethylhexyl) phthalate (DEHP).

Monitoring for long term trend assessment

Long-term trend assessment is not discussed in the RBMPs.

Monitoring of priority substances that are discharged in each RBD

EEA EFTA States are required to undertake surveillance monitoring for all priority substances which are discharged into the river basin or sub-basin. States shall monitor as relevant all priority substances discharged, and other pollutants discharged in significant quantities.

The knowledge base for discharges of priority substances has been significantly strengthened in recent years, largely due to monitoring and problem mapping conducted by various sector authorities. The County Governor of Nordland has updated Vann-Nett[55] in collaboration with other counties and a range of interested stakeholders who have collected data on the water environment. This enhanced knowledge base and increased focus on implementing measures have led to changes in the environmental status of water bodies, both positively and negatively.

Some inconsistencies are identified in transboundary water bodies, where respective authorities in Norway and Sweden have taken different approaches to catchment monitoring and management.

There is no shared database between Norway and Finland that provides comprehensive information on water environments, including impacts, environmental status, and environmental objectives. Additionally, Sweden and Norway use separate systems for managing water data: Sweden uses VattenInformationsSystem Sverige (VISS), while Norway uses Vann-Nett. The RBMPs do not clearly specify how transboundary monitoring is conducted concerning priority substances.

4.1.2 Assessment of chemical status of surface water bodies

EEA EFTA States are required to report the year on which the assessment of chemical status is based[56]. This may be the year that the SWB was monitored. If grouping is used, this may be the year in which monitoring took place in the SWBs within a group that are used to extrapolate results to non-monitored SWBs within the same group.

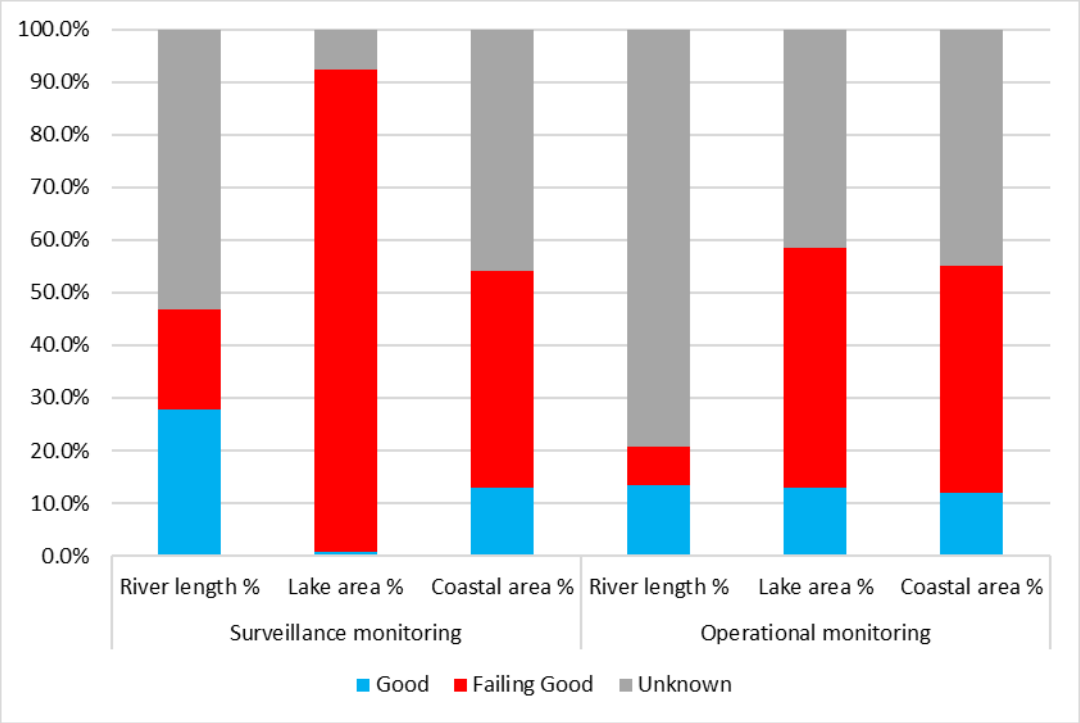
The data presented in Figure 4.1 includes monitoring up to and including 2021. The specific time-range is unclear, but assuming this includes the data from the selected river monitoring programme by the Norwegian Environment Agency, the timeframe would span from 2017 to 2021. The majority of river-based water bodies are in unknown status (79% by length for operational monitoring). While the reported data suggests that there was no monitoring in lakes or coastal water bodies, the status classification indicates that 45% of coastal water bodies and 41% of lakes (both by area) are in unknown status, with the majority of water bodies classified (as either good or poor).

Where a chemical status is known, the majority of surface water bodies are in poor status. For rivers, lakes, and coastal water bodies, the proportion of water bodies in good chemical status ranges from 10% to 14% of the total water bodies; while 43% of coastal water bodies, 46% of lakes, and 7% of rivers are all in poor status.

In terms of interpreting the data in Figure 4.1, some care is needed when determining overall results. It should be noted that more than 23,000 water bodies in Norway are rivers (72% of all water bodies), which means the volume of water bodies in unknown status is greater than the figure reviewed on its own suggests.

[55] Vann-Nett is the Norwegian water information system developed to help manage the obligations of the Water Framework Directive. It provides a publicly available resource, including maps of data.
[56] Note that as part of the approach to monitoring and chemical status, grouping of similar water bodies is allowed. The reporting of RBMP data needs to make clear when the monitoring was undertaken to support the chemical status assessment.

FIGURE 4.1 PERCENTAGE (%) OF SURFACE WATER BODY LENGTH / AREA IN EACH CHEMICAL STATUS CLASS, INCLUDED IN MONITORING IN THE 2ND RBMPS



Ubiquitous persistent, bioaccumulative and toxic priority substances

According to Article 8a(1)(a) of the Environmental Quality Standards Directive, eight priority substances and groups of priority substances behave like ubiquitous, persistent, bioaccumulative and toxic substances.[57] These substances are generally expected to cause widespread exceedances, and their emissions can be challenging to tackle (e.g. due to long-range atmospheric transport and deposition). In order to show the progress made in tackling other priority substances, EEA EFTA States have the possibility to present the information related to chemical status separately for these substances.

Based on the data analysed, a total of 3.3% of all water bodies in Norway are in poor chemical status (see Figure 4.2). Mercury is the priority substance which causes the greatest number of failures (2.1% of all water bodies in Norway), which is equivalent to 64% of all failures. From the top ten substances causing water bodies to fail to achieve good chemical status, six are ubiquitous persistent, bioaccumulative and toxic (uPBT) substances (mercury, tributyltin, Polycyclic Aromatic Hydrocarbons (PAHs), and Perfluorooctanesulfonic Acid (PFOS)). This should illustrate the scale of the impact that uPBT substances have on achieving good chemical status in Norway.

In the RBMPs, status is provided for the overall situation. No disaggregation is provided for status with and without uPBT substances.

4.1.3 Classification

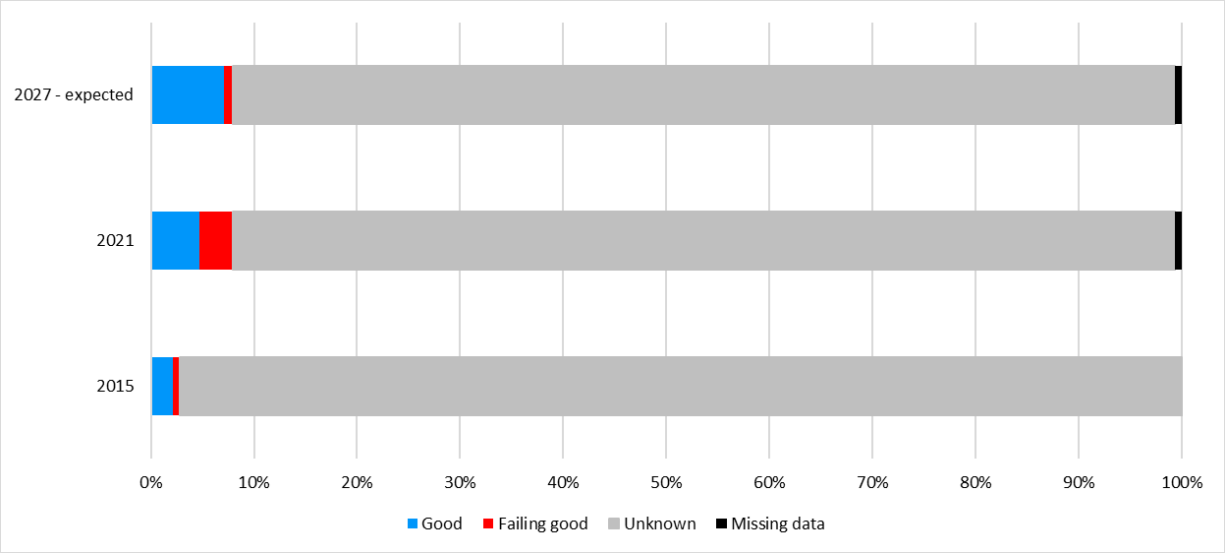
Chemical status

Figure 4.2 provides the chemical status classification at the year preceding the periods covered by the 1st (2015) and 2nd (2021) RBMPs, along with the projections for the expected status in 2027. Figure 4.2 illustrates that under the 1st RBMPs, 97% of all water bodies in Norway were in unknown status, with 2% in good status and 1% in poor status. The 2nd RBMPs illustrate that a limited amount of progress has been made with 92% of all water bodies in unknown status. 4.7% are in good status, and 3.3% in

[57] Brominated diphenylether, mercury and its compounds, polyaromatic hydrocarbons (PAHs), tributyltin, PFOS, dioxins, hexabromocyclododecane and heptachlor.

poor status (with mercury being the primary cause as indicated above). The RBMPs themselves make comments about aspiration targets and aims to significantly reduce the proportion of water bodies in unknown status[58], however, the results of the electronic reporting to WISE (which forms the basis of Figure 4.2) suggest that by 2027 a similar situation presents with 92% in unknown status, and the major development being expected improvements in chemical status for the water bodies where status is known.

FIGURE 4.2 CHEMICAL STATUS FOR SURFACE WATER BODIES IN NORWAY IN THE 2ND (2021) AND 1ST RBMPS (2015) AND EXPECTED STATUS IN 2027



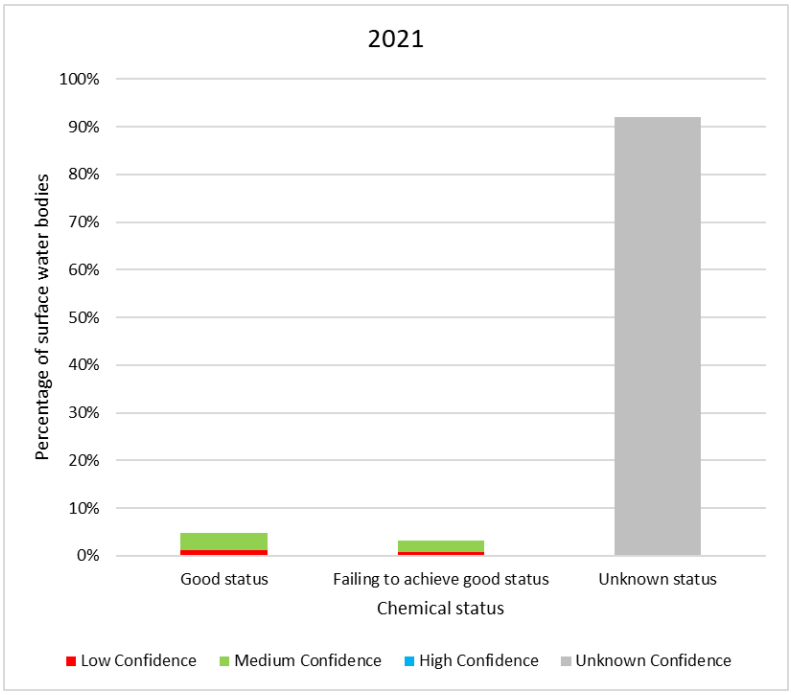
Confidence in classification

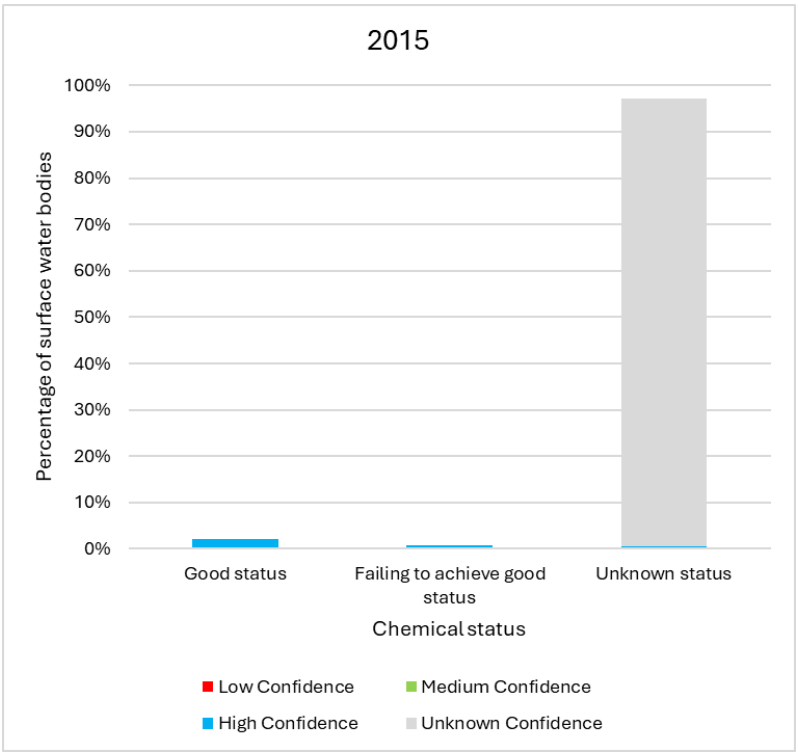
The WFD reporting guidance[59] helps set out the terminology for defining confidence in the chemical classification status as high, medium, low, or unknown. In this case, the confidence ratings are defined as 'high' (good data for all priority substances that are discharged in the RBD), 'medium' (limited or insufficiently robust monitoring data for some or all priority substances that are discharged in the RBD), 'low' (no monitoring data), and 'no information' (no monitoring, conceptual model, or expert judgment).

Figure 4.3 provides confidence ratings for the current RBMPs (2021) and the previous RBMPs (2015). In a similar fashion to the overall chemical classification (shown in Figure 4.2) 'unknown' makes up the biggest proportion, falling from 97% in 2015 to 91% in 2021. For the remainder, while the proportion of water bodies with a classification has increased, the confidence in that classification has decreased. In 2015, for the 3% of water bodies with a classification the confidence was high. This reflects the earlier comments in this section, that Norway has only classified water bodies where monitoring data exists to support that assessment. For the 2021 classifications, 6% are in medium confidence (spread across good and poor status), and 2% are in low confidence. Further explanation for why confidence has fallen is not provided in the RBMPs.

[58] For example, see Bottenhavet (NO2), and Nordland (NO118).
[59] Available at: https://cdr.eionet.europa.eu/help/WFD/WFD_715_2022/Guidance%20documents/WFD%20Descriptive%20Reporting%20Guidance.pdf

FIGURE 4.3 CONFIDENCE IN THE CLASSIFICATION OF CHEMICAL STATUS OF SURFACE WATER BODIES IN NORWAY IN THE 2ND AND 1ST RBMPS[60]



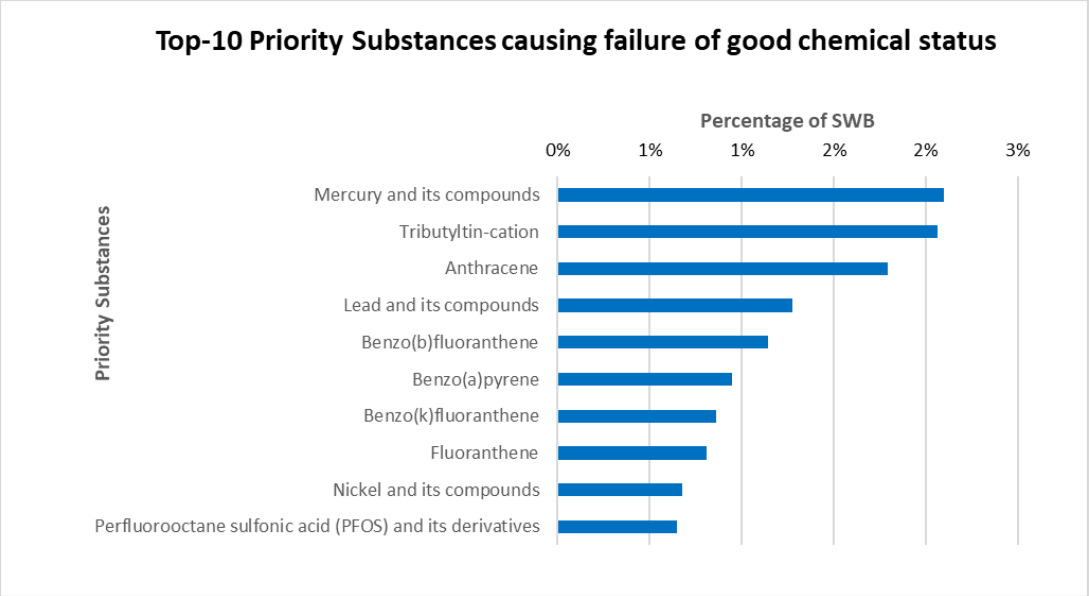


[60] Norway has suggested that the shift from low to unknown confidence between 2015 and 2021 is likely due to changes in how the categories were used / applied and could also be due to differences in how confidence has been reported in the two periods / the reporting format. Norway has further stated that the knowledge base (based on number of datapoints) has progressively increased since 2009.

Reasons for failing to achieve good chemical status of SWBs

Figure 4.4 provides details of the top ten substances which prevent water bodies from achieving good chemical status. The top two substances, mercury and tributyltin make up 64% of all failures each.[61] The top ten is dominated by a combination of metals (mercury, lead, and nickel), along with polyaromatic hydrocarbons (anthracene, fluoranthene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene), which are primarily linked to the combustion of fossil fuels and industrial processes (particularly metallurgy). The other remaining top ten sources, include PFOS which is a significant issue across Europe more generally, and tributyltin, a biocide that was used in anti-fouling paints for ships as well as in amenity settings.

FIGURE 4.4 THE TOP-10 PRIORITY SUBSTANCES CAUSING FAILURE TO ACHIEVE GOOD CHEMICAL STATUS IN SURFACE WATER BODIES IN NORWAY



4.2 Main changes, previous recommendations, and gaps

Overall, the analysis of the current RBMPs illustrates that limited progress has been made. While there have been major developments and steps in terms of monitoring in biota and sediment to establish a good network, details of the trend analysis are missing. The number of water bodies in unknown status has improved from 97% under the previous RBMPs to 92% under the current round, but arguably that is still far too high, and the majority of Norway's water bodies are in unknown status, making it more difficult to have effective measures against potential risks.

Norway has over 30,000 water bodies in total, which represents a very significant challenge in terms of developing a fully comprehensive monitoring network. Therefore, it is likely unreasonable to expect classification of chemical status on a broad monitoring network alone.[62] Grouping approaches have been adopted by other European countries faced with the same issue, but not by Norway. This indicates that it is not demonstrated that approaches have been developed to tackle this issue, despite the previous recommendation to design monitoring that will provide enough and reliable information for grouping.

Norway has established a publicly available database for monitoring of discharges (Vannmiljø), which is positive. However, the collaboration and consistency of reporting and data with neighbouring countries (Sweden and Finland) looks more fragmented.

[61] In accordance with the 'one-out, all-out' principle, the same water body can fail to achieve good status for more than one substance.
[62] The majority of EU Member States report monitoring in between 30% to 60% of their surface water bodies.

The WFD requires monthly monitoring for 45 priority substances. The information assessed suggests that 21 substances have been monitored quarterly. There may be good reasons, such as seasonal issues (snow and ice) that may make monthly monitoring in some water bodies impractical. However, the RBMPs lack sufficient explanation for why specific priority substances are not included and therefore it is difficult to draw conclusions.

Significant steps have been taken to establish a monitoring network for biota and sediment, as was recommended following the assessment of Norway's pilot RBMPs. However, to complete the trend analysis, a sufficient body of data needs to be developed over time. The RBMPs provide very little information on trends or trend analysis, or reasons why it is not yet possible, which can be considered a reporting gap.

The WFD also requires long-term trend analysis for named priority substances (20 in total) in biota and sediment. While Norway has established monitoring networks for (most of) these substances, the results of the trend analysis are to date missing from the RBMPs. It is unclear whether this is simply through a lack of temporal data or other issues.

5 Monitoring, assessment, and classification of quantitative status of groundwater bodies

Good groundwater quantitative status means the quantitative status required to meet the environmental objectives for groundwater bodies established under Article 4(1)(b) of the WFD. According to Annex V of the WFD, a GWB will be in good quantitative status if:

- the available groundwater resource is not exceeded by the long-term annual average rate of abstraction;
- the groundwater levels and flows are sufficient to meet environmental objectives for associated surface waters and groundwater dependent terrestrial ecosystems; and
- anthropogenic alterations to flow direction resulting from level change do not cause saline or other intrusion.

5.1 Assessment of implementation and compliance with WFD requirements

5.1.1 Monitoring of quantitative status in groundwater

In the 2nd RBMPs, the total number of delineated GWBs in Norway is 1,401, increasing from 1,394 in the 1st RBMPs. The delineation of the GWBs has been revised and the total GWB area has increased from 4,802 km^2 to 4,893 km^2 since the 1st RBMP (+1.9%). In Norway, there are 3 transboundary GWBs[63].

Among the 1,401 GWBs, 16 (1.1%) are subject to quantitative monitoring, undertaken with 35 monitoring sites. This is an improvement from the 1st RBMPs, where no GWBs were subject to quantitative monitoring. The 16 GWBs with quantitative monitoring in the 2nd RBMPs represent 14% of the total GWB area (Table 5-1), and all of them are in good quantitative status.

[63] In the 2nd RBMPs, the 3 GWBs characterised as transboundary are NO668316-132164, NO002-998-G and NO664534-130215. It is noted that in the 1st RBMPs, Norway reported to WISE electronic reporting only 1 transboundary GWB (NO668316-132164).

TABLE 5-1 PERCENTAGE (%) OF GROUNDWATER BODY AREA INCLUDED IN QUANTITATIVE MONITORING BY 2021

Quantitative monitoring 2021	Area of groundwater body (km^2)	Percentage (%) of total groundwater body area
Yes, monitoring undertaken	685	14.0%
No, monitoring not undertaken	4207	86.0%
Total groundwater body area	4893	100.0%

In the 2nd RBMPs, 269 GWBs are linked to drinking water protected areas. In the 1st RBMPs, no GWBs were linked with drinking water protected areas.

5.1.2 Assessment of quantitative status for groundwater

The methodology for groundwater quantitative status assessment considers the assessment of water balances and saline or other intrusions. However, whilst it appears there is some form of water balance analysis between known abstractions and availability, the details are not clear from the RBMPs and, in particular the electronically reported data states that the assessment of long-term groundwater level trends, the assessment of impacts on groundwater associated aquatic ecosystem and the assessment of impacts on groundwater dependent terrestrial ecosystems are not considered.[64] This was also the case in the 1st RBMPs.

Consideration of groundwater associated surface waters and / or groundwater dependent ecosystems

Groundwater associated aquatic ecosystems are not reported, and they are not considered in the groundwater quantitative status assessment, similarly to the 1st RBMPs.

Norway has reported the existence of groundwater dependent terrestrial ecosystems, but these are not considered in the groundwater quantitative status assessment, similarly to the 1st RBMPs.

Grouping of groundwater bodies

According to the 2nd RBMPs, grouping of GWBs was not used in the assessment of the quantitative status of GWBs, similarly to the 1st RBMPs.[65]

5.1.3 Classification of quantitative status for groundwater

Classification

In the 2nd RBMPs, all 1,401 GWBs were in good quantitative status by 2021 (Figure 5.1), which is an improvement from the 1st RBMPs, where 16 out of 1,394 GWBs (i.e., 1.1% of total GWBs) were in poor

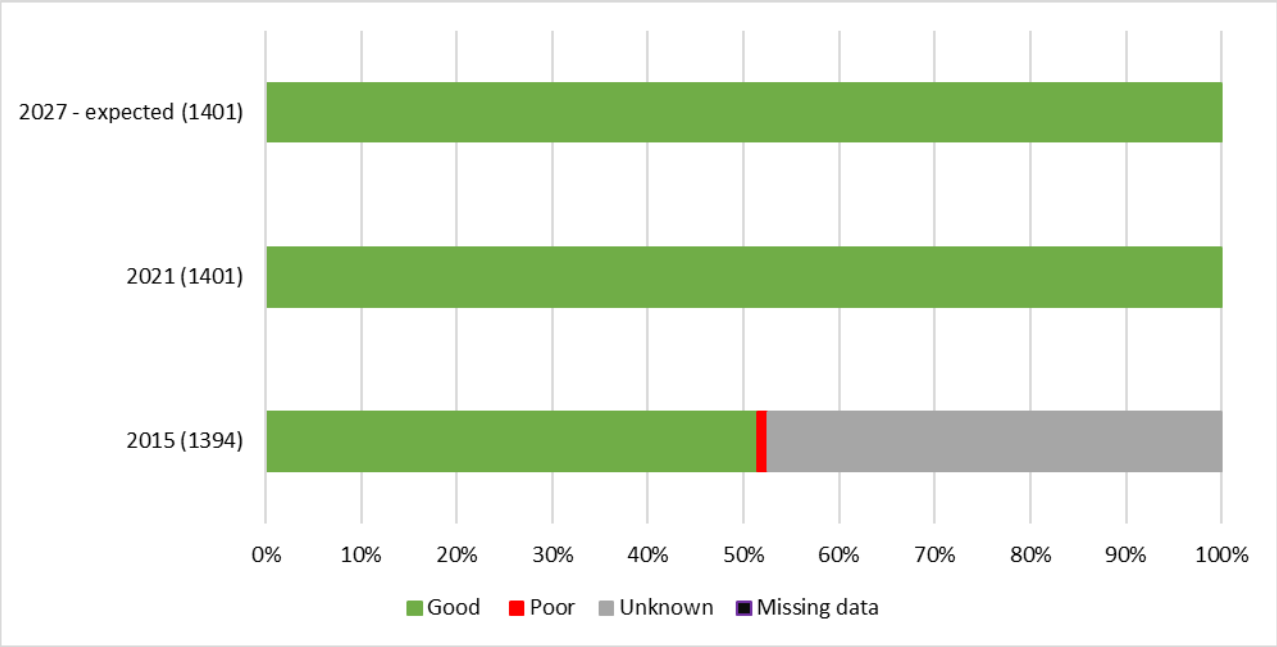
[64] Based on WISE electronic reporting, none of the above elements were reported to be used for the groundwater quantitative status assessment (gwmet_gwmethodologies). The 2nd RBMPs state that, at the time of their drafting, it was not possible to transfer groundwater monitoring results (e.g. groundwater levels) from Vannmiljø to Vann-Nett. Therefore, they could not be considered for the assessment of the groundwater chemical and quantitative status. The Norwegian Environment Agency was working to enable the entering of monitoring data into Vann-Nett. It was expected that this would be ready in the first quarter of 2021. Norway subsequently clarified that the classification of groundwater quantitative status was provided by the Norwegian Water Resources and Energy Directorate (NVE). NVE reviewed all groundwater abstraction permits and concluded that there were no groundwater bodies where the total abstraction exceeded the total groundwater recharge. Furthermore, saline or other intrusions have been assessed as not relevant for Norway, as relevant cases have never been reported in the country.

[65] According to the 2nd RBMPs, Norway monitors only a sample of GWBs (see section 5.1.1) and extends the resulting classification to the other GWBs, considering also the available monitoring data for groundwater levels and information included in groundwater abstraction permits.

quantitative status and 661 GWBs (i.e., 47.4% of total GWBs) were in unknown quantitative status in 2015.

No GWBs are expected to fail to achieve good quantitative status by 2027 (Figure 5.1).

FIGURE 5.1 QUANTITATIVE STATUS OF GROUNDWATER BODIES IN THE 2ND (2021) AND 1ST RBMPS (2015), AND EXPECTED STATUS BY 2027

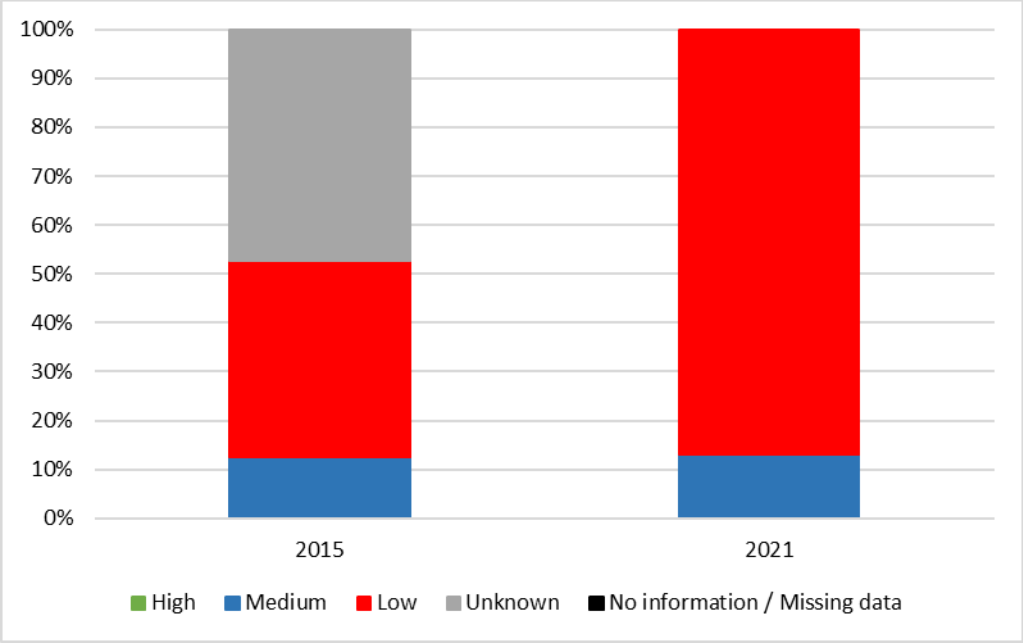


Furthermore, based on reported data, no GWBs are at risk of failing to achieve good quantitative status by 2027.

Confidence in classification

The overall confidence in the assessment of the quantitative status of GWBs has improved since the 1st RBMPs, due to the elimination of the classifications with unknown confidence (Figure 5.2). The classifications with unknown confidence have at large been reclassified with low confidence in the 2nd RBMPs (i.e., 87.0% of the assessments). Classification with medium and high confidence has only slightly increased from 12.4% of the assessments in the 1st RBMPs to 13.0% of the assessments in the 2nd RBMPs.

FIGURE 5.2 CONFIDENCE IN THE CLASSIFICATION OF QUANTITATIVE STATUS OF GROUNDWATER BODIES IN THE 2ND AND 1ST RBMPS



5.2 Main changes, previous recommendations, and gaps

In the 2nd RBMPs, the total number of delineated GWBs in Norway is 1,401, increasing from 1,394 in the 1st RBMPs. The delineation of the GWBs has been revised and the total GWB area has increased from 4802 km^2 to 4893 km^2 since the 1st RBMPs (+1.9%).

Based on the pilot RBMPs, Norway was recommended to establish appropriate groundwater monitoring and assessment.

The number of quantitative monitoring sites has increased from none in the 1st RBMPs to 35 in the 2nd RBMPs. Furthermore, the number of GWBs with quantitative monitoring has increased from none in the 1st RBMPs to 16 (i.e., 1.1% of total GWBs) in the 2nd RBMPs. However, the monitoring coverage is arguably still too low.

The 2nd RBMPs state that all 1,401 GWBs in Norway have been assessed as being in good quantitative status. However, the classification of quantitative status is still being conducted without extensive monitoring results and without considering all the elements defined by the WFD as necessary for the classification of the groundwater quantitative status: long term groundwater level trends, groundwater associated aquatic ecosystems, groundwater dependent terrestrial ecosystems.

A significant portion of the groundwater quantitative status classifications has still been conducted with low confidence in the 2nd RBMPs (i.e., 87.0% of the assessments).

6 Monitoring, assessment, and classification of chemical status of groundwater bodies

Good groundwater chemical status means the chemical status required to meet the environmental objectives for groundwaters established under Article 4(1)(b) of the WFD.

A GWB will be in good chemical status if the following criteria are satisfied:[66]

[66] Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance Document No. 15. Guidance on Groundwater Monitoring, page 15.

- General water quality: the concentrations of pollutants should not exceed the quality standards applicable under other relevant EEA legislation in accordance with Article 17 of the WFD.
- Impacts on ecosystems: The concentration of pollutants should not be such as would result in failure to achieve the environmental objectives specified under Article 4 of the WFD for associated surface waters nor any significant diminution of the ecological or chemical quality of such bodies nor in any significant damage to terrestrial ecosystems which depend directly on the GWB.
- Saline intrusion: The concentrations of pollutants should not exhibit the effects of saline or other intrusions as measured by changes in conductivity.

6.1 Assessment of implementation and compliance with WFD requirements

6.1.1 Monitoring of chemical status in groundwater

Norway has two nationwide monitoring programmes for groundwater. The National Groundwater Network, which is a collaborative project between the Geological Survey of Norway and the Norwegian Water Resources and Energy Directorate (NVE), has monitored groundwater quality, levels and temperature since 1977. This network is mostly focused on groundwater bodies for drinking supply and monitoring results do not show indications of poor quantitative status. The monitoring sites are registered in Vann-Nett. In 2015 (1st RBMPs), as part of WFD implementation, the Norwegian Environment Agency initiated representative monitoring of 14 groundwater bodies presumed to be under significant pollution pressure. The characterisation and mapping of these representative localities was carried out by the Geological Survey of Norway for groundwater bodies presumed to be polluted from industrial, urban and landfill sources, and by the Norwegian Institute of Bioeconomy Research for groundwater bodies presumed to be polluted by agriculture.

Among the 1,401 GWBs, 68 GWBs (2.0%) are subject to chemical monitoring[67], undertaken with 54 surveillance and 14 operational monitoring sites. This is an improvement from the 1st RBMPs, where no GWBs were subject to chemical monitoring. The 68 GWBs with chemical monitoring represent 17.2% of the total GWB in the 2nd RBMPs (Table 6.1) and all of them are in good chemical status.

TABLE 6.1 PERCENTAGE (%) OF GROUNDWATER BODY AREA INCLUDED IN QUANTITATIVE MONITORING IN THE 2ND RBMPS

Chemical monitoring	Area of groundwater body (km^2)	Percentage (%) of total groundwater body area
Yes, monitoring undertaken	843	17.2%
No, monitoring not undertaken	4050	82.8%
Total groundwater body area	4893	100.0%

Not all substances causing risk of deterioration in chemical status are subject to monitoring in the 2nd RBMPs. Only some of the Groundwater Directive[68] Annex I and Annex II (Part B) substances are

[67] Out of these, 27 are subject to surveillance monitoring and 1 is subject to operational monitoring.
[68] Directive 2006/118/EC.

included.[69] Only some of the WFD core parameters are monitored and their monitoring is not performed in all RBDs.[70]

6.1.2 Assessment of chemical status for groundwater

The methodology for groundwater chemical status assessment is described in WISE electronic reporting and the 2nd RBMPs. It considers the assessment of general quality for a limited number of parameters and saline or other intrusions, but it does not consider the assessment of impacts on groundwater associated aquatic ecosystems, the assessment of impacts on groundwater dependent terrestrial ecosystems and the assessment of impacts on drinking water protected areas in any RBD, which was also the case in the 1st RBMPs.[71]

General chemical assessment

The 2nd RBMPs state that the chemical status of groundwater bodies is assessed against the established thresholds values, as reference conditions. However, they do not explain how the results from different monitoring sites on the same GWB are synthesised.[72]

Threshold values

Threshold values are set for substances leading to risk of not achieving good groundwater chemical status are set out in the Norwegian Water Regulation. Not all Annex II (Part B) substances are included.[73] A threshold value is not reported for trichloroethylene, tetrachloroethylene or their sum. Background levels for naturally occurring substances are not considered in the development of the respective threshold values in any RBD. Furthermore, an explanation is not provided on how threshold value setting accounts for the variation of natural background levels. The threshold values have not been coordinated with neighbouring countries, according to WISE electronic reporting.

Trend assessment

There is not a trend assessment methodology available, and the relevant assessment has not been performed, according to WISE electronic reporting.

A trend reversal methodology is not available. The starting point for trend reversal has not been reported.

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[69] Pesticides and their relevant metabolites, chloride, nitrite, total phosphorus and electrical conductivity are not included in WISE electronic reporting for any RBD in the 2nd RBMPs. Arsenic, cadmium, lead and mercury are included in WISE electronic reporting for 13 RBDs. Nitrate, ammonium and sulphate are included in WISE electronic reporting for 11 RBDs. Tetrachloroethylene is included in WISE electronic reporting for 8 RBDs. Trichloroethylene is included in WISE electronic reporting for 6 RBDs. Phosphate is included in WISE electronic reporting for 4 RBDs.

[70] pH, electrical conductivity and dissolved oxygen are not included in WISE electronic reporting for any RBD in the 2nd RBMPs.

[71] Based on WISE electronic reporting, none of the above elements were used for the groundwater chemical status assessment (gwmet_gwmethodologies). The 2nd RBMPs state that, at the time of drafting the 2nd RBMPs, it was not possible to transfer groundwater monitoring results from Vannmiljø to Vann-Nett. Therefore, they could not be considered for the assessment of the groundwater chemical and quantitative status. The Norwegian Environment Agency was working to enable entering the monitoring data into Vann-Nett. It was expected that this would be ready in the first quarter of 2021.

[72] Norway has clarified that the surveys carried out at the 14 operational groundwater monitoring sites, which were selected because of known high pressures, have provided valuable knowledge and data that can be used in the further work of characterising and classifying groundwater bodies in Norway. Considering the results of the pressure analysis conducted in 2013, combined with the monitoring results from the above sites with high pressures and other monitoring results from the National Groundwater Network monitoring sites, the Norwegian Environment Agency used expert judgment to classify the chemical status of groundwater bodies. Approximately, two thirds of the groundwater bodies were classified in good chemical status. These GWBs all have low pressures. Furthermore, saline or other intrusions have been assessed as not relevant for Norway, as relevant cases have never been reported in the country.

[73] In the 2nd RBMPs, threshold values have been reported to WISE electronic reporting only for nitrate. No threshold is also reported for total phosphorous, but it is noted that phosphate is reported for 4 RBDs.

Grouping

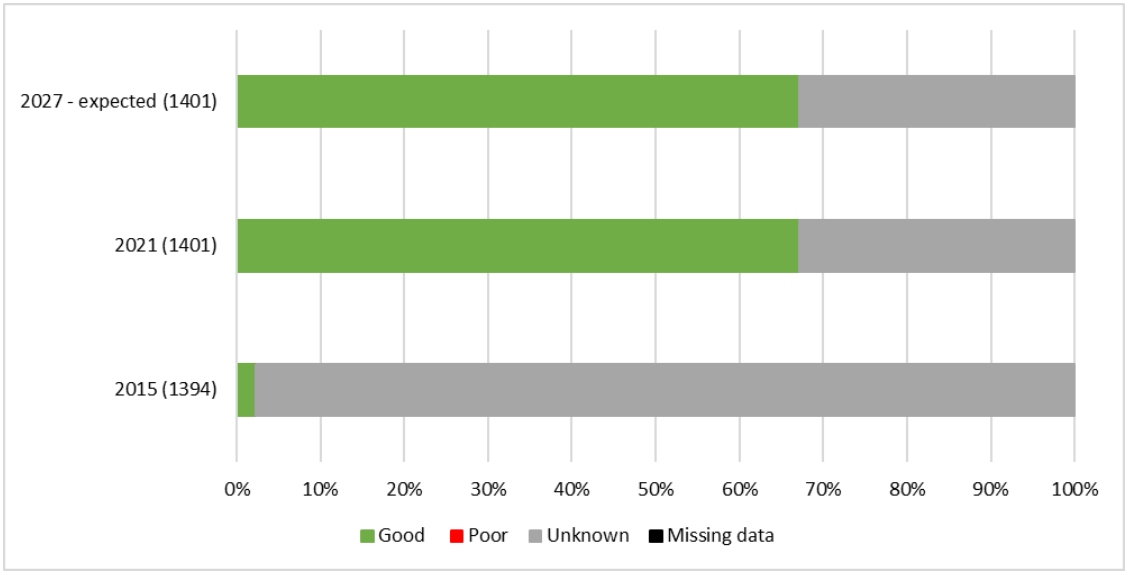
According to the 2nd RBMPs, grouping of GWBs was not used in the assessment of the chemical status, similarly to the 1st RBMPs.

6.1.3 Classification of chemical status for groundwater

In the 2nd RBMPs, 941 out of 1,401 GWBs (i.e., 67.2% of total GWBs) were in good chemical status, no GWBs were in poor chemical status and 460 GWBs (i.e., 32.8% of total GWBs) were in unknown chemical status in 2021 (Figure 6-1). An improvement may be identified from the 1st RBMPs, where 1 GWB (i.e., 0.07% of total GWBs) was in poor chemical status and 1,362 GWBs (i.e., 97.7% of total GWBs) were in unknown chemical status in 2015. Therefore, a significant amount of GWBs with unknown status in the 1st RBMPs have been reclassified as in good status in the 2nd RBMPs.

No GWB is expected to fail to achieve good chemical status by 2027, while the proportion of GWBs in good or unknown chemical status are expected to remain the same (Figure 6.1).

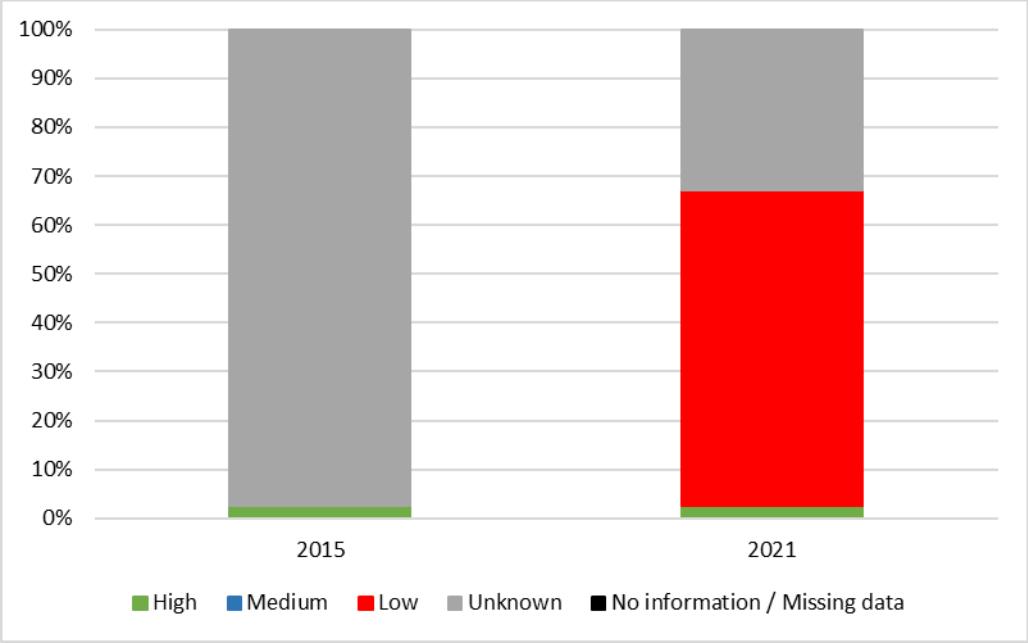
FIGURE 6.1 CHEMICAL STATUS OF GROUNDWATER BODIES IN THE 2ND (2021) AND 1ST RBMPS (2015), AND EXPECTED STATUS BY 2027



Confidence in classification

The overall confidence in the assessment of the chemical status of GWBs has improved since the 1st RBMPs, due to the reduction of the classifications with unknown confidence from 97.6% to 32.8% (Figure 6.2). However, the classifications with unknown confidence have at large been reclassified with low confidence, as classifications with low confidence rose from 0.0% to 64.6% of the assessments. No classifications have been conducted with medium confidence in the 2nd RBMPs, similarly to the 1st RBMPs. Classifications with high confidence have increased only slightly from 2.4% to 2.6% of the assessments.

FIGURE 6.2 CONFIDENCE IN THE CLASSIFICATION OF CHEMICAL STATUS OF GROUNDWATER BODIES IN THE 2ND AND 1ST RBMPS



6.2 Main changes, previous recommendations, and gaps

In the 2nd RBMPs, the total number of delineated GWBs in Norway is 1,401, increasing from 1,394 in the 1st RBMPs. The delineation of the GWBs has been revised and the total GWB area has increased from 4,802 km^2 to 4,893 km^2 since the 1st RBMPs (+1.9%). Based on the pilot RBMPs, Norway was recommended to establish appropriate groundwater monitoring and assessment.

In the 2nd RBMPs, 460 GWBs (i.e., 32.8% of total GWBs) were in unknown chemical status in 2021.

The vast majority of the classifications are still conducted with low (i.e., 64.6% of the assessments) or unknown confidence (i.e., 32.8% of the assessments) in the 2nd RBMPs. Groundwater associated aquatic ecosystems, groundwater dependent terrestrial ecosystems and drinking water protected areas are not considered in the establishment of threshold values and in the assessment of groundwater chemical status, despite this being identified as an action point following the pilot RBMPs.

In the 2nd RBMPs, groundwater chemical monitoring is performed only in 54 surveillance and 14 operational monitoring sites, covering only 68 GWBs (i.e., 2.0% of total GWBs or 17.2% of total GWB area). Although the chemical monitoring coverage has improved between the 1st and the 2nd RBMPs, it is still too low. Only some of the GWD Annex I and Annex II (Part B) substances and the WFD core parameters are monitored.

Moreover, the RBMPs do not explain how the results from different monitoring sites on the same GWB are synthesised.

Threshold values for substances leading to risk of not achieving good groundwater chemical status have now been set out in the Norwegian Water Regulation but background levels for naturally occurring substances are not considered in the development of the respective threshold values in any RBD.

The threshold values have not been coordinated with neighbouring countries, according to WISE electronic reporting.

There is not a trend assessment methodology available, and the relevant assessment has not been performed, according to WISE electronic reporting. A trend reversal methodology is not available. The starting point for trend reversal has not been reported.

7 Designation of heavily modified and artificial water bodies and definition of good ecological potential

Many SWBs have been heavily modified in their physical structure to serve various uses including navigation, flood protection, hydropower, and agriculture. In many cases, it is neither viable nor desirable from a socio-economic perspective to abandon such uses and to remove the physical modifications which affect the water bodies that would be required to bring them to good ecological status, which refers to a nearly natural undisturbed condition. EEA EFTA States can, thus, designate such water bodies as HMWBs whose environmental objective is good ecological potential instead of good ecological status.

7.1 Assessment of implementation and compliance with WFD requirements

7.1.1 Designation of heavily modified and artificial water bodies

In the 2nd RBMPs for Norway, 2,649 (11.4%) river water bodies, 1,051 (15.4%) lake water bodies and 64 (2.8%) coastal water bodies are designated as heavily modified. No water bodies are classified as artificial, as shown in

Figure 7.1. There has been an increase in the number of water bodies classified as heavily modified since the previous RBMPs. The main driver of this increase has been from the reclassification of some physical impacts on water bodies and continuing developments involving water use, as well as updates to the delineation of water bodies based on new investigations, monitoring and more detailed assessments.

FIGURE 7.1 PERCENTAGE OF SURFACE WATER BODIES THAT HAVE BEEN DESIGNATED AS HEAVILY MODIFIED OR ARTIFICIAL IN THE 2ND AND 1ST RBMPS, PER WATER CATEGORY

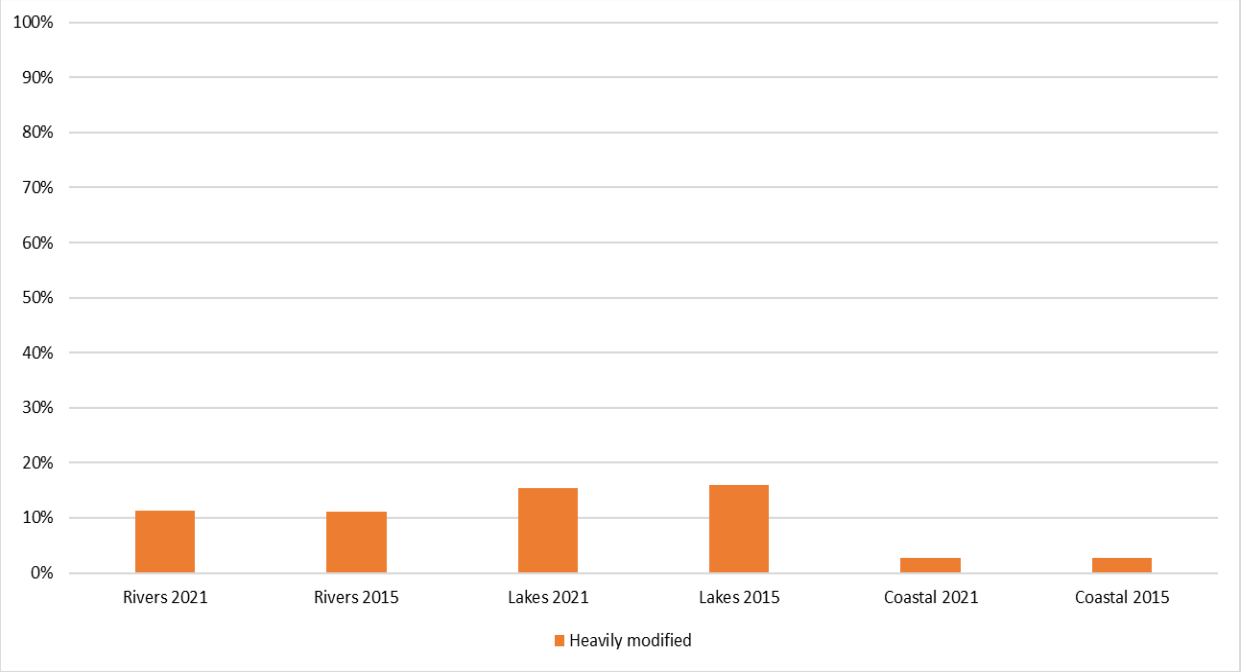
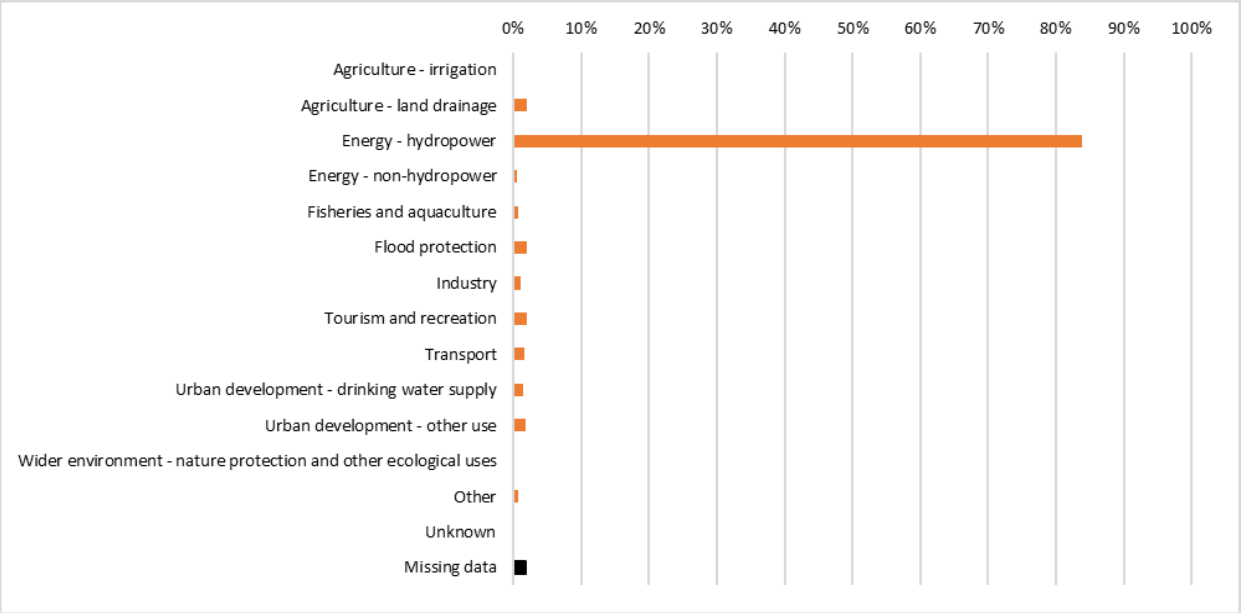


Figure 7.2: shows the main type of water use that is the cause of the HMWB designation for the water bodies. Hydropower is the highest cause and is responsible for HMWB designation in 83% of the water bodies. The next highest water uses are land drainage from agriculture, flood protection and tourism and recreation, but they each represent less than 3% of the total type of water use.

In the planning period 2016-2021, several new hydropower plants were established, some of which have been assessed to likely not achieve the environmental objective of good ecological status without disproportionate costs or significant impacts on their use. These are candidates for HMWB. Several larger hydropower plants and developments without year-round minimum water flow have become candidates for HMWB.

FIGURE 7.2 PERCENTAGE (%) OF ARTIFICIAL AND HEAVILY MODIFIED WATER BODIES AFFECTED PER TYPE OF WATER USE



Approach for the designation of heavily modified water bodies and artificial water bodies

Specific assessments are made for water bodies where socially beneficial activities have altered hydrological and physical conditions to such an extent that good ecological status cannot be achieved without significantly affecting the purpose of the activity. Such water bodies are designated by the RBD competent authority in consultation with the RBD committee as HMWBs if the criteria in Section 5 of the Norwegian Water Regulation[74] are met. The status as HMWB and the justification are reviewed when updating the RBMPs. Examples of impacts that may lead to HMWB designation include hydropower development, drinking water supply, channelisation, stream closure and flood protection. If good ecological status can be achieved with feasible measures, the water body should not be designated as a HMWB but as a natural water body with the objective of achieving good ecological status. For water bodies designated as a HMWB, the environmental objective is set to good ecological potential.

Norway has developed a national guidance document for the designation, setting of environmental objectives, and use of exemptions for HMWBs.[75]

Norway has reported an increase in the number of HMWBs since the previous RBMPs. This is due to a review of physical impacts that were not considered in the previous planning period, as well as updates to the delineation of water bodies based on new investigations, monitoring and more detailed assessments.

[74] This is the Norwegian transposition of Article 4(3) of the WFD.
[75] *Veileder 01:2014. Sterkt modifiserte vannforekomster*, available at: https://cdr.eionet.europa.eu/no/eu/wfd2022/documents/national/envzkamow/Heavily_modified_water_bodies.pdf/manage_document. Norway has stated that the guidance is being reviewed in 2025.

Criteria for the significant adverse effects and if specific thresholds have been specified

According to WFD Article 4(3)(a), EEA EFTA States may designate a HMWB only if the changes to the hydromorphological characteristics of that water body which would be necessary for achieving good ecological status (i.e., restoration or mitigation measures) would have significant adverse effects on its uses or the wider environment.

The RBMPs state that the significant adverse effects are determined on a case-by-case basis and a cost benefit assessment will be used to determine the value of the modification. Information on thresholds was not found in the RBMPs.

Checking whether the beneficial objectives served by the modifications of the HMWBs cannot reasonably be achieved by other means

According to WFD Article 4(3)(b), EEA EFTA States may designate a HMWB only if an assessment of whether the benefits served by the modified characteristics of the water body cannot reasonably be achieved by other means which are a significantly better environmental option.

Other means has been defined as either relocating the beneficial objective to another water body, replacing the beneficial objective with an alternative method or partial replacement and / or relocation of the beneficial objective. It must be considered whether it is technically feasible to introduce an alternative method to deliver the benefit, whether the measure will represent a significantly better environmental outcome that will provide good ecological status, and whether there are disproportionately high costs associated with the alternative approach, including both financial and societal costs.

Some of the benefits of HMWB in agricultural areas can, for example, be artificial channels where there used to be wetlands, straightened stream courses, closed stream courses, or high, stone-lined canal and riverbanks. Otherwise, HMWBs may be included in hydropower development, channelled for agricultural purposes, or developed as port facilities. Information on some of the benefits of the HMWBs is provided in some of the RBMPs, but the RBMPs mainly refer to the database in Vann-Nett for more information about each individual HMWB.

7.1.2 Definition of good ecological potential for heavily modified and artificial water bodies

Definition of good ecological potential

Good ecological potential is defined in the overview of key concepts and definitions in the RBMPs as the status that can be achieved in an HMWB if all relevant environmental improvement measures that do not significantly affect the beneficial purpose (Section 5 of the Water Regulation) are implemented.

The national guidelines state that the environmental objective of good ecological potential should be set based on realistic environmental measures (positive benefit / cost), and as a minimum must secure a functioning ecosystem. Where good ecological potential cannot be achieved, less stringent environmental objectives should be set as an exception in accordance with the conditions in Section 10 of the Water Regulation.[76]

The approach used to assess good ecological potential

The RBMPs set out which water bodies are likely to achieve good ecological potential, and which ones are unlikely to meet the environmental objective without disproportionate costs or significant impact on their use. More specific details are described in the Vann-Nett database.

In some of the RBMPs, a document is attached listing water bodies with environmental objectives that require new measures which may result in a loss of power production to meet the environmental objective. At the same time, the RBMPs set out that for other water bodies affected by hydropower production with environmental objectives that assume power loss, the environmental objective is changed to the current ecological status, with the criteria for HMWBs not achieving good ecological potential due to disproportionate costs applied.

[76] National transposition of Article 4(5) of the WFD.

Biological assessment

In the national guidance document on HMWBs, it is described that the environmental objective of good ecological potential is primarily defined by the biological elements that are desired to be achieved. If there is no knowledge of biological elements, hydromorphological and / or physico-chemical quality elements can be used to describe the desired status.

What constitutes quality elements is described for natural water bodies in Annex V, point 1.2.5 of the Norwegian Water Regulation. Biological quality elements can, for example, be a viable population of salmon (% of assumed original production), maintenance of specific key populations (e.g., freshwater pearl mussel) in the river, re-establishment of habitat types or achieving the presence or re-establishment of certain quality elements (fish, benthic invertebrates, or aquatic vegetation) (even if other quality elements are not present).

Mitigation measures for defining good ecological potential

Good ecological potential is a less stringent objective than good ecological status because it allows for the ecological impacts resulting from those physical alterations that (i) are necessary to support a specified use or (ii) must be maintained to avoid adverse effects on the wider environment. Good ecological potential therefore reflects the requirement to address other pressures, including physical pressures, not associated with the specified use, while ensuring that the adverse ecological effects of the physical alteration can be appropriately mitigated without undermining the benefits they serve.

General mitigation measures have been identified in the RBMPs and specific mitigation measures have been included in the online Vann-Nett database.

7.2 Main changes, previous recommendations and gaps

All of the Norwegian pilot RBMPs had water bodies that could be identified as heavily modified. In the 2nd RBMPs many of those initially identified have now been designated but some are still awaiting a final decision. There has been an increase in the number of water bodies classified as heavily modified due to a review of physical impacts that were not considered the previous planning period and ongoing developments associated with water use impacting on water bodies. The largest increase has been in the number of rivers classified as heavily modified, which has increased by 466, followed by lakes and coastal water bodies. Additionally, in the 2nd RBMPs new candidates for HMWBs have been identified which are associated with new power plants.

The pilot RBMPs did not provide clear information on the water bodies which were classified as HMWBs. It was therefore recommended that a comprehensive explanation of the approach used for HMWB designation should be included in the latest RBMPs, as well as the methodology used for the definition of good ecological potential.

Since then, Norway has developed detailed guidance for the classification of HMWB based on the CIS guidance and provided further information on aspects which were found to be lacking in the pilot RBMPs. Norway is using the mitigation measures approach with general measures presented with the RBMP and more specific water body measures listed on the Vann-Nett database, which links the pressure type and the proposed mitigation measure. The guidance is currently being reviewed.

8 Exemptions to the environmental objectives

The environmental objectives are defined in Article 4 of the WFD. These require the EEA EFTA States to prevent the deterioration of status of all water bodies and to protect, enhance and restore[77] all water bodies with the aim of achieving good water status or potential by 2024[78]. According to the Norwegian Water Regulation, the deadline was by 2021, synchronizing with the schedule of the EU Member

[77] The obligation to restore does not apply to HMWBs.
[78] In accordance with the timelines as adapted to the EEA Agreement by Joint Committee Decision No 125/2007.

States. The aim is long-term sustainable water management based on a high level of protection of the aquatic environment.

Exemptions to the general objectives allow for the extension of the deadlines, less stringent objectives, temporary deterioration, or deterioration for the implementation of new projects, provided a set of conditions are fulfilled and the required justifications are provided in the RBMPs.

8.1 Assessment of implementation and compliance with WFD requirements

8.1.1 Exemptions

Where the environmental objectives cannot or have not yet been achieved, exemptions can be applied pursuant to Article 4(4), (5), (6) and (7) of the WFD, and Article 6(3) of the Groundwater Directive. The application of an exemption is subject to strict conditions. The justifications must be provided in the RBMPs, and reviewed every six years.

Article 4(4) WFD allows for time exemptions for two subsequent RBMPs, for reasons of disproportionate costs, technical feasibility or natural conditions. Pursuant to the Norwegian transposition of the directive, this means until the end of 2033 (the date by which objectives of the 3rd (2028-2033) RBMP cycle should be achieved), except for reasons of natural conditions.

Article 4(5) WFD allows setting less stringent objectives for certain water bodies so affected by sustainable human development activities or with natural conditions such as to make it infeasible or disproportionately costly to achieve good status or potential.

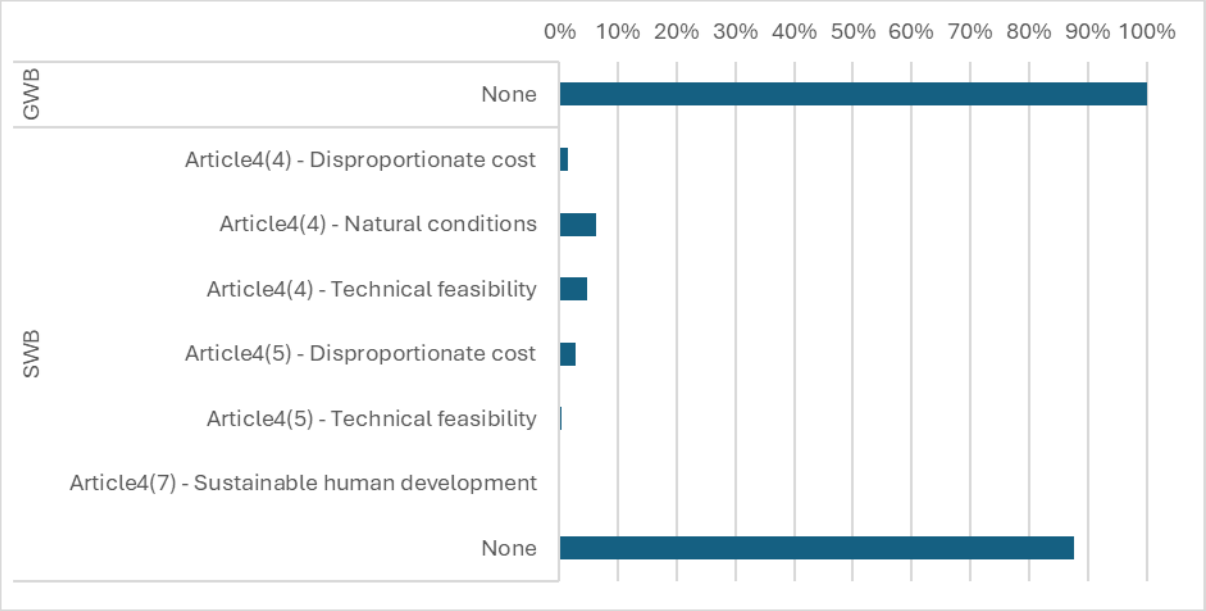
Article 4(6) WFD allows for temporary deterioration in the status of bodies of water if this is the result of circumstances of natural cause or force majeure which are exceptional or could not reasonably have been foreseen and all conditions set out in that provision have been met.

Article 4(7) WFD allows for new projects or modifications to result in deterioration of status or potential or to prevent the achievement of good status or potential.

Article 6(3) of the Groundwater Directive allows for an exemption to carry out measures to prevent or limit inputs of pollutants into groundwater. This is subject to demonstrating compliance with the criteria set out in that provision (6(3)(a)-(f)) and establishing that efficient monitoring of the bodies of groundwater concerned is being carried out.

Figure 8.1 below summarises the percentage of water bodies subject to each type of exemption (and reason), based on Norway's electronically reported data.

FIGURE 8-1 TYPE OF EXEMPTIONS REPORTED TO BE APPLIED TO SURFACE WATER AND GROUNDWATER BODIES FOR THE 2ND RBMPS[79]



The specific approaches to assessing technical feasibility, disproportionate costs and natural conditions are not reported in the 2nd RBMPs. The overall approach to justifying Article 4(4) and Article 4(5) exemptions has been set out by in a guidance document.[80]

Information on the exemptions applied is reported for each water body at Vann-Nett. However, reported information only indicates the type of exemption applied (e.g. Article 4(4), 4(5)) and the grounds (e.g. technical feasibility, disproportionate costs) and does not provide further details on justification. This is a major gap. Whilst some general explanations are provided on a sectoral level[81], these are not provided at water body level, making it difficult to see why a specific water body has an exemption.

Table 8.1 shows the main significant pressures from priority substances causing failure to achieve good chemical status and for which exemptions have been applied[82]. The main pressures on SBWs resulting in the need to apply exemptions come from other diffuse pressures, Industrial Emissions Directive (IED) and non-IED plants, contaminated sites or abandoned industrial sites, and mining.

TABLE 8.1 PRESSURES RESPONSIBLE FOR PRIORITY SUBSTANCES TO CAUSE FAILURE TO ACHIEVE GOOD CHEMICAL STATUS OF SURFACE WATER BODIES, FOR WHICH ARTICLE 4(4) EXEMPTIONS HAVE BEEN APPLIED (INCLUDING IDENTIFICATION OF WHICH OF THEM ARE UPBT SUBSTANCES).

Significant pressure on SWBs	Article4(4) - Disproportionate cost	Article4(4) - Natural conditions	Article4(4) - Technical feasibility
P1-1 - Point - Urban waste water	6		46
P1-3 - Point - IED plants	90		99

[79] This graph does not present an accurate representation of Article 4(7) exemptions as while applications of Article 4(7) WFD were not reported electronically, the PDF RBMPs refer to at least 30 water bodies covered by this exemption.
[80] *Miljømål i regionale vannforvaltningsplaner 2022-2027.* The guidance document as updated in 2024 is available at: https://www.vannportalen.no/veiledere/miljomal-i-regionale-vannforvaltningsplaner-2022---2027/.
[81] For example, in the PoMs and the Ministerial approval, available at:» https://www.regjeringen.no/no/aktuelt/et-stort-skritt-videre-for-a-na-vannmiljomalene/id2942694/.
[82] Based on the electronically reported data.

P1-4 - Point – Non-IED plants	7	7	116
P1-5 - Point - Contaminated sites or abandoned industrial sites			1
P1-6 - Point - Waste disposal sites	8		6
P1-7 - Point - Mine waters			1
P1-9 - Point - Other			5
P2-1 - Diffuse - Urban run-off		3	39
P2-10 - Diffuse - Other	144	20	244
P2-2 - Diffuse - Agricultural			5
P2-4 - Diffuse - Transport	3	1	29
P2-5 - Diffuse - Contaminated sites or abandoned industrial sites	76	9	29
P2-6 - Diffuse - Discharges not connected to sewerage network		7	14
P2-7 - Diffuse - Atmospheric deposition	2	72	2
P2-8 - Diffuse - Mining	27		62
P5-3 - Litter or fly tipping	1		

Application of Article 4(4)

Article 4(4) exemptions have been applied to 2,808 SWBs in Norway. Coastal water bodies have had their deadlines extended, often based on them being affected by environmental toxins, which involve costly and complex measures that take a long time to plan and achieve beneficial effects.

Several river bodies have had their deadlines extended because they are affected by escaped farmed fish, resulting in poor or very poor genetic integrity of wild salmon populations. Some have had their deadlines extended due to *Gyrodactylus salaris*. The RBMPs describe effects of escaped farmed salmon on wild salmon stocks to be cumulative, and that with the levels of escaped farmed salmon in many water bodies, the objectives of preserving the genetic integrity and variability of the stocks cannot be achieved. According to the RBMPs, regardless of the measures planned, it will take a long time to recover the genetic composition in wild salmon stocks making reaching environmental objectives on time infeasible. The assessment concludes that the relevant conditions are met, and that water bodies with poor or very poor status for genetic integrity are given an extended deadline until 2033 to achieve the environmental objectives. Nationally, this applies to a total of 57 water bodies.

Several water bodies affected by agriculture have had their deadlines extended based on eutrophication from, for example, high phosphorus levels in the soil, which will require many years and reduced application of phosphorus fertilisation to meet environmental objectives.

Several water bodies have had their deadlines extended due to impacts from mining, where the status is less than good.

Deadline extensions were justified based on technical feasibility in 4.8% of SWBs, disproportionate costs in 1.6% of SWBs, and natural conditions in 6.2% of SWBs.

Application of Article 4(5)

Less stringent environmental objectives have been set for HMWBs where realistic environmental improvement measures do not exist. For water bodies with moderate, poor, or very poor potential, less stringent environmental objectives have been established.

The 2nd RBMPs mention that 1,003 SWBs have used this exemption.

Exemptions were justified based on technical feasibility in 0.4% of SWBs and disproportionate costs in 2.7% of SWBs.

No information is available on the main significant pressures from priority substances causing failure to achieve good chemical status for SWBs and for which exemptions have been applied.

Application of Article 4(6)

According to the electronic reporting, no exemptions have been applied under Article 4(6).

Application of Article 4(7)

According to the information reported in the RBMPs[83], Norway applied Article 4(7) to at least 30 water bodies[84] during the preceding RBMP planning cycle. Among these, the majority relate to the construction or upgrade of hydropower plants (22 water bodies). The remaining applications concern the development of a port (5 water bodies)[85] and mining activities (2 water bodies). The application of Article 4(7) to the deposit of mining waste in one water body has been challenged before national courts. In March 2025, the EFTA Court gave its advisory opinion in that case.[86]

The RBMPs do not always detail the number of water bodies affected by each project where the exemption has been applied. Moreover, some RBMPs (Trøndelag, Nordland og Jan Mayen, Bottenhavet) highlight the lack of a complete overview of Article 4(7) applications. It is therefore uncertain whether the exemption has been applied more widely.

In some cases where new permits for physical alterations have been granted, a small to medium impact is expected and good ecological status can reasonably be maintained or achieved by implementing the mitigation measures imposed in the permit hence no Article 4(7) exemptions have been applied. Although the RBMPs may lack a full overview, this indicates that the potential need to apply Article 4(7) to new projects is regularly assessed by sectoral authorities.

National guidance on the use of the Article 4(7) exemptions has been developed[87], explaining the legal framework and key interpretation issues. The guidance sets out the steps in the assessment and division of responsibilities.

Application of Article 6(3) Groundwater Directive

According to the electronic reporting, no exemptions have been applied under Article 6(3) of the Groundwater Directive.

8.2 Main changes, previous recommendations and gaps

Norway has applied exemptions on the basis of Article 4(4), Article 4(5) and Article 4(7).

The application of Article 4(4) and 4(5) exemptions is generally lower in Norway than the EU average. The use of Article 4(4) on the grounds of technical feasibility for 2.7% of SWBs for ecological status and 2.2% for chemical status compares to 31.2% and 24.4% of SWBs respectively for reporting EU Member States. Similarly, the use of Article 4(4) on the grounds of disproportionate costs for SWB chemical status (1.1% of SWBs) and ecological status (0.4%) in Norway is lower than in reporting EU Member States (17.2% and 17.7% respectively). Finally, the use of Article 4(4) on the grounds of

[83] Norway has explained that, at the time of updating the RBMPs, a technical solution was lacking to register applications of Article 4(7) in the national database (Vann-Nett). According to Norway's electronic reporting, Article 4(7) had only been applied to one water body in Trøndelag RBD. Norway has since clarified that this exemption was most likely registered by mistake.
[84] In one instance, the number of affected water bodies is not specified.
[85] Borg Havn, Innlandet og Viken RBD
[86] Case E-13/24, *Friends of the Earth Norway and others v The Norwegian Government, represented by the Ministry of Climate and Environment and the Ministry of Trade, Industry and Fisheries*
[87] Ministry of Climate and Environment, *Veiledning til bruk av vannforskriften § 12 - med presisering*, 9 July 2021, available at https://cdr.eionet.europa.eu/no/eu/wfd2022/documents/national/envzkamow/Guidance_on_practice_of_Article_4-7.pdf.

natural conditions for surface water ecological status (5.9%) and chemical status (0.4%) is lower than for reporting EU Member States (19.7% and 18.4% respectively).

The application of Article 4(5) exemptions on the grounds of infeasibility (0.4% of SWBs and disproportionate costs (2.7%) compares to 8.5% and 5.1% of SWBs respectively for EU Member States.

No exemptions under Article 4(6) WFD or Article 6(3) GWD have been applied in Norway.

The recommendations from Norway's pilot RBMPs focused on ensuring compliance with the requirements for the use of exemptions in Article 4, in particular, justifying Article 4(4) exemptions and ensuring compliance with all requirements of Article 4(7) where it is invoked. Norway was also recommended to develop national guidance on the application of Article 4(7).

Norway has developed the national guidance (2020) on the application of Article 4(4) and 4(5), setting out the approach to justifying exemptions on the grounds of technical feasibility, disproportionate costs and natural conditions. Information on applied exemptions is reported per water body but generally without an explanation of why the exemption has been invoked for each affected water body apart from a generic description that exemptions are proposed if significant costs or other substantial considerations justify it.[88]

As recommended following the pilot RBMP, Norway has developed national guidance (2021) on the application of Article 4(7).

Norway applied Article 4(7) to at least 30 water bodies during the preceding RBMP planning cycle. However, a technical solution has been lacking to register applications of Article 4(7) in the national database (Vann-Nett). The RBMPs do not always detail the number of water bodies affected by each project where the exemption has been applied and some RBMPs (Trøndelag, Nordland og Jan Mayen, Bottenhavet) highlight the lack of a complete overview of Article 4(7) applications. It is, therefore, uncertain whether the exemption has been applied more widely.

9 Programme of Measures

Under Article 11 of the WFD, EEA EFTA States must set up PoMs as part of their RBMPs. These are the measures that are required to be implemented to address the significant issues identified and to allow the achievement of the objectives established under Article 4.

The Key Types of Measures (KTM) referred to in this section are groups of measures identified in the PoMs, which target the same pressure or purpose. The individual measures included in the PoMs should be grouped into KTMs for the purpose of reporting. The same individual measure can be part of more than one KTM because it may be multi-purpose, but also because the KTMs are not completely independent silos. KTMs were introduced to simplify the reporting of measures and to reduce the very large number of supplementary measures reported by some States.[89]

'Basic measures' are listed in Article 11(3) WFD. These are the minimum measures to be complied with. 'Supplementary measures,' as referred to in Article 11(4) WFD, are those measures designed and implemented in addition to the basic measures, with the aim of achieving the objectives established pursuant to Article 4 WFD.

A KTM may be one national measure, but it would typically comprise more than one national measure. The 25 predefined KTMs are listed in the WFD Reporting Guidance 2022.

The KTM should be fully implemented and made operational within the RBMP planning period to address specific pressures or priority substances and achieve the environmental objectives.

[88] Norway has clarified that there is guidance on reporting water body-specific justifications for the exemptions, available at: https://www.vannportalen.no/veiledere/veiledning-i-hvordan-registrere-miljomal-og-unntak-i-vann-nett-saksbehandler/.
[89] WFD Reporting Guidance 2022, page 47. Available at: https://cdr.eionet.europa.eu/help/WFD/WFD_715_2022/Guidance%20documents/WFD%20Descriptive%20Reporting%20Guidance.pdf.

9.1 Assessment of implementation and compliance with WFD requirements

9.1.1 General issues

An indication as to whether measures will be fully implemented and made operational is when they have been reported as being planned to tackle significant pressures (at the KTM level). Significant pressures should also be reported at the water body level. Measures should be planned in the RBMPs to tackle all significant pressures, with at least one KTM assigned to each pressure.

Implementation of measures in Norway is recognised as an issue in the RBMPs. There are several measures and strategies in place to address and compensate implementation delays. Norwegian authorities have emphasised strengthening cooperation between different sectors and authorities to ensure more effective implementation of the measures. This includes better coordination and sharing of information between local, regional, and national levels.

In Norway, no measures have been implemented to tackle groundwater pressures due to no GWBs failing to achieve good status. For SWBs, measures have been assigned to all significant pressures. This indicates clear knowledge of the pressures driving the KTMs.

As set out in more detail in section 9.1.2 below, Norway has assigned 381 basic measures to 15 KTMs. 320 supplementary measures have been assigned to 17 KTMs.[90]

No measures were reported to KTM 8- Water efficiency, technical measures for irrigation, industry, energy and households, KTM 9- Water pricing policy measures for the implementation of the recovery of cost of water services from households, KTM 10- Water pricing policy measures for the implementation of the recovery of cost of water services from industry or KTM 11- Water pricing policy measures for the implementation of the recovery of cost of water services from agriculture.

Qualitative cost-effectiveness analysis of measures

Cost-effectiveness analysis is an appraisal technique that provides a ranking of alternative measures to achieve set environmental objectives on the basis of their costs and effectiveness, where the most cost-effective has the highest ranking.

There are now cost estimates for a significantly larger portion of the measures than in 2016. Even though there is now more coherence between impacts and measures, and a better description of costs and benefits, a complete picture of the costs for implementing the measures is still not provided.

There is a varying level of information on the cost-effective analysis of measures, and the RBMPs are generally scarce on information. For example, the Nordland og Jan Mayen RBMP mentions that cost-effectiveness has been conducted by the Norwegian Institute for Bioeconomy for agricultural measures but does not link to a document showing how this is done. Additionally, the majority of RBMPs add that in the impact assessments for reaching objectives, the most realistic option includes only assessed prioritised, feasible and cost-effective measures between 2022-2027. Norway also has a guidance document for elaborating costs estimates[91], although it is still unclear how the cost-benefit analysis has been conducted for the measures.

One of the national guidance documents for the PoMs gives guidance on describing the benefit of measures with a view to increasing the understanding of the positive effects the various measures have on the aquatic environment.[92] The document notes that the aim is to describe the benefits, i.e. anticipated effects of different measures qualitatively rather than to quantify these effects in terms of impact factors.

[90] This is the number of types of measures available for implementation and each measure is applied across many water bodies. Norway has stated that in total, between 12,000 and 13,000 actual measures have been included in the PoMs for the cycle 2022-2027.
[91] Available at: https://www.vannportalen.no/veiledere/eksempelsamling-for-utarbeidelse/
[92] The document, as updated in 2024, is available at: https://www.vannportalen.no/veiledere/nyttebeskrivelse-tiltaksprogram/.

Financing of measures

Many measures have been proposed in the various RBMPs. The measures are financed by different actors, depending on which sector the measures belong to.

In each of the RBMPs, the costs of the measures which need to be implemented have been included. Table 9.1 below provides the cost of implementing measures in each of the RBMPs for Norway. Within the RBMPs, a table is included showing a breakdown of cost between basic and supplementary measures. Furthermore, a national guidance document for tools and measures[93] lists measures aiming to protect or improve the state of aquatic environment and available water management policy instruments (legal, economic, administrative). The document states that measures can be funded through grants or the application of polluter pays principle.

Basic monitoring is financed by national authorities. Operational monitoring should, as far as possible, be paid for by the polluter. Some of the operational monitoring is authorised by licensing conditions or conditions in discharge permits. For problem mapping, it is more difficult to enforce the "polluter pays" principle, and there is a greater need for financing through public authorities.

TABLE 9.1 AN OVERVIEW OF FUNDING REQUIRED TO IMPLEMENT THE MEASURES BETWEEN 2022-2027

Name of RBD	National Investment funding 2022-2027 (million EUR)
Bottenviken (NO1)	Unavailable
Møre og Romsdal (NO1101)	92.19
Norsk-Finsk (NO1106)	20.15
Trøndelag (NO1107)	69.45
Nordland og Jan Mayen (NO1108)	86.22
Troms og Finnmark (NO1109)	32.74
Torneälven (NO1TO)	Unavailable
Bottenhavet (NO2)	0.14
Västerhavet (NO5)	0.89
Agder (NO5103)	26.19
Rogaland (NO5104)	51.71
Innlandet og Viken (NO5107)	751.82
Vestfold og Telemark (NO5108)	516.02
Vestland (NO5109)	554.11
Tornionjoki (NOVHA5)	Unavailable
Kemijoki (NOVHA6)	Unavailable

Prioritisation of measures

To achieve feasible environmental objectives (based on costs and priority sectors) in this reporting period, measures have been prioritised. The RBMPs emphasise the importance of making priorities during the planning period. The bases for prioritisation are national goals and guidelines, regional goals and strategies, and local societal needs. In addition to priorities within each sector, the RBMPs

[93] Direktoratsgruppen for gjennomføring av vannforskriften, 13 July 2022, *Virkemidler og tiltak i vannforvaltningen*, available at: https://www.vannportalen.no/veiledere/Virkemidler-og-tiltak-i-vannforvaltningen-01.12.2020.

highlight the need for coordination of measures between different sectors. The Ministerial approval[94] states that the Norwegian Government aims to strengthen consideration for nature and the environment in water bodies that are affected by hydropower. The Norwegian Government has proposed that environmental improvement measures that may result in power losses will be implemented in 144 river water bodies, which is a higher number than in 2016.

The RBMPs clearly describe the prioritisation of measures concerning water bodies affected by hydropower, where this is done on both a regional and national level.[95] However, for measures addressing other pressures, there is less information about the prioritisation process.

9.1.2 Assigning national measures to Key Types of Measures

The KTMs are expected to deliver the bulk of the improvements through reduction in pressures required to achieve WFD environmental objectives. States are expected to report on the national measures associated with the KTMs, and whether the national measures are basic (Article 11(3) or supplementary (Article 11(4)).

Details of Norway's assignment of measures to KTMs is set out in Table 9.2.

Norway has assigned national basic measures to all KTMs except for:

- KTM3 - Reduce pesticide pollution from agriculture
- KTM12 - Advisory services for agriculture
- KTM14 - Research, improvement of knowledge base reducing uncertainty
- KTM18 - Measures to prevent or control the adverse impacts of invasive alien species and introduced diseases
- KTM19 - Measures to prevent or control the adverse impacts of recreation including angling
- KTM23 - Natural water retention measures

Norway, furthermore, assigned national supplementary measures to all KTMs except for:

- KTM4 - Remediation of contaminated sites (historical pollution including sediments, groundwater, soil)
- KTM13 - Drinking water protection measures (e.g. establishment of safeguard zones, buffer zones etc)
- KTM15 - Measures for the phasing-out of emissions, discharges and losses of Priority Hazardous Substances or for the reduction of emissions, discharges and losses of Priority Substances
- KTM16 - Upgrades or improvements of industrial wastewater treatment plants (including farms).

Norway has assigned the largest number of basic measures to KTM1 - Construction or upgrades of wastewater treatment plants (Urban Wastewater Treatment Directive (UWWTD) (76) and addressing diffuse pollutants (8)) followed by KTM6 - Improving hydromorphological conditions of water bodies other than longitudinal continuity (32 measures addressing hydromorphological conditions) and KTM2 - Reduce nutrient pollution from agriculture (25 measures addressing diffuse pollutants).

[94] Available at: https://www.regjeringen.no/no/aktuelt/et-stort-skritt-videre-for-a-na-vannmiljomalene/id2942694/
[95] Norway has clarified that mitigation measures that may result in a loss of power production have been prioritised in the RBDs, in the agencies' recommendations and in the ministry's approval.

TABLE 9.2 ASSIGNING THE TYPES OF NATIONAL MEASURES TO KEY TYPES OF MEASURES

Key Type of Measures	National basic measures	National supplementary measures	Number of RBDs where reported
KTM1 - Construction or upgrades of wastewater treatment plants	84	6	11
KTM2 - Reduce nutrient pollution from agriculture	42	65	10
KTM3 - Reduce pesticides pollution from agriculture		2	1
KTM4 - Remediation of contaminated sites (historical pollution including sediments, groundwater, soil)	53		11
KTM5 - Improving longitudinal continuity (e.g. establishing fish passes, demolishing old dams)	45	27	12
KTM6 - Improving hydromorphological conditions of water bodies other than longitudinal continuity	32	52	11
KTM7 - Improvements in flow regime and / or establishment of ecological flows	27	8	12
KTM12 - Advisory services for agriculture		10	9
KTM13 - Drinking water protection measures (e.g. establishment of safeguard zones, buffer zones etc)	12		7
KTM14 - Research, improvement of knowledge base reducing uncertainty		33	12
KTM15 - Measures for the phasing-out of emissions, discharges and losses of Priority Hazardous Substances or for the reduction of emissions, discharges and losses of Priority Substances	11		8
KTM16 - Upgrades or improvements of industrial wastewater treatment plants (including farms)	9		9
KTM17 - Measures to reduce sediment from soil erosion and surface run-off	3	11	7
KTM18 - Measures to prevent or control the adverse impacts of invasive alien species and introduced diseases		42	10
KTM19 - Measures to prevent or control the adverse impacts of recreation including angling		3	3
KTM20 - Measures to prevent or control the adverse impacts of fishing and other exploitation / removal of animal and plants	6	16	8
KTM21 - Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure	31	4	8
KTM22 - Measures to prevent or control the input of pollution from forestry	5	1	5
KTM23 - Natural water retention measures		9	6
KTM25 - Measures to counteract acidification	9	6	9
Other	12	25	16

9.1.3 Pressures for which gaps need to be filled to achieve WFD objectives and the KTMs planned to achieve objectives

EEA EFTA States are required to report the gaps that need to be filled to achieve WFD environmental objectives in terms of all significant pressures on surface waters and groundwaters, in terms of priority substances causing failure of good chemical status and in terms of RBSPs causing failure of good ecological status or good ecological potential.

EEA EFTA States were expected to report which KTMs are to be made operational to reduce the gaps to levels compatible with the achievement of WFD environmental objectives.

The pressures causing the most amount of water bodies to fail achieve good status in Norway are diffuse pollution (agricultural, atmospheric deposition, discharges not connected to sewerage networks, transport, forestry and urban run-off), point source pollution (urban wastewater discharges), hydrological and physical alterations (hydropower and other), introduced species and diseases as well as other anthropogenic pressures:

- P2-7 - Diffuse - Atmospheric deposition (7,321 SWBs)
- P2-6 - Diffuse - Discharges not connected to sewerage network (7,001 SWBs)
- P2-2 - Diffuse - Agricultural (6,893 SWBs)
- P7 - Anthropogenic pressure – Other (4,793 SWBs)
- P4-3-3 - Hydrological alteration – Hydropower (3,692 SWBs)
- P5-1 introduced species and diseases (2,866 SWBs)
- P2-4 - Diffuse – Transport (1,684 SWBs)
- P1-1 - Point - Urban wastewater (1,334 SWBs)
- P2-3 - Diffuse – Forestry (1,198 SWBs)
- P2-1 - Diffuse - Urban run-off (1,196 SWBs)
- P4-1-4 - Physical alteration of channel / bed / riparian area / shore - Other (1,194 SWBs)

The biggest gap indicator for surface water comes from P2-7 - Diffuse - Atmospheric deposition. Two KTMs have been applied to bridge this gap (KTM 25- measures to counteract acidification) and “other”.

Norway has planned the following measures to tackle these most significant pressures:

- KTM1 - Construction or upgrades of wastewater treatment plants
- KTM2 - Reduce nutrient pollution from agriculture
- KTM3 - Reduce pesticides pollution from agriculture
- KTM5 - Improving longitudinal continuity
- KTM6 - Improving hydromorphological conditions of water bodies other than longitudinal continuity
- KTM7 - Improvements in flow regime and / or establishment of ecological flows
- KTM12 - Advisory services for agriculture
- KTM17 - Measures to reduce sediment from soil erosion and surface run-off
- KTM18 - Measures to prevent or control the adverse impacts of invasive alien species and introduced diseases
- KTM19 - Measures to prevent or control the adverse impacts of recreation including angling
- KTM22 - Measures to prevent or control the input of pollution from forestry
- KTM23 - Natural water retention measures
- KTM25 - Measures to counteract acidification

No information was provided for significant pressures and KTMs applied to GWBs as they are all in good status.

Aquaculture is described as one of priority focus areas and is identified as one of the biggest challenges in several RBDs. It can be noted that aquaculture production in Norway exceeds that of the EU as a whole.[96] The PoM includes measures specific for aquaculture, and the RBMPs state that there is a need for new measures related to salmon lice and escaped farmed fish that can hinder the achievement of the environmental objectives. One of the measures is to "further develop the traffic light system." The main purpose of the traffic light system is to ensure growth in the aquaculture industry. Growth is allowed in areas where the lice impact on wild salmon is "acceptable" according to established threshold values. In areas with "unacceptable" impact, production can be reduced. Furthermore, the impact of sea lice on wild salmon is the only environmental indicator in the traffic light system at present. The remaining measures are to:

- Investigate how the traffic light system affects the work to achieve the environmental objectives set for wild salmon.
- Develop a plan to establish criteria for including sea trout in the traffic light system. Investigate how the structure can be changed to protect individual stocks of Atlantic salmon that are particularly vulnerable due to sea lice.
- Continue the ongoing work on a comprehensive and more effective system for monitoring and removing escaped farmed fish and future requirements for a common solution to track the fish.

9.1.4 Transboundary cooperation

The water management plans in international RBDs initially have separate measures on each side of the border, but as highlighted in section 1.1.3, cooperation with neighbouring countries is taking place.[97]

Two joint EU-funded projects between Norway and Sweden were carried out from 2016-2021. Participants included the Norwegian Environment Agency, the Swedish Agency for Marine and Water Management, the County Governor of Innlandet, and the County Administrative Board of Värmland:

- The project "Two countries - one river" (2017-2020) was based on results and proposed measures from the project "Vänerlaxens fria gång," which ran from 2009-2016. The projects were about the Väner salmon in the Trysil / Femund watercourse (Klarälven).
- "Swedish-Norwegian efforts for noble crayfish": The project worked to save the critically endangered noble crayfish.

There are several challenges across the borders, for example the salmon parasite *Gyrodactylus salaris*, which has caused entire populations of wild salmon in certain rivers in Norway to be lost. The salmon parasite is naturally found in both Sweden, Finland, and Russia, and there is great concern about the spread of the salmon parasite to water bodies in the north of Norway. An infection of the salmon parasite to water bodies in the Norsk-Finsk international RBD would have major consequences for environmental status, ecosystems, and many users and societal interests. Mitigating and preventive measures to prevent the spread of *Gyrodactylus salaris* are considered very important.

9.2 Main changes, previous recommendations and gaps

As a change from the 1st RBMPs, Norway has assigned KTMs to all pressure groups within the RBMPs.

Norway was previously recommended to ensure that the PoM was effective, that there was funding for its implementation and that competent authorities were committed to implementing it. It is still unclear

[96] According to Eurostat, Norway's aquaculture production in 2022 exceeded that of the EU as a whole: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Aquaculture_statistics#EU_Aquaculture

[97] Information on cooperation with Sweden is available at: https://www.vannportalen.no/aktuelt/2023/stadig-bedre-samarbeid-med-sverige-om-vannforvaltningen/. Information on cooperation with Finland is available at: https://circabc.europa.eu/ui/group/1c566741-ee2f-41e7-a915-7bd88bae7c03/library/ca912a95-af37-4074-bc59-ad7eab871e8b/details.

how the competent authorities will implement the PoM.[98] There is mention of national guidelines and regulations within the RBMPs, but details of how the RBD competent authorities will use these to implement specific measures are lacking. There are some indications, however, that measures are in place to achieve good status.

Norway also reported costs of measures, thereby partially meeting the previous recommendation of ensuring funding. Gaps remain in relation to identifying planned sources of funding and the actual project costs, with no information on funding sources for the specific measures. It is mentioned that the polluter pays principle could be used, although Norway highlights issues with application of this principle.

With the exception of water bodies affected by hydropower, there is generally a lack of clarity regarding whether and how exactly cost-effectiveness analysis and prioritisation have been carried out for other measures. Despite mentioning that each sector should have its own responsibility of carrying out its measures, prioritising those measures to focus on the biggest challenges to achieving good status would help to drive the implementation of measures.

This is the first time that the RBMPs consider the biological pressures from aquaculture and set out corresponding measures. This is a positive development considering the scale and impact of the industry in Norway. From the RBMPs it is nevertheless clear that further, more concrete measures are needed to attain the environmental objectives.

10 Measures related to abstractions and water scarcity

Water abstraction can be one type of significant pressure in an RBD and at the water body level, and may come from different sectors, in particular household and other urban uses, agriculture, industry, and energy. Within the assessment framework of the WFD, abstraction pressures are clearly linked to the quantitative status of GWBs. Furthermore, water abstraction pressures are linked with the assessment of the hydromorphological elements of SWBs, which supports the overall assessment of ecological status.

10.1 Assessment of implementation and compliance with WFD requirements

10.1.1 Water abstraction and trends

Water abstraction (understood as consumptive use or net consumption) is not a significant pressure at the RBD level or in significant portions of any RBD in Norway, similarly to at the time of the 1st RBMPs. According to the Water Exploitation Index+, Norway is the country in Europe least affected by water scarcity[99] at the national or RBD level. In the 2nd RBMPs, no GWB is in poor quantitative status by 2021 or at risk of failing to achieve good quantitative status by 2027.

Water abstraction has been identified as a significant pressure for specific SWBs. 451 SWBs (i.e. 1.4% of total SWBs), spread across 10 RBDs[100], failed to achieve good ecological status or good ecological potential by 2021 and they are affected significantly by water abstraction for agriculture, public water supply, industry, hydropower, fish farms and other abstractions. Water abstraction is not the only significant pressure for these SWBs, as they are also affected by different types of pollution and hydromorphological pressures.

[98] Norway has noted that under Section 25 of the Norwegian Water Regulation, the responsible authority in accordance with relevant legislation makes the decision on implementation of individual measures included in the PoM. It is further explained in national guidelines, available at: https://www.vannportalen.no/regelverk-og-foringer/nasjonale-foringer/vann-i-nasjonale-forventninger-til-planlegging-2019/.
[99] The Water Exploitation Index+ (WEI+) compares water consumption against renewable water resources. Available at: https://www.eea.europa.eu/en/analysis/indicators/use-of-freshwater-resources-in-europe-1.
[100] These SWBs are associated with 10 RBDs across the country: NO1101 (Møre and Romsdal), NO1106 (Norsk - Finsk), NO1107 (Trøndelag), NO1108 (Nordland og Jan Mayen), NO1109 (Troms and Finnmark), NO5103 (Agder), NO5104 (Rogaland), NO5107 (Innlandet and Viken), NO5108 (Vestfold and Telemark) and NO5109 (Vestland).

As water abstraction is not identified as a significant pressure at the RBD level or in significant portions of any RBD in the 2nd RBMPs, Norway is not expected to report and has not reported data concerning water abstraction.

Norway has clarified that due the abundance of water in the country, there is no system to report the volume of water abstracted from the water sources. Rather, national authorities focus on whether there is sufficient water left in the water bodies. To monitor compliance, there are hydrological measurement stations, internal control systems, and an obligation to report deviations. Abstracting more water than what is allowed by legislation or permits is prohibited and can be sanctioned.

10.1.2 Measures related to abstractions and water scarcity

Basic and supplementary measures to address water abstraction have been planned for the specific SWBs failing to achieve good ecological status and good ecological potential and where water abstraction as a significant pressure. The number of basic measures is much larger than supplementary measures, which is explained by the limited number of water bodies with significant abstraction pressures in Norway.

There is a permitting regime to control surface and groundwater abstractions and impoundments.[101] Furthermore, there is a register of abstractions from surface water and groundwater for all relevant RBDs and a register of impoundments.[102] Permits are issued by competent authorities, who define their duration based on data and information contained in the technical substantiation documentation. A periodic review of the permits is not reflected in Norwegian legislation, although permits can be refused or revised under specific conditions in order to maintain or achieve the environmental objectives in the RBMP.

According to WISE electronic reporting, small abstractions are defined with certain thresholds and those under the threshold are exempted from controls.[103] Ecological flows have not been defined and implemented for all relevant water bodies.[104] As a result, work is still ongoing, and Norway has planned relevant measures in the 2nd RBMPs (see Topic 13 – Measures related to hydromorphology).

For water bodies where ecological flows have been included as a relevant measure in the RBMPs, their subsequent implementation is the responsibility of relevant authorities under sectoral legislation. National authorities may also conduct relevant sample checks after authorisation or targeted checks to prevent cases of unauthorised abstractions or violation of permit conditions.

Drought management is not currently covered in the RBMPs, as it is generally not considered an issue for Norway at the present time. However, there may be water pressure issues in the future, and the RBMPs recommend that analysis of water quantity is carried out for RBDs that may be vulnerable to summer droughts in the future. There is no information currently available for the relationship between achieving WFD objectives and successful drought management.

10.2 Main changes, previous recommendations and gaps

Water scarcity is generally not a major issue in Norway. Water abstractions nevertheless have an impact on some individual water bodies. 451 SWBs (i.e. 1.4% of total SWBs), spread across 10 RBDs, failed to achieve good ecological status or good ecological potential by 2021 and they are affected significantly by water abstraction for agriculture, public water supply, industry, hydropower, fish farms and other abstractions.

A periodic review of water abstraction permits is not reflected in Norwegian legislation.

[101] It is noted that a permitting procedure for impoundments is not reported in WISE electronic reporting (rbmppom_targetedq).
[102] It is possible to find information in Vann-Nett about abstraction from surface water and groundwater bodies. Available at: https://vann-nett.no/waterbodies/map.
[103] Relevant data are reported in WISE electronic reporting (rbmppom_targetedq). However, the respective threshold for the definition of small abstractions is not provided in the 2nd RBMPs or in the Water Resources Act, 2001 (LOV-2000-11-24-82).
[104] The national guidance document on classification describes how ecological flows can be determined. The 2nd RBMPs do not refer to existing implementation of ecological flows on relevant water bodies.

Ecological flows have not yet been defined and implemented for all relevant water bodies, but Norway has planned relevant measures in the 2nd RBMPs.

11 Measures related to pollution from agriculture

Pollution pressures from agriculture include point sources and diffuse pollution sources. Agricultural point sources are generally linked to the farm buildings and farmyard and associated infrastructure, including livestock feeding areas, wastewater treatment lagoons or manure / slurry storage areas in livestock agriculture or from handling, mixing and equipment washdown areas for pesticides, fertilisers and fuel storage. The application of fertilisers, slurries, manures and pesticides to arable land can lead to diffuse pollution if applied in excess of the crops' needs or during inappropriate climatic conditions. Diffuse pollution refers to the release of potential pollutants (i.e. nitrogen, phosphorus, pesticides) from a range of activities that individually may have minimal effect on the water environment but at the catchment scale can have a significant impact. Agricultural soil itself, where eroded, can also be a pollutant, releasing sediment and suspended solids to the water environment. To address agricultural pollution, the EEA EFTA States are required to implement basic and supplementary measures.

11.1 Assessment of implementation and compliance with WFD requirements

11.1.1 Use of measures

Diffuse pollution from agriculture is a key pressure in Norway, with over 6,800 SWBs requiring measures to tackle the pressures of agriculture.

TABLE 11.1 AN OVERVIEW OF KTMS APPLIED IN THE RBDS TO TACKLE DIFFUSE PRESSURES.[105]

KTM	Number of RBDs applied	Number of basic measures	Number of supplementary measures
KTM2 – Reduce nutrient pollution from agriculture	10	42	65
KTM3 – Reduce pesticides pollution	1	0	2
KTM12 – Advisory services for agriculture	9	0	10
KTM13 – Drinking water protection measures (e.g. establishment of safeguard zones, buffer zones etc.)	7	12	0
KTM17 – Measures to reduce sediment from soil erosion and surface run-off	7	3	7
KTM23 - Natural water retention measure	6	0	6

Measures were not applied to GWBs as there are currently none which are failing to achieve good status.

Regarding measures aimed at reducing agricultural pollution, it appears from the RBDs that measures for nutrients, salinity and soil erosion are a combination of both voluntary and mandatory measures, with mandatory measures put in place in the areas facing the greatest pressure. There are grants and subsidies to support uptake of voluntary measures.

[105] The number of measures is the number of types of measures available for implementation and each measure is applied across many water bodies. Norway has stated that, in total, between 12,000 and 13,000 actual measures have been included in the PoMs for the cycle 2022-2027.

National guidelines have been set which include voluntary measures to reduce impacts of agriculture where grants are provided to those who implement the measures. The national guidelines allow authorities to set stricter guidelines within vulnerable areas, although these have not been used often. The RBMPs refer to fertiliser regulations which are said to allow local authorities to set restrictions on the timings and quantity of spreading depending on the local situation. Additionally, under the Land Act, environmental requirements may be set in vulnerable areas. However, it is not clear to what extent these measures are applied and enforced in practice. Whilst there is a guidance document for tools and measures[106] which has a chapter on agricultural measures and includes the responsible authorities for implementing the agricultural measures, it does not include the actual methods for implementing the measures.[107]

11.1.2 Implementation of measures

The previous RBMPs did not specifically mention the number of measures implemented. However, it is noted that since 2016, there has been a strong focus on both monitoring and implementing measures in accordance with the plans. The knowledge base has, therefore, been significantly strengthened in recent years, largely due to extensive monitoring and problem mapping conducted by local Water Boards and various sector authorities.

The current RBMPs lack clear information on the implementation of agricultural diffuse pollution measures since the 1st RBMPs. It is unclear what progress has been made since the 1st PoMs.

11.1.3 Funding of measures

The information on funding of measures can be found in section 9.1.1 of this report. Funding of agricultural measures has been broken down in each of the RBMPs, covering the amount of funding needed to achieve the measure. One guidance document which support the RBMPs list tools and measures which can be funded through grants, or the polluter pays principle.[108] It is unclear how much financial incentive is derived from these grants and how much finance will come from the polluter pays principle.

11.1.4 Gaps and distance to target

Load estimates from different sectors are not shown in the RBMPs. In the Vann-Nett database, there are two registered measures to reduce runoff from pesticides from agriculture. Electronic reporting shows that KTMs have been planned to tackle diffuse pollution from agriculture, with upwards of 6,000 water bodies requiring measures[109] to achieve good status by 2021.

11.1.5 Nutrient management

There are established threshold values in the Norwegian Water Regulation for nutrients in discharges into water bodies. These are further used as physico-chemical quality elements to classify the ecological status of the water body.

[106] Available at: https://www.vannportalen.no/veiledere/Virkemidler-og-tiltak-i-vannforvaltningen-01.12.2020.
[107] Norway has clarified that pursuant to Section 25 of the Norwegian Water Regulation, the responsible authority in accordance with relevant legislation takes decisions on implementation of individual measures included in the PoM.
[108] Available at: https://www.vannportalen.no/veiledere/Virkemidler-og-tiltak-i-vannforvaltningen-01.12.2020.
[109] KTM2 – Reduce nutrient pollution from agriculture, KTM 12 – Advisory services for agriculture, and KTM 17 – Measures to reduce sediment from soil erosion and surface run-off.

11.2 Main changes, previous recommendations, and gaps

Following the pilot RBMPs, Norway was recommended to conduct a gap analysis in nutrient pollution in all areas where diffuse pollution from agriculture was relevant and ensure measures were put in place to allow reduction in the pollution from the sector. Norway has now performed such a gap analysis and assigned measures to reducing nutrient pollution from agriculture. However, there is a lack of description of how this gap assessment was undertaken in the individual RBMPs and how the conclusions were reached.

Norway was also recommended to consider the implementation of economic incentives related to reduction of pollution load. The RBMPs now indicate that grants are provided for those who implement voluntary measures to reduce impacts of agriculture. Economic incentives are therefore considered, but their specific details on pollution load reduction are not covered in the RBMPs.

Implementation of individual measures included in the PoM are is carried out by the responsible authority in accordance with relevant legislation. However, there still appears to be a lack of information as to how Norway plans to roll out these measures beyond listing the responsible authorities. Considering the significant amount of water bodies failing to achieve good status due to pollution from agriculture, further efforts are needed to plan and implement sufficient measures.

12 Measures related to pollution from sectors other than agriculture

In the context of this topic, pollution is considered in terms of nutrients, organic matter, sediment, saline discharges and chemicals (priority substances, RBSPs, groundwater pollutants and other physico-chemical substances) arising from all sectors and sources apart from agriculture. This includes urban wastewater treatment works, other industry, urban areas, forestry, transport, aquaculture and energy production. It deals with the pollution of surface waters and groundwater.

There are two broad categories of measures that could be established for the control and reduction of pollution from non-agricultural sources of nutrients, organic matter and chemicals for an RBD:

- measures referring to the source of pollution that allow the reduction or phasing-out of more than one pollutant (for e.g. wastewater treatment process); and
- measures related to the substance (e.g. priority substances, RBSPs or nutrients) causing the pollution (e.g. banning of substance, limitation of one of its specific uses).

12.1 Assessment of implementation and compliance with WFD requirements

12.1.1 Key Types of Measures to tackle pollution from non-agricultural sources

Besides agriculture, the pollution pressures affecting the most SWBs in Norway are diffuse pollution pressures from atmospheric deposition, discharges not connected to the sewerage network, transport, and urban run-off; and point source pollution pressures from urban wastewater.

Diffuse pollution from aquaculture affects 25% of Norway's total coastal waters.

6 KTMs relevant to non-agricultural sources of pressures causing failure of WFD objectives have been reported for in Norway. These KTMs are:

- KTM1 – Construction or upgrades of wastewater treatment plants
- KTM4 - Remediation of contaminated sites (historical pollution including sediments)
- KTM15 - Measures for the phasing-out of emissions
- KTM16 - Upgrades or improvements of industrial wastewater treatment plants (including farms)

- KTM21 – Measures to prevent of control the input of pollution from urban areas, transport and built infrastructure
- KTM22 - Measures to prevent or control the input of pollution from forestry

Basic measures for the control of point source discharges

The WFD specifies that PoMs shall include, as a minimum, "basic measures" and, where necessary to achieve objectives, "supplementary measures" when basic measures are not enough to address specific significant pressures.

The basic measures have been linked to KTM1, KTM16 and KTM22. One supplementary measure has been linked to KTM22. The measures planned linked to KTM4, KTM15 and KTM 21 are not detailed in the electronic reporting.

The RBMPs include basic measures to control point source discharges, measures aimed at stormwater management, measures for the organisation of on-site wastewater treatment in sparsely populated areas, and international conventions for long-range transboundary pollution.

Water protection zone measures and measures to reduce the pressure on the chemical status are not specified in the electronically reported PoM.

It is not clear what the measures are to address all drivers causing chemical pollution.

12.2 Main changes, previous recommendations and gaps

The assessment of Norway's pilot RBMPs did not include any recommendations specific to the measures related to pollution from sectors other than agriculture.

A key gap identified in this assessment is that a clearer link should be made between chemical status failures and measures to address these.

13 Measures related to hydromorphology

Hydromorphological pressures can include variation in flow characteristics caused by physical barriers and / or channel modification and sediment disposal, removal of substrate, and / or change in water level caused by dredging.

The main measures relevant to hydromorphology are:

- Improving longitudinal continuity (e.g., establishing fish passes, removing old dams).
- Improving hydromorphological conditions of water bodies other than longitudinal continuity (e.g., river restoration, improvement of riparian areas, removal of hard embankments, reconnecting rivers to floodplains, improvement of hydromorphological condition of transitional and coastal waters, etc).
- Improvements in flow regime and / or the establishment of ecological flows.
- Measures to reduce sediment from soil erosion and surface run-off (e.g., improvements to the condition of riverbanks or lake shoreline).
- Natural water retention measures (e.g., floodplain restoration and management, re-meandering, stream bed re-naturalisation, restoration and reconnection of seasonal streams, reconnection of oxbow lakes, riverbed material re-naturalisation, removal of dams and other barriers and elimination of riverbank protection).
- Research, improvement of knowledge base reducing uncertainty.

13.1 Assessment of implementation and compliance with WFD requirements

13.1.1 Measures to tackle hydromorphological pressures

Hydromorphological pressures are significant in nearly all RBDs. The main source of these hydrological alterations is hydropower. A series of measures have been developed to address these pressures. These include improvements to fish migration and habitat, river restoration, removal of redundant structures and assets, changes to ongoing maintenance, establishing minimum ecological flows, and improving riparian and floodplain habitat.

How a measure is implemented and enforced often depends on the conditions of the specific permits. Most modern hydropower permits contain environmental terms, allowing the authorities to impose measures and investigations. However, certain older hydropower permits do not contain such terms, while other are not subject to permitting. The implementation of a specific measure, such as the establishment of ecological flows, may therefore require permit revisions, or the introduction of a permitting requirement.

The RBMPs contain a prioritisation of permit revisions based on a national guideline from 2014.[110] The guideline, which is based on a cost-benefit analysis from 2013, in effect designates the water bodies for which ecological flows may be implemented as those with the highest environmental benefit compared to the loss of energy. Such prioritisation based on a cost-benefit analysis is an example of good practice. However, it is noted that the guideline and underlying cost-benefit analysis only covers hydropower facilities with permits open for revision by 2022, thus excluding a significant amount of hydropower plants, such as those exempt from permits and those for which revisions are only possible after 2022. Moreover, circumstances might have changed since 2013 warranting an updated assessment.

13.1.2 Ecological flows

In the national guidance document on classification, it is described how ecological flow has been determined. The minimum water flow levels have been determined based on national HMWB guidance and must ensure a functioning ecosystem to avoid requiring an exemption. The flow levels required is assessed individually for each water body.

13.1.3 Nature-based solutions

It is highlighted in some of the RBMPs that nature-based solutions should be prioritised to ensure that water environment measures are climate-resilient. This is also mentioned in relation to ecosystems and land use. Considerations of nature-based solutions is also emphasised in Norway's Climate Action Plan for 2021–2030, which is provided as a background document to the RBMPs.[111]

The nature-based solutions that have been proposed will support the general measures to improve the hydromorphology of the water bodies. If nature-based solutions are not chosen, then justification is required as to why another option was chosen. Numerous nature-based solutions have been identified in the list of general measures.

13.2 Main changes, previous recommendations, and gaps

Comprehensive data has been submitted via electronic reporting on the hydromorphological pressures faced within the RBDs. Each of the pressures has KTMs assigned to prevent and mitigate the

[110] Available at: https://www.vannportalen.no/regelverk-og-foringer/nasjonale-foringer/nasjonale-foringer-for-regulerte-vassdrag-2014/.
[111] Available at: https://cdr.eionet.europa.eu/no/eu/wfd2022/documents/national/envzkamow/Norways_Climate_Action_Plan_for_2021-2030.pdf.

associated pressures. The general measures have been set out in the RBMP for the relevant individual water bodies.

The recommendation following Norway's pilot RBMPs was to provide information on the linkages between all planned hydromorphological measures and their expected effects on quality elements, particularly on biological quality elements and on the hydromorphological parameters. In the 2nd RBMPs, discussion has been included around the uncertainties in demonstrating the ecological impact of hydromorphological improvements. It is uncertain which mitigation measures are appropriate and whether there will be an ecological improvement after the measure has been completed. Norway has committed to obtaining knowledge from comparable water bodies where measures have been implemented or to conduct new investigations through problem mapping or monitoring. The environmental improvement is assessed on a case-by-case basis using national guidance on the benefit of measures. The results should be reported at the end of the RBMP cycle (together with the updated RBMPs).

It is not clear in the RBMPs that Norway has introduced a periodic review of controls to ensure that the hydromorphological conditions of the bodies of water are consistent with the achievement of the required ecological status or potential for bodies of water designated heavily modified. The PoMs state which legal instruments are used to impose the necessary measures, and if the instruments are not sufficient, the permits or regulations must be updated.

14 Economic analysis

Article 5 of the WFD requires the EEA EFTA States to undertake an economic analysis of water use according to the specifications of Annex III. In addition, Article 13 and Annex VII of the WFD require the States to include summary reports of these economic analyses as part of the RBMP. Annex III of the WFD stipulates that the economic analysis of water use should contain enough information in sufficient detail to support the assessment of cost recovery for water services and related obligations (Article 9) as well as the judgments on the most cost-effective combination of measures in respect of water uses to be included in the PoMs.

14.1 Assessment of implementation and compliance with WFD requirements

The WFD requires that the RBMPs include a summary of the economic analysis of water use, and an assessment of the most cost-effective combination of measures in the estimate of potential costs in the Programme of Measures. However, no such summaries of the economic analysis of water uses are included in the 2nd RBMPs.

In the 2nd RBMPs, sector authorities use default cost estimates compiled by the Norwegian Environment Agency from the relevant authorities to estimate the costs of different measures within various sectors. They then submit proposals for measures in Vann-Nett. Where the planning of measures has progressed sufficiently to know detailed project costs, these should be entered into Vann-Nett.

National guidance documents provide overviews of the tools and measures available[112], and examples for estimating costs of measures.[113]

The Norwegian Environment Agency has also complied a guidance with benefit descriptions for the implementation of different measures. In particular, describing the benefits of the PoMs guidance contributes to an understanding of the positive effects the various measures have on the aquatic environment.[114]. However, it describes the benefits qualitatively rather than quantifying the effects in terms of impact factors.

Article 9 of the WFD requires Member States to take account of the principle of recovery of the costs of water services, including environmental and resource costs. The 2nd RBMPs do not report on Article

[112] Available at: https://www.vannportalen.no/veiledere/Virkemidler-og-tiltak-i-vannforvaltningen-01.12.2020.
[113] Available at: https://www.vannportalen.no/veiledere/eksempelsamling-for-utarbeidelse/.
[114] Available at: https://www.vannportalen.no/veiledere/nyttebeskrivelse-tiltaksprogram/.

9 implementation including calculation of cost recovery rates of water services. The methodology for assessing environmental and resource costs is also not described in the RBMPs.

Article 9 of the WFD also requires Member States to ensure that water-pricing policies provide adequate incentives for users to use water resources efficiently and to take into account the polluter pays principle. The 2nd RBMPs do not report information on incentive water pricing. The 2nd RBMPs also do not report information on the application of polluter pays principle. However, for some measures, references are made to polluter pays principle in the context of measures' implementation.

14.2 Main changes, previous recommendations, and gaps

The 2nd RBMPs do not include information on updates to economic analysis of water uses (Article 5) and cost recovery assessment of water services (Article 9).

Based on the pilot RBMPs, Norway was recommended to provide detailed information on the economic analysis, including on water services, environmental and resource cost calculation, assessment of recovery of costs of water services, the implementation of polluter pays principle, and the implementation of incentive water pricing policy.

Despite this recommendation, the 2nd RBMPs do not report information on financial, environmental and resource cost recovery of water services, nor on the application of polluter pays principle and incentive water pricing, although it is noted that national guidance documents have been developed based on some CIS Guidance Documents (e.g. Guidance document no. 20).

15 Considerations specific to protected areas (identification, monitoring, objectives and measures)

According to Article 6 of the WFD, the EEA EFTA States shall ensure the establishment of a register or registers of all areas lying within each RBD which have been designated as requiring special protection under specific EEA legislation for the protection of their surface water and groundwater. Additional specific objectives, concerning water management, should be set for the specific areas to achieve the level of protection required under the relevant legislation (e.g. the Drinking Water Directive or the Urban Wastewater Treatment Directive).

15.1 Assessment of implementation and compliance with WFD requirements

There are five types of protected areas designated in Norway's river basins which are:

- Areas designated or intended for the withdrawal of drinking water: Includes water bodies designated or intended to be designated as a source of drinking water (including SWBs and GWBs) according to the Norwegian Drinking Water Regulations, and which are registered with the Norwegian Food Safety Authority.
- Areas designated for the protection of economically significant aquatic species: These protected areas include National Salmon Waterways and Salmon Fjords. The purpose of these areas is to give a selection of around 50 of the most important salmon stocks in Norway special protection.
- Areas designated for bathing waters: The municipalities' assessment of bathing water quality is carried out on the basis of Water Quality Standards for open-air baths form the Norwegian Health Agency, which is partly based on the EU's Bathing Water Directive.
- Areas sensitive to nutrients: Areas that have been designated as sensitive according to the Fertiliser Regulations and Chapter 11 of the Pollution Regulations. The areas may also include areas that the state administrator in the areas has defined as sensitive to nutrients.
- Areas designated for the protection of habitat types and species: Areas for the protection of habitats that consist of water, are in water, or which have species that live in and rely on water habitats. Primarily consists of formally protected areas under the Nature Conservation Act and the Natural Diversity Act, designated by the Norwegian Environment Agency.

Protected areas are described in the annexes to the RBMPs. There is an overview of the protected areas in the RBDs that have protected status under sector legislation, including areas designated for drinking water or recreation, etc. Drinking water sources are monitored in accordance with the requirements of the Drinking Water Regulation. The location of drinking water sources for groundwater and surface water can be found on maps in Vann-Nett. Monitoring of many bathing water sites is also carried out. This is part of the operational monitoring.

In the electronic data, it is reported that 541 river water bodies, 709 lake water bodies and 388 GWBs are associated with drinking water protection areas.

15.1.1 Monitoring sites for protected areas

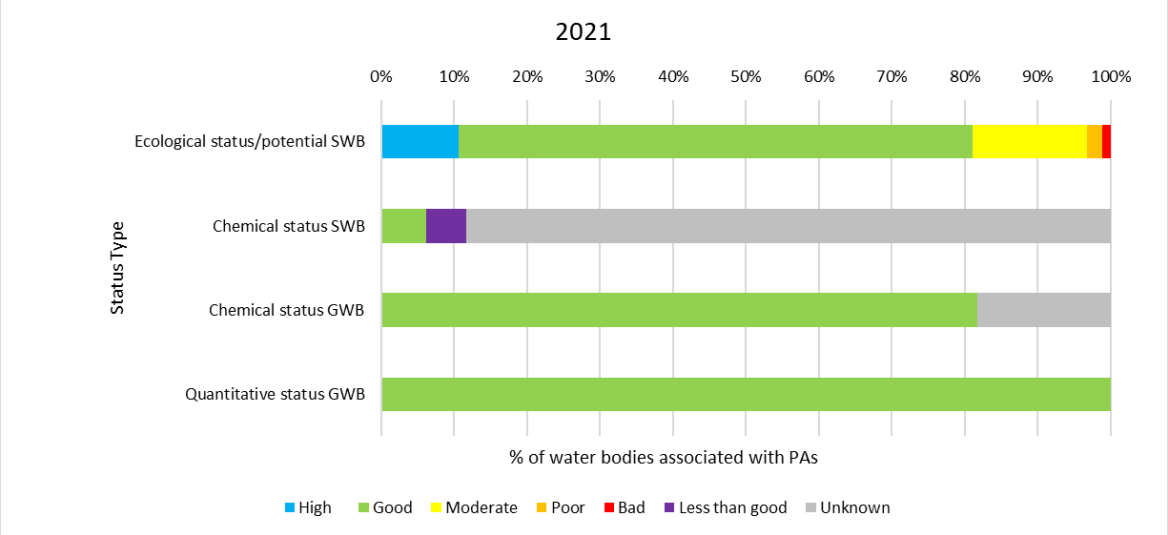
In the electronic data, it is reported that the number of monitoring sites associated with drinking water protection areas is 61 in rivers, 148 in lakes, and 30 in groundwater.

In the RBMP PDFs, there is no specific information on additional monitoring programmes for surface water drinking water protected areas other than what is usually monitored for drinking water quality.

15.1.2 Protected areas and ecological status

The status of water bodies associated with protected areas is shown in Figure 15.1. SWBs associated with protected areas are currently predominantly at a high or good ecological status with over 80% of SWBs achieving this status. Less than 5% of SWBs have been classified as poor or bad, which is lower than the EU average at the time of the 2nd RBMPs where 18% SWBs associated with protected areas were at poor or bad ecological status. All GWBs that have been reported on have achieved good status.

FIGURE 15.1 STATUS OF WATER BODIES ASSOCIATED WITH PROTECTED AREAS IN THE 2ND AND 1ST RBMPS



15.1.3 Additional objectives

The RBMPs state that protected areas often have their own additional objectives and that these include links to bacteria in drinking and bathing water or separate management objectives in certain protected areas.

15.1.4 Measures for protection of drinking water zones

In accordance with the Norwegian drinking water regulation, water utilities must assess and monitor the risk of contamination of drinking water. Waterworks therefore monitor the raw water source; some

also monitor supply sources (streams) for drinking water. Such monitoring is not imposed by the Norwegian Food Safety Authority, but self-initiated. Monitoring in connection with drinking water has so far not been included in the monitoring programme, as drinking water sources are assessed to have a good ecological condition. However, the RBMPs inform that changes in parameters such as total phosphorus and bacteria can show whether drinking water sources are sufficiently protected against pollution, therefore a selection of the drinking water sources should be included in the monitoring programme in the long term.

15.2 Main changes, previous recommendations and gaps

There were a number of recommendations in relation to protected areas following Norway's pilot RBMPs, namely to consider the inclusion of water related objectives of nature protected areas, to assess whether additional objectives needed to be set in drinking water protected areas and to consider including shellfish areas as protected areas. It is not clear from the 2nd RBMPs if additional objectives have been set for protected areas, and shellfish areas are not considered.

Norway was also recommended to ensure monitoring on drinking water sources was according to Article 7 and Annex V of the WFD. Drinking water sources are monitored in accordance with the requirements of the Drinking Water Regulations but are not included in the surveillance monitoring programme.

There is a lack of information provided on any additional measures within the RBMPs.

16 Adaptation to drought and climate change

Climate variability and change should be considered in the implementation of water policy and therefore in river basin management planning. Climate change consideration includes using climate change projections to inform the assessment of pressures and impacts, configuration of monitoring to detect future climate change impacts, and the selection of measures that are robust to possible projected climate conditions.

16.1 Assessment of implementation and compliance with WFD requirements - climate change adaptation

Norway has established a Strategy for Climate Change Adaptation (2015-2019)[115] and Climate Action Plan for 2021–2030.[116] Furthermore, the Norwegian Environment Agency published in 2024 a Strategy for the coordination of the national climate adaptation work for 2024-2028.

The 2nd RBMPs and PoMs contain chapters about climate change and climate adaptation, and they are supplemented by a guidance note.[117] Climate change is also mentioned in the preamble, main challenges, relations to other regional plans, including climate plans. The RBMPs make references to several climate change impacts in Norway. For example, they refer to more frequent and intense precipitation events, additional erosion from agricultural land or natural areas, landslides, floods, temperature increases, increased runoff from both urban and rural areas, greater risk of heavy metals leaching from mining sites. However, fewer details are provided about the integration of such climate change considerations in the 2nd RBMPs' planning. For example, the RBMP of the Agder RBD illustrates the official climate change projection for the county and states that it is the responsibility of each sectoral authority to assess the climate change impact and adaptation related to each single measure to be included in the PoM.[118]

[115] Available at: https://publikasjoner.nve.no/diverse/2017/nves.strategy.for.climate.change.adaption2017.pdf.
[116] Available at: https://cdr.eionet.europa.eu/no/eu/wfd2022/documents/national/envzkamow/Norways_Climate_Action_Plan_for_2021-2030.pdf.
[117] Available at: https://www.vannportalen.no/sharepoint/downloaditem?id=01FM3LD2U64VCWIWD3WBDLHXY2FMNOKBQK.
[118] RBMP of Agder RBD, chapter 5.3.1 (pp. 43 - 45)

The consideration of the impact of climate change on existing pressures and the impact on the ecological and chemical status of water bodies varies between RBDs. For example, the environmental impact assessment annexed to the RBMP of the Agder RBD assesses the climate change impact on pressures and measures concerning urban wastewater and agriculture. The RBMP for Nordland og Jan Mayen states that there is a clear connection between climate-related challenges and the water environment, but it is still uncertain how climate change will affect the status of the water and the possibility of achieving environmental objectives. The RBMPs of some of the other RBDs discuss the expected impacts of climate change on the water environment, but do not discuss how this may affect the resultant ability to achieve the environmental objectives of the WFD.

According to WISE electronic reporting, no climate change adaptation measures have been included in the PoMs in the 2nd RBMPs, similarly to the 1st RBMPs. The 2nd RBMPs do not explicitly discuss whether the PoMs are fit to tackle future climate conditions and projected trends (climate proofing). The 2nd RBMPs do not demonstrate how monitoring programmes are configured to detect climate change impacts. The 2nd RBMPs only state that the assessments of the water environment must be seen in conjunction with the guidelines in the National Planning Guidelines for Climate and Energy Planning and Climate Adaptation. No maladaptation measures have been identified within the 2nd RBMPs.

16.2 Main changes, previous recommendations and gaps

The recommendation following Norway's pilot RBMPs was that Norway should demonstrate how climate change projections had informed assessments of WFD pressures and impacts, how monitoring programmes were configured to detect climate change impacts, and how selected measures were robust to cope with projected climate conditions.

Although a number of climate change adaptation strategies and plans are available in Norway, the 2nd RBMPs do not indicate a close coordination with them. The 2nd RBMPs do not demonstrate how climate change projections have informed assessments of WFD pressures and impacts, including an analysis of the projected impacts of climate change and drought on the ecological and chemical status of water bodies. Furthermore, they do not demonstrate how monitoring programmes are configured to detect climate change impacts, include any measures explicitly targeting climate change, water scarcity and drought or elaborate how selected measures are robust enough to cope with projected climate conditions (climate proofing).