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Department for Environment Food and Rural Affairs

Environment Agency

Water for life and livelihoods

River Basin Management Plan
North West River Basin District

Annex A: Current state of waters

Contents

A.1 Introduction

This annex presents maps that show the status of water bodies and where we have environmentally significant deteriorating trends in groundwater quality. It includes maps showing the network of monitoring stations and maps showing the surface water body types that are present in the North West river basin district. There is an overview of the types and the reference conditions of all waters at the end of this annex.

Detailed information about classification on a water body by water body basis is included in annex B.

Annex D lists protected areas established under other Directives. It includes their location, monitoring network and compliance with their objectives.

A.2 Maps of classification results

Status assessment is a useful way of reporting the health of the environment. For a particular point in time a classification will show us where the quality of the environment is good and where it may need improvement.

In 2007 the Environment Agency made a change to the way we assess the status of water bodies. For twenty years, we have been using a General Quality Assessment (GQA) scheme to assess river water quality in terms of chemistry, biology and nutrients. GQA has helped drive environmental improvements by dealing with many of the major point sources of pollutants, such as discharges from sewage treatment works or other industry. The Environment Agency now needs a more comprehensive way of assessing the whole water environment that will help us direct action to where it is most needed.

For surface waters there are two separate classifications for water bodies: ecological and chemical. For a water body to be in overall ‘good’ status both ecological and chemical status must be at least ‘good’.

For groundwater there are two separate classifications for groundwater bodies: chemical status and quantitative status. Each must be reported in addition to the overall groundwater body status. For a groundwater body to be at good status overall both chemical status and quantitative status must be good. In addition to assessing status, there is also a requirement to identify and report where the quality of groundwater is deteriorating as a result of pollution and which may lead to a future deterioration in status.

» A separate document explaining the classification process in more detail can be found here

» Remember that classification is just one part of the evidence base that helps to focus efforts on those water bodies where a difference needs to be made. **If you have information regarding the state of your local water environment please contact our National Customer Contact Centre on 08708 506 506.**

Ecological status

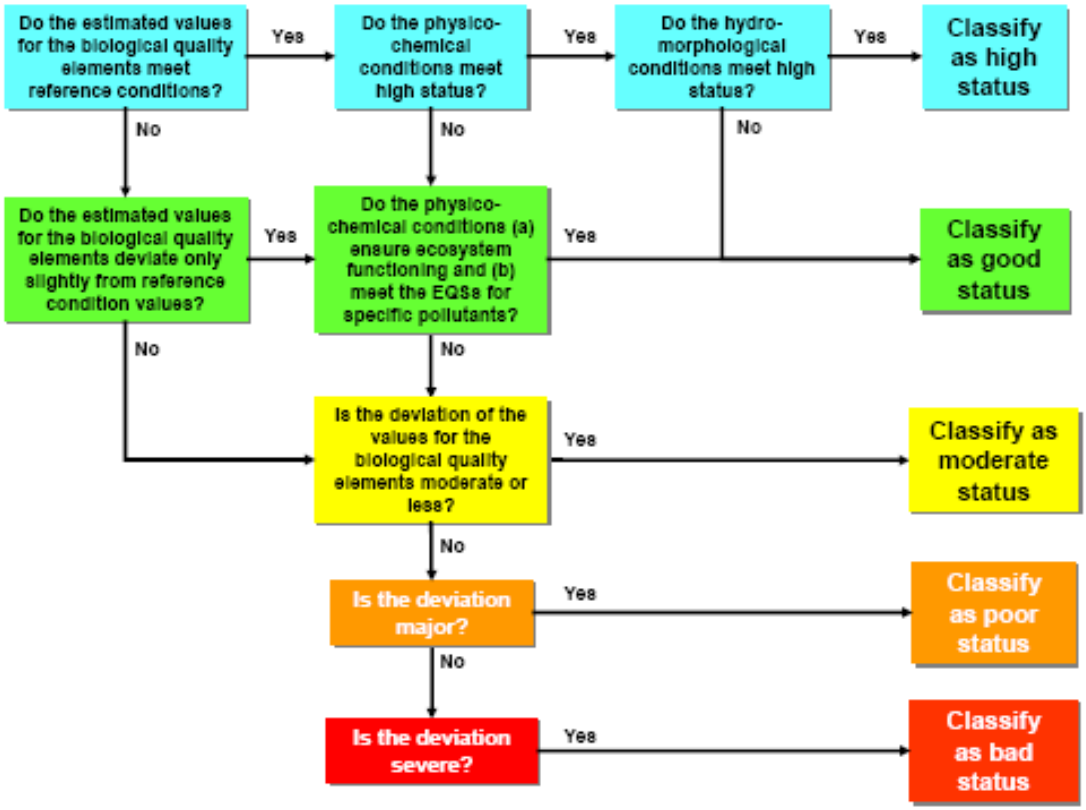
Ecological classification is summarised in figure A.1 (below) and comprises:

- The condition of biological elements, for example fish
- Concentrations of supporting physico-chemical elements, for example the oxygen or ammonia levels
- Concentrations of specific pollutants, for example copper
- And for high status, largely undisturbed hydromorphology

Ecological status is recorded on the scale of high, good, moderate, poor or bad. 'High' denotes largely undisturbed conditions and the other classes represent increasing deviation from this natural condition – from here on described as 'reference condition'. The ecological status classification for the water body, and the confidence in this, is determined using the worst scoring quality element.

In annex B the ecological status for water bodies is accompanied by a statement of how certain the Environment Agency is that a water body is worse than good status. See section A.6 for further information.

Figure A.1 **Decision tree illustrating the criteria determining the different ecological status classes (from UKTAG Classification Guidance).**



Only biological elements are recorded on the full scale, high to bad. Supporting physico-chemical elements are not reported below moderate status. However, the UK Technical Advisory Group (the UK-wide collaboration to develop best practice) has produced standards that distinguish between moderate, poor and bad for physico-chemical elements. The Environment Agency uses this information as part of our evidence base as well.

Surface Water Chemical status

Chemical status is assessed by compliance with environmental standards for chemicals that are listed in the Environmental Quality Standards Directive 2008/105/EC. These chemicals include priority substances, priority hazardous substances and eight other pollutants carried over from the Dangerous Substance Daughter Directives. Chemical status is recorded as good or fail. The chemical status classification for the water body, and our certainty in this, is determined by the worst scoring chemical.

An assessment of chemical status is required in water bodies where priority substances and other specific pollutants are known to be discharged in significant quantities. If a water body is labelled as "does not require assessment" it is because these pollutants are not discharged into this water body in significant quantities.

Groundwater status – chemical and quantitative

The achievement of good status in groundwater involves meeting a series of conditions which are defined in the Water Framework Directive (2000/60/EC) [1] and Groundwater Directive (2006/118/EC). In order to assess whether these conditions are being met, a series of tests has been designed for each of the quality elements defining good (chemical and quantitative) groundwater status.

There are five chemical and four quantitative tests. Each test is applied independently and the results combined to give an overall assessment of groundwater body chemical and quantitative status. The worst case classification from the relevant chemical status tests is reported as the overall chemical status for the groundwater body and the worst case classification of the quantitative tests reported as the overall quantitative status for the groundwater body. The worst result of these two is reported as the overall groundwater body status. Groundwaters are classed at either good or poor status.

The classification process is described further in UKTAG guidance: Paper 11b(i): Groundwater Chemical Classification for the purposes of the Water Framework Directive and the Groundwater Daughter Directive[2], and also in EU Water Framework Directive Common Implementation Strategy Guidance: Guidance Document No. 18: Guidance on Groundwater Status and Trend Assessment[3].

Groundwater Trend assessment

For groundwater bodies that have been identified as being at risk of failing to meet their environmental objectives for groundwater quality, there is a requirement to identify any significant and sustained upward trends in pollutant concentrations. A significant trend is one that could lead to a groundwater body failing to meet its environmental objectives before 2021 (the end of two river basin cycles) if measures are not put in place to reverse the trend.

The trend assessment process is described further in UKTAG guidance: Groundwater Trend Assessment[4].

[1] Directive 2008/105/EC, 16 Dec. 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC
[2] http://www.wfduk.org/LibraryPublicDocs/gw_chemical_classification_paper_final_draft
[3] http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework_directive/guidance_documents/guidance_n18pdf/_EN_1.0_&a=d
[4] http://www.wfduk.org/tag_guidance/Article_05/Folder.2004-02-16.5332/gw_trend

Ecological Potential

For water bodies that have been designated as candidate heavily modified or artificial (HMAWBs), the Environment Agency must classify according to their ecological **potential** rather than **status**. For detail on HMAWBs see annex I. UKTAG have adopted the 'mitigation measures approach' for classifying HMAWBs. This is a complicated procedure.

The approach first assesses whether actions to mitigate the impact of physical modification are in place to the extent that could reasonably be expected. If this mitigation is in place, then the water body may be classified as achieving good or better ecological potential. If this level of mitigation is not in place, then the water body will be classed as moderate or worse ecological potential.

Before an overall ecological potential classification is applied the second step is for the results of the mitigation measures assessment to be cross-checked with data from biological and physico-chemical assessments.

Where the Environment Agency have data for biological quality elements that show signs of damage from pressures other than hydromorphological alterations (for example, if the diatom or phytoplankton status is poor because of nutrient pressures) the ecological potential will be changed. To reflect this other pressure the water body will be labelled as 'Poor Ecological Potential'. This is also true where we have data for physico-chemical quality elements. As with diatoms, these are capable of picking up impacts beyond the hydromorphological pressure and must be also be reflected in the overall ecological potential result.

Where the flow conditions do not support good status (for example, due to over abstraction) it is necessary to over-ride the mitigation measures assessment so that the results of the biological surveys dictate the overall ecological potential. By doing this we will ensure we don't misrepresent the potential of a water body where, despite all mitigation measures being taken to address the physical pressures, the wildlife is suffering because of an abstraction upstream.

Finally, the Environment Agency may sometimes find that a water body has been designated as heavily modified yet the biological elements surveyed are at good ecological status. Where this is true we will remove the HMWB designation. We may be carrying out further biological monitoring between 2010 and 2012 to confirm that it is right to remove the designation.

Expert Judgement

The Environment Agency doesn't have data from all water bodies. Where we lack data we have used expert judgements to provide an initial assessment of water body status. This expert judgements is based on the following strands of evidence:

- Risk assessments carried out as the first part of the river basin planning process (River Basin Characterisation)
- Data from other organisations, such as Natural England (SSSI condition assessments)
- Expert opinion from national experts and local Environment Agency officers

» Classification results based on expert judgement are clearly marked in Annex B.

A level playing field

Some of the scoring used in ecological classification has been agreed at a European level. The process of agreement is called 'intercalibration'. It ensures we are operating in a consistent way with the rest of Europe. Our definition of good must be comparable with other

countries. The classification techniques which have not yet been intercalibrated can still be used for classification in the UK and will go through a second phase of intercalibration. It should be noted that there is no intercalibration process for groundwater.

The results

In the North West river basin district 30 per cent of surface waters meet good ecological status or better; 70 per cent do not meet good status (512 water bodies). 22 per cent of groundwater bodies are at good overall status with the rest being poor status.

The majority of surface water bodies that fail to meet good status fail because of the Invertebrates and Fish elements of classification. Both help to assess the impact of abstraction of water, water quality and morphological alteration to waterbodies.

The following maps show the classification results for the river basin district (Figure A.2 to A.7)

Figure A.2 **Ecological status or potential for rivers, canals and surface water transfers**

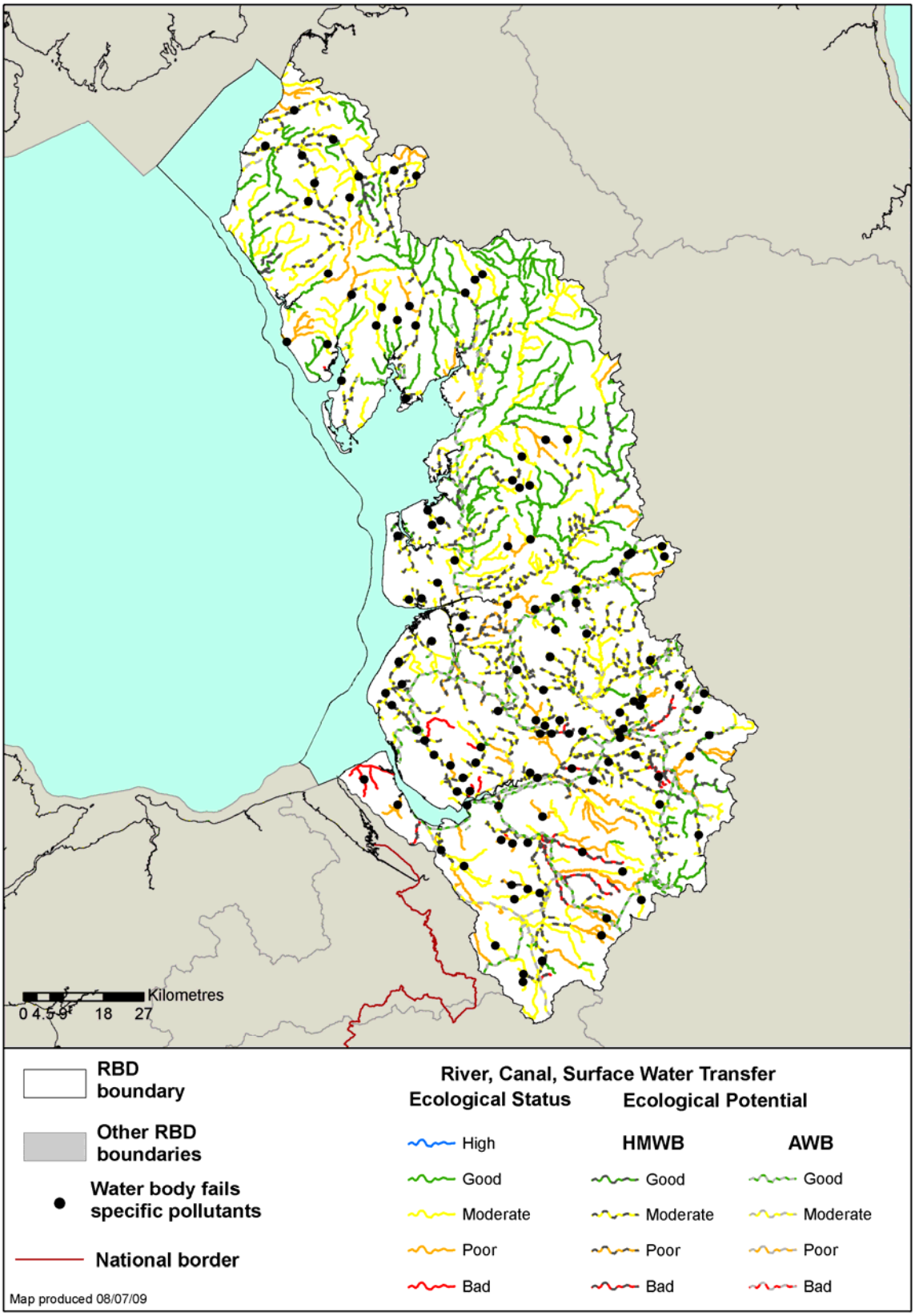


Figure A.3 **Ecological status or potential for lakes and ditches**

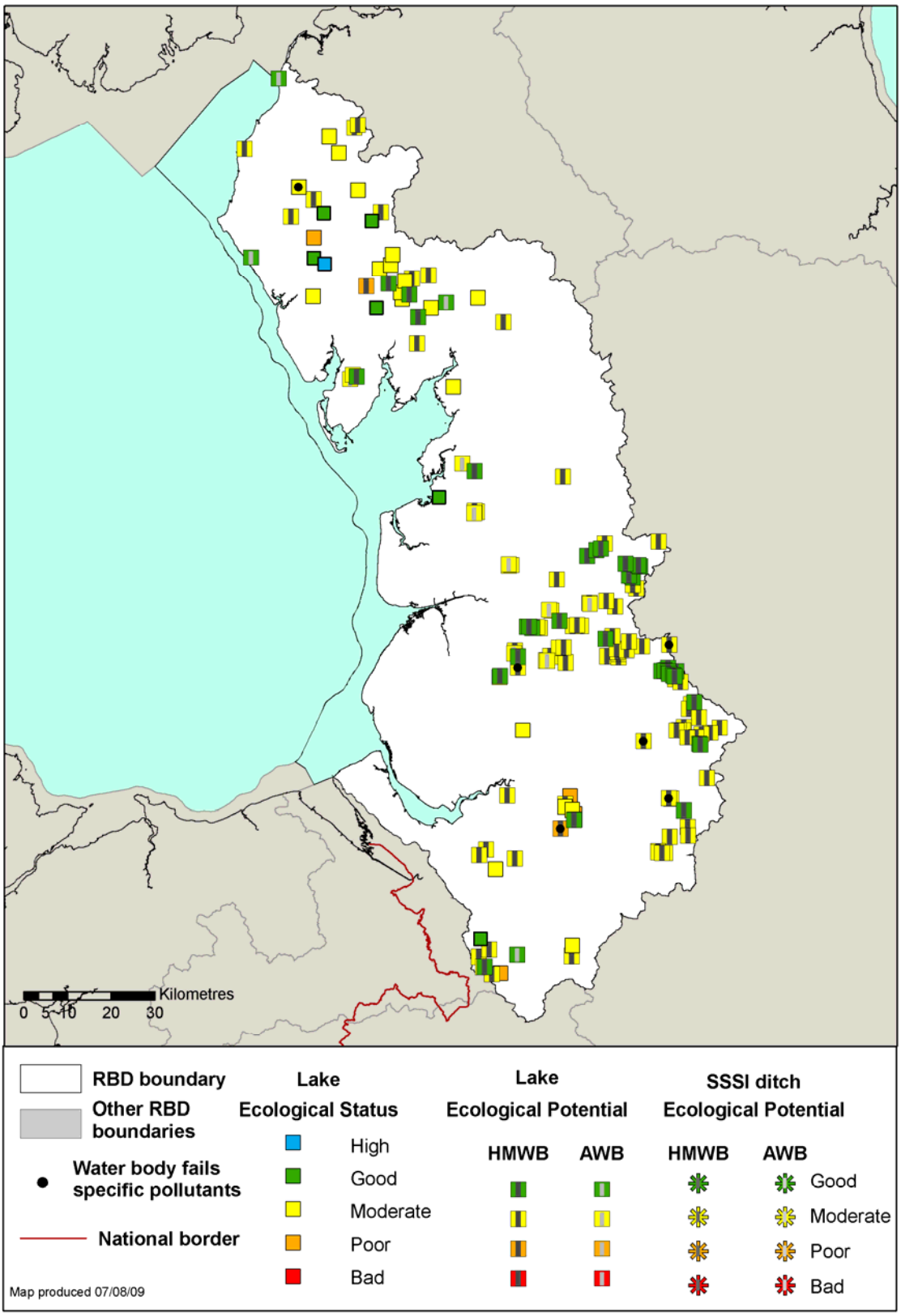


Figure A.4 **Ecological status or potential for estuarine and coastal waters**

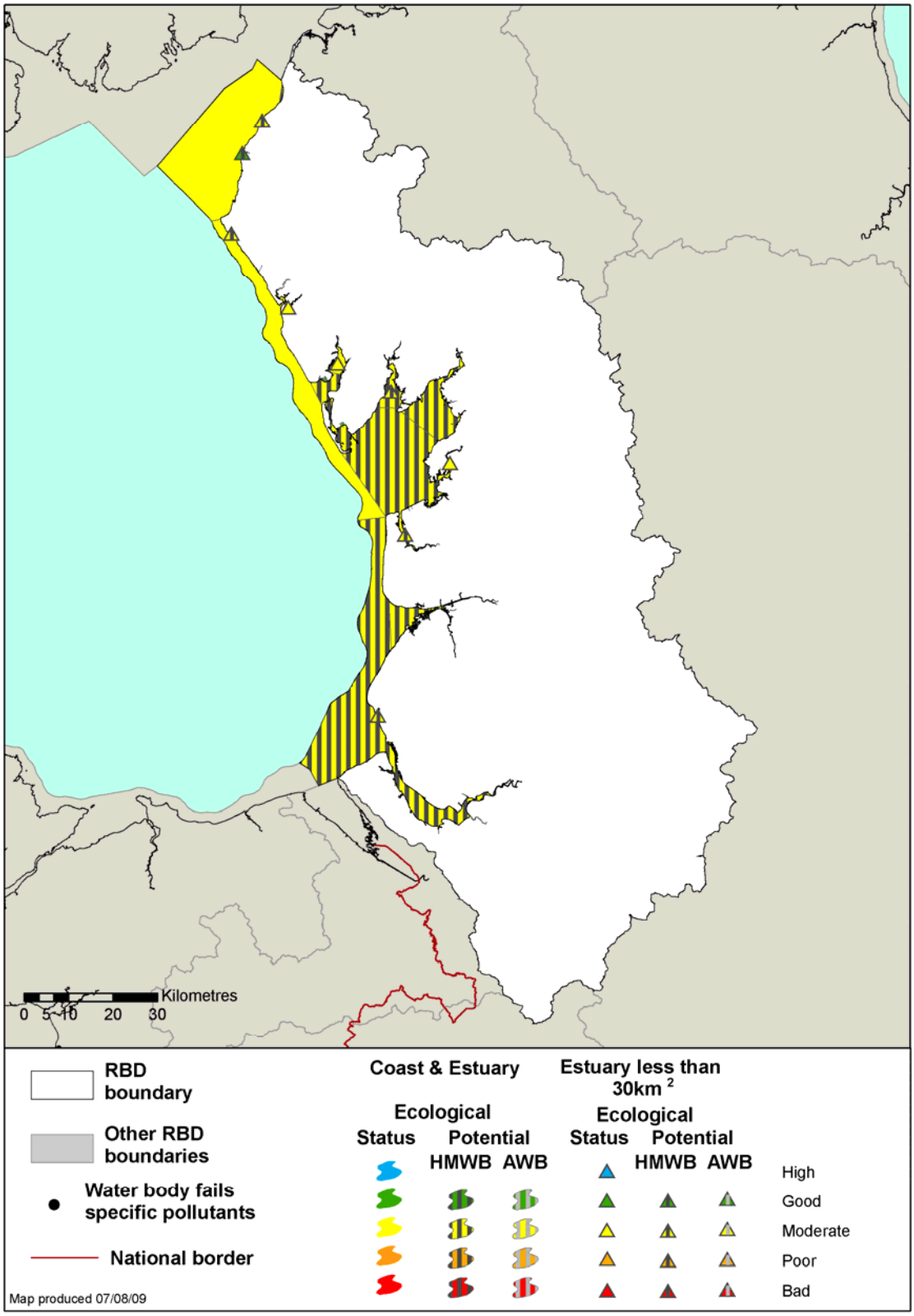


Figure A.5 **Chemical status for rivers, lakes, estuarine and coastal waters**

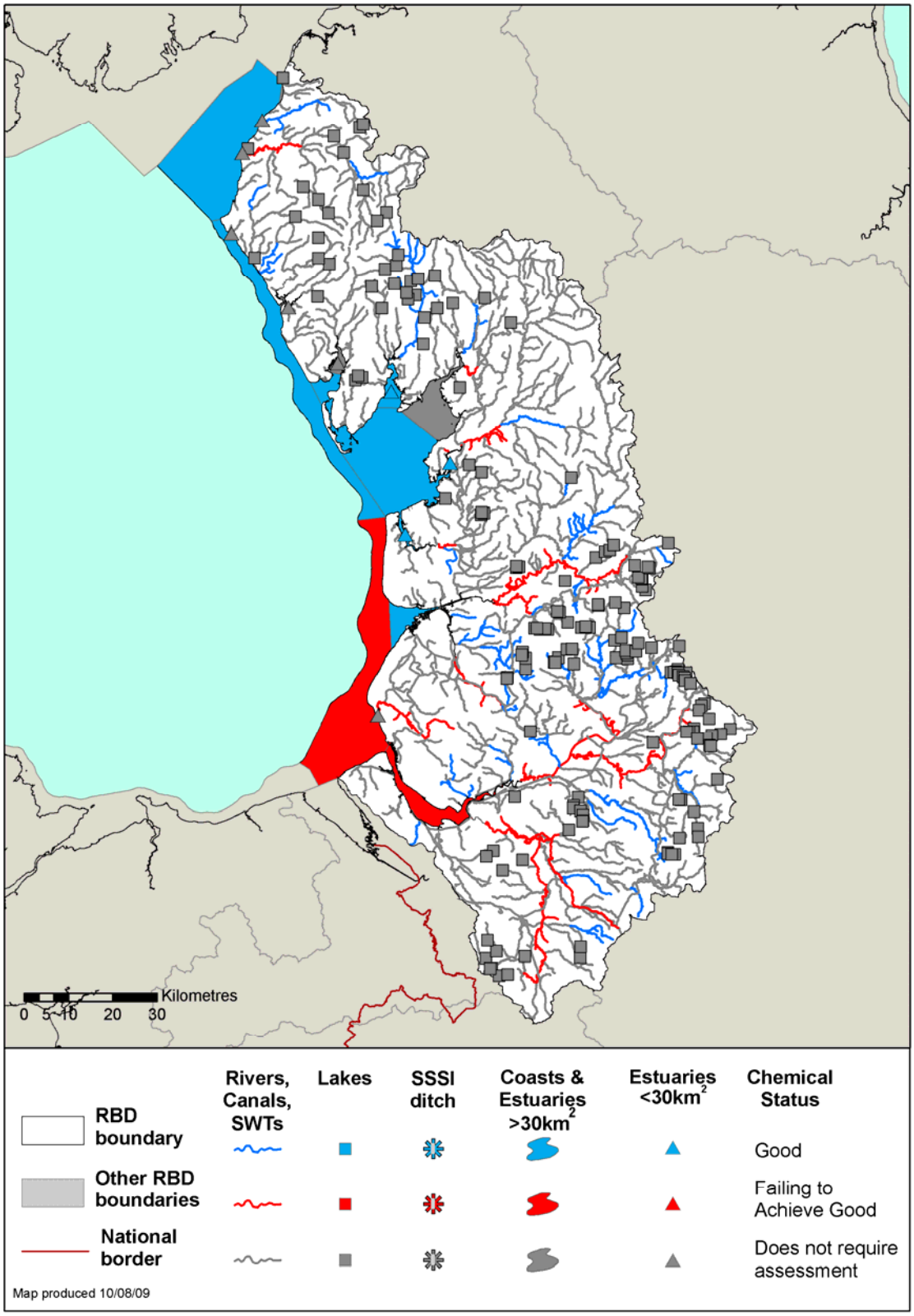


Figure A.6 **Chemical status and trends for groundwater**

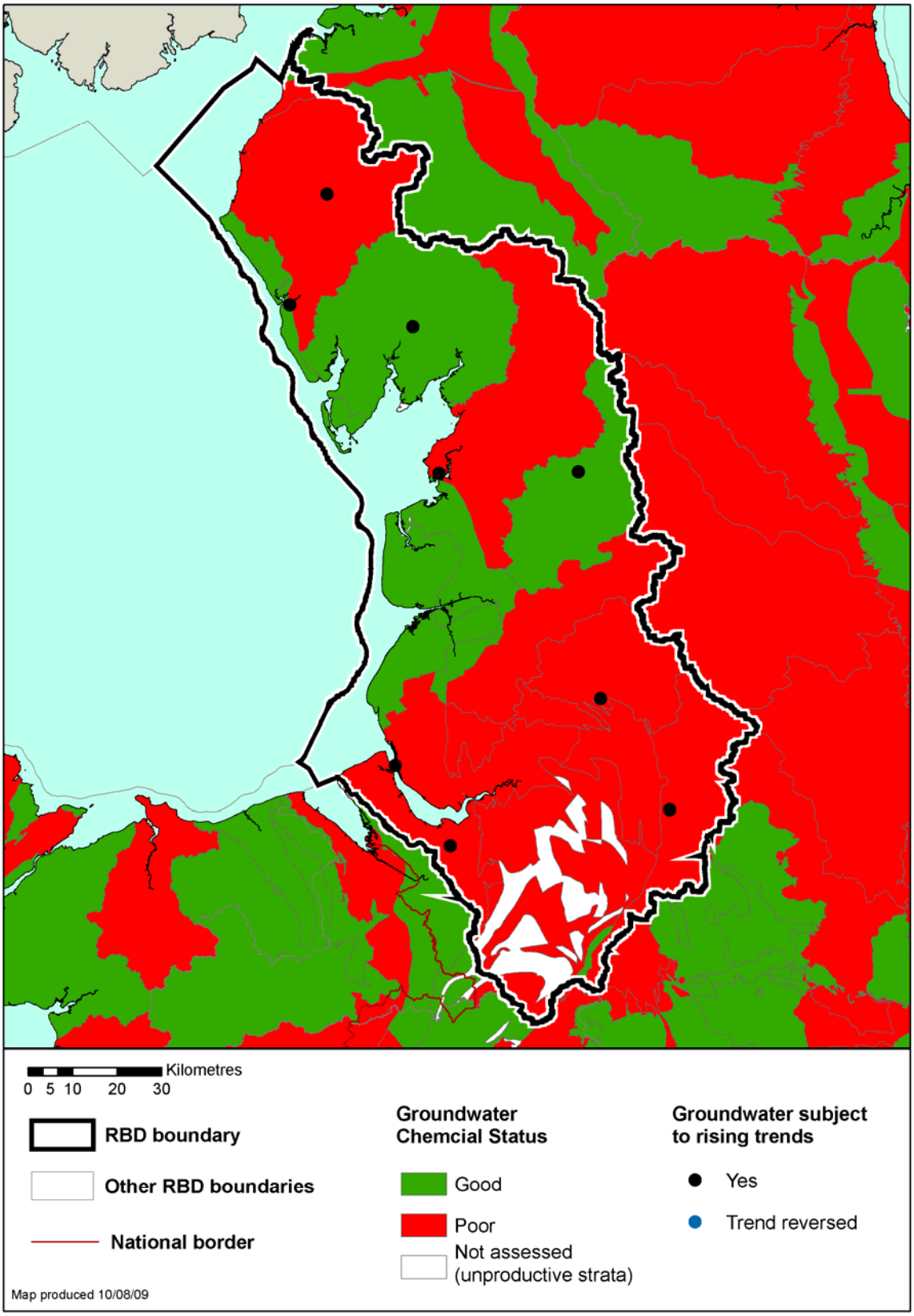
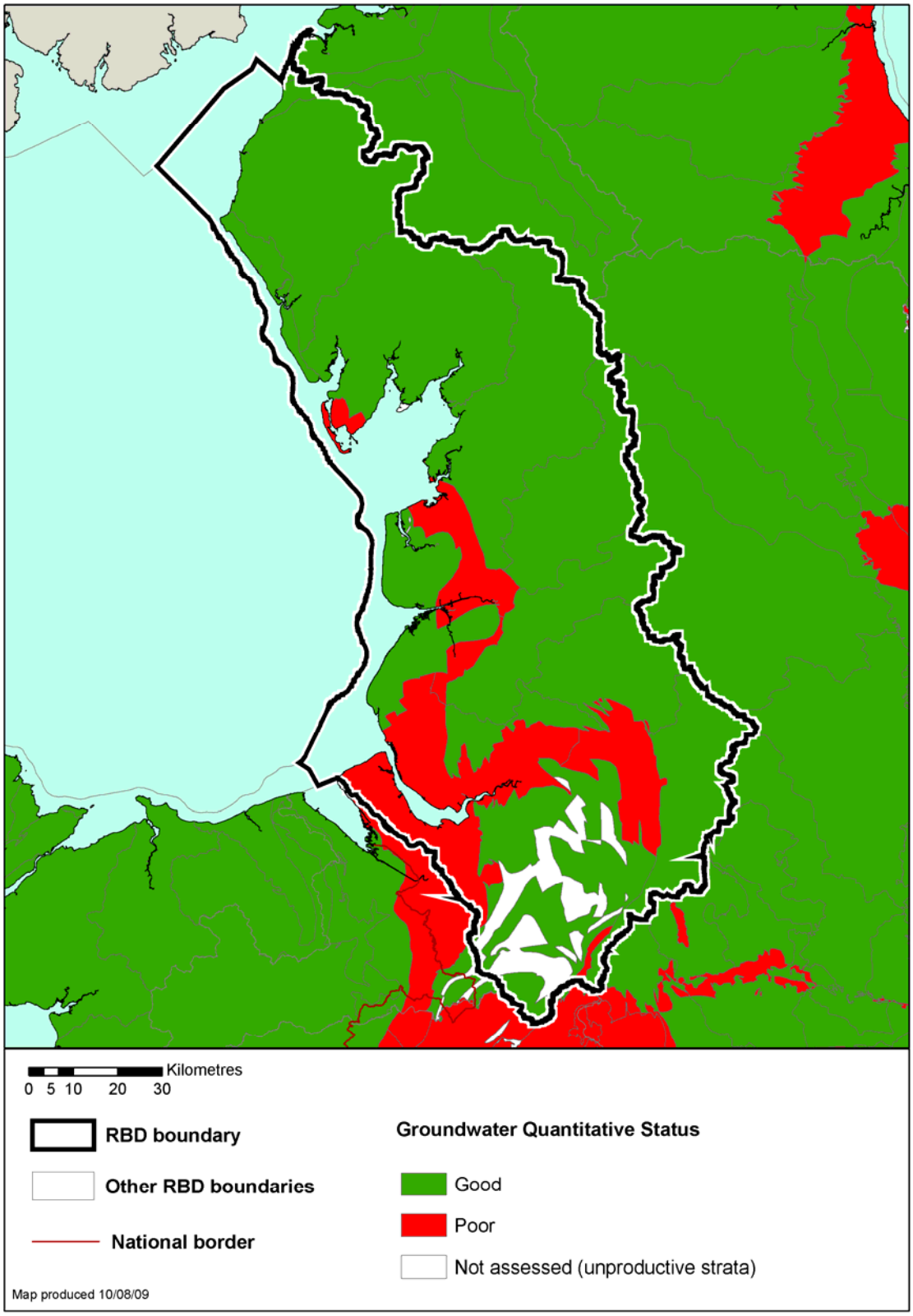


Figure A.7 **Quantitative status for groundwater**



A.3 Maps of monitoring network

In this section we show the network of monitoring stations used up to establish the actual condition of all water body types within the North West river basin district in terms of their ecology, water chemistry, flow and groundwater level.

For fresh surface waters we are using a targeted monitoring programme to classify water bodies at risk of failing to meet good status in 2015 (see annex G – Pressures and risks to the water environment). We have also established a smaller network of surveillance sites to provide information on long-term natural and anthropogenic trends. This network will also be used to validate our risk assessments.

For groundwater we have established two monitoring networks to classify groundwater bodies. We have a groundwater quality monitoring network that meets the surveillance and operational monitoring requirements for chemical status and trend assessment, and a groundwater level monitoring network to meet the requirements of quantitative status assessment.

We have also established surveillance monitoring in our coastal and estuarine water bodies.

Wherever possible we have supplemented data from the new ecological monitoring programmes with data from our monitoring programmes established for other purposes.

» More information on the monitoring and classification techniques can be found on the UKTAG website.

The following maps show our monitoring programme that we have used to classify water bodies (Figure A.8 to A.11)

Figure A.8 **Surveillance water bodies for rivers, lakes, estuarine and coastal water bodies**

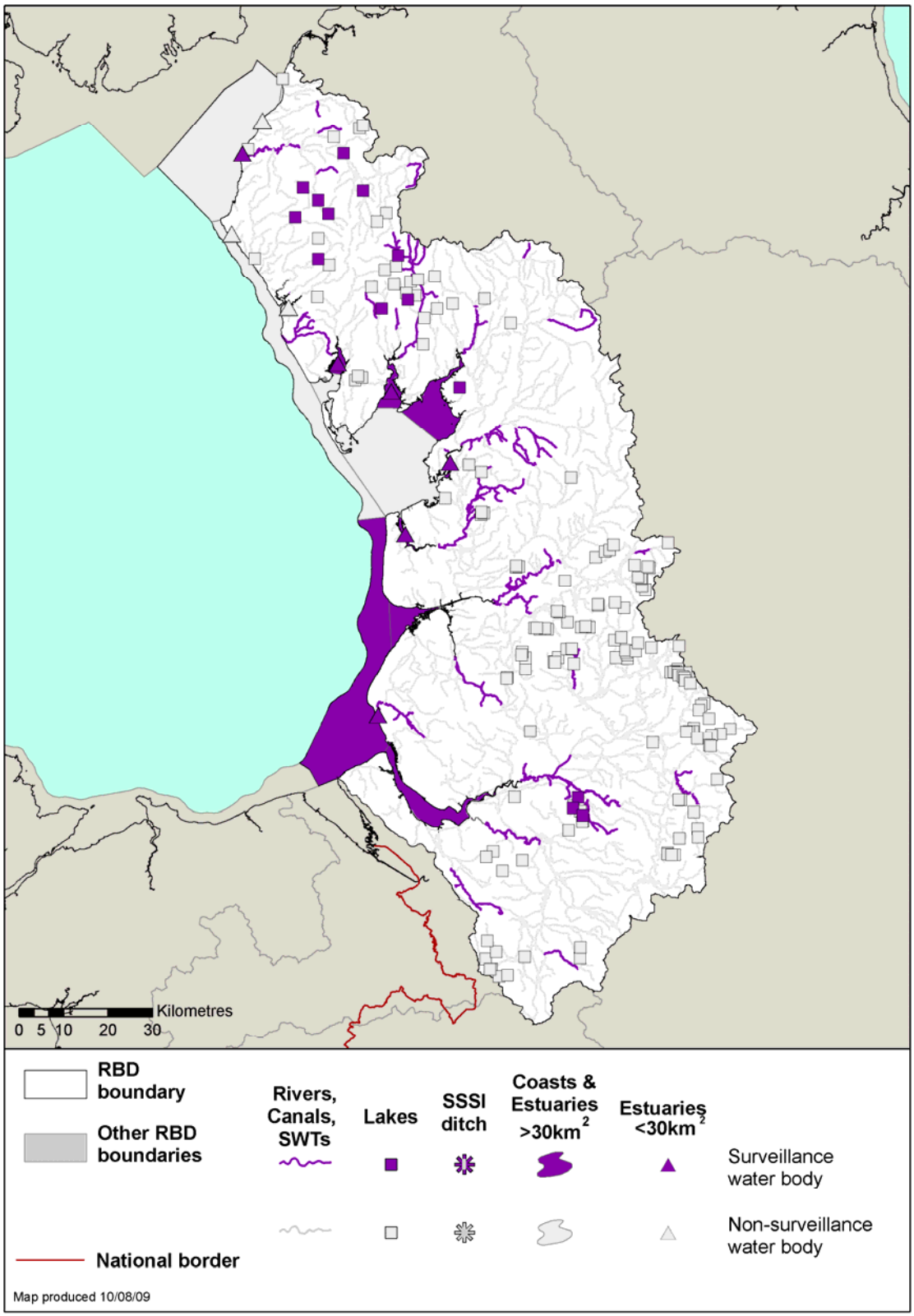


Figure A.9 **Ecological, chemical and flow monitoring network for rivers, canals, and lakes**

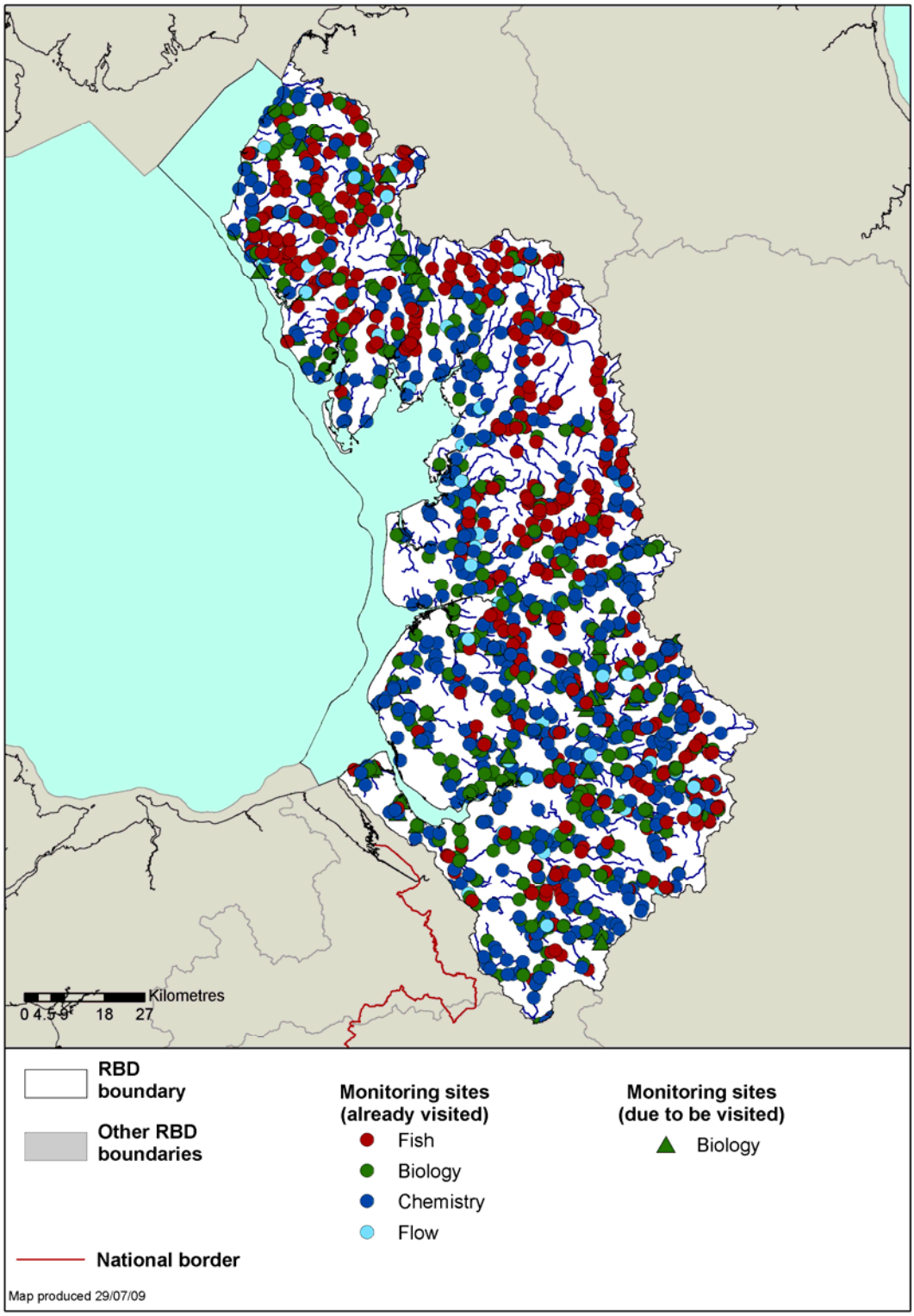


Figure A.10 **Ecological and chemical monitoring network for estuarine and coastal waters**

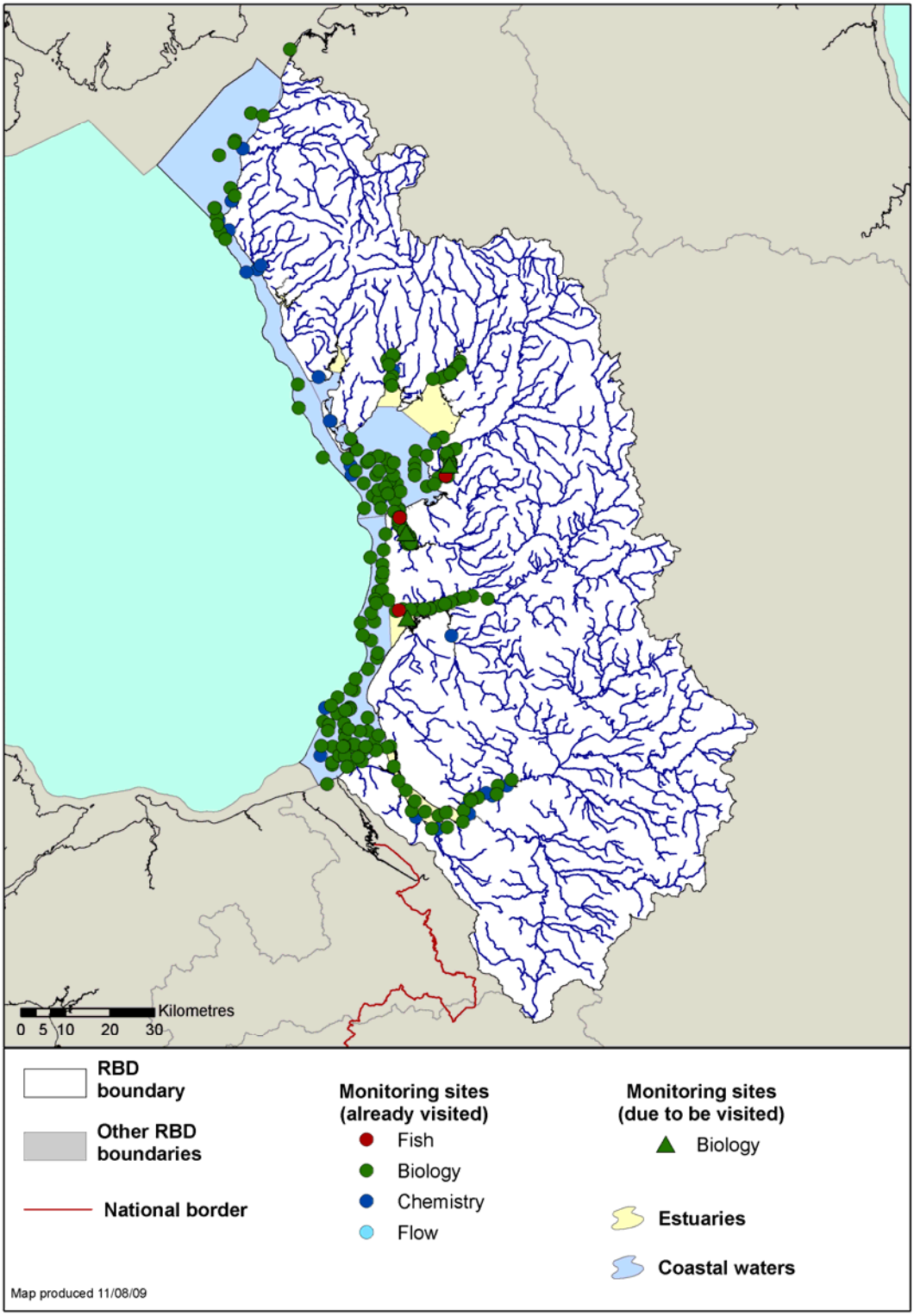
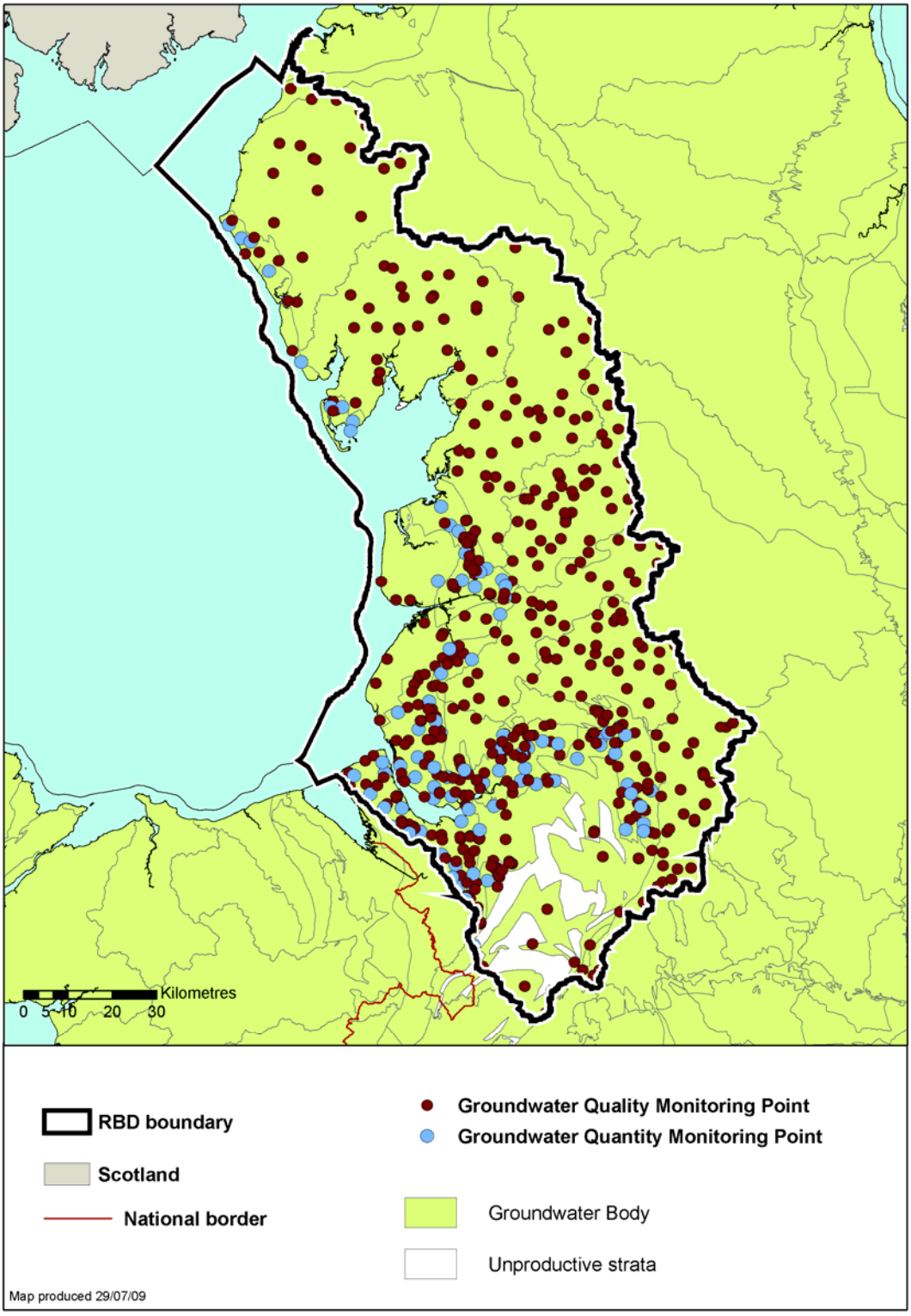


Figure A.11 **Chemical and level monitoring networks for groundwater**



A.4 Maps of surface water body types

Because the sorts of animals and plants found in upland, rocky, fast-flowing streams are very different to those found in lowland, slow flowing, meandering rivers, surface water bodies are grouped into different types according to their physical and chemical characteristics. The types described below dictate, in very general terms, the sorts of plants and animals likely to be present in water bodies of that type.

Further information on water types in the North West river basin district and the associated reference conditions are included in section A.5 of this annex.

The surface water body types that are found in the North West river basin district are illustrated in the maps shown below in Figures A.12 to A.14.

Figure A.12 **River water body types in North West river basin district**

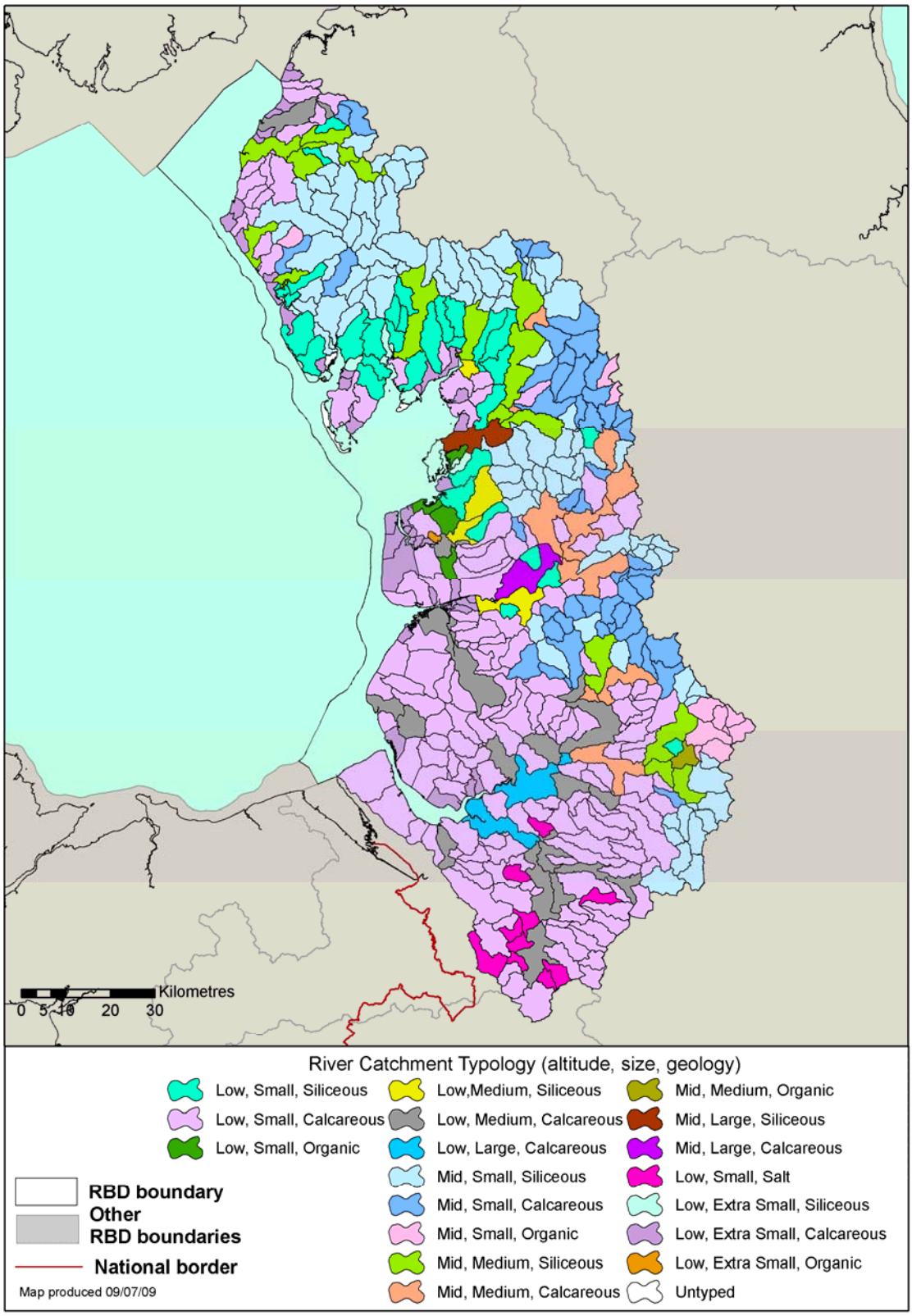


Figure A.13 **Lake water body types in North West river basin district**

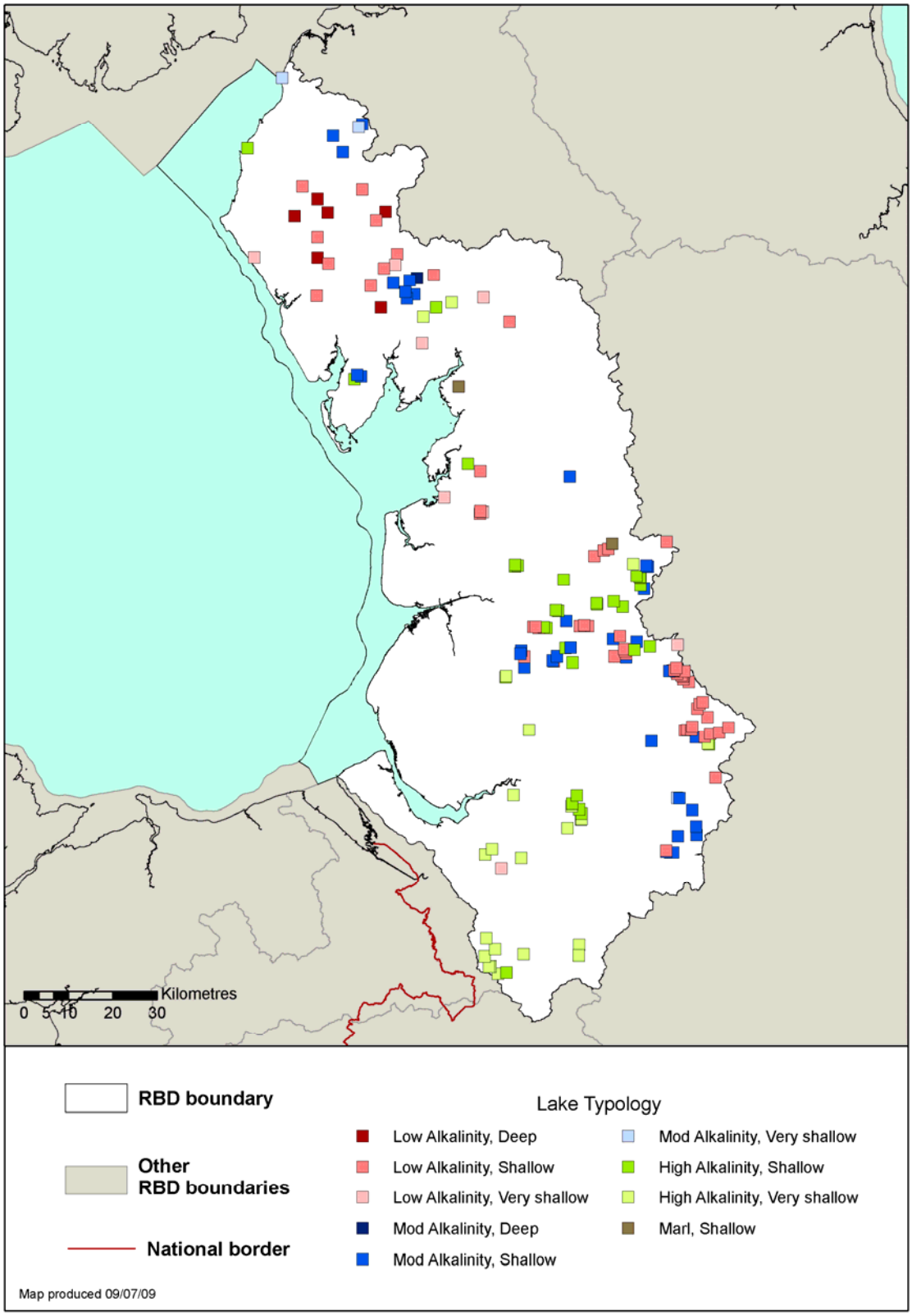
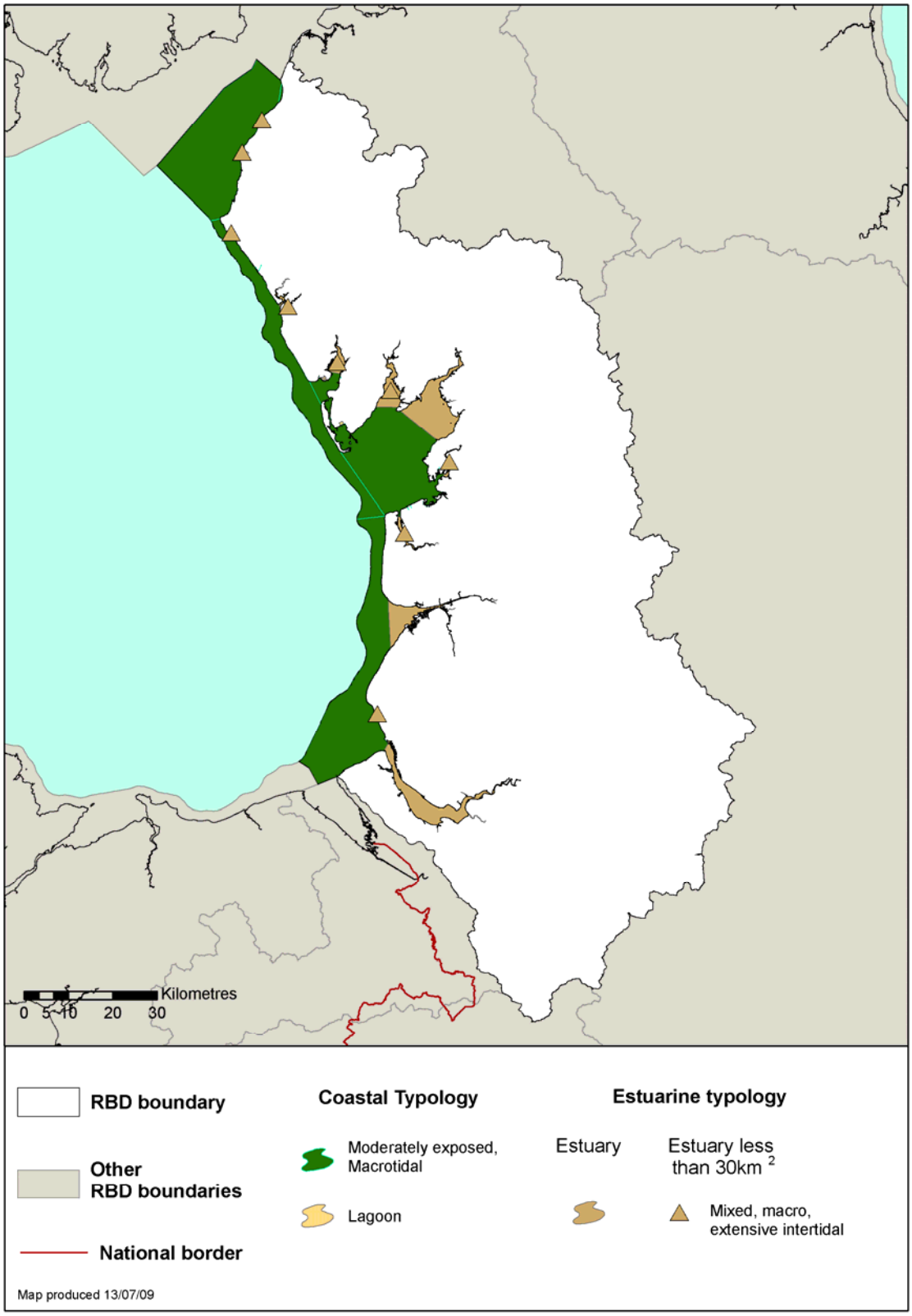


Figure A.14 **Estuarine and coastal water body types in North West river basin district**



A.5 Surface water body types and reference conditions

In the North West river basin district there are fourteen river types, seven lakes types, one estuarine water type and two coastal water types. A descriptive overview for each of these water body types is given below.

Reference condition descriptions covering the sorts of plants and animals expected to be found in the different types of water bodies in undisturbed conditions have been produced for each type or group of types (see references below). These types are the ones that have been used in the initial characterisation of each river basin district. In some cases there are no examples of reference condition in the UK and descriptions are based on similar types in other Member States, or extrapolation from modelling studies, or historic data.

Reference conditions and the conditions found in high status waters are the same thing. For example, if a classification tool shows that the diatom community in water body is at high status, then the species composition and abundance of diatoms in that type of water body are what would be expected under reference or undisturbed conditions. The way reference values have been determined for each of the biological elements is given in the UKTAG Assessment Methodologies which can be found on the UKTAG website.

The Ministerial Directions on Environmental Standards give the values for high status for both biological and physico-chemical elements and include screening approaches for high status hydrology and morphology. It is important to understand that to be in overall reference condition a water body would need to comply with all the criteria including hydrological regime and morphological criteria. There are very few of these in England and Wales using the current criteria.

The reference conditions descriptions are given in detail on the UK Technical Advisory Group website:

For rivers at:
WFD UK TAG - Type Specific Reference Conditions for Rivers

For lakes at:
WFD UK TAG - Type Specific reference conditions for Lakes

For estuarine and coastal waters at:
WFD UK TAG - Reference conditions for Estuarine and Coastal Waters

Types of water in the river basin district

Rivers

River Type 1: small catchment area (10-100km^2), mean catchment altitude- low (<200m), with a predominantly siliceous geology.

Type overview: in England and Wales, this type of river is predominantly found in the South West (particularly Cornwall), Kent/Sussex, around the New Forest in Hampshire, the western part of Wales, Anglesey and in the Lake District. Across Great Britain it covers 11% of the typed river length.

River Type 2: small catchment area (10-100km^2), mean catchment altitude- low (<200m), with a predominantly calcareous geology.

Type overview: In England and Wales, this river type is found in virtually all lowland regions. It is the most common type covering 26% of typed river length across Great Britain.

River Type 3: small catchment area (10-100km^2), mean catchment altitude- low (<200m), with predominantly organic surface deposits.

Type overview: in England, it is restricted to streams draining into the Wash. In Scotland acidic conditions dominate, whereas in East Anglia base rich conditions prevail. It covers less than 2% of typed river length across Great Britain.

River Type 4: medium sized catchment area (100-1000 km^2), mean catchment altitude- low (<200m), with a predominantly siliceous geology.

Type overview: in England and Wales this river type is found in hilly areas of the South, West and North. It covers less than 2% of the typed river length across Great Britain.

River Type 5: medium size catchment area (100-1000 km^2), mean catchment altitude- low altitude (<200m), with a predominantly calcareous geology

Type overview: in England and Wales, this type of river is widespread in all but the most upland areas. It is the third most common type and covers 12% of the typed river length across the Great Britain.

River Type 8: large catchment area (>1000 km^2), mean catchment altitude- low (<200m), catchments with a predominantly calcareous geology

Type overview: This type occurs exclusively in England and Wales, and whilst it is present over geographical area, it only covers 3% of the typed river length across Great Britain.

River Type 10: small catchment area (10-100km^2), mean catchment altitude- medium (200-800m), with a predominantly siliceous geology.

Type overview: In England and Wales, it is predominantly found in the West (Cornwall, North Devon, Wales, the Pennines and Cumbria). Across Great Britain it is the second most common type covering 22% of typed rivers.

River Type 11: small catchment area, (10-100 km^2), mean catchment altitude- medium (200-800m), with a predominantly calcareous geology.

Type overview: In England and Wales, it is moderately widespread but is predominantly located in northern areas and Wales covering 7% of typed river length across Great Britain.

River Type 12: small catchment area (10-100km^2), mean catchment altitude- medium (200-800m) with a predominantly organic surface geology.

Type overview: In England and Wales, it is found mainly in the Pennines, and covers 2% of the typed river length across Great Britain.

River Type 13: medium sized catchment area (100-1000km^2), mean catchment altitude- medium (200-800m), with predominantly siliceous geology.

Type overview: In England and Wales, it is predominantly found in the West (Cornwall, North Devon, Wales, the Pennines and Cumbria), covering 8% of the typed river length across Great Britain.

River Type 14: medium sized catchment area (100-1000 km^2), mean catchment altitude- medium (200-800m), with a predominantly calcareous geology.

Type overview: This type is rare covering 3% of the typed river length across Great Britain. In England and Wales it is predominantly restricted to northern parts.

River Type 15: medium sized catchment area (100-1000km^2), mean catchment altitude- medium (200-800m), with a predominantly organic surface geology.

Type overview: This is a rare river type occurring in the Pennines in England covering <1% of the typed rivers in Great Britain.

River Type 16: large catchment area (>1000km^2), mean catchment altitude- medium (200-800m), with a predominantly siliceous geology.

Type overview: Although this is an uncommon type across Great Britain its location at the bottom end of the largest upland Great Britain rivers, leads to it being one of the most commonly recognised types by the public. Examples are found in NW England and Wales.

River Type 17: large catchment area (>1000 km^2), mean catchment altitude- medium (200-800m), with a predominantly calcareous geology.

Type overview: in England and Wales, this type of river is scattered but mainly occurs in northern areas and Wales. It covers less than 1% of river length across Great Britain.

In addition to the UKTAG river types (1 to 17) the Environment Agency has included extra-small river water bodies (catchment area less than 10km^2). These are not official UKTAG river types so do not have a number but are shown in the maps in section A.4.

Lakes

Standing Water Type: Low alkalinity, deep

Type overview: These lake types are distributed across northern England and Wales. They are oligotrophic lakes typically formed by glacial erosion during the last ice age. A summer thermocline is likely to form. Limited carbon supply and slow decay rates in deep water sediment means good oxygenation at depth. This will prevent sediment phosphorus release under anaerobic conditions and thus limit primary production.

Standing Water Type: Low Alkalinity, shallow

Type overview: This is an uncommon type distributed in western Wales and southern England. Due to the shallow nature, there will be no summer thermal stratification. The water bodies falling into this type all occur at low and medium altitudes being formed as kettle holes or a combination of glacial erosion and deposition respectively.

Standing Water Type: Medium alkalinity, deep

Type overview: Distributed throughout the higher areas of northern England and Wales. These are oligotrophic to mesotrophic lakes, and in the British Isles, occur frequently on the upland lowland border where the calcareous soils of the lower catchment enrich the run off from base poor rocks. Light penetration is restricted by algal productivity thus the profundal zone extends into shallower water in these lakes. A thermocline will develop in the deeper lakes in the summer months. Here, the decay of the algal crop in the hypolimnion may cause summer oxygen depletion which can in turn allow the conversion of ferric salts to ferrous salts, facilitating the release of phosphorus from the sediment.

Standing Water Type: Medium alkalinity, shallow.

Type overview: This is an uncommon lake type with scattered locations across west Wales and southern England. Due to the shallow nature, there will be no summer thermal stratification.

Standing Water Type: High alkalinity, deep

Type overview: These lake types are productive and support a rich macrophyte assemblage. The majority occur in low lying areas of the Midlands and northern England with scattered sites in Wales. Typical underlying geology includes limestone, chalk and red sandstones, which provide a basal influence. Most of these lakes are formed on soft rocks but wave-washed rocky shores can form an important part of the habitat on larger lakes. Extensive beds of submerged macrophytes and reed fringes characterise these lakes.

Standing Water Type: High Alkalinity, shallow

Type overview: These lake types are productive and support a rich macrophyte assemblage. The majority occur in low lying areas of the Midlands and northern England with scattered sites in Wales. Typical underlying geology includes limestone, chalk and red sandstones, which provide a basal influence. Most lakes are formed on soft rocks but wave-washed rocky shores can form an important part of the habitat on larger lakes. Extensive beds of submerged macrophytes and reed fringes characterise these lakes.

Standing Water Type: Marl, shallow

Type overview: This rare lake type is characterised by the formation of calcium carbonate deposits (marl). It is confined to areas of soluble limestone and chalk, occurring predominantly in northern England. Calcium carbonate precipitation removes phosphate from the water column (by co-precipitation), low dissolved carbon dioxide levels can limit phytoplankton production and suspended organic matter binds to marl, leading to characteristically clear water. Marl lakes fall within a similar alkalinity range to the High Alkalinity lake type but are differentiated by catchments which are predominately limestone. Therefore they form a subset of the High Alkalinity lake type which is characterised by the production of marl. Consequently marl lakes support species rich macrophyte, fish and invertebrate assemblages which can not be easily separated from those occurring in High Alkalinity lakes.

Estuarine Waters (Estuaries)

Estuarine Type 3

Type overview: Type 3 estuarine waters are fully mixed, predominantly brackish (polyhaline) and have tidal ranges normally between 4 and 6 metres (macrotidal). They are sheltered, with a sand or mud substratum and tend to have extensive intertidal areas.

Coastal waters

Coastal Type 4

Type overview: Type 4 waters are sea waters (euhaline waters), have tidal ranges normally between 4 and 6 metres (macrotidal) and moderately exposed. They occur on the north-west coast of England, the east Anglian, Kent and Sussex coasts.

Coastal Type 10

Type overview: Coastal Lagoons, which are occur in many parts around the UK coast. They are sea waters (euhaline waters) and sheltered.

A.6 Confidence and precision of monitoring

Surface waters

Our assessments of water body status are accompanied by a description of how certain we can be that the water body is below good status. These assessments can be found in annex B for each quality element in each water body, and for the overall water body status.

The Environment Agency has used three expressions to describe how certain we are that a water body does not achieve the objective of good status. Although the terms confidence and certainty can be interchangeable, the Environment Agency has taken the decision to use an expression of *certainty* to describe all surface water classifications.

How certain we are that the water body is less than good status	**Threshold**
Very certain	≥95% certain that the water body does not meet the objective of good status
Quite certain	≥75to ≤95% certain that the water body does not meet the objective of good status
Uncertain	>50% to <75% certain that the water body does not meet the objective of good status

This description of certainty takes account of the precision of our results. Precision is influenced by natural variation in the data over time, as well as errors in the assessment process. The Environment Agency can assess how the probability of misclassification changes in relation to the amount of sampling for each biological element. This allows us to estimate the most likely levels certainty we can achieve with a given sampling effort. For example, a diatom sample from spring and autumn will allow no more than a 70% certainty of being at a particular status, but often gives high certainty (>95%) of being somewhere below good status.

In some situations our expression of certainty is based on weight of evidence or expert opinion. There are three examples of this.

- The way different water bodies respond to nutrient enrichment can be complicated. Sometimes we find that the water body does not meet the required standard for phosphorus but the biological community shows no sign of damage. In such situations it would be misleading to say we are very certain that the water body is at less than good status. In other situations, the water body does not meet the required standard for phosphorus, and the biological community – the diatoms and macrophytes – also show signs of damage: The result for each element on its own may be uncertain. But the fact that all elements suggest the same thing – weight of evidence that there is an impact – means that we become more certain that there is a problem.
- As our monitoring programme for estuarine and coastal water bodies is new, certainty in our draft classifications for these water bodies is partly based on the amount of data available for each of the classification tools. We say we are uncertain where our data sets are limited. Our marine monitoring programme will continue to provide more data, so the certainty of our assessments in estuarine and coastal waters should steadily improve over time.

- Where expert judgement (see section A.2) has been used to provide a classification we can only ever be uncertain in our assessment.

» The confidence of the results from both programmes (taking precision into account) are stated in annex B of the river basin plans.

Groundwater status

Groundwater classification comprises 4 quantitative and 5 chemical status tests (ref UKTAG paper 11b(i) and 11b (ii)). Each of the status test results is reported as a face value class accompanied by an assessment of our confidence in the result.

For groundwater confidence is reported as a qualitative statement, and is used as an indicator for prioritising action. All poor status classifications for groundwater, irrespective of confidence, will require some form of action. This is because the classification criteria for both chemical and quantitative status comprise a rigorous weight of evidence approach.

Confidence in poor status will be reported as either “high” or “low”, depending on the test. These terms are defined as follows:

- “High” confidence will usually mean that competent authorities can proceed immediately to considering restorative action, or, for example, improvement to existing measures, according to procedures in the Directive. In some cases there may be “high” confidence in the poor status, but uncertainty over the measures that should be implemented, and an options appraisal of measures/objectives will be required

- “Low” confidence will usually mean that further investigation should be carried out as a priority to improve confidence and measures taken in the first River Basin Cycle where appropriate.

It is stressed that the assessment of confidence in status should not be used as the only driver for instigating measures. Good status groundwater bodies may require higher priority attention if they are predicted to fail either the trend objective in the long term or some other measure of the risk of future deterioration in status.
Confidence in good status will be reported as either “high” or “low”, depending on the test. These terms are defined as follows:

- “High” confidence will usually mean that the only requirement is to assess potential future deterioration using surveillance monitoring.

- “Low” confidence is associated with a more limited evidence base, often in groundwater bodies that are at risk. Further operational monitoring will be required to improve the level of confidence.

The decisions on which level of confidence to assign to each status test are reached by using a combination of statistical and weight of evidence criteria. The principles for this are outlined in the UKTAG paper - Reporting Confidence in Groundwater Status Assessments5

As a principle guiding the assessment of confidence in each of the individual status tests, the key criteria are: a) the strength of the overall “weight of evidence” supporting the status assessment, and b) a combined assessment of the monitoring data in terms of the magnitude of overall departure from the poor/good status boundary and the variability of the data.

Confidence in chemical status and quantitative status will be determined and reported separately. For poor status groundwater bodies, the highest level of confidence from each of

the individual tests should be reported. For good status groundwater bodies, the lowest level of confidence from each of the individual tests should be reported. An example is provided in Figure A.15.

Figure A.15: **Classification and Confidence: example results and procedure for defining overall confidence.**

Quality Element (Status Test)	Status result	Confidence
No saline or other intrusions	Good	High
Drinking Water Protected Areas (DWPA).	Good	Low
Groundwater Dependent Terrestrial Ecosystem (GWDTE).	Poor	Low
No significant diminution of surface water chemistry and ecology	Poor	High
General Chemical Test	Poor	Low

Overall Chemical Status: Poor Status (High Confidence)

Quality Element (Status Test)	Status result	Confidence
Water Balance Test	Good	High
Surface Water Element	Good	High
Groundwater Dependent Terrestrial Ecosystem (GWDTE).	Good	Low
No saline or other intrusions	Good	High

Overall Quantitative Status: Good Status (Low Confidence)