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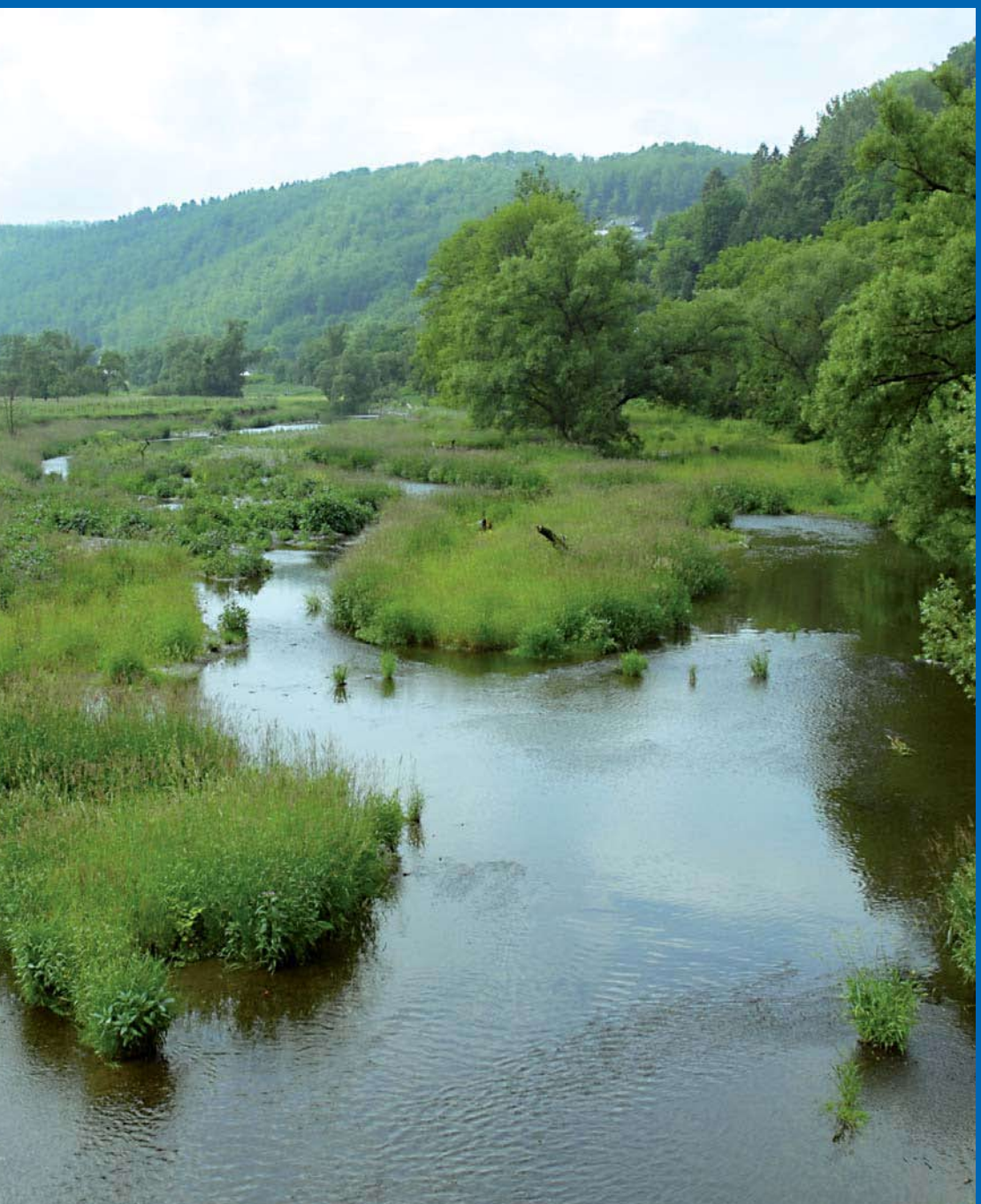
For our Environment

Water Framework Directive

Implementation of WFD programmes of measures – interim results 2012



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Interim results

Water Framework Directive

Implementation of WFD programmes of measures – interim results 2012

Content

Pothole in the river Stör, Schleswig-Holstein

About this brochure

The Water Framework Directive sets the ambitious goal of achieving “good status” for rivers, lakes, coastal waters, and groundwater by 2015. The management plans and programmes of measures for Germany’s ten river basins were issued in December 2009. In December 2012, a report on the implementation status of the programmes of measures was submitted to the European Commission.

This pamphlet describes the domains in which waterbody status improvement measures have been undertaken and what has been accomplished during the first three years of the programmes of measures. In particular, this report sheds light on the measures that have been taken in the 16 German regional states that are mainly in charge of implementing the Water Framework Directive.

This report shows that many measures are already underway, but that further efforts are needed if the WFD objectives are to be reached. And while more extensive cooperation between cities, regional states and the federal government, as well as the involvement of various waterbody related interest groups and user groups, has paid off, these collaborative actions need to be strengthened and expanded.

When it comes to durably protecting our waterbodies going forward, the challenge we face is to leverage synergy, work shoulder to shoulder, and decisively move to implement Water Framework Directive objectives.

Speyerbach in Neustadt an der Weinstraße before and after the watercourse remodeling

Introduction

The European Union has set a clear timeline for the member states to reach "good status" objectives for waterbodies throughout the EU. These efforts are based on a six year cycle, whereby the Water Framework Directive (WFD) environmental objectives are to be met by 2015, provided that no deadline extension or exception is invoked. Member states that avail themselves of an extension beyond 2015 are required to achieve all WFD environmental objectives by the end of the second and third management cycles, which extend from 2015–2021 and 2021–2027 respectively.

The first characterization and the elaboration of monitoring programmes were both completed on time. The first management plans and programmes of measures were issued in 2009 and are in the process of being implemented. The monitoring programmes show that substantial improvements have been made on the water quality front over the past decades. Owing to the WFD's emphasis on waterbody biology, the water resource management community is facing new challenges.

The management plans clearly show that 90 percent of surface waterbodies have yet to reach the WFD objectives and that improvement measures are needed. This situation is mainly attributable to the following: (a) substandard hydromorphology resulting from river bank constructions and waterway straightening measures; and (b) lack of waterbody continuity, e.g. for fish owing to barrage weir construction and the continuing high levels of inputs into waterbodies. These inputs mainly come from farming, but also from residential and mining areas. For all such waterbodies, the programmes of measures define actions that need to be taken if we are to reach the WFD objectives.

It is perfectly understandable that measures cannot be implemented simultaneously in and for all of Germany's myriad waterbodies with the goal of achieving "good status." Moreover, it takes time to carry out the necessary planning, prepare and purchase the areas in question, and or obtain the financing necessary to

Altered and highly polluted waterbodies

enable the target measures to go forward. Another factor is that it often takes a long time for the effects of a particular measure to be felt. Against this backdrop, it is no surprise that in Germany, deadline extensions have been invoked for 80 percent of all surface waterbodies and for 32 percent of all groundwater bodies. The goal is for 18 percent of all German surface waterbodies and 64 percent of all of the country's groundwater bodies to have achieved the WFD objectives by 2015.

This pamphlet provides an overview of the domains in which improvement measures have been rolled out or are in the planning stages. The assessment presented here is based on regional-state data that was submitted to the Federal Institute of Hydrology (Bundesanstalt für Gewässerkunde (BfG)) concerning waterbody statuses as at 31 October 2012 for reports that were sent to the European Commission. The BfG compiles the data for the WFD reports and sends it to Brussels. These are the first reports ever to be submitted concerning the progress of measure implementation. As some of the reports differ in their interpretation of the methods recommended by the applicable guidelines, valid comparisons of all regional-state waterbody status data are not always possible. In cases where the resulting discrepancies were unduly large, assessments were omitted from the graphics mutatis mutandis. However, these possible discrepancies between individual regional-state statistics have no impact whatsoever on the general statements made here concerning Germany as a whole.

Further details concerning the measures that have been taken can be found in the various implementation reports and pamphlets issued by the regional states and by river basin associations. A list of these publications can be found on page 33.

For a comprehensive report on management planning outcomes, see the pamphlet Water Framework Directive – The way towards healthy waters (http://www.umweltbundesamt.de/en/publikationen/water-framework-directive-way-towards-healthy).

Lowland river with high morphological alterations

Programmes of measures: implementation status

Key measures

The 2009 programmes of measures were based on a list of 107 generic types of actions that was elaborated by Bund/Länder Arbeitsgemeinschaft Wasser (LAWA).

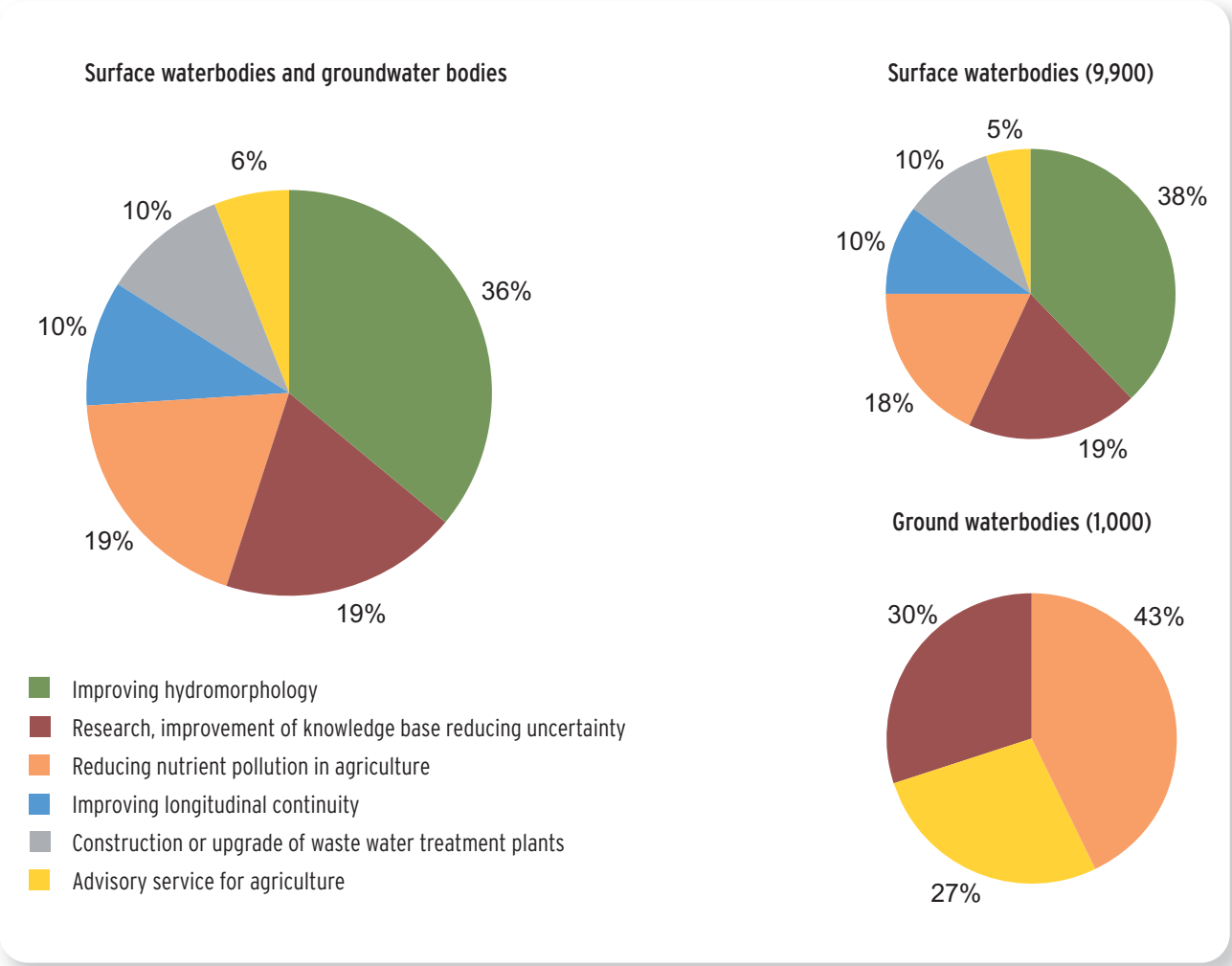
In the 2012 interim report to the European Commission concerning implementation of the programmes of measures, 53 of these types of actions (for Germany) were classified under the following six key measures:

- Improving hydromorphology
- Improving longitudinal continuity
- Reducing nutrient pollution in agriculture
- Advisory service for agriculture
- Construction or upgrade of waste water treatment plants
- Research and improvement of knowledge base reducing uncertainty

Key measures are measures that it is expected will bring about the substantial improvements necessary to achieve WFD objectives and that address the following core problems faced by Germany's waterbodies today: hydromorphological damage; impairment of river continuity for fish and other organisms; high levels of nutrient and contaminant input in surface waterbodies and groundwater.

All of the assessments and illustrations in this brochure pertain to waterbodies, which are the smallest WFD management unit and can be a stretch of a river, stream or the like. Inasmuch as the key measures are usually composed of a series of generic types of actions, the various statuses of these actions also need to be compiled. In this pamphlet, the highest implementation status that has been reached is indicated in all cases. For example, if for a given waterbody two measures are still in "planning on-going" and three are already in "construction on-going", the "construction on-going" status is indicated for the waterbody as a whole. Each generic type of action for a given waterbody was counted only once, regardless of the number of actions of this type that are planned for the waterbody in question. Hence the key-measure figures pertain not to actual concrete measures, but are instead aggregate statistics.

Figure 1: Percentage distribution of the six key measures in Germany

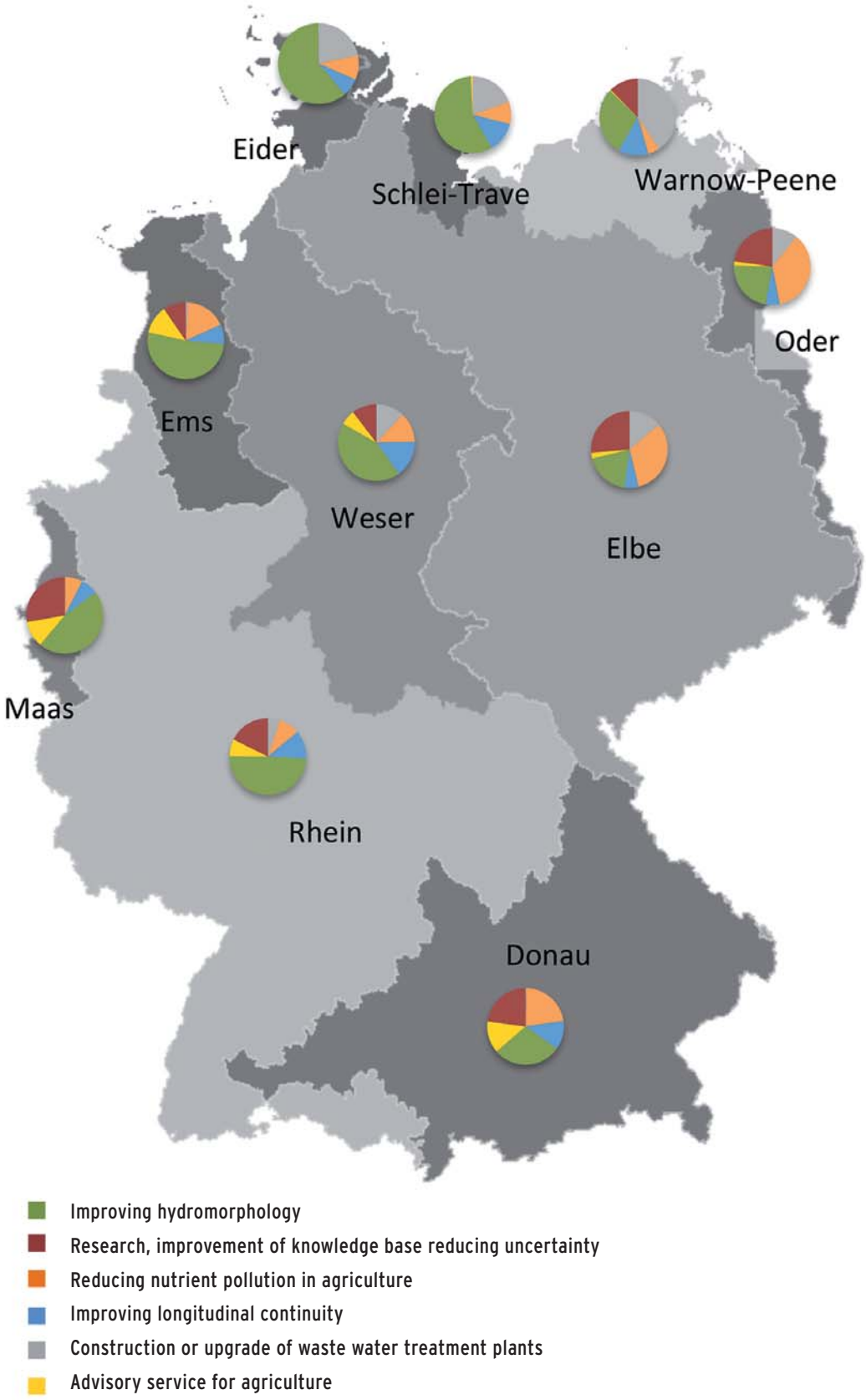


Data source: Berichtsportal WasserBLIcK/BfG; last updated 31 October 2012

Figure 1 exhibits the percentage distribution of envisaged improvement measures in Germany's surface waterbodies and groundwater, based on the six key measures. Advisory service for agriculture, improvement of knowledge base, and reducing nutrient pollution in agriculture are all beneficial for surface waterbodies and for groundwater.

Key measure distribution in the various river basin districts is exhibited in Figure 2. Measures aimed at reducing nutrient pollution in, for example, the Oder, Elbe, Danube and Ems river basins account for a high percentage of these measures. Construction or upgrade of waste water treatment plants is a major factor in the Oder, Elbe, and Weser watersheds. Improving hydromorphology accounts for the lion's share of measures in virtually all of Germany's river basin districts. But in many cases, also conceptual measures like research and improvement of knowledge base reducing uncertainty play a major role.

Figure 2: Percentage distribution of key measures in Germany's river basin districts



Data source: Berichtsportal WasserBLIcK/BfG; last updated 31 October 2012

Implementation statuses

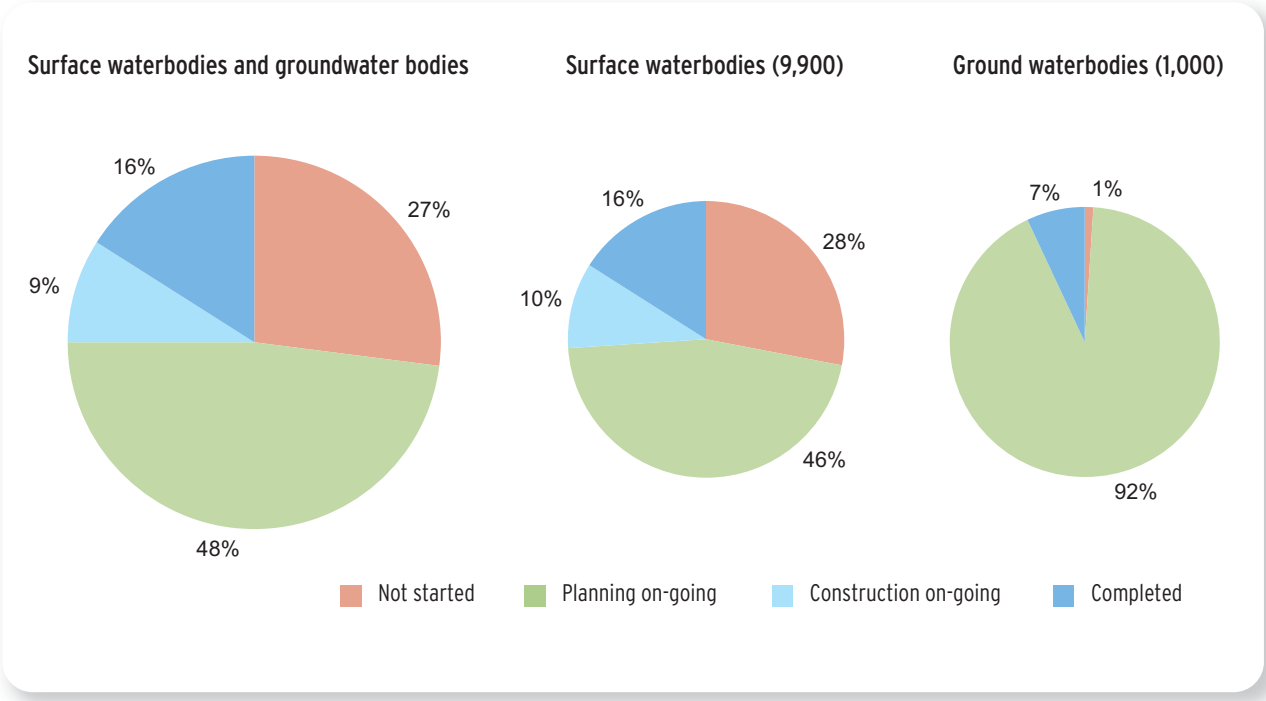
We assessed implementation progress based on the following implementation statuses for the key measures:

Table 1: Key-measure implementation statuses used to assess implementation progress

Implementation status	Explanation
Not started	The technical and/or administrative procedures necessary for starting the construction or building works of all projects of the respective type of measure have not started.
Planning on-going	Administrative procedures necessary for starting the construction or building works of at least one project of the respective type of measure have started but are not finalised.
Construction on-going	Construction or building works of at least one project of the respective type of measure have started but are not finalised.
Completed	The works of all projects of the respective type of measure have been finalised and the facilities are operational.

To date, 16 percent of the planned key measures for surface waterbodies and groundwater bodies has been completed, whereas 27 percent of such measures has not yet started (see Figure 3).

Figure 3: Implementation status of key measures in Germany



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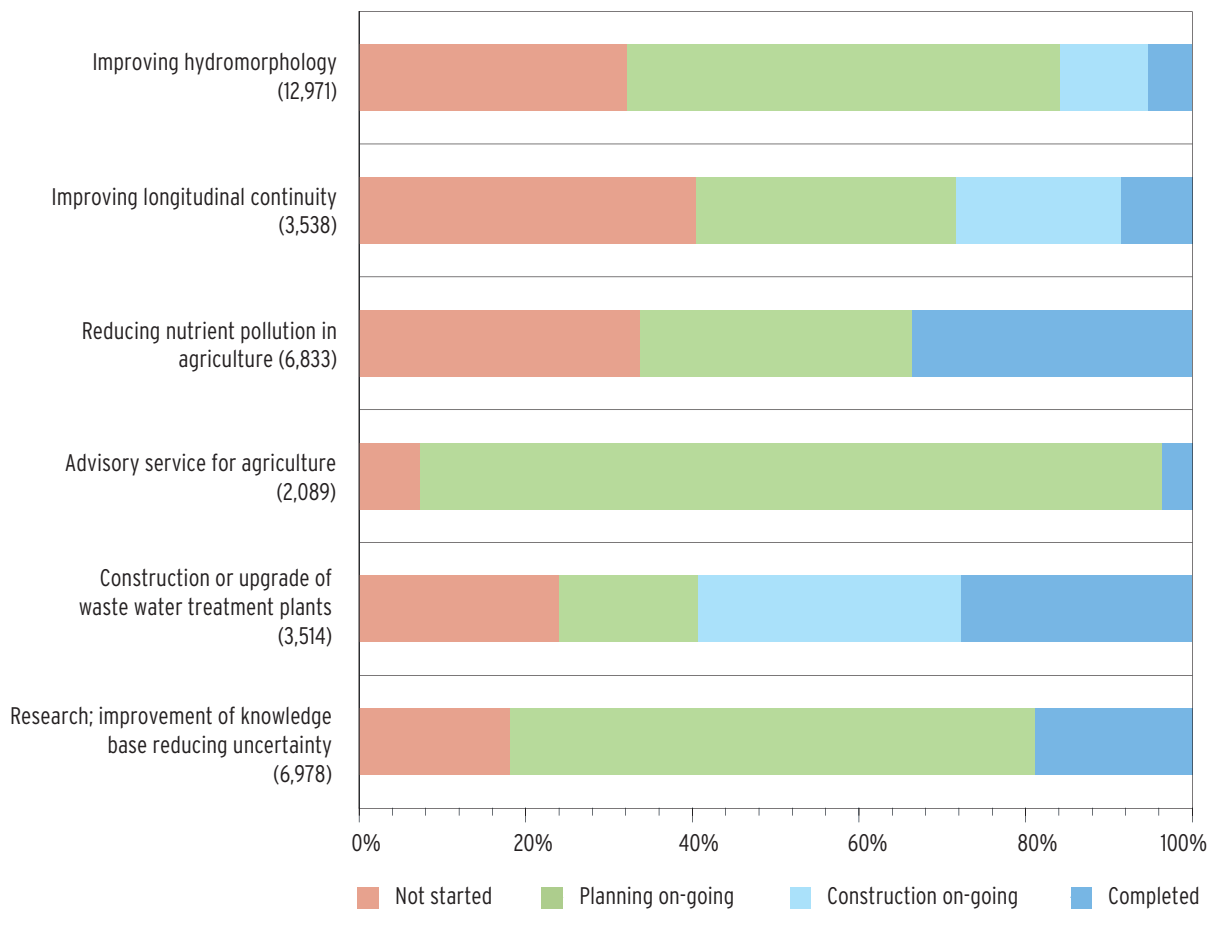
Conceptual measures are largely in "planning on-going." This also applies to advisory service for agriculture – although this is in many instances an ongoing activity that normally needs to be carried out over a relatively lengthy period in order to be effective.

According to the report data, more than 30 percent of the measures aimed at reducing agricultural nutrient inputs have been completed, with sewage treatment plant upgrading in second place in this regard. Improving longitudinal continuity is the type of measure that percentage-wise is most frequently planned but not yet begun (see Figure 4).

Figure 4: Implementation status of key measures in Germany
(The parenthesized figures indicate the number of key measures)



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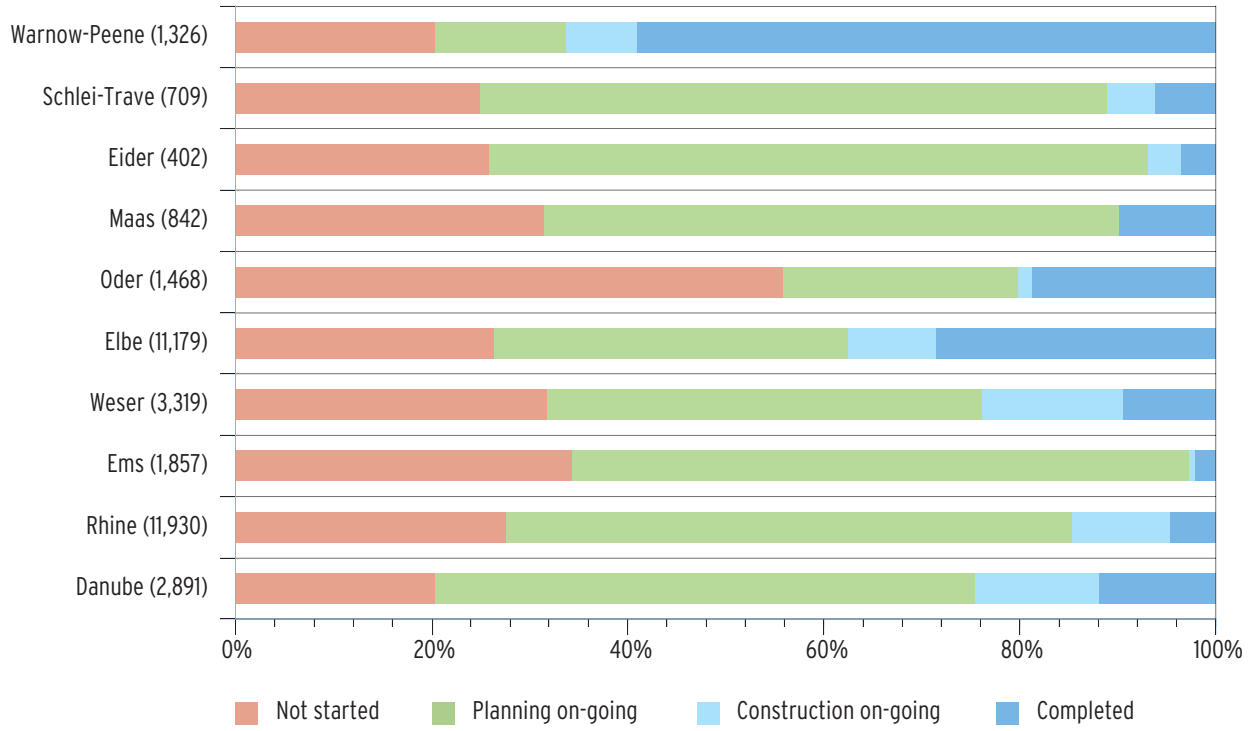
The implementation statuses in the various river basin districts fairly accurately reflect the overall situation in Germany (see Figure 5).

Figure 5: Implementation status of key measures in Germany's river basin districts
(The parenthesized figures indicate the number of measures in each river basin)



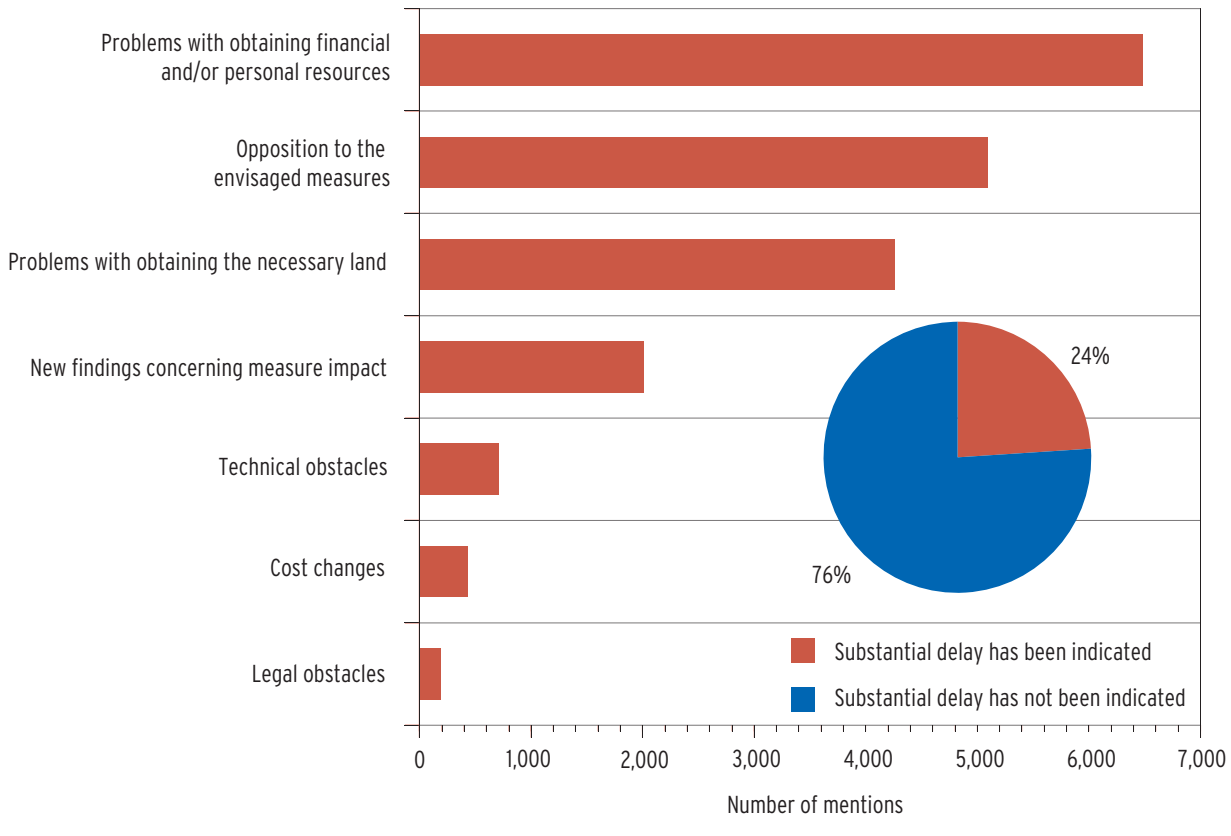
Data source: Berichtsportal WasserBLIcK/BfG; last updated 31 October 2012

The Haune in Hesse after the watercourse remodeling

Why the delays?

According to the report, delays and impediments to implementation of 24 percent of the key measures have either arisen or are foreseeable. The main causes cited are as follows: lack of financial and human resources; lack of available space; opposition to the measures (see Figure 6). Many key measures necessitate time-consuming approval procedures. The need for competing interests to come to an agreement can be quite extensive and reaching such agreements can take a long time. Many measures, particularly those involving hydromorphology, are contingent upon the required waterbody areas being available. For example in the Eider and Schlei-Trave river basin districts, changing conditions resulting from competition for farmland on which to produce sustainable raw materials for biogas facilities is cited as a reason for the fact that programmes of measures probably cannot be implemented in their entirety. Moreover, financing a given measure can entail a complex process, particularly in cases where funding needs to be sought from various subsidy programmes, or particularly when the requisite financial resources are unavailable in the cities or towns affected. But for the most part, delays in implementing measures for the 2015 objectives are attributable to a series of factors.

Figure 6: Delays in the implementation of measures for 2015 objectives, and reasons for these delays



Data source: Berichtsportal WasserBLIcK/BfG; last updated 31 October 2012

Key measures; examples of good practice

Improving hydromorphology

Hydromorphological damage is one of the main depredations that Germany's surface waterbodies have suffered. Such damage has been caused by the dams and reservoirs that have been built over the centuries for cities, trade, farming, hydro power and shipping. Hydromorphological changes have far reaching consequences for waterbodies and water-body floodplains, which are not only habitats but are also essential for the water and substance balance in the river basins in question. Hence it is no surprise that measures aimed at improving hydromorphology appear more often in Germany's programmes of measures than any other type of action.

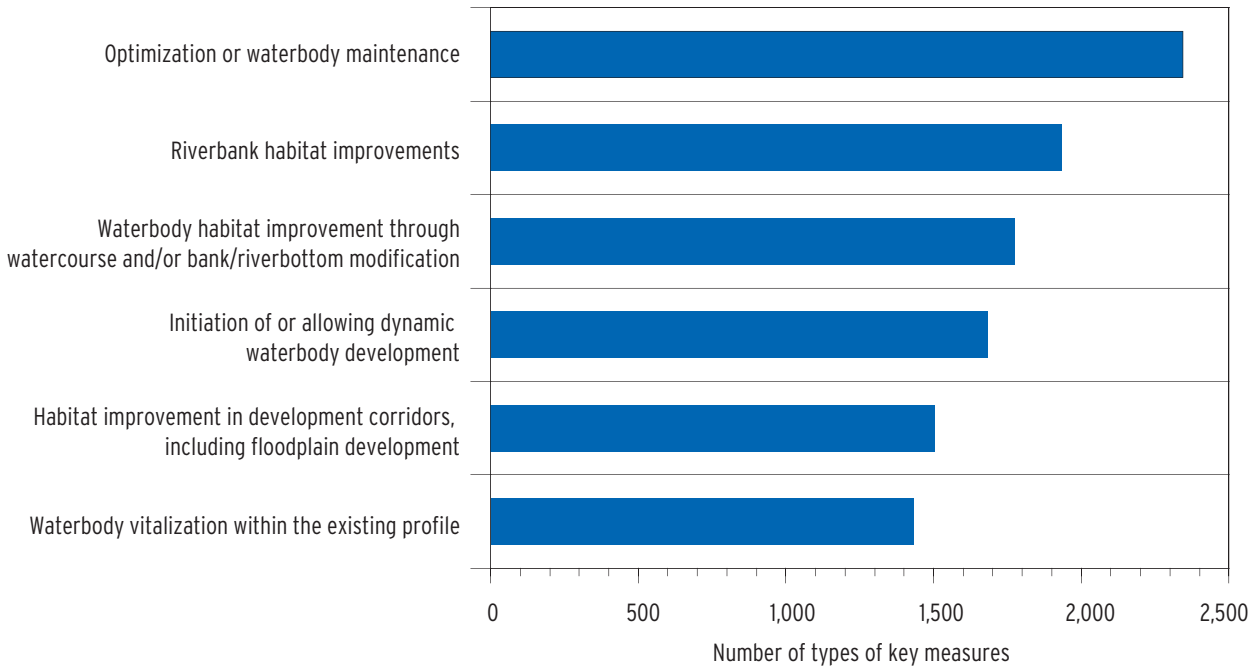
Reconstruction in the river Twiste

LAWA's list of measures contains 22 different types of actions for the "improving hydromorphology" key measures, whereby those most frequently planned are as follows:

- Water maintenance modification and optimization
- Improvement of river bank habitats through actions such as copse development
- Waterbody habitat improvement by altering river courses and reconfiguring river banks or riverbeds – including ancillary measures in this regard
- Initiating or allowing inherently dynamic waterbody development measures, including ancillary measures
- Improving habitats in waterbody development corridors, including floodplain development
- Waterbody revitalization within the existing profile

Figure 7 shows the number of these types of actions for the programmes of measures.

Figure 7: Types of actions aimed at improving hydromorphology



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Structural measures such as removing embankments and watercourse alteration are often necessary for hydromorphological actions. But it is of course much simpler to let nature take its course, an approach whereby deadwood is left in place, and flooding changes a waterbody's course in a natural fashion. Rivers can also be caused or allowed to break their banks, provided that enough space is available. The effort needed to set this

Flow control purposes with coarse woody debris in the river Stör, Schleswig-Holstein

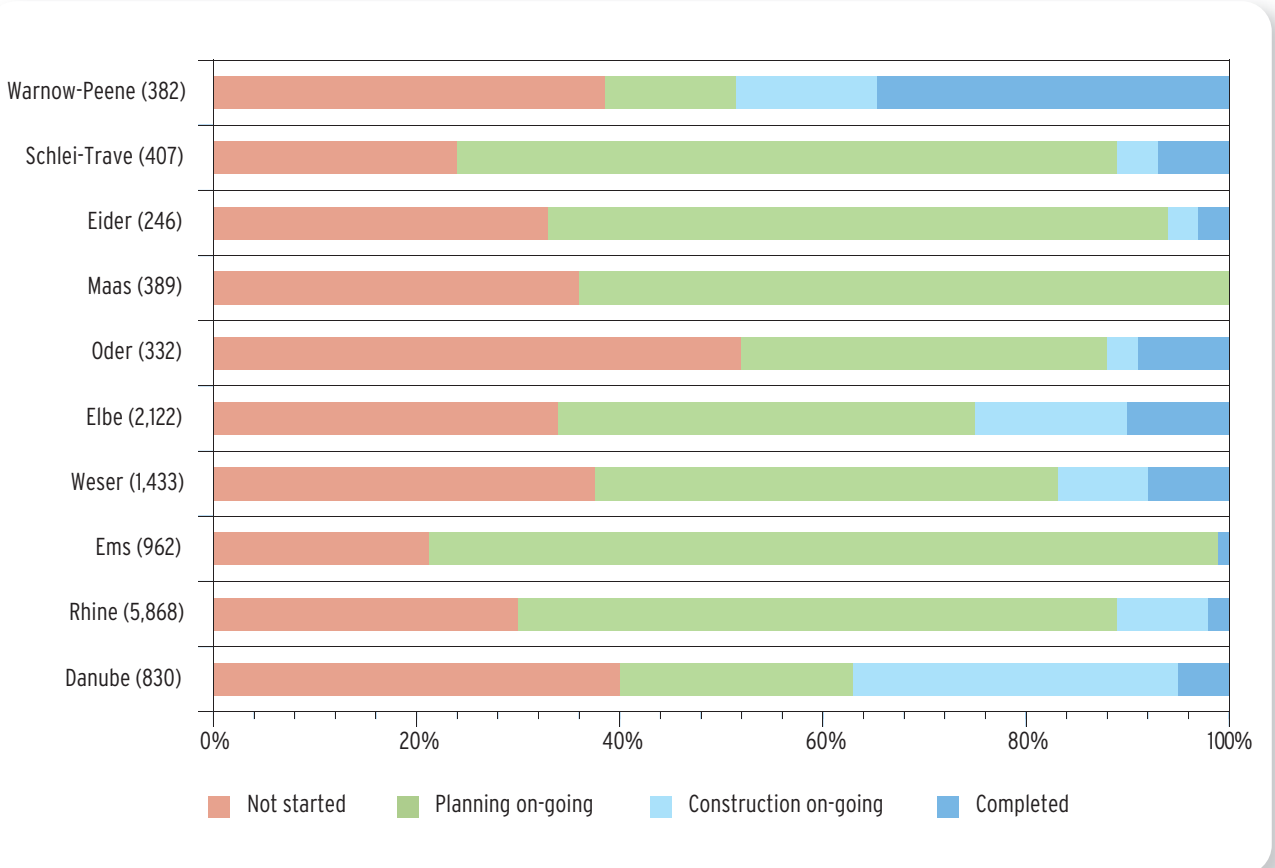
type of intrinsically dynamic measure in motion is often far smaller and less cost intensive. Strategically placing deadwood or flow-diverting large rocks will often change a watercourse's current flow patterns, thus enabling it to move closer to good waterbody status.

However, carrying out intrinsically dynamic waterbody development measures is contingent upon a sufficiently large area being available; plus it is of course essential that such measures do not put property at risk or endanger local residents.

Following are some examples of intrinsically dynamic waterbody development measures that have been set in motion for Germany's watercourses: Unstrut in Thüringen and Kleine Elster in Brandenburg with additional incorporation of oxbows; the Bavarian Inn river from Jettenbach to Töging, with networks of river and floodplain biotopes; the Stör river in Schleswig-Holstein, where bed drops were replaced by stream ramps; strategic placement of deadwood in numerous waterbodies in the regional state of Hesse.

Many envisaged hydromorphological improvement measures are still in the planning stages or have not yet commenced, as the figures show: only around five percent have been completed and an additional eleven percent are currently in progress. In the Warnow-Peene river basin district a substantial portion of the planned measures (35 percent) have been completed; and in the Danube river basin district more than 30 percent of the planned measures are in the construction or implementation phase (see Figure 8).

Figure 8: Implementation status of actions aimed at improving hydromorpholgy
(The parenthesized figures indicate the number of measures in each river basin)



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Aktion Blau Plus in the state of Rhineland-Palatinate

Between 1995 and 2012, a total of 1,200 renaturing projects involving capital investments of Euro 236 million were carried out under the Aktion Blau programme. The main aim of this programme is to integrate uses such as tourism, flood protection, urban development and environmental education. The implementation strategy of Aktion Blau Plus will continue in action until 2027, whereby going forward, municipalities and the general public will be more closely involved so as to improve public acceptance of the measures. User groups such as fishermen and farmers will also be more closely involved. Plans call for rollout of anywhere from 100 to 120 Aktion Blau Plus projects annually, with capital investments amounting to Euro 15–20 million annually. A good example of the implementation of hydromorphological measures under the aegis of Aktion Blau is the renaturing of Speyerbach (a Rhine tributary) on Neustadt/Weinstraße.

Speyerbach near Wallgasse in Neustadt an der Weinstraße before and after renaturing measures were completed

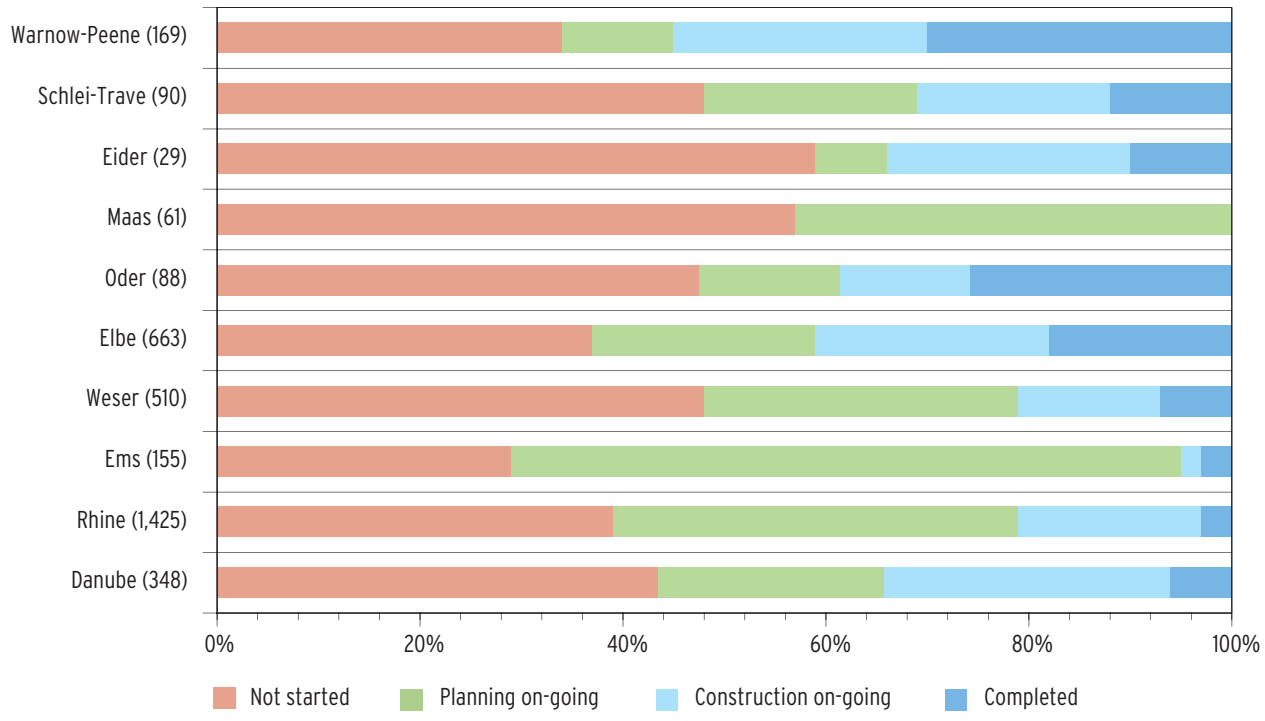
Improving longitudinal continuity

The key actions aimed at improving longitudinal river continuity involve measures that seek to restore river continuity by removing migratory obstacles. The lion's share of the envisaged measures relates to engineering structures such as hydro power weirs, barrage weirs with locks, and transverse structures in residential or farmland areas.

Nearly ten percent of the key measures in Germany that aim to create river continuity have been completed; 40 percent of them have not yet commenced (see Figure 9), and implementation delays for around one third of them are foreseeable. Far and away the main obstacle to implementation is opposition to the projects, followed by a lack of human and financial resources and a lack of space.

Improving longitudinal continuity at Elisabethenwehr in Bad Kreuznach

Figure 9: **Implementation status of improving longitudinal continuity**
(The parenthesized figures indicate the number of measures in each river basin)



Data source: Berichtsportal WasserBLIcK/BfG; last updated 31 October 2012

Restoring continuity at Muldestausee

When lignite mining came to an end, an artificial lake was created by flooding the opencast mining pits. The lake (called Muldestausee) is located between Leipzig and Dessau. To compensate for the elevation difference, two weirs were built at the lake's inlet and outlet that had a tremendous effect on continuity for migratory fish species. In the interest of restoring this continuity, a stream ramp was built in 2008 as a replacement for the weir at the lake's inlet. In 2009 construction of fish ladders was begun at the lake's outlet, in the guise of a 600 meter long double slot fish pass that enables migratory fish to negotiate the six meter height difference. The Euro 5.6 million project was financed by a lignite mine cleanup programme and by joint federal and regional-state water resource management funding. In the interest of achieving Mulde river continuity throughout the regional state of Saxony-Anhalt, renovation of the Mulde river weir in Dessau at an estimated cost of Euro 1.4 million is planned.

Fish ladder at Muldestausee in Saxony-Anhalt

River continuity in the city of Zweibrücken

The city of Zweibrücken is in charge of maintenance and development of the second and third order waterbodies in the Zweibrücken area. The programme of measures for this project currently calls for the restoration of continuity for all waterbodies by the end of 2013 – an undertaking that encompasses 21 transverse structures that migratory fish cannot pass over.

The lion's share of these measures has already been completed, and their success is already in evidence, particularly due to concurrent implementation of measures aimed at improving fish habitat quality in these waterbodies. Plans going forward call for the purchase of areas for the realization of large scale waterbody development programmes. The programme of measures is slated for completion by 2017.

Reducing nutrient pollution; advisory service for agriculture

Two of the key measures have a direct bearing on farming: (1) reducing nutrient pollution; and (2) advisory service for agriculture. Jointly elaborated by water management authorities and members of the agricultural community, these initiatives exceed the minimum statutory requirements for adherence to good professional practice and are as follows:

- Imposing restrictions on the application conditions for mineral fertilizer
- Expanding the scope of catch cropping and undersowing
- Extensification of plant and animal production

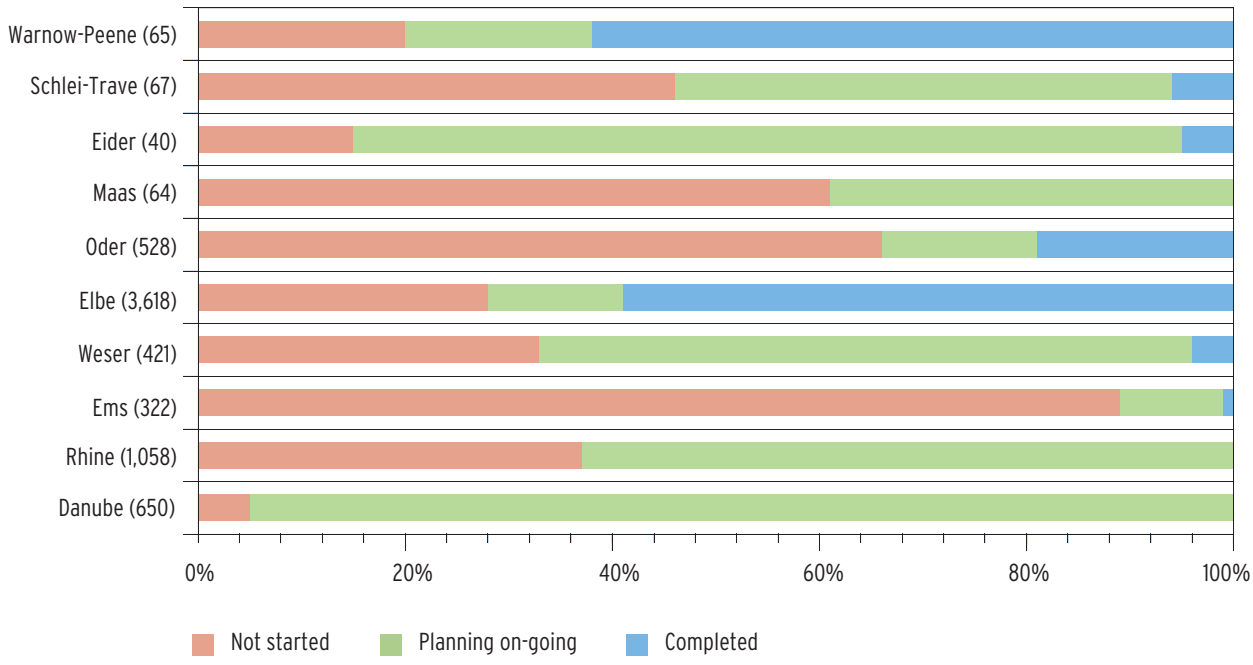
- Increased use of ground coverings and of tillage methods that protect and conserve the soil
- Applying liquid manure in a water-protective manner, for example via modified application techniques, designation of protected zones, reducing application timeframes, and increasing storage capacities
- Expanding the scope of organic farming
- Establishing buffer strips; inherently dynamic waterbody development
- Providing farmers with additional and more relevant information and advisory services.

Changes in the structure of farmland use in the Eider and Schlei-Trave river basins and elsewhere pose an obstacle to achievement of WFD objectives. The growing presence of biogas facilities in conjunction with the practice of growing corn for use as a sustainable raw material translates into competition for farmland and higher profits for growers – the upshot of this evolution being that measures aimed at reducing nutrient inputs is no longer a compelling incentive, and going forward will probably be implemented to only a limited extent.

Farming on Rügen island

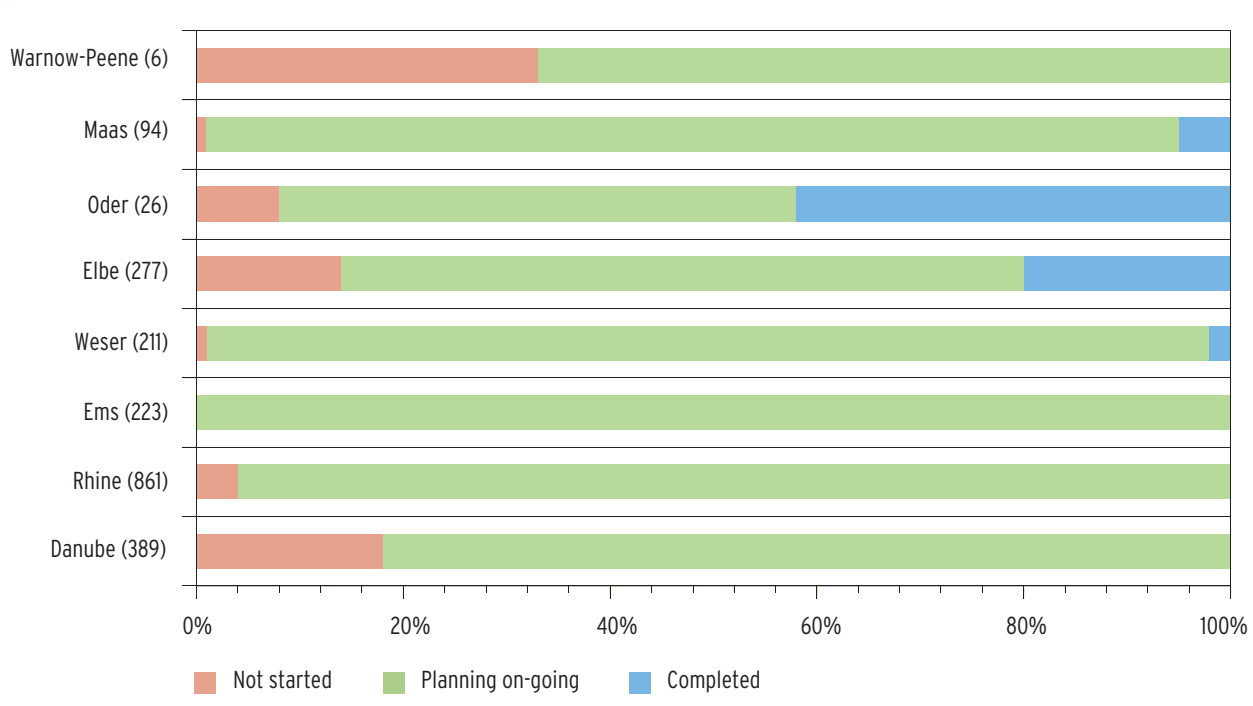
Measures aimed at reducing agricultural nutrient inputs are being implemented to varying degrees in the river basins under consideration here (see Figure 10). On the other hand, advisory service for agriculture are for the most part in “planning on-going” (see Figure 11), as they constitute ongoing measures that intrinsically lack an end point.

Figure 10: **Implementation status of reducing nutrient pollution in agriculture**
(The parenthesized figures indicate the number of measures in each river basin)



Data source: Berichtsportal WasserBLIcK/BfG; last updated 31 October 2012

Figure 11: **Implementation status of advisory service for agriculture**
(The parenthesized figures indicate the number of measures in each river basin)



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Legal and economic instruments for the reduction of high nitrate concentrations in groundwater

Twenty six percent of Baden-Württemberg's surface area is occupied by water conservation areas. To protect these areas against chemical inputs from farming activities, various instruments are used such as a regulation (Schutzgebiets- und Ausgleichsverordnung [SchALVO]) regarding water resource and watershed conservation areas, and MEKA, a regime whose acronym stands for the re-alignment of production with market capacity and for the protection of man-made landscapes. Unlike SchALVO, MEKA is voluntary and promotes various voluntary water resource protection measures. As a result of SchALVO and MEKA, nitrate concentrations in Baden-Württemberg's agricultural sector decreased by 24 percent between 1994 and 2012.

Water resource management in cooperation with farmers (WagriCo)

Lower Saxony's environmental ministry developed, in collaboration with German and British partners from the water resource management and agricultural communities, practical ways to reduce agricultural inputs that are both effective and economically viable. To this end, a list of measures was drawn up in consultation with growers and project partners, using proven drinking water conservation measures as a basis. The measures included catch cropping, corn undersowing, and avoiding tillage in the runup to summer-cereal cultivation. The successful measures were then developed into a programme of measures in close cooperation with regional-state agriculture officials.

Incorporation into the agro-environmental programme, along with an optimized approach to advising farmers and outcome monitoring for these initiatives were optimized in subsequent projects. The project cost around Euro 7 million, whose financing was split 50-50 between the EU and the project partners.

Groundwater conservation initiative in the context of agricultural extension services

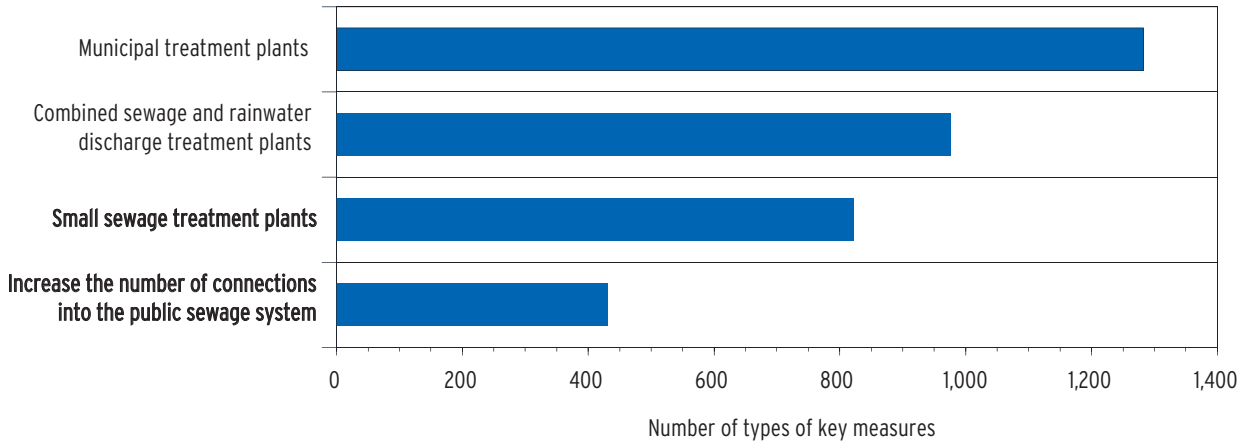
In the interest of reducing chemical inputs in waterbodies, the Unterfranken region in the regional state of Bavaria employs three full time water consultants, whose duties are as follows: providing farmers with advice on water conservation and other measures that exceed the scope of good professional practice; raising awareness of farming practices such as catch cropping that protect water resources; organizing and providing support for informational events and advising working groups, in collaboration with water companies and water resource management officials.

State agriculture officials' agricultural extension programmes are closely related to the scheme called Aktion Grundwasserschutz - Trinkwasser für Unterfranken ["Let's go to bat for groundwater: drinking water for the Lower Franconia region"] that the Lower Franconia government started in 2001. Thanks to a massive increase in agricultural land used for organic farming and for groundwater-friendly farming practices in Lower Franconia, the region has seen a substantial reduction of nitrate and fertilizer inputs.

Construction or upgrade of waste water treatment plants

Some ten percent of the key measures in Germany's river basins pertain to construction or upgrade of waste water treatment plants. Figure 12 exhibits the number of reported types of actions aimed at municipal sewage treatment plants, combined sewage and rainwater discharges, small sewage treatment plants and increasing the percentage of households that have access to the sewer system. Measures aimed at reducing chemical inputs from the industrial sector are not included in the key measures.

Figure 12: Types of actions aimed at construction or upgrade of waste water treatment plants



Data source: Berichtsportal WasserBLIcK/BfG; last updated 31 October 2012

Most of the measures aim to reduce nutrient and chemical inputs from settlement areas to levels below those mandated by EU directives. These measures are as follows:

- Building and expanding/customizing municipal sewage treatment plants
- Expanding municipal sewage treatment plants so as to reduce nitrogen and phosphorus inputs, as well as other inputs
- Optimization of municipal sewage treatment plant operating methods
- Merging of the sewage treatment resources of two or more municipalities and shutting down smaller sewage treatment plants
- Other measures aimed at reducing chemical inputs from municipal sewer systems
- Building new municipal sewage treatment plants and optimizing the operational methods of existing facilities used to discharge, treat and retain combined sewage and rainwater discharges
- Other measures aimed at reducing chemical inputs from combined sewage and rainwater discharges
- Building new small scale municipal sewage treatment plants and renovating existing ones in accordance with the state of the art
- Incorporating new areas into municipal sewage treatment plant catchment areas.

Improving sewage treatment plant efficiency in the states of Hesse and Rhineland-Palatinate

Improving the efficiency of the Hüttengesäß sewage treatment plant in the regional state of Hesse involved extensive renovation of the facility's nitrogen and phosphorus destruction facilities, its regulation systems, and optimization of its control technology. The upgrading measures have reduced waterbody nutrient load by 45 percent, and have reduced ventilation system energy use by more than 50 percent. The project involved a capital investment of Euro 375,000.

The Felsalbe sewage treatment plant in Rhineland-Palatinate, which went into operation in 1993, was originally designed to service 30,000 population equivalents. Some years ago 8,000 population equivalents were to be added, hopefully without any additional construction. To this end, the decision was made to expand the facility's capacity through load and nutrient optimized operation via so called software tuning, i.e. the use of modern measurement, control and regulation technology. Thanks to the new process design via the upgrading measure, the plant's discharge concentrations have decreased appreciably. The process optimization has also reduced annual operating costs by around Euro 40,000, and the capital investment paid for itself via the sewage fees alone.

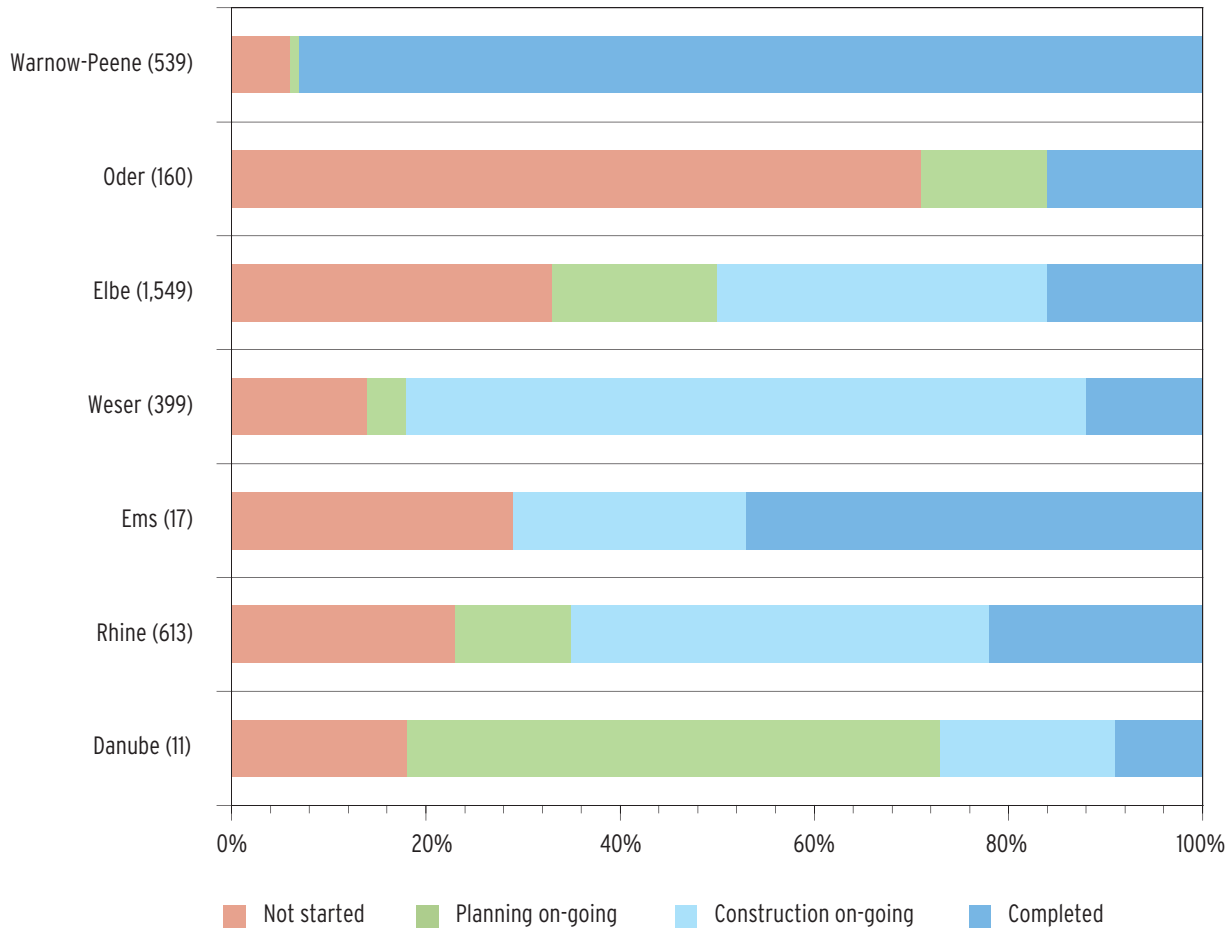
Modification of the city of Pirmasen's Felsalbe sewage treatment plan

It often also happens that measures aimed at improving combined sewage and rainwater discharge treatment in waterbodies are planned. This holds true in particular for renovation of the existing sewer system, since apart from wastewater and rainwater around 20 percent of external water runoff enters the system via leaks.

Berlin plans to expand its retention capacity through a number of measures, including the construction of storage sewers that would increase retention capacity from its current level of 220,000 to 307,000 cubic meters by 2020.

The implementation status of the key measure "construction or upgrade of waste water treatment plants" varies in Germany's river basin districts (see Figure 13). In some river basin districts, no measures have begun as yet, while in others such as the Warnow-Peene basin many measures have already been completed. For example in the Danube river basin district most measures are still in the planning stages and in the Weser and Rhine river basins most measures are underway, this means they are in the construction phase.

Figure 13: Implementation status of construction or upgrade of waste water treatment plants
(The parenthesized figures indicate the number of measures in each river basin)



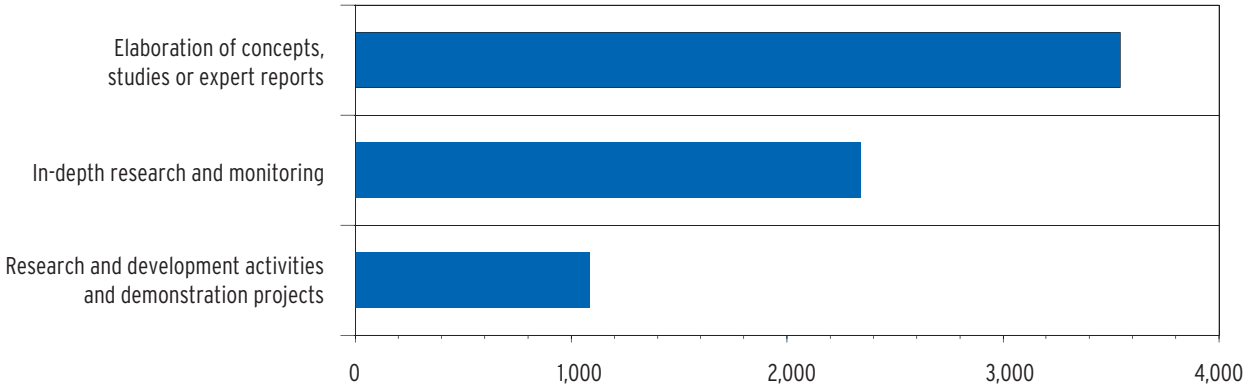
Data source: Berichtsportal WasserBLIcK/BfG; last updated 31 October 2012

Research and improvement of knowledge base reducing uncertainty

The key measure "research; improvement of knowledge base reducing uncertainty", which accounts for nearly 20 percent of the planned key measures in Germany, comprises the following activities: creating concepts; carrying out studies; elaborating expert reports; conducting in depth research and investigations; carrying out research and development and demonstration projects (see Figure 14). The fact that many waterbody cause and effect relationships have yet to be adequately researched complicates the task of defining and implementing suitable measures.

River research on the Elbe at Magdeburg

Figure 14: Types of actions aimed at research and improvement of knowledge base reducing uncertainty



Data source: Berichtsportal WasserBLIcK/BfG; last updated 31 October 2012

WIMO: Wissenschaftliche Monitoringkonzepte für die Deutsche Bucht (Scientific monitoring concepts for the German Bight)

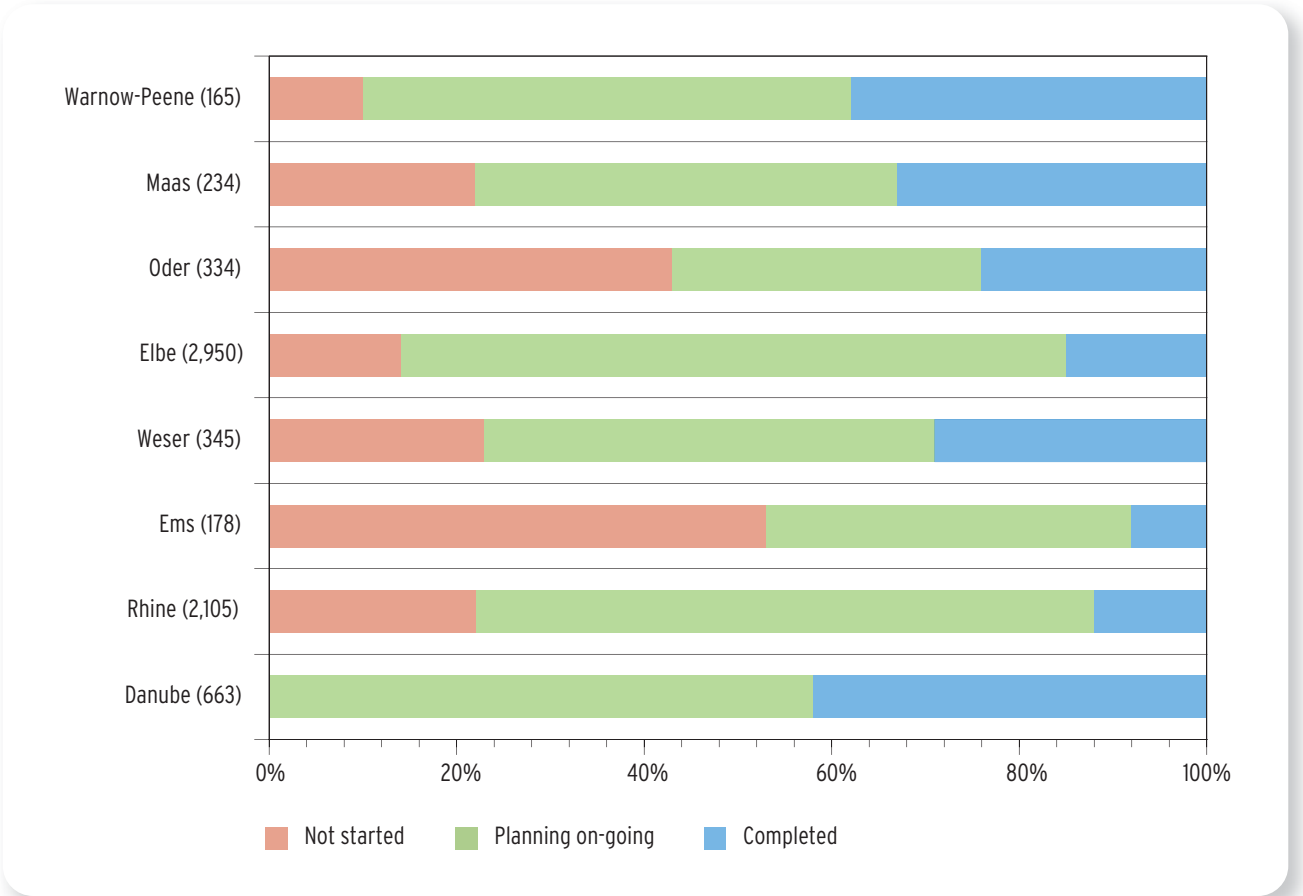
A joint research project involving twelve partners is currently being carried out for the Lower Saxony science and culture ministry and environment, energy and climate protection ministry. The project aims to include the following: developing processes that allow information to be gathered concerning habitat structures; investigating ecosystem sensitivity to oil pollution; researching sustainability indicators for the protection and development of coastal waters and the sea. These issues are being investigated in a focal area in the German Bight. The project began in 2010 and is slated to end in 2013, with the possibility of a two year extension. The project cost is Euro 3.3 million.

Sustainable development of North Sea estuaries, under the aegis of the EU's Tidal River Development (TIDE) project

This project was commissioned by a Lower Saxony water and nature conservation agency (Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz; NLWKN) and is being carried out in collaboration with Belgian, Dutch and British partners. It aimed to develop strategies for sustainable development of the North Sea's large estuaries so as to prevent the continuous plant and animal habitat loss consequent upon the use of these areas. Apart from recommending actions that can be taken for efficient renaturing measures, the NLWKN was also in charge of two studies: one concerned the renaturing of hard substrate habitats, while the other focused on the restoration of what were once valuable habitats in the areas around the branches of the Weser river. The three year project ended in June 2013.

Of the planned measures aimed at research; improvement of knowledge base reducing uncertainty, nearly 20 percent have not yet commenced, 20 percent have been completed, and more than 60 percent are still in "planning on-going". This situation varies from one German river basin district to another (see Figure 15). For example all of the Danube river basin measures have either been completed or are in the planning/implementation stage.

Figure 15: Implementation status of research and improvement of knowledge base reducing uncertainty
(The parenthesized figures indicate the number of measures in each river basin)



Data source: Berichtsportal WasserBLIcK/BfG; last updated 31 October 2012

Outlook

Implementation of the planned measures during the first management period (2009–2015) represents a major implementation milestone for the WFD. Some of the measures have been completed, others are in the pipeline, while others have not yet commenced for a variety of reasons. It remains to be seen whether it will be possible to fully implement the programmes of measures by 2015.

The WFD objectives and timelines are ambitious, and thus it is no surprise that some measures are behind schedule - a situation that is mainly attributable to a shortage of financial and human resources, as well as opposition to the measures in various quarters. Another major problem in this regard is a shortage of areas that could be designated for nature conservation and water protection purposes. Sufficiently wide buffer strips and development corridors would create quasi-natural plant and animal habitats, stem the flood of nutrient inputs from the surrounding areas, and reduce the risk of flooding. Land use pressures are being further intensified by biomass cultivation in that considerable tracts of erstwhile extensively farmed cropland are being used for energy crops.

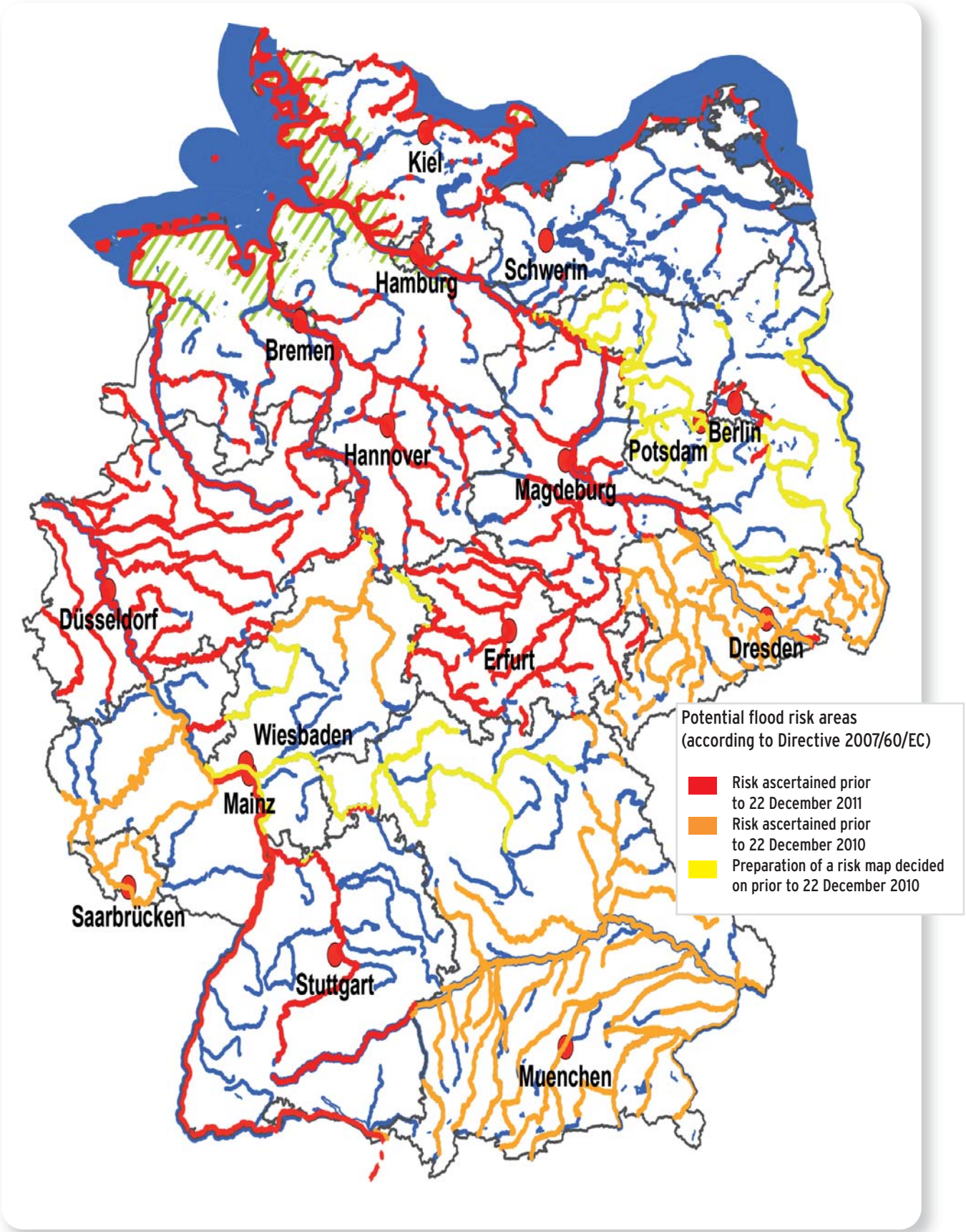
On implementation of the programmes of measures, a determination needs to be made as to whether they achieved the desired effect and if the waterbodies in question achieved the target status. The programmes of measures and management plans will be updated by 2015, which will mark the beginning of the second management plan period. It is at this juncture that we will find out how many of our waterbodies have moved closer to a good status, and where further action is needed.

It is also essential that greater use be made of the synergy resulting from the implementation of other directives such as the Flood Risk Management Directive (2007/60/EC) and the Marine Strategy Framework Directive (2008/57/EC).

The Flood Risk Management Directive, which was adopted in 2007, calls for coordination with implementation of the WFD. The German regional states have conducted a preliminary flood risk assessment, and all flood risk management plans are to be completed by the end of 2015 (see Figure 16). Certain measures serve the cause of both flood protection and waterbody protection. An example of such measures is levee re-siting, which creates not only more space for rivers to develop naturally in, but also floodwater retention zones.

Loop of the river Elbe near Dessau-Rosslau during the flood in June 2013

Figure 16: Stretches of water with a potentially significant risk of flooding



(source: Berichtsportal WasserBLIcK/BfG)

One of the largest projects of this type in Germany thus far was the resiting of the Elbe levee at Lenzen. This levee was moved up to 1.3 km inland, thus creating 420 hectares of alluvial floodplain. Other examples of projects that have successfully combined flood and waterbody protection are the following: (a) the large scale project Dynamisierung der Donauauen (Dynamization of the Danube floodplains) at Ingolstadt, whose plans call for a broad range of renaturing measures in a 2,100 hectare area; and (b) conversion of the Main river floodplain (in Unterbrunn in the Lichtenfels district in the Rhine watershed) to a quasi-natural, valuable 80 hectare ecologically valuable habitat featuring many quasi-natural river and floodplain structures that allows for further intrinsically dynamic development. The project also lengthened the river's course by around 1.2 kilometers in keeping with its course in times past, thus creating an additional 1 million cubic meters of reservoir capacity for floodwater retention.

Such measures also serve the cause of nature conservation by virtue of the fact that they restore a river floodplain containing characteristic flora and fauna. If floodplains and bottomlands are crucial for biodiversity preservation, only a handful of natural floodplains remains along Germany's major rivers.

Protection of Baltic Sea, North Sea and Wadden Sea habitats is also crucially important for implementation of the WFD. Protection of the seas was greatly strengthened by adoption, in 2008, of the Marine Strategy Framework Directive (2008/57/EC), which calls for maritime waters to achieve "good ecological status." The preliminary assessments carried out in 2012 show that the North Sea and Baltic Sea ecosystems fail this objective for a number of reasons, including their unduly high contaminant and nutrient inputs, as well as inputs from rivers that flow into these waters. WFD implementation measures aid the cause of reaching the Marine Strategy Framework Directive objectives.

Further efforts are needed in all domains in order to reach both the WFD objectives and the protection objectives of other EU directives. By rights, our waterbodies should regain their status as habitats for characteristic flora and fauna, and their functions, including for human beings, should be restored to as close as possible to their original state so that, for example, they can be used for drinking water, floodwater retention areas, and as recreational areas.

Baltic Sea coast on the Darβ in Mecklenburg-West Pomerania

Further information

Below you will find links to (a) other reports and pamphlets from the various regional states and river basin associations concerning the implementation status of programmes of measures; and (b) general information concerning the programmes of measures with factual information and many additional examples.

Baden-Wuerttemberg:
http://www.um.baden-wuerttemberg.de/servlet/is/101559/

Bavaria:
http://www.lfu.bayern.de/wasser/wrrl/informationsmaterial/index.htm

Berlin:
http://www.stadtentwicklung.berlin.de/umwelt/wasser/eg-wrrl/de/inberlin/inberlin.shtml

Brandenburg:
http://www.lugv.brandenburg.de/cms/detail.php/bb1.c.326878.de

Bremen:
http://www.umwelt.bremen.de/de/detail.php?gsid=bremen179.c.14989.de

Hamburg:
http://www.hamburg.de/wrrl

Hesse:
http://www.flussgebiete.hessen.de
http://www.wrrl.hessen.de

Lower Saxony:
http://www.mu.niedersachsen.de/wasser/WRRL/niedersachsen/7371.html

Mecklenburg-West Pomerania:
http://www.wrrl-mv.de//doku/oeffentlicher_zwischenbericht_2012_11_01.pdf
http://www.wrrl-mv-landwirtschaft.de

North Rhine-Westphalia:
http://www.flussgebiete.nrw.de/index.php/Umsetzung_des_Programms_Lebendige_Gew%C3%A4sser

Rhineland-Palatinate:
http://www.wrrl.rlp.de

Saarland:
http://www.saarland.de/15545.htm

Saxony:
http://www.umwelt.sachsen.de/umwelt/wasser/11655.htm
https://publikationen.sachsen.de/bdb/artikel/13361

Saxony-Anhalt:
http://www.sachsen-anhalt.de/index.php?id=51240
http://www.sachsen-anhalt.de/fileadmin/Elementbibliothek/Master-Bibliothek/Landwirtschaft_und_Umwelt/W/Wasserrahmenrichtlinie/Neustruktur/Aktuelles/ 27.7.2012/Bro_Wasser_bewegt-2_klein.pdf

Schleswig-Holstein:
http://www.schleswig-holstein.de/UmweltLandwirtschaft/DE/WasserMeer/02_WRRL/111_Zwischenbilanz/ein_node.html

Thuringia:
http://www.flussgebiete.thueringen.de

River Basin Community Elbe:
http://www.fgg-elbe.de/start-en.html

River Basin Community Ems:
http://www.nlwkn.niedersachsen.de/wasserwirtschaft/egwasserrahmenrichtlinie/flussgebietseinheit_ems/bewirtschaftungsplaene_massnahmenprogramme/45605.html

River Basin Community Rhine:
http://www.fgg-rhein.de

River Basin Community Weser:
http://www.fgg-weser.de/en/index_en.html

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