

# **01 - WATER FRAMEWORK DIRECTIVE IMPLEMENTATION AND INTEGRATED CATCHMENT MANAGEMENT.**

## ***WHERE ARE WE NOW? WHERE ARE WE GOING? AN EPA VIEW.***

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### **Abstract**

Good progress was made in undertaking the 1<sup>st</sup> cycle river basin managements plans (RBMPs); an improved understanding of Ireland's water resources and the threats to it were gained and the requirements of the Water Framework Directive (WFD) were met in terms of production of relevant reports. In spite of the significant advances, some weaknesses were evident, particularly in terms of public engagement. During the recession, there was a hiatus in undertaking some of the key elements of the WFD and, as a consequence, the production of the 2<sup>nd</sup> cycle RBMP will be delayed from 2015 to 2017. New governance arrangements for water management have commenced. The EPA has been given additional responsibilities and additional resources, while local authorities will have a key role. The integrated catchment management (ICM) approach will provide the organising principles and framework for water management. Catchment characterisation, the foundation of water resources management, has started. Networks of relevant organisations and individuals will be fundamental to achieving effective collaboration, coordination and progress. While achieving this progress is challenging, there is a willingness, momentum and ambition that should help ensure success.

## **1 INTRODUCTION**

This paper summarises the implementation of the Water Framework Directive (WFD) to-date, outlines the new governance arrangements and the planned work programme designed to ensure effective implementation of the WFD in the context of implementation new deadlines.

## **2 WHERE ARE WE NOW**

### **2.1 The First Stage of WFD Implementation**

Ireland's approach to WFD implementation under legislation enacted in 2003 (S.I. No. 722 of 2003) was to set up seven River Basin Districts (RBDs). Over €50 million was spent on consultancy teams to support the early delivery of RBD projects. The work undertaken by the RBD consultants and staff, local authorities and public bodies such as the EPA and the Geological Survey of Ireland, has made a major contribution to our understanding of water bodies and the impacts of pressures on them. In the process Ireland produced a characterisation report in 2005, as required by Article 5 of the WFD, river basin management plans (RBMPs) in 2009 for the seven RBDs, as required by Article 13 of the WFD, and completed classification of water bodies for reporting to the European Commission in 2009. With additional resources provided to the EPA, monitoring of water improved substantially. However, in spite of the great efforts and significant advances made up until 2009, weaknesses in the process were evident, such as:

- The scientific basis was overly dependent on expert judgement.
- There was an inadequate linkage between surface water and groundwater.
- The measures in the RBMPs tended to be overly general and followed a 'one size fits all' approach.
- Responsibility for water management rested with a multitude of organisations, including the EPA, 34 local authorities and government departments; therefore no single body had ultimate responsibility for water management, leading to inadequate governance arrangements. For example, local authorities were faced with establishing or proposing measures to apply to areas of national policy where they had no formal expertise, e.g., agriculture.
- Public and community engagement and participation (a requirement of the WFD) were inadequate.

The situation in 2010 regarding Water Framework Directive (WFD) implementation in Ireland is well summarised by the OECD (2010) as follows:

- *“Ireland has made good progress and has met all deadlines to date for implementing the WFD. Draft river basin management plans were completed for all districts in 2008. Nevertheless, the rate of progress so far is unlikely to meet the WFD goals for 2015.*
- *The institutional arrangements for river basin districts may not prove sufficiently robust.*
- *Ireland should promote broader participation by NGOs and relevant organisations in the development and implementation of national policies, plans and projects.”*

## 2.2 From 2009 to 2014

The period from 2009 to 2013 coincided with the financial crisis and the recession. While on-going monitoring and compliance checking was undertaken by the EPA, local authorities, the Marine Institute and Inland Fisheries Ireland, in the absence of resources, the work areas previously undertaken by consultants and required for the 2<sup>nd</sup> cycle RBMP did not commence. As a consequence, it was not feasible to meet the deadlines for production of a second Article 5 Report (which requires characterisation, a review of the impact of human activity and an economic analysis of water use) and it will not be feasible to meet the 2015 deadline for the 2<sup>nd</sup> cycle RBMP(s). During this period however, a new water utility, Irish Water, was established, with a remit to take over water services functions from local authorities and good progress was made by OPW in implementing the Floods Directive. Significant progress was made in licensing and authorising discharges from urban wastewater treatment plants to surface water. In addition, during 2012 and 2013 consultations on new governance arrangements between the Department of Environment, Community and Local Government (DECLG), the EPA and the County and City Managers Association commenced.

Pressures, such as urban wastewater treatment plants and fertilizers applied to agricultural lands, are the driver for water resources degradation, although a potential to impact need not transfer to an actual significant impact. Improved information on these pressures will enable them to be managed more effectively; while further improvements are necessary, good information is available for domestic wastewater treatment systems (see EPA, 2013(a) and 2013 (b)), urban wastewater treatment plants from the licensing and authorisation process, and nutrient loads from agriculture in the LPIS (Land Parcel Information System) dataset, compiled by the Department of Agriculture, Food and Marine (DAFM).

Significant progress was made in this period in improving geoscientific datasets and information:

- ◆ In 2009, the Teagasc-EPA Soils and Subsoils Mapping Project completed a national indicative soils map at a nominal working scale of 1:100,000 and a national subsoils map at a nominal working scale of 1:50,000 (Fealy, et. al. 2009). The subsoils map is available in digital format from the GSI and the soils map is available in digital format from Teagasc and the EPA.
- ◆ The Irish Soils Information System (ISIS) project, undertaken by Teagasc and co-funded by EPA and Teagasc, published a soils map of Ireland at 1:250,000 scale in 2014. This is available in digital format from: <http://isis.teagasc.ie> .
- ◆ The Geological Survey of Ireland (GSI) completed country-wide mapping of groundwater vulnerability in 2013 – maps can be viewed at: [http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI\\_Simple](http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple)

Major research projects were undertaken in this period, such as the following:

- ◆ The *Pathways Project*, funded by EPA, was undertaken by a consortium of researchers from QUB, TCD and UCD. The main aim of the *Pathways Project* has been to develop an improved conceptual understanding of diffuse nutrient and sediment transport dynamics in Irish catchments, to inform the development of appropriate Catchment Management Support Tools. These tools are intended to enable the assessment of contaminant pressures on water

bodies and assist with identifying mitigation measures and management strategies for enabling good water body status to be reached or maintained, as appropriate. The project was completed in early 2014 and elements of the work are being continued in the EPA with the production of two catchment management support tools – a catchment characterisation tool (CCT) in early 2015 and a catchment modelling tool (CMT) in 2016.

- ◆ The *Agricultural Catchments Programme* (ACP) is a major study undertaken by Teagasc and funded by the Department of Agriculture, Food and Marine with the principal objective of evaluating the effectiveness of measures implemented under Ireland's National Action Programme under the EU Nitrates Directive. The first four-year phase was completed at the end of 2011 and the second phase will be completed in 2015. The ACP Phase 1 Report and other information is available at: <http://www.teagasc.ie/agcatchments/>
- ◆ The HYDROFOR project undertaken by a consortium of researchers from UCD, NUIG, UCC and the Marine Institute, completed in 2014, and with several objectives including quantifying nutrient and sediment losses to water from forests.

The research findings from these projects and other research undertaken by Teagasc and third level colleges provide a strong basis for considering and managing diffuse pollution pressures, particularly from agriculture and forestry.

### 3 INTEGRATED CATCHMENT MANAGEMENT – THE PATHWAY TO THE FUTURE

#### 3.1 Why a New Approach to Catchment Management?

The achievement of Water Framework Directive (WFD) objectives is critical to i) attaining satisfactory water status, ii) *Food Harvest 2020* goals and iii) creating a greater appreciation of the beneficial role of water to Irish society. Existing approaches to dealing with water quality issues have been effective to-date in improving water quality issues arising from major point pollution sources, such as urban wastewater treatment plants and IPPC licensed activities, although continued investment is needed. However, dealing with nonpoint (diffuse) pollution sources and small point sources is a more complicated and challenging process. While implementation of the *EC (Good Agricultural Practice for Protection of Waters) Regulations, 2014* (S.I. No. 131 of 2014) and the *Water Services Amendment Act, 2012* (S.I. No. 2 of 2012)) has the potential to mitigate the impacts from agricultural activities and domestic waste water treatment systems (DWWTSs), and are achieving some improvements, it is likely that new processes, approaches and practices will be required as a means of achieving greater progress.

In deriving a new approach to catchment management, account needs to be taken of the reasons that approaches and plans to-date have not achieved and cannot achieve the required outcomes. Some of these reasons are listed below (Daly, 2013):

- Stakeholder involvement and local ownership is lacking.
- Regulations, which are often unconnected and focussed on particular pollution sources and pollutants, have not resulted in an integrated environmental approach.
- Most analysis and resulting activities conducted at too generalised (regional or national) a scale.
- River Basin Management Plan recommendations usually too generalised and based on a 'one size fits all' approach.
- Activities have concentrated largely (and understandably up until now) on the WFD 'restoration' objective, such as 'red dot' river sites (i.e., where there is pollution from a specific major activity, such as sewage discharge).
- Often a focus on means (operation of processes) rather than ends (environmental outcomes).
- Critical pressures and conflicts in the catchments are often 'skirted around'.
- Emphasis on pressures and receptors, with no or limited appreciation of the role of the 'pathway' connecting them.

- Catchment based on a 2-D conceptual model, with little or no account taken of roles of the subsurface pathways and groundwater.
- Over-emphasis on ‘what’ and not enough on ‘where’; the critical source area concept not used.
- Main emphasis is on the ‘command and control’ approach, using inspections and compliance checking rather than seeking behavioural change through stakeholder awareness and involvement.
- Multi-organisational involvement and responsibilities, but with inadequate linkages and collaboration.
- Silo organisational structures, founded on either disciplines or narrowly based processes and objectives, with inadequate linkages and integration.

### 3.2 What New Approach?

There are solutions. We will need closer engagement, the hard yards of outreach and a common framework. In our view, a key part of the solution for mobilising towards having a healthy, resilient, productive water resource is ‘**integrated catchment management**’ (ICM). This is an approach that has been proposed (Harris, 2013; Daly, 2013) as being required to achieve effective water and catchment management, and is the approach that is used in areas like the Murray Darling basin Australia and is being promoted by DEFRA for the UK (DEFRA, 2013), where it is called the “integrated catchment based approach”.

Integrated catchment management (ICM) is based on the concepts of i) catchments as biophysical units in which natural resources use, and ecological and water protection takes place, ii) integration of local community and scientific involvement, and iii) appropriate organisational structures and policy objectives. Specifically, ICM is<sup>1</sup>:

- A **philosophy** – to foster an organisational culture and associated attitudes that view i) cooperation and collaboration as essential and ii) interactions between natural resources and human activities or responses in a holistic way.
- A **process** – an overarching planning framework and implementation process that reflects the philosophy of ICM and provides the ‘vehicle’ through which ICM is delivered. The process needs to provide a flexible, adaptive, on-going and dynamic integrated mechanism, which coordinates the activity of many people, both in the public sector and the community.
- An **outcome** – the planning and implementation of sustainable resource use practices, which will vary from place to place, depending on conditions and needs, and the achievement of planned environmental outcomes, which are based on environmental, regulatory, economic and social considerations.

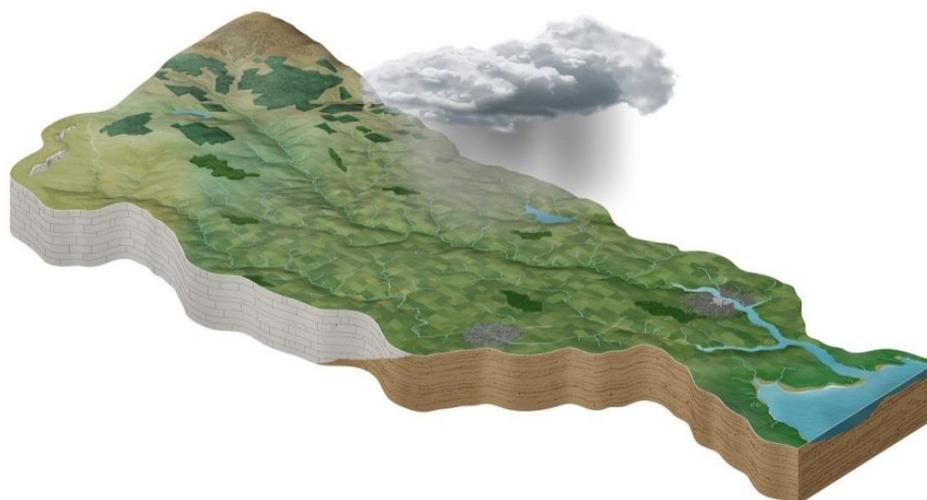
**ICM** is a new way of thinking and working, although it builds on past successes and experiences. It provides the ‘organising principles’ and ‘organising framework’ for successful water management. In simple terms, it includes **all** of the following elements (if one or some are missing, it is no longer ICM):

- We need to see Catchments in 3 dimensions, as shown in Figure 1, to follow the flow of water ‘from the mountains to the sea’, both underground and at the surface.
- Catchments as the land based units of water management; they are 3-D physical entities, mapped at a scale that best fits to enable the issues, solutions and consultations to be targeted effectively.
- A focus on pollutant pathways, both surface and subsurface, that link pressures with receptors, and enable critical source areas (CSAs) to be delineated.
- Partnerships with local communities and citizen engagement that includes identifying key stakeholders, public awareness and outreach campaigns, identifying issues of concern, and obtaining and taking account of feedback, collectively devising practical solutions to issues raised, and providing assistance to implement measures and change where necessary.

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<sup>1</sup> This definition is adapted from: Bellamy et al., 2002.

- Genuine integration and learning.
- A change from the top-down, ‘command and control’ approach to a combination of bottom-up and top-down.
- Systematic communications and social learning between policy, science and operations as a means of dealing with the complexities caused by working cultures, remits and priorities.
- Linkages, co-operation and networks rather than ‘silos’, both internally in organisations and between organisations. In particular, good communication and co-operation between public bodies such as local authorities, Teagasc, OPW, Department of Agriculture and Marine, Department of Environment, Community and Local Government and the EPA will be needed.
- Looking at ‘ecosystem goods and services’ in a systematic manner, including putting a ‘value’ on water resources, geosystems and ecosystems, and the potential contribution to the ‘green economy’.
- Enhancement of the local environment for people, businesses and wildlife, while achieving the WFD objectives required by the EC.
- A series of interconnected steps: creating and communicating a vision of ICM; building partnerships; characterising the catchments; finalising goals; identifying and evaluating possible management strategies; designing an implementation programme; and implementing the programme and making adjustments, if necessary. The generic steps are outlined in Table 1.



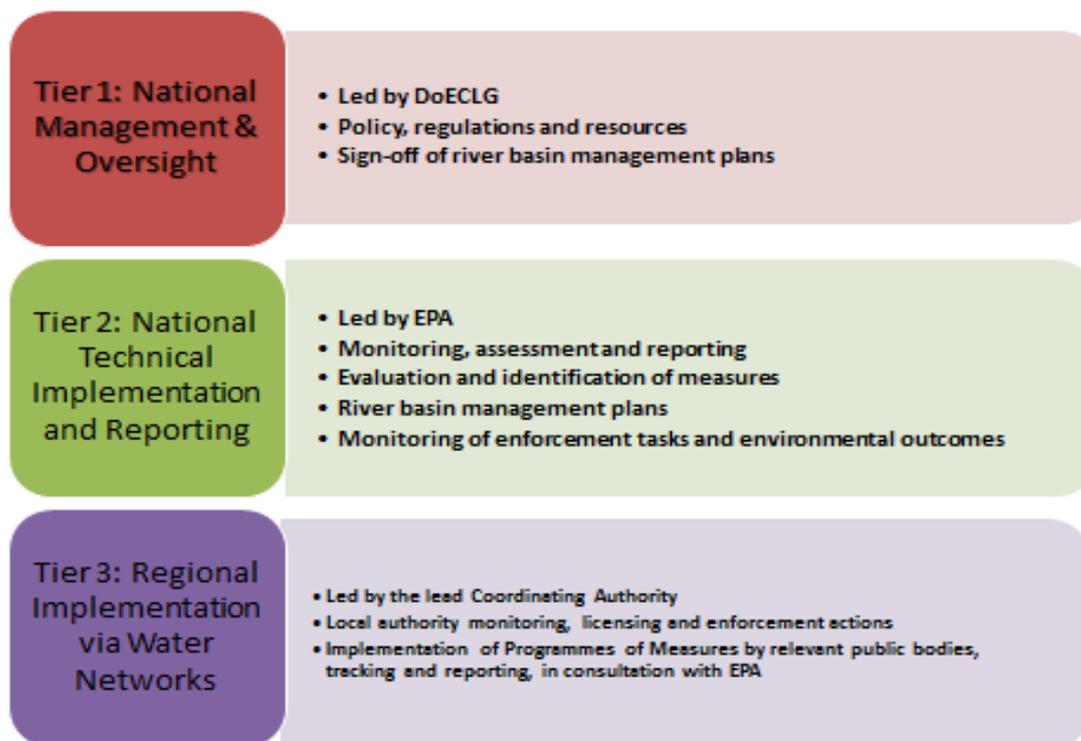
**Figure 1:** Schematic diagram of a catchment which encompasses groundwater, rivers, lakes, estuaries and coastal waters, ecosystems, geosystems, and pressures from human activities such as quarries, forestry, farming and urban areas.

## 4 BUILDING TOWARDS 2017

### 4.1 New Governance Arrangement

New regulations – the European Union (Water Policy) Regulations 2014 (S.I. No. 350 of 2014) – and a consultation document on the timetable and work programme for the development of the 2<sup>nd</sup> cycle RBMPs have been published by DECLG (DECLG, 2014). These provide the direction for the future implementation of the WFD. They include details on new governance arrangements and the timetable for implementation of the WFD (Table 2) – in effect there will be a delay in the publication of the 2<sup>nd</sup> cycle RBMP(s) of two years, from December 2015 to December 2017.

The revised governance structures are shown in Figure 2.



*Figure 2: Proposed new governance arrangements*

As a component of the new arrangements, significant new responsibilities have been assigned to the EPA, together with additional resources. EPA now has a leadership role in technical implementation and reporting. The EPA will be i) undertaking catchment characterisation, ii) reviewing the impact of human activities, iii) preparing template river basin management plan(s), iv) drafting environmental objectives and v) compiling common programmes of measures for further development and input by local authorities at Tier 3 and finalisation and approval by the Minister. The local authorities, operating at Tier 3 will lead implementation and enforcement of the measures on the ground and have key responsibility for ensuring compliance with the Directive on public participation including consultation on draft river basin management plans.

A new section – the WFD Integration and Coordination Unit – has been established in the EPA to help facilitate the new EPA responsibilities.

As part of the new arrangements, there will be a single national approach for the development of river basin management plans. It is planned to merge the existing seven RBDs into one national RBD. In addition, technical analysis and planning will be undertaken on the basis of water or catchment management units, which will be decided on by the EPA.

## 4.2 Catchment Scales

Clearly, catchments exist at multiple scales and scale is not an objective construct. There is no one right scale, but scale is nevertheless all-important. In principle, the activities needed to achieve the various water/catchment objectives must be at a scale that is appropriate to achieving these objectives, and, in particular, to enable the problems, solutions and consultations to be targeted effectively. Depending on the scale, different parties may take different roles. For example, for an RBD, national state agencies will lead catchment management efforts, while at the local, detailed scale, local authorities and local community groups/stakeholders, will take the lead in developing and implementing solutions.

In following the principle outlined above, five scales are relevant (see summary in Table 1). While these are defined here, linkages across the scales are essential to successful water/catchment management. It is not possible to manage and understand our water resources by focusing on one scale. We can't "fix" at the national and RBD scale without paying attention to necessary issues and changes at the scales below, and we can't ensure the future well-being of the water resources we all care about without paying attention to changes/developments at the national scale. It is also important not to focus only on one scale. Therefore, we will need to think 'multiple scales'.

**Table 1:** Summary details on the proposed scales for successful integrated catchment management

Level of Detail	Scale	Main Driver	Purpose/Objective	Main Actors
	National	Achievement of WFD objectives	Where policy is made.	Tier 1 agencies (e.g., government departments)
	RBD (1,000s km <sup>2</sup> )	WFD River Basin Plan	Where reporting to EC is undertaken.	EPA
	Catchment (Water Management Unit) (100s km <sup>2</sup> )	Overall assessments of risks & impacts, and required responses to both	Where delivery is organised; evaluation is undertaken; reports are written; plans are made.	EPA; WFD Offices; local authorities; other public bodies such as IFI, MI, NPWS, IW, OPW; SWAN; NFGWS, farming organisations.
	Sub-catchment (~100 km <sup>2</sup> )	Delivering to achieve agreed objectives	Local community involvement. Catchment walks. Investigative monitoring. Inspections. Public awareness and participation.	WFD coordinating authorities, local authorities, local communities, local env. groups, farming organisations, NFGWS. EPA involved in assisting and advisory roles.
	Water body	Status & Article 5 report	For reporting to EC	EPA
	Site-specific or project-specific assessments (e.g., local dump)	Dealing with specific issues/problems	Detailed investigations and on the ground solutions	Consultants, local 'owners' of issue, appropriate regulatory body

### 4.2.1 Site/Field Scale

Many potential point pollution sources are investigated and dealt with at this detailed scale, e.g., septic tank systems, farmyards, landfills.

### 4.2.2 Water Bodies

Essentially water bodies (WBs) are the 'units' for reporting status and risk characterisation results (Article 5 and Tier 1 Risk Assessment) to the Commission. Although the WFD probably intends that the WBs are the WFD water management units, in practice they will not fulfil this function as they are

bodies of separate water types that are not linked (e.g., groundwater with surface water) or are poorly linked (e.g., rivers with estuaries, coastal waters and lakes). In addition, the sizes vary enormously, e.g., rivers a few kilometres long with small (<10 km<sup>2</sup>) catchment areas and groundwater bodies several hundred km<sup>2</sup> in size. Integration of WBs is not readily feasible at this scale.

Tier 1 characterisation (Deakin (2013)) (see Section 4.3) is undertaken on all WBs and the results provide the basis for the Article 5 and Significant Water Management Issues (SWMI) reports.

#### **4.2.3 Sub-catchment Scale**

This is the scale – relatively small geographic areas (in the range 50-150 km<sup>2</sup>) – where the majority of detailed evaluation and ‘delivery’ will take place. This involves characterisation, compliance checking and public engagement.

Integrated analysis of all water types (groundwater, rivers, lakes, estuaries and coastal waters) and highly sensitive ecosystems, and evaluation of the results arising from the Tier 1 risk characterisation is undertaken on sub-catchments. This involves aggregation of relevant WBs in the sub-catchments. Where there are “at risk” WBs, detailed characterisation is undertaken, which would include evaluation of loadings for discharges to surface water and groundwater, and use of the EPA/Pathways Project catchment characterisation tool (CCT) to help evaluate the impact of pollutant loadings from diffuse sources and domestic wastewater treatment systems (DWWTSs), and locate likely critical source areas (CSAs) where specific measures to mitigate water quality problems may be needed.

Compliance checking, such as DWWTS and farm inspections, will generally be planned and undertaken at this scale.

Local community involvement is an essential component of ICM. One of the challenges will be to get sufficient local buy-in to making water a focal point for the community, thereby ensuring that local people contribute to evaluating the issues and the means of managing their water resources. The connection between ecosystems, geo-systems and human-social systems is best demonstrated in sub-catchments, where a sense of place and ownership can be attained. Therefore, local engagement/education/public awareness will be undertaken at this scale.

#### **4.2.4 Catchment (Water Management Unit) Scale**

Our proposed water management units (WMUs) are the catchments as defined, with some additions in the Shannon catchments, by the nationally-defined hydrometric units, giving 46 catchments/WMUs in the Republic of Ireland. They are shown in Figure 3.

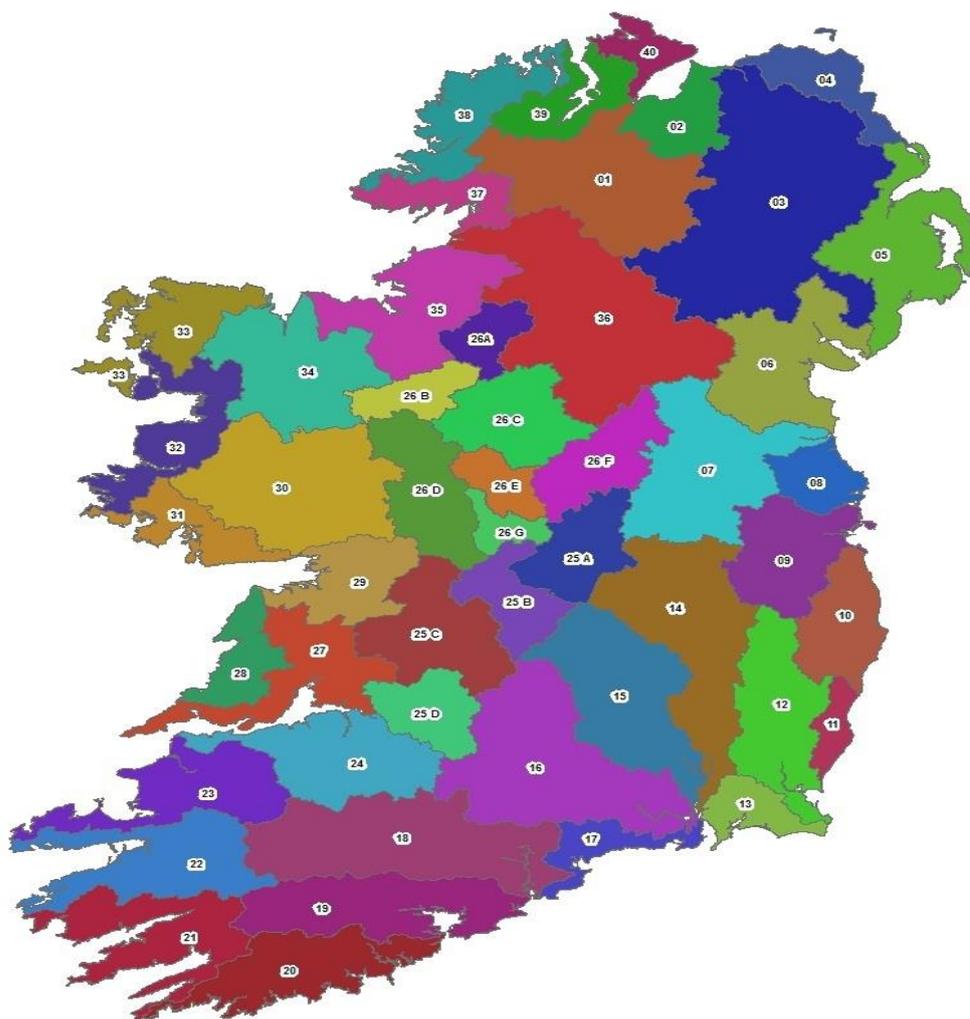
The proposal to use these 46 catchments as WMUs is for the following reasons:

- ◆ They are coherent landscape units encompassing and connecting i) water flowing from upland areas to the coast or, in the case of the Shannon catchment, the Shannon itself and ii) all pressures with the potential to impact on all the water types in the catchment.
- ◆ They are at a practical scale for deciding on, planning and coordinating activities; in effect, this is a practical management and ‘governance’ scale for water;
- ◆ While sub-catchments are the required scale for detailed analysis, the areas are too small for decision-making on appropriate measures. Therefore, sub-catchments need to be aggregated into catchments (sub-catchments are nested in catchments) to enable integrated assessments and an integrated approach to water management; this will include evaluation of monitoring networks, consideration of pollutant loads (including relative loads from different pressures), abstraction pressures, and analysis and prioritisation of the measures.
- ◆ While public engagement is undertaken largely at sub-catchment scale, it would be planned at catchment scale.
- ◆ This is a practical scale to enable integration of physical planning and WFD implementation. The integration needs to be delivered and set out a regional level, through the Regional Planning Guidelines (or similar form). From this regional level, County Development Plans

can implement and incorporate the integrated catchment management approach. It is envisaged that County Development Plans will become more detailed in relation to programme of measures required to achieve WFD objectives. County Development Plans and associated local authority GIS systems need to be detailed so planning can be informed. Finally, in a statutory context, local area plans will help to realise development in the context of the detailed measures and County Development Plan objectives and policies.

#### 4.2.5 RBD Scale

The general issues and priorities for water and interrelated land management are set out at this scale as part of the River Basin Management Plan.



*Figure 3: Proposed water management units (WMUs) (based on hydrometric areas)*

### 4.3 Catchment Characterisation

**Catchment characterisation** is the foundation of water resources management as it provides an understanding of the physical and ecological characteristics, impacts, sources of impacts and quantification of pollutant loads and abstraction pressures in the catchment.

Characterisation is a means of:

- Linking and integrating existing and new knowledge and data in a focussed way to achieve multiple objectives.
- Understanding and describing catchments in the source-pathway-receptor (S-P-R) framework for environmental management.
- Providing a greater understanding of the hydrodynamics and hydrochemistry of water in Ireland.
- Getting optimum value from the available data and our improved understanding.
- Targeting monitoring.
- Targeting and prioritising measures both in terms of “what measure?” and “where is the optimum area for applying the measure?”
- Managing catchments.

Risk characterisation is a forward prediction towards the target deadlines and highlights the areas where monitoring and measures need to be implemented and/or adjusted so that the objectives can be met on time. Further characterisation is carried out on those areas still At Risk to refine the measures and monitoring as appropriate. Risk characterisation uses a greater degree of predictive assessment (which may include modelling), whilst status assessments rely primarily on monitoring. Status is a measure of the state of a WB at a point in time and is based on analysis of monitoring data for a previous period, such as the previous river basin cycle; therefore the status assessment can be used to look backwards to help review whether the measures are working and the water bodies are improving.

Further details on characterisation are given in Deakin (2013). Three tiers of characterisation will be undertaken so that the level of assessment will be commensurate with the level of risk posed (see Figure 4). Some key features are as follows:

1. The first stage (Tier 1 characterisation) is a screening exercise, largely based on existing monitoring data and assisted by an automated WFD Application tool. This will be undertaken on **water bodies (WBs)**, and will include evaluation of current status, mitigation or otherwise of pressures, trend analysis, and evaluation of the environmental capacity of the water body by assessing the distance to a threshold, such as an EQS.
2. The outputs will categorise the risk of water bodies not meeting WFD objectives into three categories: ‘at risk’, ‘not at risk’ and ‘review’; a rapid assessment of the ‘review’ WBs will be undertaken prior to completion of the Article 5 Report and the SWMI Report in late 2015.
3. All water bodies categorised as being ‘at risk’ will be aggregated into sub-catchments (sizes ranging from 75-150 km<sup>2</sup>). Tier 2 characterisation will be undertaken on these **sub-catchments**. The output of Tier 2 sub-catchment characterisation will be an analysis of the *potentially* significant pressures, the location of these pressures in the case of point sources and abstractions, the resilience of the ecosystems, and likely critical source areas in the case of diffuse pollution sources. Load apportionment work will help to determine which sources of nutrients are most important.
4. More detailed (Tier 3) characterisation will be undertaken in particular problem areas, potentially involving catchment walks, investigative monitoring, inspections and numerical modelling. The output of the Tier 3 characterisation will be an understanding of which of the potentially significant pressures identified under the Tier 2 characterisation are actually significant, i.e. which are the ones that are actually causing the impact and therefore need mitigation measures. For example, the Tier 2 characterisation may highlight that diffuse sources of phosphorus are an issue within the sub-catchment, and the catchment characterisation tools will have identified the likely critical source areas. However, the catchment walks, investigative monitoring and inspections carried out as part of Tier 3 will be required to determine which likely critical source areas, or parts of critical source areas, or activities within those areas can be ruled out, and which should be brought forward for consideration at the next step for measures. Tier 3 characterisation will

largely be carried out by the Local Authorities with guidance from EPA. It will help provide a structure and a strategy for prioritisation for work essentially already being carried out.

- The results of the WB and sub-catchment characterisation will then be used as the basis of **catchment** (Water Management Unit) characterisation, which will aggregate and integrate the information and conclusions from the analysis at the detailed scales to enable a holistic, regional assessment as a basis for evaluation of objectives, which may conflict in some circumstances, and the costing and prioritisation of mitigation measures.

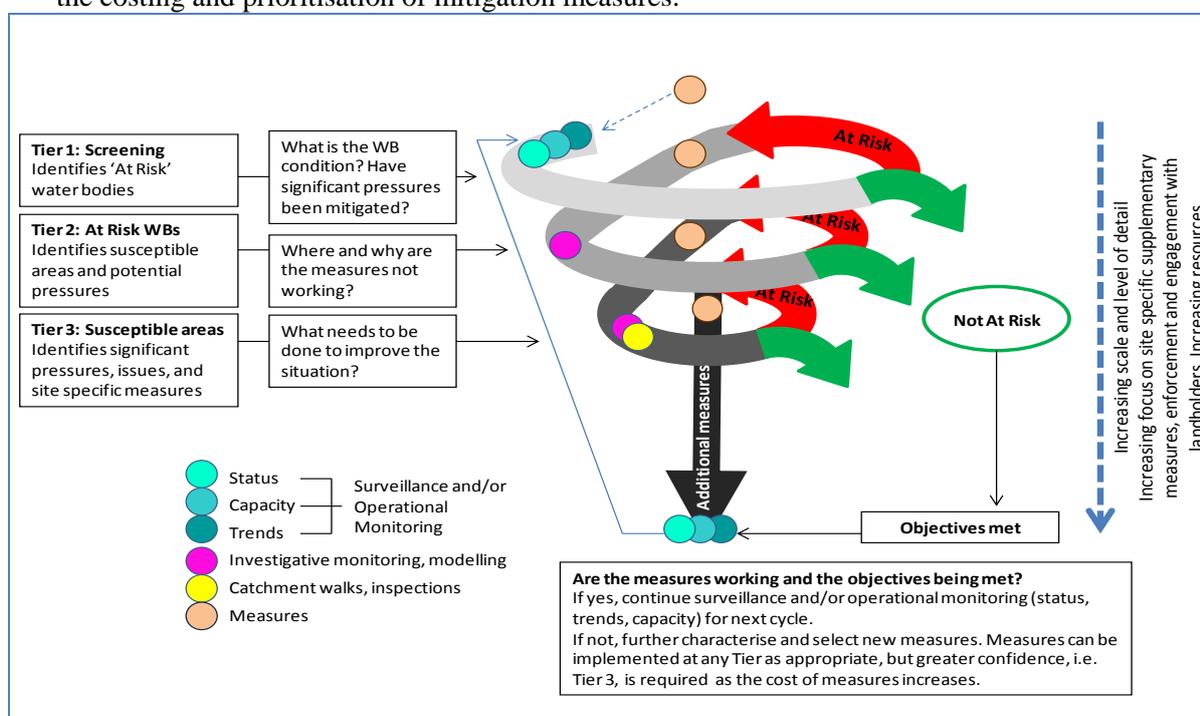


Figure 4: Three tiers of assessment approach (from Deakin, 2013).

#### 4.4 Networking

The characterisation approach, and selection and successful implementation of measures and management strategies will involve integration of datasets and knowledge at a national scale. With this in mind, a Catchment Management Network has been established to provide a platform for the EPA, government departments and agencies, local authorities, other public bodies and environmental non-government organisations to work together to avoid duplication of effort while working towards RBMP delivery and achieving integrated catchment management. This Network will act as an umbrella for facilitating working groups on, for example, characterisation, measures, monitoring networks, hydromorphology and public participation. In addition it will identify where capacity building is most required in areas relating to integrated catchment management and provide/facilitate this training. The Network will also provide a mechanism for knowledge exchange and initiating public participation as the community involvement will be essential. Above all, it will enable catchment managers to come together to exchange ideas and assist one another in delivering the 2<sup>nd</sup> cycle RBMP and taking Ireland further along the path towards achieving integrated catchment management.

#### 4.5 2<sup>nd</sup> Cycle River Basin Management Plan (RBMP)

As a precursor to completion of the 2<sup>nd</sup> cycle RBMP, potential mitigation measures will be identified and evaluated, management strategies will be reviewed and an implementation programme will be designed. The EPA will facilitate this process with the aid of the networking process outlined above, which will involve a broad range of public and private sector bodies and representatives. Economic analysis will be the responsibility of DECLG. The EPA will prepare a template RBMP; it is proposed

that the Plan will then be completed by local authorities, who will also be responsible for public consultation on the Plan.

In the next three years, the challenge to accomplish comprehensive and effective characterisation, and an implementation programme that will be capable of achieving successful catchment management for the benefit of Irish people is considerable. It will require hard work, realistic scientific analysis, judgements based on the available evidence, community engagement, and, above all, the cooperation of relevant agencies and individuals, both in the public and private sectors, including greater integration of work areas. And, it will need to be based, in our view, on the framework provided by the ICM approach, as outlined in Table 1. However, there is a momentum and ambition to achieve significant progress.

## 5 BEYOND 2017

Clearly, while plans are necessary, they do not achieve catchment management. From late 2016 onwards, implementation will be the priority. Progress will need to be measured. The 3<sup>rd</sup> cycle of work will commence, building on the work of the 2<sup>nd</sup> cycle. As trends and outcomes are analysed, adjustments will need to be made. It is probable that the Tier 3 characterisation (outlined in Section 4.3) and community engagement will be key work areas.

While great progress has and is being made on the scientific aspects of catchment management, significant deficiencies in the areas of public participation and social learning need to be urgently addressed. Ó Cinnéide (2014), in an analysis on the evolution of the WFD in Ireland and Europe, concluded “*If Europe is to achieve a tangible progress in reducing the environmental costs of diffuse water pollution, public participation and learning cannot be seen as an afterthought or as a discretionary, non-core element of the Water Framework landscape*”. He quotes Orr (2007), “*We need to take a social learning approach in water, where we learn together how to make sense of complex problems and adapt our ways of managing*”. This area is, perhaps, our greatest future challenge.

## 6 ACKNOWLEDGEMENTS

This paper is based on discussions and influences from numerous colleagues.

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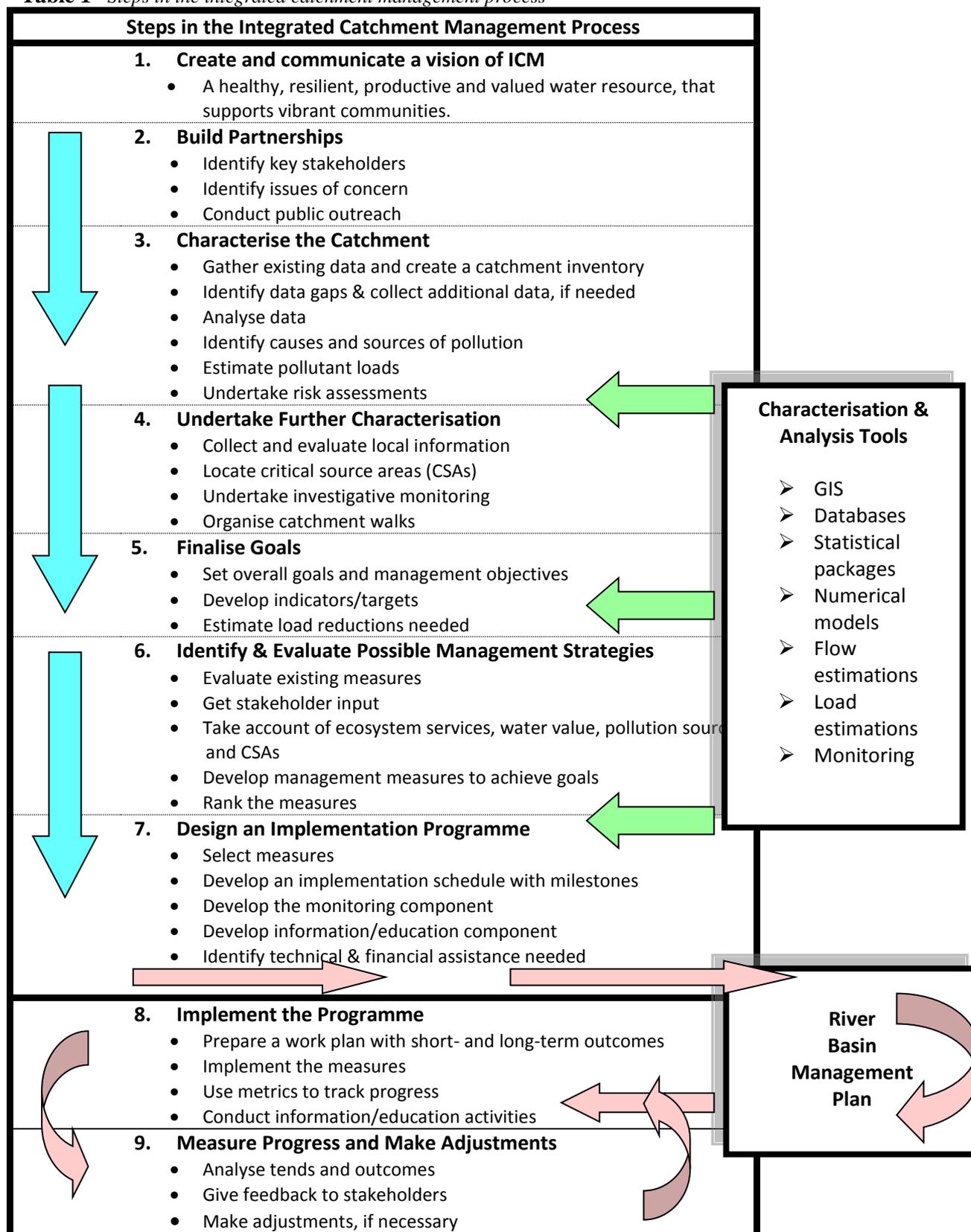
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**Table 1** Steps in the integrated catchment management process<sup>2</sup>



<sup>2</sup> This table is adapted from USEPA (2008)

Table 2

### Draft timetable and Consultation arrangements for the development of the second cycle River Basin Management Plans

WFD Element	Purpose	Draft Dates and Periods
<b>Publish draft timetable &amp; work programme for 2015-2021 River Basin Management Plans (RBMPs), including statement of the consultation measures to be taken (this consultation).</b>	Sets out the draft timetable & work programme to produce the 2 <sup>nd</sup> cycle RBMPs. Highlights the mile stones in the RBMP cycle where consultation is required and the measures we will undertake to ensure involvement in the consultation process.	July 2014 (consultation to close 31 January 2015)
<i>Publish interim overview of the Significant Water Management Issues (SWMI) in Ireland</i>	Identifies significant water management issues to be addressed in the 2 <sup>nd</sup> draft RBMPs and to facilitate public consultation	July 2015
<i>Consultation Period following publication of SWMI for receipt of comments</i>	Opportunity to comment on the significant water management issues. Consultation will be facilitated both through written consultation and online	July 2015 to December 2015
<i>Publish revised Significant Water Management Issues overview and characterisation report required under Article 5 of the Water Framework Directive</i>	Provides technical details of the characterisation of the river basin district, review of the environmental impact of human activity and economic analysis of water use previously identified	December 2015
<i>Publish Draft River Basin Management Plan for 2015-2021 &amp; provide explanation for any extended deadlines and less stringent environmental objectives proposed</i>	Sets out the objectives for the water environment and presents the strategy for meeting those objectives	December 2016
<i>Consultation Period following publication of Draft RBMP for receipt of comments</i>	Opportunity to comment on the draft plans including the objectives set and the measures proposed. Consultation will be facilitated both through written consultation and online	December 2016 to June 2017
<i>Publish updated RBMP for 2015-2021</i>	Sets out objectives for the water environment & the strategies for meeting those objectives between 2012 - 2021	by December 2017

(from DECLG, 2014)