

Public Engagement in Integrated Catchment Management: StreamScapes Recommendations



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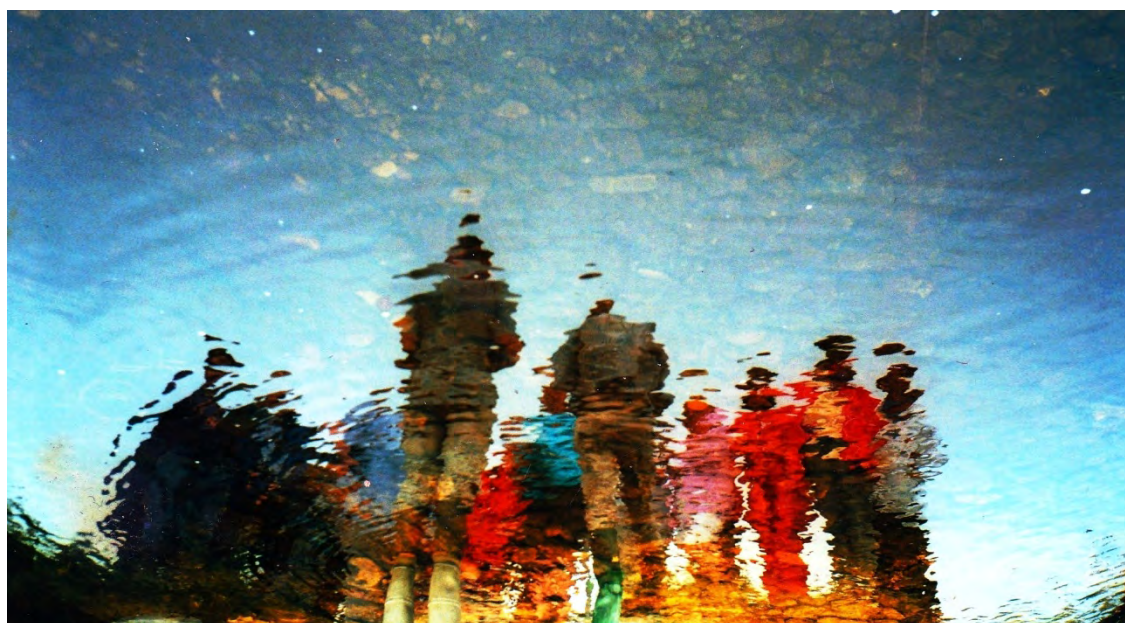
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Public Engagement in Integrated Catchment Management: StreamScapes Recommendations

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EPA Research Report



Prepared for the Environmental Protection Agency
by
StreamScapes Aquatic & Biodiversity Education Project
Coomhola Salmon Trust, Ltd
Bantry, Co. Cork

Author:
Mark Boyden

ENVIRONMENTAL PROTECTION AGENCY
An Ghníomhaireacht um Chaomhnú Comhshaoil
PO Box 3000, Johnstown Castle, Co.Wexford, Ireland
Telephone: +353 53 916 0600 Fax: +353 53 916 0699
Email: info@epa.ie Website: www.epa.ie

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Preface

'A family is a community related by blood; a business is a community related by ink; and a catchment is a community related by water.'

(StreamScapes)

'As an instrument of change, participation plays a central role in the current discussion on the concept of adaptive management. Adaptive management can be considered as a systematic process for improving management policies and practices by learning from the outcomes of implemented management strategies. While explicitly acknowledging uncertainty and complexity, the concept stresses the ability of readjustment to changes in the system being managed. Researchers working with this concept focus on participation as a basis for learning processes and creative solutions. Broadening the scope of possible management strategies by including different interests and stakeholder groups helps policy makers to develop flexible ways of managing the environment. The use of participation within the concept of adaptive management is closely linked to the concept of social learning, emphasising collaboration and the development of shared practices between different stakeholders to respond flexibly to unexpected developments, and to include new insights and changing circumstances into management decisions...

...These ideas were taken a step further with the research of Ostrom et al. (1990, 1999), who suggested that local communities throughout the world may in many cases be able to successfully manage their own resources without the need for centralised authorities to take local decisions.'

Von Korff et al. (2012, p. 7)

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Executive Summary

In assessing the achievement of Irish and EU environmental objectives since the 1990s, the experience of public engagement projects has highlighted the limitations of top-down prescriptive approaches. The lessons from a range of such initiatives point to the necessity of developing effective participatory templates that are conducive to citizen/stakeholder co-authorship of plans as well as wide public participation in the implementation of solutions on the ground.

Though more recent legislative instruments (e.g. Water Framework Directive [WFD] and the Aarhus Convention) indicate or specify 'public participation', it is necessary to rely first upon state- or academically generated 'guidance' documents to interpret what 'engagement' and 'participation' actually mean, and second upon a variety of pioneering initiatives to determine and develop models for practical application of these objectives on the ground.

One of these initiatives, 'StreamScapes', is an Aquatic & Biodiversity Education programme produced by Coomhola Salmon Trust, Ltd, an environmental NGO based in Co. Cork. This study draws on a summary overview of the legislation and the guidance literature, together with 25 years' development of StreamScapes ethos and methodology, to produce the following recommendations on public engagement/participation for the implementation of the Second Cycle of River Basin Management Planning, with especial focus upon containing diffuse/non-point/rural pollution (see Figs E.1 and E.2).

Key Recommendations for Public Engagement for Second Cycle of River Basin Management Planning

- 1 The proper scale at which to address issues is the catchment (*localised*) level;
- 2 *Education may be more efficacious than enforcement;*
- 3 Engage a small critical mass (c. 5%) of local population in resource awareness;
- 4 Use multiple (and creative) 'hooks' to engage people on their own terms in the efforts to promote stewardship of water quality;
- 5 Schools, corporate and community and voluntary groups can play a key role;
- 6 Communications must be jargon free in order to successfully engage citizens;
- 7 Redouble efforts to propagate 'best-practice' principles in pursuit of livelihood, recreation, and domestic management (to minimise anthropogenic impacts);
- 8 Consider that 'engagement' may best be driven and led by perceived 'honest brokers', for example, Rivers Trusts, environmental NGOs, social scientists, community leaders, agricultural advisors, etc., supported by catchment science and state agency;
- 9 Achieve 'joined-up' thinking to facilitate and economise achievement of targets, such as linking green agricultural incentives with deliberate local (water-quality) objectives;

- 10 Consider facilitating pilot initiatives where mini-catchment communities largely formulate their own (facilitated) local catchment management plans (with catchment science input);
- 11 With regard to River Basin District Governance (in support of public engagement), this report concludes with three linked and inseparable recommendations:
 - a As the WFD implementation 'governance hub', the EPA WFD Integration & Coordination Unit (WFD I&C Unit) must be adequately resourced and staff offered mid- to long-term tenure to ensure continuity during imminent steep (social) learning curve;
 - b As it appears at this writing that it will fall to local authorities to drive and deliver 'on-the-ground' public engagement (in addition to implementing a wide range of support measures), adequate funding and staffing must be allocated to enable these functions to achieve excellence; and
 - c Finally, a formal, centralised, and highly accessible collation of all public engagement efforts to enable wide and continuous 'social learning' across governance bodies and all sectoral actors is established.



Figures E.1 and 2. StreamScapes 'Ulster Blackwater', a catchment management (CM) outreach pilot produced with Department of the Environment, Community & Local Government and Monaghan County Council, engaged participants in field trip (left) and discussion of local issues (right).

1 Introduction

In 1995 the then Minister of State for Marine, Eamon Gilmore TD, formally launched the concept of 'catchment management' (CM) in Ireland in the course of his opening address at a StreamScapes Catchment Festival in Coomhola, before joining with some hundreds of participants in releasing local salmon fry into the river in celebration and affirmation of this local aquatic resource. Since then, the Irish experience has had the benefit of 20 years of 'social learning' regarding the CM process, with notable successes and failures; it is imperative that we now process and digest these lessons and bring them to bear upon current renewed efforts for improving water quality in Ireland.

The year 2014 saw the twenty-fifth anniversary of the StreamScapes Aquatic & Biodiversity Education Programme. Through extensive experience with hundreds of primary and secondary schools as well as community and corporate groups, these efforts have sought to develop a catchment-based awareness education template to enhance the capacity of a lay public to participate in wider efforts to secure statutory water quality and biodiversity objectives. This has been done with particular regard to EU member states' obligations to implement overarching European legal instruments, including the Water Framework Directive (WFD) (2000), with further reference to the Habitats Directive (1993) and the Aarhus Convention (UN/ECE).

StreamScapes development has been informed by the relevant legislation, the 'guidance' literature, and the extensive field experience in producing awareness initiatives to produce an evolving *ethos* and *methodology* as the basis for engagement.

Accordingly, this study provides an overview of these factors and makes recommendations based upon them, in an effort to contribute to the quest to determine viable, practicable and effective engagement techniques to secure meaningful participation by the public in the attainment of essential aquatic and biodiversity goals.

2 ‘Public Participation’ – The Legislative Context

For the purposes of elaborating upon the concept of *public participation* within the context of the implementation of the WFD, and to understand its legal basis, it is necessary to look here to the precedent established by two pieces of EU legislation: (a) references from the WFD Preamble, Articles, and Annexes¹, and (b) the Aarhus Convention². What follows is a brief citation of relevant passages from each of these documents.

2.1 Directive 2000/60/EC (the ‘Water Framework Directive’)

The concept of public participation is underpinned by the Preamble, Articles and Annexes in the directive itself. For instance, Preamble 14 notes that ‘The success of this Directive relies on close cooperation and coherent action at Community, Member State and local level as well as on information, consultation and involvement of the public, including users.’ Preamble 46 states that:

To ensure the participation of the general public including users of water in the establishment and updating of river basin management plans, it is necessary to provide proper information of planned measures and to report on progress with their implementation with a view to the involvement of the general public before final decisions on the necessary measures are adopted.

Later, Art. 14.1 notes that: ‘Member States shall encourage the active involvement of all interested parties in the implementation of the Directive, in particular in the production, review and updating of the river basin management plans’, and continues that ‘On request, access shall be given to background documents and information used for the development of the draft river basin management plan.’

In the context of Arts 14.1/.2/.3, the directive continues to specify consultation obligations (and timetables) in relation to the development of River Basin Management Plans. Annex VI cites ‘educational projects’ as a further example of public participation. Finally, Section A of Annex VII gives a specification for freedom of information requirements in support of the WFD:

... a summary of the public information and consultation measures taken, their results and the changes to the plan made as a consequence ... the contact points and procedures for obtaining the background documentation and information referred to in Article 14(1), and in particular

¹ Directive 2000/60/EC (the ‘Water Framework Directive’) (transposed into Irish Law under ‘European Communities [Water Policy] Regulations 2003, S.I. No. 722 of 2003’).

² Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, 1998 (‘The Aarhus Convention, UN/ECE’; ratified by Ireland 2012).

details of the control measures adopted in accordance with Article 11(3)(g) and 11(3)(i) and of the actual monitoring data gathered in accordance with Article 8 and Annex V ...

2.2 The Aarhus Convention

Aarhus is meta-EU, UN-inspired legislation which, in the course of linking human rights with environmental rights, informs all twenty-first-century environmental legislation by going to the heart of the relationship between people and their government. Though substantially an environmental agreement, it is furthermore a code for government accountability, transparency, and responsiveness in the context of public participation in general governance (Ewing et al., 2011). Including most EU countries as signatories, it specifies three 'pillars' that establish the basis for effective public participation. These are viewed as 'inalienable rights' and enshrined in Arts 4–9:

- 1 Access to information: effective public participation in decision-making depends on full, accurate, up-to-date information. The 'Access to Information' pillar is split in two. The first part concerns the right of the public to seek and receive information from public authorities and the obligation of public authorities to provide information in response to a request (passive). The second part concerns the obligation upon authorities to collect and publicly disseminate information of public interest without the need for a specific request (active).
- 2 Public Participation in Decision-making: this pillar is divided into three parts. The first part concerns participation by the public that may be affected by or is otherwise interested in decision-making on a specific activity. The second is concerned with the participation of the public in the development of plans, programmes, and policies relating to the environment. The third part covers participation of the public in the preparation of laws, rules and legally binding norms.
- 3 Access to Justice: this third pillar of the Convention enforces both the information and the participation pillars in domestic legal systems, and strengthens enforcement of domestic environmental law. The justice pillar furthermore provides a mechanism for the public to enforce environmental law directly.

Finally, this definitive and over-arching convention specifies that parties shall promote environmental education and environmental awareness (Art. 3, Para. 3), hence placing these activities firmly in the realm of 'public participation'. Box 2.1 below outlines the Center for Collaborative Policy's criteria for public participation.

Box 2.1. Criteria for Excellence in Public Participation

The public participation process seeks out and facilitates the involvement of those potentially affected.

- 1 The public is involved in designing how they will participate.
- 2 There are multiple methods for participation.
- 3 The venue(s) for public participation are accessible to the diverse public.
- 4 The public participation process provides participants with the information they need to participate in a meaningful way.
- 5 Methods for participation are user-friendly and perceived as fair, just, and respectful.
- 6 Public's role in decision-making is clear.
- 7 The public's contribution has the potential to meaningfully influence the decision or outcomes.
- 8 The public participation process communicates to participants how their input affected the decision or outcomes.
- 9 The public has the opportunity to be involved and/or monitor the implementation of the decision or outcome.

Source: Center for Collaborative Policy (CCP), 2005. *Public Involvement Needs Assessment*. Cal. State Uni. Sacramento (Appendix H).

3 ‘Public Participation’: Samples from the ‘Guidance’ Literature

‘Public participation’, though widely and increasingly acknowledged as an essential element in the development and implementation of statute and practice, remains a somewhat ambiguous term. Its definition has undergone a dynamic evolution based on experiences throughout Europe (involving all forms of governance issues including WFD implementation), and indeed internationally. Ideally, the rationale behind efforts to promote the inclusion of ‘public participation’ in the development of environmental law engenders scenarios which will provide for:

- The engagement and accessing of a wide range of stakeholder contributions in the course of the drafting of law and plans, this process yielding not alone a better-informed final outcome but also increasing the chances of stakeholder (both sectoral and individual citizen) ‘co-ownership’ of objectives; and
- Instance and example of how stakeholders may proactively (and practically) *participate* in the subsequent implementation and achievement of the objectives of the legislation.

The ultimate purpose of the WFD mechanism is to develop ‘River Basin Management Plans’, supported by ‘Programmes of Measures’ (the means) which will assist in the attainment of high standards of water quality throughout the European Community (the objective). The widest possible interpretation of ‘public participation’ in achieving both the means and the end is seen as being crucial to the success of the initiative. Though this current study urges a more dynamic interpretation, in this context we examine a synopsis of the guidance literature to understand the precedent:

- a The indicative efforts of the European Community-produced *Guidance on Public Participation in Relation to the Water Framework Directive*,³
- b The EU-commissioned independent study, *Harmonising Collaborative Planning (HarmoniCOP); Learning Together to Manage Together/Improving Participation in Water Management*;⁴ and
- c *Towards Risk-Based Management of European River Basins: Key-findings and recommendations of the RISKBASE project*.⁵

³ EU Public Participation Working Group (2002).

⁴ Ridder et al. (2005).

⁵ Brils, J. and Harris, B. (2009).

3.1 Guidance on Public Participation in Relation to the Water Framework Directive

The WFD guidance document, drawn up with the widest collaboration amongst all EU partners, contributes the following interpretations to establish the implications of 'public participation': 'This guidance document aims at assisting competent authorities in the Member States and Accession Countries with the implementation of Article 14 of the Water Framework Directive about Public Participation' (Executive Summary, p. 3). It goes on to note:

This guidance starts with creating a common understanding regarding the meaning of public participation in the context of the WFD. Public participation can generally be defined as allowing people to influence the outcome of plans and working processes. It is a means of improving decision-making, *to create awareness of environmental issues* [my emphasis] and to help increase acceptance and commitment towards intended plans. Public participation for the implementation of the Directive is recommended at any stage in the planning process, from the Article 5 requirements to the Programme of Measures and the design of the River Basin Management Plan.

(WFD Guidance, Executive Summary, pp. 3–4)

Although the phrase 'public participation' does not appear in the Directive, three forms of public participation with an increasing level of involvement are mentioned: information supply, consultation, and active involvement. According to the Directive, the first two are to be ensured, the latter should be encouraged. Although the Directive does not require active involvement, this guidance shows how active involvement can be very useful for reaching the objectives of the Directive. These three forms can be interpreted as being 'public participation', although public participation usually covers a wider range of activities than prescribed by the Directive.

(WFD Guidance, Executive Summary, p. 4)

Moreover,

A clear signal should be given that **no blue-print exists for public participation** and that the public participation process should be organised and adapted to national, regional and local circumstances.

(WFD Guidance, Executive Summary, p. 4)

And

... the Directive gives no clear boundaries when it comes to the extent of these forms of public participation ... [the] guidance elaborates the range of possibilities between **minimum requirements** and **best practices** ... it is up to the competent authority, which will – as a representative of the Member State – commission the public participation process, to decide which possibilities will be used in the ... process.

(WFD Guidance, Section 2.6, p. 25)

3.2 Harmonising Collaborative Planning (HarmoniCOP); Learning Together to Manage Together/Improving Participation in Water Management

The *HarmoniCOP Handbook* (see Fig. 3.1) represents an example of the ongoing development of the theory and practice of public participation. The foreword (written by Philippe Quevauviller, European Commission DG Environment) begins by acknowledging that:

Despite comprehensive recommendations set out in the EU Guidance on Public Participation in relation to the Water Framework Directive which represent an authoritative interpretation of Article 14 of the WFD, practicalities for encouraging public active involvement are not described in detail.

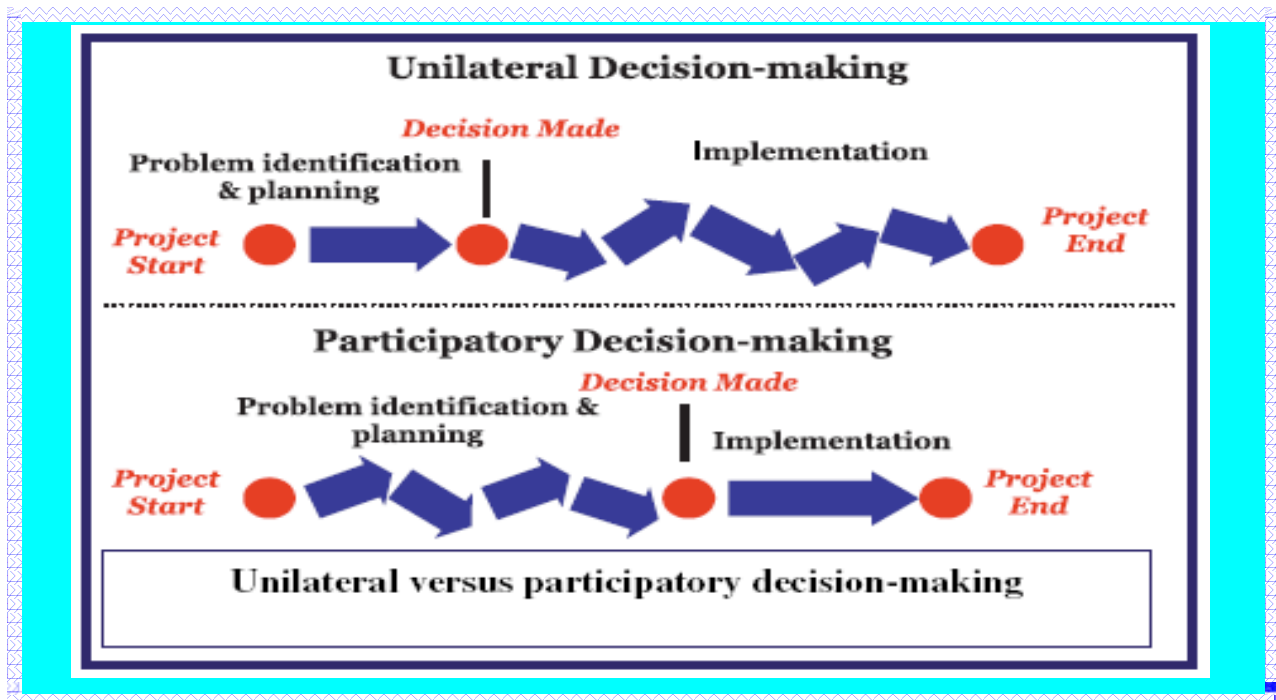


Figure 3.1. Unilateral decision-making process, *Harmonicop Handbook*. ©2005 All rights reserved.

It then proceeds to formulate and examine opportunities for facilitating public participation, emphasising the core concept of ‘social learning’ as a fundamental element in the advancement of public participation within the context of implementation of the WFD:

Social learning means ‘learning together to manage together’. It emphasises collaboration between the different stakeholders, starting at the earliest possible moment (in the process). It helps to build up trust, develop a common view on the issues at stake, resolve conflicts and arrive at joint solutions that are technically sound and actually implemented in practice. It helps all stakeholders to achieve better results than they could achieve otherwise.

In effect, ‘social learning’ refers to the ‘shared’ experience and particular expertise of all parties: legislators, civil service administrators, scientific/academic community, stakeholders, and the wider public collaborating through informational flows to both identify issues and to mutually

evolve and determine corrective actions including, within the context of WFD, the Programme of Measures.

In addition, though acknowledging the importance of both 'Consultation' and 'Active Involvement' in planning processes, it goes on to establish the crucial distinction between these two terms: 'Consultation' means that the public can react to government proposals ... it is legally required to publish drafts and allow the public some time to make comments in writing. Other forms of consultation include oral consultation and surveys. 'Active involvement' implies a more involved role for the public. The public may:

- have discussions with the authorities;
- help to determine the policy agenda;
- help to develop solutions;
- be involved in taking decisions;
- participate in implementation;
- be responsible for RBM [river basin management].

3.3 Towards Risk-Based Management of European River Basins: Key Findings and Recommendations of the RISKBASE project

This 'RISKBASE' report resulted in the identification of three guiding (key) principles for the management of river basins:

- 1 Be well informed: a sound, evidence-based understanding of the functioning of the soil-sediment-water ecosystem and of its interaction with the social system is the basis to river basin management.
- 2 Manage adaptively: we have to learn-by-doing as social/ecological systems are complex and dynamic and can respond in non-linear and unexpected ways.
- 3 Take a participatory approach: the involvement of stakeholders will improve management, e.g. because they may bring in local knowledge.

Finally, the 'RISKBASE' document, in elaborating upon public participation, reinforces the guidance themes by stressing that emphasis is placed on 'the integration of management interests with the values of stakeholders involved in all sectors influenced by eco-hydrological services' and goes on to note that the 'inclusion and integration' of stakeholders in river-basin planning processes is needed. It adds that participatory approaches allow the exchange of views and opinions on specific issues and enables stakeholders to bring 'their knowledge to the table' and facilitate 'learning together' in order to understand the land-water system in a better way in order to find the most appropriate solutions. The document also comments that this process of social learning helps develop new capacities between social agents by teaching them how to collaborate and how to understand each other's roles and capacities. It terms this the 'Adaptive Water Management' (AWM) approach and stresses that it also entails 'including local knowledge as well as the use of tools and techniques like (eco)-hydrological modelling' (pp. 24–5).

3.4 Further Notes on Social Learning and ‘Public Engagement’

“Social learning ... is ... a process of communicative action where multiple actors collectively learn about and develop an understanding of each other’s interests, concerns, and preferences through dialogue and deliberation”.

(Muro and Jeffrey, 2012)

“Since the 1970s, participation has played a role in rural development concepts (Belshaw and Chambers 1973, Uphoff et al. 1979). In the 1990s, participatory technology development approaches also noted the value of local knowledge, and that it should be integrated into the development of innovative solutions (Röling 1996, Biggs and Smith 1998). Specifically, Chambers (1994) emphasised the importance of local capacity building, knowledge ownership, and empowerment, if local end users were to adopt the proposed solutions. These ideas were taken a step further with the research of Ostrom et al. (1990, 1999), who suggested that local communities throughout the world may in many cases be able to successfully manage their own resources without the need for centralised authorities to take local decisions. Today we can see a widespread application of participatory approaches in many areas of development research and practice. However, big challenges still remain in many cases to support transitions from centralised resource management regimes to more decentralised regimes, as well as to develop the skilful application of participatory approaches in practice (Creighton 2005)”.

(Von Korff et al., 2012)

“The key elements of social learning, which is at the core of adaptive management, are a feedback loop between structures, problems and outcomes. The governance structure (open /closed) can influence the process whereby groups learn to solve problems and this can in turn affect the outcomes/delivery of the group or network. By learning how to tackle issues and to design technical solutions around shared issues such as pollution in a river catchment, these structures can build positive outcomes and social capital”.

(Ó Cinnéide, 2014)

“The effective development and rollout of Public Participation measures will firstly differentiate between various sectors and identify their capacity to engage in the process. For instance, many sectors (such as Farming, Construction, Forestry, and Environmental NGOs) and some individuals may be interested in contributing to the development of River Basin Management Plans... whereas the means must be found to enable universal ‘participation’ (Awareness + ‘Best Practice’ = Conscious Stewardship) in the achievement of WFD objectives. Therefore, the measures to ensure participation must be varied and manifold”.

(Boyden, 2008)

American experience in addressing water-quality issues went through a similar evolution to that in Ireland, insomuch as the initial sweeping legislation addressed the major (point-source) problems, but it was later realised that there was a raft of intractable and persistent miscellaneous (diffuse) pollution sources which would require the participation of the wider public to solve. Box 3.1 examines this evolution in the US.

Box 3.1. Comparative Legislative & Implementation Evolution – The US Clean Water Act (1972)

The Federal Clean Water Act 1972 is administered by the US EPA. From the late 1970s attention gradually turned to the widespread problem of non-point source pollution and, hence, to watersheds ('catchments'). By 1977 Section 208 was added to the Clean Water Act, charging EPA and state water quality agencies with developing water-quality control plans that would identify non-point source pollution.

Following further reporting and refinement (and *learning*), Section 319, the 'Non-point Source Management Program' was added to the Act in 1987. The elements of the '319' programme included:

- Identification and assessment of water quality problems on a 'watershed-by-watershed' basis;
- Development of Best Management Practices (BMPs) to prevent the problems identified, and programmes for implementing the BMPs
- Institutional arrangements to promote (voluntary programme), encourage (incentivised), or require (regulatory) the implementation of the BMPs.

In 1995 William Kier noted that 'It is important that local communities organise to assess and develop plans to protect and restore their watersheds because it is clear that the federal and state water authorities have too big a job to do so without public involvement.'

4 StreamScapes Ethos

The psychology underlying people's relationships to 'the environment' and with each other is central to securing their optimum participation in conservation issues. A particular regard to the dynamics of intra- and inter-sectoral relations between, for example, state agencies, environmental NGOs, agriculture, construction and other sectors is vital.

As a result, in addition to the formation of guiding (environmental) policy, the enactment of legislative instruments, and the determination of enforcement procedures, it was perceived within the context of StreamScapes development that a 'fourth estate' in the environmental field was needed. This would be the establishment of a proponent of *environmental awareness education* (and potential arbiter) that would be seen to be an 'honest broker' and would be universally accepted by all sectors. Hence, from its conception in 1989 especial attention was paid to the development of the ethos of the StreamScapes programme, guided by an absolute neutrality of presence, which is consistent with all sensible educational effort.

To elaborate, strife and confrontation seem endemic to public consideration of environmental issues. In a typical scenario, 'the finger may be pointed' at a given sector, accusing that sector of transgression, with the result that the sector concerned becomes defensive, leading to an entrenchment of positions and a reduction in the capacity for behavioural change. For example, in the roll-out and establishment of Special Areas of Conservation (SACs) and other similar provisions, people whose lives were affected by these initiatives often expressed confusion and resentment as they felt that: (a) the rationale for the 'imposition' of these designations was not adequately provided to them and (b) that they were not provided with the opportunity to co-author the course of action that would rectify the underlying problems.

As a response to scenarios such as these, StreamScapes set out from the very beginning to come from a place of respect for all constituents, in order to create a forum where **solutions** to environmental problems associated with given sectors were elicited from within those sectors in an effort to promote 'bottom-up' initiatives. It was believed that this would create the basis for enhanced participation in (and ownership of) the identification and implementation of solutions (e.g., the StreamScapes 'Farming & Biodiversity' competition for Agricultural Science students [see <http://streamscapes.ie/farming-biodiversity/> and Fig. 4.1]).

“How can we, as farmers, protect water quality and enhance instream biodiversity?”

**A COMPETITION FOR LEAVING AND PRE-LEAVING CERT AG SCIENCE STUDENTS
GREAT PRIZES FOR WINNING STUDENTS AND SCHOOLS!**

Water quality is key to many biodiversity issues. How can we safeguard surface and ground waters that run through and around our farms? Submit your ideas, in poster format, and be in for a chance to win valuable prizes for yourself and your school!

- Application forms available from IASTA website: www.iasta.ie
- Deadline for submissions Wednesday 30 November 2011
- Submissions must be made in Poster format only and posted to:
IASTA, Athlone Education Centre,
Athlone, Co. Westmeath.
- Winners will be announced in The Farmer's Journal on 10 December 2011 with an awards ceremony to follow (date & venue to be announced)
- Decision of the Judges is final and no correspondence will be entered into
- This competition is produced in association with the Irish Agricultural Science Teachers' Association (IASTA), the Biodiversity Policy Unit at National Parks & Wildlife Service, Department of Arts, Heritage and the Gaeltacht, the EPA, and Coomhola Salmon Trust

Figure 4.1. StreamScapes 'Farming & Biodiversity' Competition, 2011.

Moreover, as StreamScapes activities proceed from a neutral position, the primary focus of participant engagement centres on the revealing of natural wonders (via awareness education, field trips, etc.). This is borne out by a conviction that this exposure will help participants in voluntarily aspiring to be stewards of local aquatic and biodiversity resources.

A further component in the development of the StreamScapes ethos was a perception that there was a deficit in information and awareness in terms of the use of 'best-practice' principles in people's pursuit of livelihood, recreation and domestic management in terms of water, and concern about the

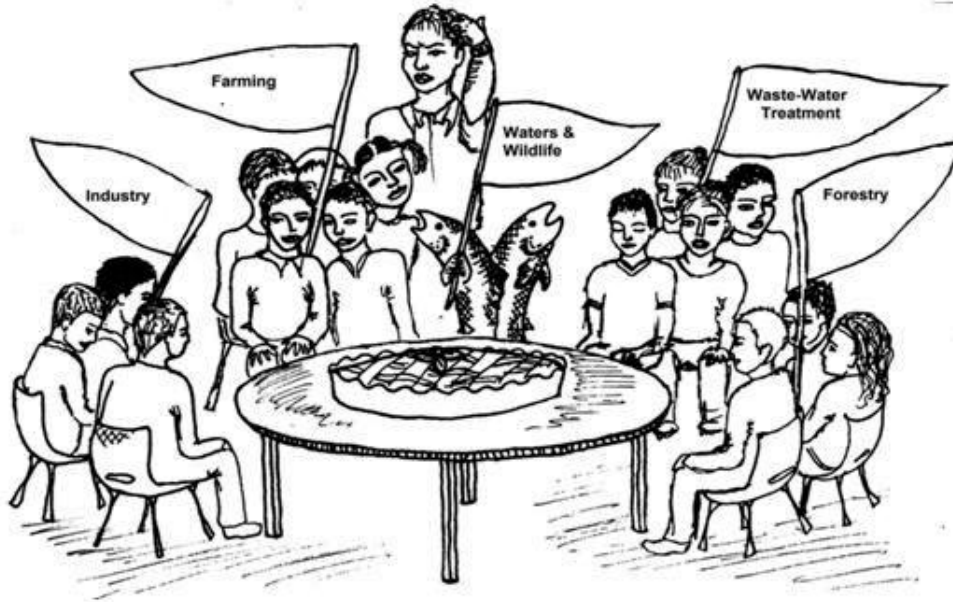
resultant impact that this had upon local water quality, habitats, species and ecological processes. While the practical application of solving this question is outlined in Section 5 below, this also led to deliberations that could inform how this problem could be addressed, producing the proposed neologism: 'ultrastructure'.

The concept of 'ultrastructure' is related to an idea posited by the French Jesuit priest and palaeontologist/geologist, Pierre Teilhard de Chardin, of '*noosphere*'⁶, the growing sense of mind or '*mindfulness*' which overlays and potentially influences human behaviours (and the far-reaching impacts which these behaviours have).

For StreamScapes, ultrastructure sums up a state of mind, an attitude – conveying a sense of cultured awareness of the value and purpose of the *infrastructure* being used. It implies a sense of conscious stewardship. An example used in the the StreamScapes awareness-raising programmes of the imposition of 'ultrastructure' on infrastructure is in the area of sewage treatment. Whether discharging to a septic tank or community-treatment plant, individuals have the capacity to limit the efficacy of these systems (and unleash a chain reaction of downstream environmental damage) by what they may (sometimes mindlessly) pour down sinks and toilets. Examples of harmful agents include toxins found in a wide range of common household products (such as paints, disused pharmaceuticals, cleaning agents, etc.). Provision of *ultrastructure* ensures that users are aware of 'best practice' in relation to their discharges and that this then translates into a minimisation of potential impacts. This constitutes an intrinsic foundation of StreamScapes development: to identify imaginative means of propagating awareness of the value of high-status aquatic and biodiversity assets, and to equip citizens with the necessary 'best-practice' principles to minimise their impacts upon these assets (see Fig. 4.2).

⁶ 'Noosphere': itself a neologism of its day (1922), de Chardin (together with Vladimir Vernadsky and others) asserted in his work that there was, in cosmology and evolutionary terms, the formation of the Earth (the *geosphere*), followed in turn by the emergence of the *biosphere* (all Life), which was crowned by the emergence of the *noosphere* or human cognition. As with '*ultrastructure*', sometimes it can be useful to encapsulate a concept with a term which in this latter instance may assist in conveying the importance of a concept to policy-makers. See de Chardin, 1955. *Le phénomène humain*. Paris.

Figures 4.2 and 4.3. StreamScapes stresses working at the catchment level, cultivating a voluntary sense of stewardship through biodiversity lessons, and fostering dialogue between sectors to promote 'buy-in', behavioural change, and attainment of high status water quality. Illustrations (above and below) from *StreamScapes Basic – The Teacher's Guide*, © 1998 Coomhola Salmon Trust.



The completed Catchment Model



5 StreamScapes Methodology

The StreamScapes methodology encompasses what today may seem to be ‘given’ principles but which – it must be stressed – took years of serious thought and refinement to achieve. When this work began in 1989, dedicated ‘environmental education’ for a general lay audience wasn’t widely available, and the StreamScapes team needed to ‘make it up’ as we went along. The following elements all assisted in achieving the objective of *public participation* and *conscious stewardship* of the aquatic environment and biodiversity:

- Localising environmental education;
- Personalising participants’ relationship with the environment;
- Embracing the catchment concept;
- Engaging a small critical mass of the catchment population;
- Providing hands-on field experience;
- Equipping participants with knowledge of best-practice principles;
- Producing a dedicated local environmental booklet and map;
- Using eco art;
- Holding a catchment festival;
- Helping participants contribute according to their aptitude/specific intelligence;
- Stressing participant-led learning with open outcomes.

5.1 Localising Environmental Education

The ‘environment’ isn’t something that happens somewhere else ... it happens all around us, in our gardens, on our farms, in our villages and towns. The challenge is to localise our relationship with the ‘environment’ so that we understand that we are inextricably linked to the habitats, species and ecological processes that surround us and which we are constantly part of.

5.2 Personalising Participants’ Relationship with the Environment

StreamScapes aims to find ways to simplify and personalise participants’ experience of the ‘environment’. Hence, for many years (and even recently in a StreamScapes project in Co. Fermanagh) the StreamScapes team have promoted this personal relationship with activities in schools, for example, setting up aquaria in classrooms so students could hatch their own salmon eggs and witness this phenomenon directly. Subsequently, participating schools come together to release the (local) young salmon into their local river. It is difficult to leave such an event without a sense of a ‘personal environment’. It encourages schoolchildren or locals to wonder how ‘*my fish* is getting on?’ and encourages behaviours that increase the chance of ‘*my fish*’ surviving.

5.3 Embracing the Catchment Concept

The 'catchment' (or in larger systems the 'sub-catchment'), is the appropriate jurisdiction for addressing water and wildlife management. In this regard, StreamScapes anticipated the WFD as early as the 1980s. At that time, the project team was arguing that aquatic and biodiversity education should take place on a catchment-by-catchment basis. We have a saying at StreamScapes: 'A family is a community related by blood; a business is a community related by ink; and a catchment is a community related by water.'

5.4 Engaging a Small Critical Mass of Catchment Population

The methodology goes on to target the direct participation in a StreamScapes catchment-based project of c. 5% of local population. This is done because it builds capacity for the project and enables messages to get farther and wider as virtually all residents of a given catchment then hear about the project, and it helps to establish a wide currency of issues.

5.5 Providing Hands-on Field Experience

There is no substitute for direct immersion in fieldwork by participants. In a classroom it is not always possible to grasp the issues. As a result, whenever practical, participants are given direct hands-on field experience. That may mean everyone is told to put on their 'wellies' and head down to the river. StreamScapes uses similar but a more simplified techniques to scientists to characterise a water body and the biodiversity that it supports. For example, all StreamScapes participants are taught to use 'kick-nets' to sample local aquatic insects – stone flies, mayflies, caddis, etc. – to learn how to assess the stream's capacity to support biodiversity, to understand how this may indicate local water quality and appreciate how this relates to human health and local socio-economy.

5.6 Equipping Participants with Knowledge of 'Best-Practice' Principles

Humans have a significant capacity to make an impact upon local ecology through our pursuit of livelihood, recreation and domestic management. Part of the StreamScapes remit is to convey some simple tips that can assist in buffering these impacts and, importantly, in eliciting participants' own ideas in this regard.

5.7 Producing a Dedicated Local Environmental Booklet & Map

This is a further essential component of StreamScapes methodology and a vehicle for communicating information on the water cycle, local species and habitats as well as the 'best-practice' information. A dedicated publication (see Fig. 5.1) also assists to propagate a given project far beyond the involvement of direct participants. Apart from issuing directly to project participants, booklets are distributed to supermarkets, waiting rooms and creameries. Increasing awareness underlines how behavioural changes can make a significant impact: an attractive booklet brought home by a family member and left on the kitchen table is hard to miss – enabling the messages to extend widely.

Including a Catchment Map (see Fig. A.1) with the publication reinforces this sense of a ‘community related by water’ and that we are absolutely dependent upon each other to achieve thriving farms, businesses, and communities amidst a background of high quality local environment (see Appendix 1).



Figure 5.1. Examples of Streamscapes publications used to provide information on core issues at catchment level.

5.8 Using Eco-Art

Once the classroom lessons and the field trip are complete, StreamScapes participants then translate what they have learned into artworks. This may involve projects ranging from the making of giant ‘food webs’ out of willow branches, replete with models of insects, birds and fish, to paintings, drawings, sculptures and models of the local catchment. It is this coordination of intellect, creativity and tactile efforts which, in interpreting the lessons, assists them to become indelible.



Figure 5.2. Catchment model produced by National (primary) School assists participants to comprehend issues.

5.9 Holding a Catchment Festival

When feasible, a StreamScapes Project seeks to culminate in a catchment festival. This provides a venue for exhibiting participants' project and eco-art work, also a forum for a community celebration of local aquatic and biodiversity resources. In addition, it offers the wider community the opportunity to acquire learning and establish a conscious stewardship of these resources. For instance, in 2014, the StreamScapes Ilen project concluded with a Catchment Festival that exhibited hundreds of participants' Eco-Art Projects in an oversize marquee at Skibbereen, Co. Cork in May 2014 (see Figs 5.2 and 5.3 below). A further element was the cutting-up and distribution of jigsaw pieces of a large print of the catchment map to schools and groups. The pieces were brought on the day to assemble the full map and reinforce the concept of a community defined by its catchment.

5.10 Helping Participants Contribute according to their Aptitude/Specific Intelligence

This element of StreamScapes methodology attempts to address an ideal of pedagogical philosophy in which it is acknowledged that individual participants each contribute a particular strength or aptitude to a team in terms of interests and/or experience. Many wider groups (of say, 25 people) will usually

include a photographer, ornithologist, botanist, angler, archivist, communicator, etc. The strategy is to facilitate this mini-community to bring their varied intelligences and abilities to bear upon the cooperative consideration of local catchment (see 'StreamScapes Advanced', 2000). This echoes the educational reform advocated by the philosopher/psychologist John Dewey.⁶

5.11 An Emphasis on Participant-led Learning with Open Outcomes

Again, this is consistent with the StreamScapes ethos, as it makes for a more compelling and empowering experience if participants (regardless of age) feel that they are on equal footing with their tutors (or regulators), and that their prior knowledge, experience, and opinions are relevant and will influence the outcomes.



Figure 5.3. StreamScapes Ilen participants attend the 'River Ilen Catchment & Coastal Zone' Festival & Eco Art Exhibition, May 2014.

⁶ For Dewey, the central ethical imperative in education was democracy. Every school, as he wrote in *The School and Society* (1899), must become 'an embryonic community life, active with types of occupations that reflect the life of the larger society and permeated throughout with the spirit of art, history and science.(Meg Pinto: PBS Production 'Only a Teacher: Schoolhouse Pioneers')

6 Other Innovative Public Engagement Initiatives

The reader is invited to examine the project website, www.streamscapes.ie, for further information on the StreamScapes project, where one may also download various supporting publications.

Furthermore, there are numerous other initiatives of great interest and merit operating on various scales, all contributing to the wider efforts to develop an adaptive template to enhance the capacity of a lay public to participate in securing statutory water-quality and biodiversity objectives.

6.1 Rivers Trust

The 'Association of River Trusts' (www.theriverstrust.org) for England and Wales was launched in 2001 following extensive consultation with existing charitable rivers trusts and other related interests. The organisation changed its name to 'The Rivers Trust' on 2 August 2011. Rivers trusts now represent catchments across a large part of England and Wales. The main aims are 'to co-ordinate, represent and develop the aims and interests of the member Trusts in the promotion of sustainable, holistic and integrated catchment management and sound environmental practices, recognising the wider economic benefits for local communities and the value of education'.

6.2 Ballinderry River Enhancement Association

Now a member of the Rivers Trust, the Ballinderry project (<http://www.ballinderryriver.org/>) is a long-standing initiative in Co. Tyrone. The Ballinderry River Trust has spawned the RIPPLE (Rivers Involving People, Places, and Leading by Example) Project, which is engaging the Ballinderry community in a CM initiative (and the subject of a Mark Horton presentation at the 'Integrated Catchment Management Workshop' in Cork, November 2014; see Fig. 6.1).

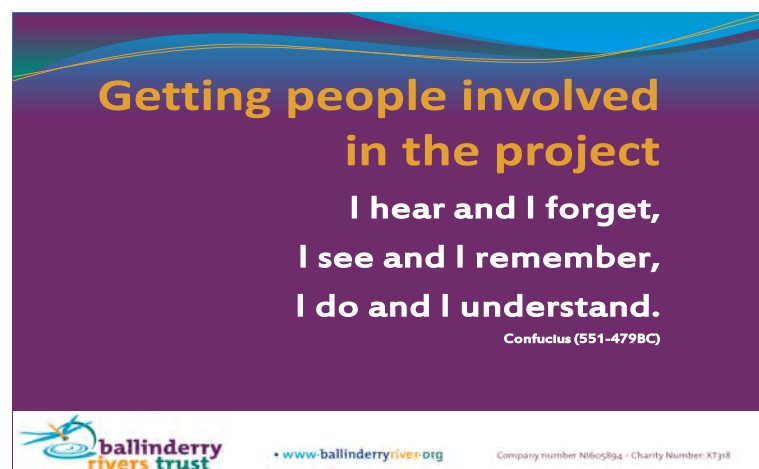


Figure 6.1. Slide from Mark Horton's presentation of Ballinderry initiative at [Integrated Catchment Management Workshop, Cork](#), 2014.

6.3 The Atlantic Salmon Trust

The Atlantic Salmon Trust (www.atlanticsalmontrust.org) has commissioned Martin McGarrigle (ex-EPA) to produce a *Small Streams Characterisation System Survey Manual* on the assessment of small streams; the intention is to provide rivers trusts, angling associations, and similar bodies with a relatively simple way of assessing the condition of small streams so that problems can be identified and remedial action prioritised. This initiative has the capacity to empower ‘minor’ stakeholders (primarily anglers) to contribute to the assessment of small tributary streams which are beyond the scope of WFD monitoring regimes (because of budgetary constraints). This is an excellent example of the value of ‘*citizen science*’ in adding value to (and increasing capacity of) micro-assessment within catchments.



Figure 6.2. Martin McGarrigle field-tests the ‘Small Streams Characterisation System’ (and Survey Manual) with volunteers at Killyleagh Castle, Co. Down, July 2014 (which this researcher attended).

7 Recommendations for Future Public Engagement Strategies

A review of the WFD regulations and the evolving guidance literature, when viewed through the lens of 25 years' experience in StreamScapes activity and reflection, yields the following set of recommendations for effective public engagement (discussed in more detail below):

- 1 The proper scale at which to address issues is the catchment (*localised*) level;
- 2 *Education may be more efficacious than enforcement;*
- 3 Engage a small critical mass (c. 5%) of local population in resource awareness;
- 4 Use multiple (and creative) 'hooks' to engage people on their own terms in the efforts to promote stewardship of water quality;
- 5 Schools, corporate and community and voluntary groups can play a key role;
- 6 Communications must be *jargon free* in order to successfully engage citizens;
- 7 Redouble efforts to propagate 'best-practice' principles in pursuit of livelihood, recreation, and domestic management (to minimise anthropogenic impacts);
- 8 Consider that 'engagement' may best be driven and led by perceived 'honest brokers', for example, Rivers Trusts, environmental NGOs, social scientists, community leaders, agricultural advisors, etc., supported by catchment science and state agency;
- 9 Achieve 'joined-up' thinking to facilitate and economise achievement of targets, such as linking green agricultural incentives with deliberate local (water-quality) objectives;
- 10 Consider facilitating pilot initiatives where mini-catchment communities largely formulate their own (facilitated) local catchment management plans (with catchment science input);
- 11 With regard to River Basin District Governance (in support of public engagement), this report concludes with three linked and inseparable recommendations:
 - a As the WFD implementation 'governance hub', the EPA WFD Integration & Coordination Unit (WFD I&C Unit) must be adequately resourced and staff offered mid- to long-term tenure to ensure continuity during imminent steep (social) learning curve;
 - b As it appears at this writing that it will fall to local authorities to drive and deliver 'on-the-ground' public engagement (in addition to implementing a wide range of support measures), adequate funding and staffing must be allocated to enable these functions to achieve excellence; and
 - c Finally, a formal, centralised, and highly accessible collation of all public engagement efforts to enable wide and continuous 'social learning' across governance bodies and all sectoral actors is established.

7.1 The proper scale at which to address issues is at the catchment (*localised*) level

Recommendation: work at the appropriate scale ... (the) Catchment scale ...

(Daly, 2013, Catchment Management & Agriculture Presentation, Slide 38).

The experience of practitioners in each of the study sites is that the most effective learning on water occurs at the micro level, in local catchments, where participants can develop a holistic view of the economic, social, cultural and environmental elements of water policy.

(Ó Cinnéide, 2014, p. 186)

This is also the conclusion of StreamScapes ethos and methodology, and supported by the experience in the field. It is important to build a local sense of 'catchment consciousness'. The 'environment' is too big a topic to interest people, but the chances for engagement in the issues improves if the focus is kept local and specific. If awareness is cultivated at this local level, pride in aquatic resource often follows, and this pride may then be harnessed to promote action and *participation*.

7.2 Education may be more Efficacious than Enforcement

Regulations and inspections are part of the mix of management tools, but they can incur resentment amongst stakeholders, whereas the psychology involved in awareness initiatives represents an entirely different approach. Therefore, it is recommended that *localised* environmental education initiatives form an important component of CM programmes, as they provide the basis for *voluntary* behavioural change and willingness to *engage* in management regime.

7.3 Engage a Small Critical Mass in Resource Awareness

A 'small critical mass' which experiences compelling environmental education creates the basis for a beneficial 'contagion' of intra-catchment communications that then encompasses a majority of local population, leading to wide currency and consideration of issues which includes those who are beyond the scope of direct participation.

7.4 Use Multiple (and Creative) 'Hooks' to Engage People

Consistent with the observations on the psychology of engagement, outreach must cater to the multiple intelligences and aptitudes of the community and seek to involve people on their own terms. Hence, engagement need not necessarily be restricted to the primary topic of water (though this will be sufficient for many), but may extend to include topics which may indirectly promote concern for local aquatic resource, for example:

- Local history and folklore: what are the stories associated with the river and its riparian zones? Were there battles, enchantments, trysts ...?

- Architecture: when and by whom were the bridges built? The mill buildings, weirs and aqueducts?
- Music: are there songs, tunes, airs about the local river?
- Nature studies: involve and engage those with an interest in birds, plants, trees ...
- Art, poetry, photography ...

7.5 Acknowledge the Value of Schools, Corporate, Community and Voluntary Groups

Schools, corporate, and community and voluntary groups have a key role to play in engendering public engagement with water-quality issues. These micro-communities provide a ready-made forum for engagement. Primary schools are the source of the most enthusiastic participants (*'My BEST day of school...ever!'*) and students represent an important conduit for conveying messages to parents and the wider community. However, adult groups hold the key to promoting multisectoral consideration of a given catchment's strengths and weaknesses, and contributing to determining the measures needed to address the issues.

7.6 Use Jargon-free Language

To successfully engage citizens, stakeholder communications must be *jargon free*. As Ó Cinnéide (2014, p. 121) noted: 'One of the key barriers to progress in public engagement is simply that of language'. Sustainable Water Network (SWAN, 2007) research found that 'Out of the four technical terms put to the public, 67% of those surveyed did not understand any of them. Only 45% were aware of what River Basin District they lived in':

Water Framework Directive: too many syllables (!) ... eyes glaze over and people think about what else they could be doing. 'Fish'...'Bug'; just right! *This isn't a question of 'dumbing down'; it's just that a guild of high-level scientists and water managers have evolved a lexicon which flies over the heads of the people they must engage.*

In the course of public outreach on water quality issues, the use of terms such as 'Water Framework Directive' is enough to dissuade people from connecting, and it is recommend that engagement be based upon simple terminology.

7.7 Redouble Efforts to Propagate 'Best-practice' Principles

It is important to redouble efforts to propagate **'best-practice' principles** in pursuit of livelihood, recreation, and domestic management (to minimise anthropogenic impacts). Ó Cinnéide (2014, p.132) remarks: 'Knowledge about water quality issues is seen as a prerequisite to action, innovation and changes in behaviour in regards to water usage.' There is a lot of good literature and advice being produced now, for example, Teagasc's good-management practices on farms, and Local Authorities on septic tanks, but all of this must be expanded to ensure that we have a smart society (*'ultrastructure'*), whose members – of their own volition – do everything they can to minimise their impacts (for example, see: <http://www.fisheriesireland.ie/fisheries-management-1/463-minding-our-watercourses/file>).

7.8 Honest Brokers

Consider that ‘engagement’ may best be driven and led by perceived ‘honest brokers’ – for example, Rivers Trusts, environmental NGOs, social scientists, community leaders, agricultural advisors, etc., supported by catchment science and state agencies. In a presentation to the Integrated Catchment Management (ICM) Conference in 2014, Horton commented that ‘When peace came to Northern Ireland we found ourselves with a lot of idle Social Scientists, so we’ve teamed them with the Catchment Scientists to develop engagement techniques’ (Horton, 2014).

While state agencies must facilitate and oversee CM, over-conspicuousness of agency personnel in these processes will inevitably restore the top-down Status Quo which has fallen short of achieving essential water quality and habitats objectives. The River Basin Plan for Scotland calls for awareness-raising on diffuse pollution (Natural Scotland, 2009). A SEPA official described how they went about this task: ‘We did that at a local level. We used local champion farmers and we got the NFUS to organise them. They can mobilize and text people. We had afternoon events. We might have 60 or 70 farmers coming, on a farm’ (Ó Cinnéide, 2014, p. 147).

And this aspiration references the assertion from the ‘StreamScapes Ethos’ section of this study which advocates a neutral, honest-broker ‘fourth estate’ to complement the three chief environmental arena components of policy, regulation and enforcement.

7.9 ‘Joined-up’ Thinking

Joined-up thinking could be, for example, linking green agricultural incentives with deliberate local (water-quality and habitats/species) objectives: This is self-evident and would provide ready means to introduce a financial carrot to contribute to an integrated process, but time is short...farmers are resentful at being penalised for allowing land to revert to ‘natural’/ungrazed state to facilitate habitats and water quality objectives, and their goodwill is under threat!

7.10 Pilot Initiatives

Pilot initiatives might be considered, whereby mini-catchment communities largely formulate their own **local CM Plans** (with catchment science input). It could be argued that a radical departure is needed in current CM approaches, so a core recommendation of this study is for the EPA WFD Integration & Coordination Unit to commission a small number of pilot CM projects which bring into play all of the *ethos*, *methodology*, and engagement techniques cited herein (to lay an informed foundation), and follow this up with a facilitated process that enables pilot catchment communities to author their own plans.

7.11 River Basin Governance

With regard to **River Basin District Governance**, this report offers three linked and inseparable recommendations:

- a As the WFD implementation 'governance hub', the EPA WFD Integration & Coordination Unit (WFD I&C Unit) must be adequately resourced and staff offered mid- to long-term tenure to ensure continuity during the imminent steep (social) learning curve;
- b As it appears at this writing that it will fall to Local Authorities to drive and deliver 'on-the-ground' public engagement (in addition to implementing a wide range of support measures), adequate funding and staffing must be allocated to enable these functions to achieve excellence; and
- c Finally, that there be established a formal, centralised, and highly accessible collation (database) of all public engagement efforts to enable wide and continuous 'social learning' across governance bodies and all sectoral actors.

Ó Cinnéide (2014, p. 27) notes that:

The RBD networks were based on geographic and administrative criteria, but were not designed with any explicit principles of how to foster collaboration. Over €53 million was spent by the lead Department (Environment) on consultancy teams to support the early delivery of RBD projects, but the learning that was embodied in these consultancy-led teams was quickly lost, as the project teams were gradually disbanded after 2008.

He goes on to comment that:

While the State invested an eye watering sum ... in consultancy services to support the River Basin projects in the decade after 2002, there was a consistent policy at central government of not recruiting permanent, core staff for the WFD agencies or for the fledgling River Basin bodies. This approach of reliance on short term consultancy teams has militated against the creation of a community of practice and has hampered social learning in the River Basin structures.

(Ibid., 2014, p. 155)

Original estimates suggested that 30 personnel would be needed to adequately implement the ambit of the WFD ICU, but current staff number only six permanent and five temporary staff. Moreover, at the time of writing it is further understood that Local Authorities will have a major role to play in the public engagement aspect of River Basin Management as well as other support functions. Hence, this process is going to require sufficient endowment, as well as considerable perseverance *and continuity*, to hold and convey the benefits of accrued *social learning* which resides at the heart of the previously cited EU guidance literature.

Finally, to achieve full realisation of the 'adaptive management' concept (identified by Von Korff et al. 2012), there is a perceived requirement for the creation of a widely accessible Database of Public Engagement Initiatives to facilitate and propagate the 'social learning' process amongst managers as well as all stakeholders. This would be a record of what works and what doesn't in terms of engagement initiatives. Therefore, this prescription concludes with this final important recommendation.

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Acronyms and Annotations

CM Catchment management

ICM Integrated catchment management

RBD River basin district

SAC Special Area of Conservation

SWAN Sustainable Water Network

WFD Water Framework Directive

Appendix 1 Case Study: ‘StreamScapes Ilen – A Celebration of the River Ilen Catchment & Coastal Zone’ (2013–2014 and ongoing)

As a preface to this case study the author wishes to make it clear that the brief of StreamScapes projects generally is that they produce effective and compelling aquatic & biodiversity educational lessons for participants, and a forum for discussion of related issues, but that they neither claim nor seek licence or empowerment to broker comprehensive CM processes. StreamScapes expertise lies in engaging the citizens of a given catchment with a foundation of enhanced awareness, and if this holds any value beyond enriching participants’ personal appreciation of local waters and wildlife (and possibly altering behaviours) it lies in better preparing them for formal CM initiatives that may ensue.

The River Ilen Catchment is a good representative example of a typical spate river (see below, ‘The River Ilen Catchment & Coastal Zone’), with extensive hill grazing and forestry in the upland areas, dairying well represented in lower areas, and a demographic consisting of a largely rural population along with several villages (population<500) and one major town (>2,000, Skibbereen), containing a smattering of industry (quarrying, cement products, boat yards), aquaculture and fishing. There are 19 chiefly small rural primary schools and 3 town-based secondary schools.

The ‘**StreamScapes Ilen**’ Project was funded by West Cork Development Partnership Ltd under Rural Development Funding instrument (there may be an important precedent here for finding the means to endow similar initiatives in catchments around the State). The project was sufficiently resourced, enabling it to achieve several key elements of the methodology:

- 1 The project was catchment specific, concerning itself with the River Ilen catchment and coastal zone (including offshore inhabited islands; see project map below).
- 2 Of the catchment population 6.5% were engaged in direct participation in ‘hands-on’ field trip as well as classroom-based theory session (807 participants out of a total catchment population of c. 12,200, spread across all rural sectors).
- 3 All 22 schools in the catchment took part in the project, though weather and logistics restricted the degree of participation with a small number of these.
- 4 Five corporate groups and five community & voluntary groups were included in the project to date; further interested groups will be engaged in 2015, but with funding concluded this is undertaken by voluntary StreamScapes staff.
- 5 Participants across this range of schools and adult groups were engaged in:

- Theory sessions which explored introduction to the Water Cycle, 'best-practice' measures, opportunities for personal experience/account;
 - Field trip (instream & riparian) to realise the learning; and
 - Project work to add further meaning to the lessons.
- 6 The endeavour was supplemented by the production and distribution of 2,000 copies of a dedicated, localised catchment environmental booklet, together with an insert A2 map (Fig. A.1) of the catchment (this project-specific publication, together with other details of the project, may be accessed at <http://streamscapes.ie/streamscapes-ilen/>). Apart from provision of a copy for each direct participant, these booklets were furthermore distributed through creameries, shops, and other various venues to assist in building currency of issues with the wider population.
- 7 The 'StreamScapes Ilen' project produced a Catchment Festival, involving several hundred direct participants (from schools and adult groups) but also providing a venue for wider public attendance in celebration of the catchment (Figs A.2–A.5). The focal point was the project work of the schools (including eco-art and biodiversity project reports), supported by circus entertainers, traditional music and set-dancing to create an environment conducive to collective affirmation/celebration of local aquatic and biodiversity assets.

Sample StreamScapes Teaching Staff Report

'As field trip work provided live samples of the aquatic invertebrates for the children it created a platform for deep learning. The pupils were able to apply the knowledge gained in the beginning of the lesson by looking at/holding live samples which they collected from their nearby rivers. From an educational basis the presentation targeted the three learning domains of Cognitive, Psychomotor and Affective. The Affective aspect was fulfilled by allowing the pupils to openly discuss the impact of water pollution in their locality and also by how they themselves could make an impact on preventing pollution and conserving water. One of the main observations made was that the majority of the participating students could identify and justify each of the bio-monitors by the end of the lesson.'

- 8 Apart from the festival, and the school- and adult group-engagement, the outreach was further supplemented by the production of three dedicated general public-awareness events which engaged citizens 'on the street' in the principle town as well as at a rural venue jointly hosted by a local dairy and a tourism group. These occasions provided further opportunity to distribute the dedicated 'Ilen' publication and to engage with citizens on water-quality issues.

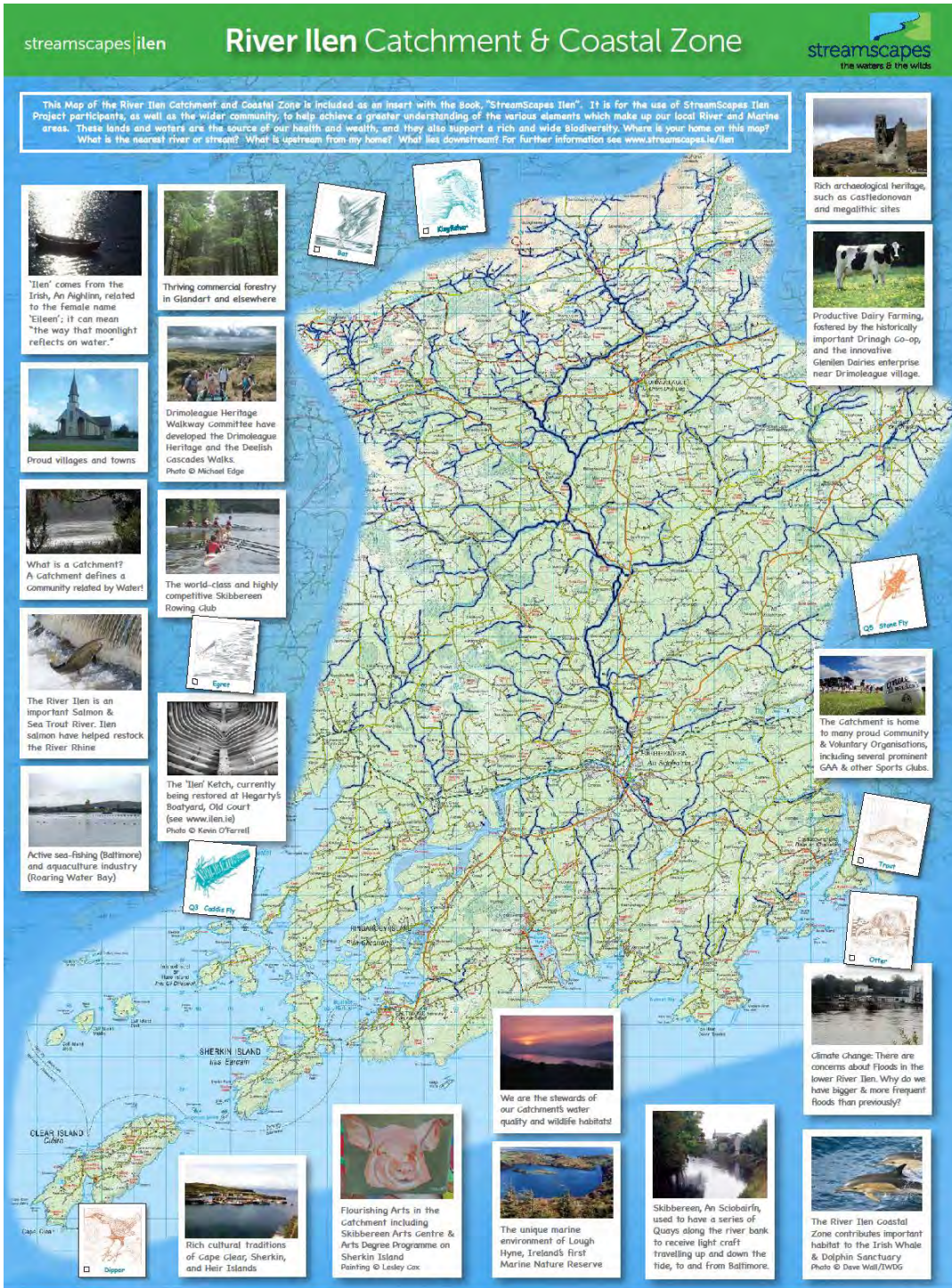


Figure A.1. An A2 Map, with highlighted rivers & streams, accompanied a dedicated local environmental booklet, reinforcing the core 'Catchment Consciousness' message (Spatial Data © Ordnance Survey Ireland/Government of Ireland Copyright Permit No. MP 0007813).



Figures A.2 and A.3. StreamScapes engagement stresses 'hands-on' field experience...unforgettable!



Appendix 2 Sample StreamScapes Projects

StreamScapes Bantry Bay Catchments (1989–1995)

StreamScapes Ilen 1 (1996)

StreamScapes Coomhola/Ouvane/Glengarriff (1997)

StreamScapes Martin/Shournagh (River Lee tributaries) (1998)

StreamScapes *Corcaigh* (1999-2001)

StreamScapes *Gaillimh* (2001-2003)

StreamScapes Bhutan (2002-2003; StreamScapes resources & methodology utilised in Bhutanese river communities)

StreamScapes Bandon (2004)

StreamScapes Upper Lee (2005-06)

StreamScapes Flesk (2007)

StreamScapes Slaney (2008)

StreamScapes Kenmare River (2009)

StreamScapes *Cnoc Bui* (2010)

StreamScapes Ouvane (2011)

StreamScapes *Abha na Saileach* – River of the Willow (2012-2014)

StreamScapes Beara Catchments (2013)

StreamScapes Ilen 2 (2013-2014)

StreamScapes Erne (2014-ongoing; w/ N. IRE. Environment Link)

StreamScapes Ulster Blackwater (2014-ongoing, w/ Monaghan Co. Co./DEHLG)

StreamScapes Laune (2014-ongoing; w/ Kerry Co. Co. & Killorglin Tidy Towns)

'Farming & Biodiversity Competition' (2010-2014: Annual competition for 2nd level Agricultural Science students; w/ EPA & NPWS)

StreamScapes Loobagh (River Maigne tributary) (2015): w/ Limerick Co. Council

Please see www.streamscapes.ie for further details.

Appendix 3 StreamScapes Publications

- StreamScapes Basic – The WaterCourse (1995)
- StreamScapes Basic Teacher's Guide (1998)
- StreamScapes Advanced – A Stakeholder's Handbook (1999)
- StreamScapes Advanced Teacher's Guide (2001)
- StreamScapes Catchment Assessment Manual (2004)
- StreamScapes Basic (2nd edn) (2007)
- StreamScapes Ilen: The River Ilen Catchment & Coastal Zone (2013)
- Who Lives in my Townland? An Introduction to Biodiversity (2014)
- StreamScapes Erne (2015)
- StreamScapes Ulster Blackwater (2015)
- StreamScapes Loobagh (2015)
- StreamScapes Laune (2015)
- StreamScapes Múinteoir (2015)
- StreamScapes X-Stream: How to Assess & Conserve Your Local Stream (2015)



Public Engagement in Integrated Catchment Management: StreamScapes Recommendations

EPA Small Scale Study - 2014-W-SS-16

Front Cover: StreamScapes Teacher-training event for Beara Nat'l. School Teachers, 2001.

This page: Field trip in support of 'StreamScapes Ulster Blackwater Project', Co. Monaghan 2014

Photo credits: Stephanie O'Toole, Jessica Mason, Amelia Boyden, Anneke ten Brinke,

Aaron O'Sullivan, Andrew McCaul, Mark Boyden

AN GHNÍOMHAIREACTH UM CHAOMHNÚ COMHSHAOIL

Tá an Gníomhaireacht um Chaomhnú Comhshaoil (GCC) freagrach as an gcomhshaoil a chaomhnú agus a fheabhsú mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaoil a chosaint ó éifeachtaí díobhálacha na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

Rialú: Déanaimid córais éifeachtacha rialaithe agus comhlíonta comhshaoil a chur i bhfeidhm chun torthaí maíthe comhshaoil a sholáthar agus chun díriú orthu siúd nach gclóíonn leis na córais sin.

Eolas: Soláthraimid sonraí, faisnéis agus measúnú comhshaoil atá ar ardchaighdeán, spriocdhírthe agus tráthúil chun bonn eolais a chur faoin gcinnteoireacht ar gach leibhéal.

Tacaíocht: Bímid ag saothrú i gcomhar le grúpaí eile chun tacú le comhshaoil atá glan, táirgiúil agus cosanta go maith, agus le hiompar a chuirfidh le comhshaoil inbhuanaithe.

Ár bhFreagrachtaí

Ceadúnú

- Déanaimid na gníomhaíochtaí seo a leanas a rialú ionas nach ndéanann siad dochar do shláinte an phobail ná don chomhshaoil:
- saoráidí dramhaíola (m.sh. láithreáin líonta talún, loisceoirí, stáisiúin aistriúcháin dramhaíola);
- gníomhaíochtaí tionsclaíocha ar scála mór (m.sh. déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta);
- an diantalmhaíocht (m.sh. muca, éanlaith);
- úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe (OGM);
- foinsí radaíochta ianúcháin (m.sh. trealamh x-gha agus radaiteiripe, foinsí tionsclaíocha);
- áiseanna móra stórála peitрил;
- scardadh dramhuisce;
- gníomhaíochtaí dumpála ar farraige.

Forfheidhmiú Náisiúnta i leith Cúrsaí Comhshaoil

- Clár náisiúnta iniúchtaí agus cigireachtaí a dhéanamh gach bliain ar shaoráidí a bhfuil ceadúnas ón nGníomhaireacht acu.
- Maoirseacht a dhéanamh ar fhreagrachtaí cosanta comhshaoil na n-údarás áitiúil.
- Caighdeán an uisce óil, arna sholáthar ag soláthraithe uisce phoiblí, a mhaoirsiú.
- Obair le húdaráis áitiúla agus le gníomhaireachtaí eile chun dul i ngleic le coireanna comhshaoil trí chomhordú a dhéanamh ar líonra forfheidhmiúcháin náisiúnta, trí dhírú ar chiontóirí, agus trí mhaoirsiú a dhéanamh ar leasúcháin.
- Cur i bhfeidhm rialachán ar nós na Rialachán um Dhramhthrealamh Leictreach agus Leictreonach (DTLL), um Shrian ar Shubstaintí Guaiseacha agus na Rialachán um rialú ar shubstaintí a ídionn an ciseal ózóin.
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaoil.

Bainistíocht Uisce

- Monatóireacht agus tuairisciú a dhéanamh ar cháilíocht aibhneacha, lochanna, uiscí idirchriosacha agus cósta na hÉireann, agus screamhuiscí; leibhéal uisce agus sruthanna aibhneacha a thomhas.
- Comhordú náisiúnta agus maoirsiú a dhéanamh ar an gCreat-Treoir Uisce.
- Monatóireacht agus tuairisciú a dhéanamh ar Cháilíocht an Uisce Snámha.

Monatóireacht, Anailís agus Tuairisciú ar an gComhshaoil

- Monatóireacht a dhéanamh ar cháilíocht an aeir agus Treoir an AE maidir le hAer Glan don Eoraip (CAFÉ) a chur chun feidhme.
- Tuairisciú neamhspleách le cabhrú le cinnteoireacht an rialtais náisiúnta agus na n-údarás áitiúil (m.sh. tuairisciú tréimhsiúil ar staid Chomhshaoil na hÉireann agus Tuarascálacha ar Tháscairí).

Rialú Astaíochtaí na nGás Ceaptha Teasa in Éirinn

- Fardail agus réamh-mheastacháin na hÉireann maidir le gáis cheaptha teasa a ullmhú.
- An Treoir maidir le Trádáil Astaíochtaí a chur chun feidhme i gcomhair breis agus 100 de na táirgeoirí dé-ocsaíde carbóin is mó in Éirinn

Taighde agus Forbairt Comhshaoil

- Taighde comhshaoil a chistiú chun brúnna a shainnithint, bonn eolais a chur faoi bheartais, agus réitigh a sholáthar i réimsí na haeráide, an uisce agus na hinbhuanaitheachta.

Measúnacht Straitéiseach Timpeallachta

- Measúnacht a dhéanamh ar thionchar pleananna agus clár beartaithe ar an gcomhshaoil in Éirinn (m.sh. mórfheananna forbartha).

Cosaint Raideolaíoch

- Monatóireacht a dhéanamh ar leibhéal radaíochta, measúnacht a dhéanamh ar nochtadh mhuintir na hÉireann don radaíocht ianúcháin.
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taimí núicléacha.
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta.
- Sainseirbhísí cosanta ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

Treoir, Faisnéis Inrochtana agus Oideachas

- Comhairle agus treoir a chur ar fáil d'earnáil na tionsclaíochta agus don phobal maidir le hábhair a bhaineann le caomhnú an chomhshaoil agus leis an gcosaint raideolaíoch.
- Faisnéis thráthúil ar an gcomhshaoil ar a bhfuil fáil éasca a chur ar fáil chun rannpháirtíocht an phobail a spreagadh sa chinnteoireacht i ndáil leis an gcomhshaoil (m.sh. Timpeall an Tí, léarscáileanna radóin).
- Comhairle a chur ar fáil don Rialtas maidir le hábhair a bhaineann leis an tsábháilteacht raideolaíoch agus le cúrsaí práinnfhreagartha.
- Plean Náisiúnta Bainistíochta Dramhaíola Guaisí a fhorbairt chun dramhaíl ghuaiseach a chosc agus a bhainistiú.

Múscailt Feasachta agus Athrú Iompraíochta

- Feasacht chomhshaoil níos fearr a ghiniúint agus dul i bhfeidhm ar athrú iompraíochta dearfach trí thacú le gnóthais, le pobail agus le teaghlach a bheith níos éifeachtúla ar acmhainní.
- Tástáil le haghaidh radóin a chur chun cinn i dtithe agus in ionaid oibre, agus gníomhartha leasúcháin a spreagadh nuair is gá.

Bainistíocht agus struchtúr na Gníomhaireachta um Chaomhnú Comhshaoil

Tá an ghníomhaíocht á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóirí. Déantar an obair ar fud cúig cinn d'Oifigí:

- An Oifig Aeráide, Ceadúnaithe agus Úsáide Acmhainní
- An Oifig Forfheidhmithe i leith cúrsaí Comhshaoil
- An Oifig um Measúnú Comhshaoil
- An Oifig um Cosaint Raideolaíoch
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag comhaltaí air agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair inní agus le comhairle a chur ar an mBord.

Identifying Pressures:

Water is an essential commodity: human life – and indeed all life on earth – depends upon it. The question is “how will we deal with it such that it sustains us now and in the future?” Effective water management is critical to the future well-being of Irish society. We need an adequate supply of good quality, safe water - for drinking, to protect biodiversity under the Habitats and Birds Directives, to obtain ‘good quality’ status for all waterbodies as specified by the Water Framework Directive (WFD), and for industrial and agricultural use, especially in the context of Food Harvest 2020 (FH2020) goals.

Informing Policy:

The Integrated Catchment Management (ICM) approach has been proposed (Harris, 2013; Daly, 2013) as being required to achieve effective water and catchment management, and implement the WFD. A key focus in ICM is developing a vision for the catchment, by involving local stakeholders. Article 14 of the WFD also specifies that consultation and involvement of the public be included as part of implementation, but EU WFD guidance states ‘no blue-print exists for public participation, and... the public participation process should be organised and adapted to national, regional and local circumstances.’ This study provides a practical guide to what works when engaging local communities around Ireland.

Developing Solutions:

Broadening the scope of possible management strategies by including different interests and stakeholder groups helps policy makers to develop flexible ways of managing the environment. This small scale study draws on StreamScapes’ 25 years of experience of delivering environmental education programmes around Ireland, focused on the aquatic environment and biodiversity. StreamScapes have helped local populations understand these issues at catchment scale. This report details the techniques they have developed for public engagement, and recommendations for the future.

