PILOT ACTION 1

REPORT

September 2005

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SECTION 1 – INTRODUCTION

1.1 THE ICREW PROJECT

Improving Coastal and Recreational Waters (ICREW) is a project funded by the European Union's INTERREG IIIB programme for the Atlantic area (figure 1), which includes the United Kingdom, Republic of Ireland, Portugal, France and Spain. The project's key aim is to improve the quality of bathing and recreational waters, by developing the tools and techniques that will assist member states in complying with the requirements of the Bathing Water Directive.

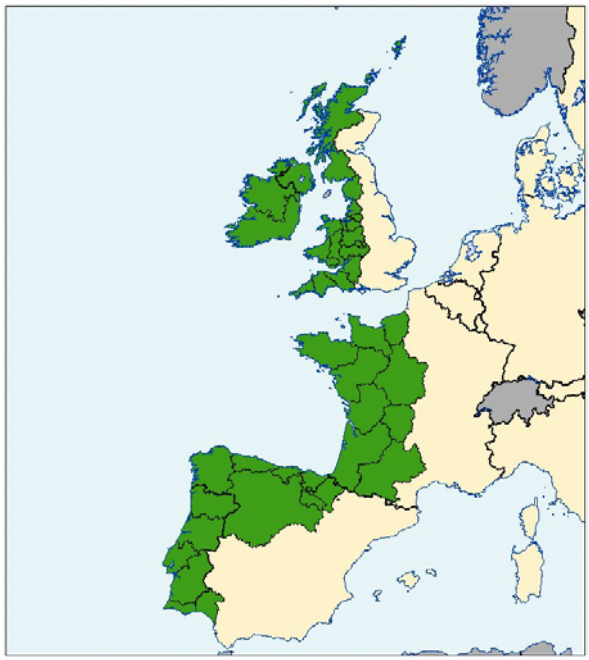

Figure 1 -INTERREG IIIB Atlantic Area

Nineteen partner organisations from across the five Atlantic Area member states are involved in ICREW and each brings expertise and experience from their own regions and organisations.

Work within the project is structured into seven sub-projects (Pilot Actions or PAs), each dealing with a different aspect of bathing water quality and management.

1.2 KEY PROJECT DRIVER

In all Member States of the EU the quality of designated bathing waters are monitored against standards set in the EC Bathing Water Directive (76/160/EEC).

However, 100% compliance with the mandatory standards in the Directive has not yet been achieved and further work is required.

Significantly, a revision to the Directive was agreed in October 2005. This will require compliance with tighter water quality standards and also necessitate the provision of more information to the public than previously required. Active management of beaches and bathing waters will also be key to future compliance with the new Directive.

The ICREW project aims to assist member states in improving their compliance with the Bathing Water Directive. More importantly it aims to provide the tools and techniques to assist member states to comply with the requirements of the new Bathing Water Directive.

1.3 PILOT ACTION 1

This report represents the output from the first of the ICREW Pilot Actions – Sampling and Data Review. In addition to providing baseline information for the other six Pilot Actions in ICREW, the key aims are to:

- Examine and understand how different EU Member States manage their bathing waters and highlight any differences in practice.
- Understand the practical issues of bathing/recreational water quality in each of the Member States.
- Understand the consequences of, and facilitate the implementation of, the proposed new Bathing Water Directive.

The Pilot Action was carried out from August 2003 to September 2004, beginning with staff exchange visits between the UK, Portugal and France. Information was gathered and exchanged through presentations, discussions, observations of sampling technique and visits to bathing water sites, laboratories, sewage treatment works (STW), and farms.

A comparison was made between the three countries, highlighting similarities, differences and examples of best practice, enabling recommendations to be made regarding the interpretation and implementation of the new Bathing Water Directive.

Ireland and Spain did not take part in the exchange visits but provided data which in specific circumstances allowed comparisons between all five countries within the Atlantic Area.

1.4 KEY RECOMMENDATION

This report highlights variations in the application of the current Bathing Water Directive which exist between all three (in some instances five) member states involved in Pilot Action 1 (PA1).

These variations have arisen through differing interpretations of the requirements of the Bathing Water Directive. These variations can result in differing amounts of resource being expended by member states to secure compliance, potentially resulting in skewed impacts on local environments and economies.

In addition, the unilateral development of mechanisms by member states to ensure compliance is inefficient.

Based on the findings of this report, it is recommended that a series of best practice guidance documents on implementation of the new Bathing Water Directive should be drawn up to accompany the Directive. These should be made freely available to member states.

This would encourage a more efficient system of implementation and a consistent approach to management and compliance within member states.

The guidance notes will not be mandatory in application but should assist member states by:

- ensuring the resource is not wasted by developing techniques and protocols that already exist elsewhere
- ensuring that the Directive is implemented in a consistent manner across all member states, without undue economic, environmental or health impacts on any one member state.

A number of recommendations for effective implementation of the new Directive are outlined in section 3. They cover a variety of topics including length of bathing season, sample discounting, designation of bathing waters, sample frequency and provision of public information.

1.5 THE PARTNER COUNTRIES

1.5.1 England

In England the partner involved in Pilot Action 1 was the Environment Agency (EA), a public body sponsored by the Department for Environment, Food and Rural Affairs (Defra) and the National Assembly for Wales (NAW). The EA works closely with the local authorities, businesses and interest groups to inform and educate, but also to monitor the implementation of related regulation.

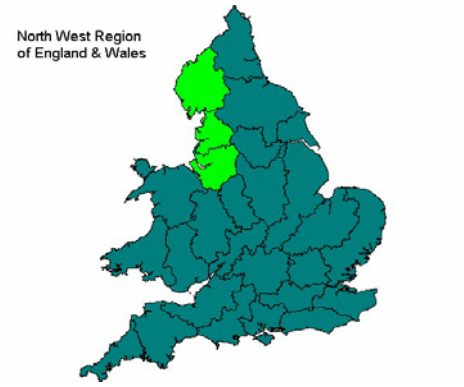

Figure 2 - The NW region of England and Wales

The exchange visits in the UK were carried out in the North West (NW) region of England (figure 2). The topography is variable, ranging from flat lowlands near the coast and Cheshire, to uplands, such as the Yorkshire Dales and the Pennines. The region contains several significant river catchments, including the Eden, the Lune, the Ribble and the Mersey. Much of the NW has low-permeability underlying rock, resulting in rapid river flow response to rainfall events. There are also a number of lakes, ponds and reservoirs in the region. Many of these are in the Lake District, the largest being Lake Windermere.

The NW is bordered by the Irish Sea, a semi-enclosed shelf sea area.
The climate in the region is cool to mild, with temperatures ranging from a minimum average of 0°C in January to a maximum average of 18.9°C in July. Rain is frequent (average rainfall: 800mm/y), but strong local variability exists. The main land use is agricultural (80% of land cover), principally for livestock farming. Additional important industries include fisheries and tourism. The average population density is 1,596 per km^2, making this the most densely populated area of the three visited as part of PA1.

Due to its diversity of habitats, 80% of the region's coastline has been designated as a Special Areas of Conservation (SAC) or Special Protection Areas (SPA) due to the European importance for wildlife and international importance for bird populations.

1.5.2 France

The French partners were the Brittany Regional Department of Sanitation (DDASS) and the Brittany Regional Department of Social Affairs (DRASS). These are government bodies which operate under the French Ministry of Health and Social Protection. DDASS and DRASS are responsible for dealing with water sanitation issues and regulating the implementation of related laws.

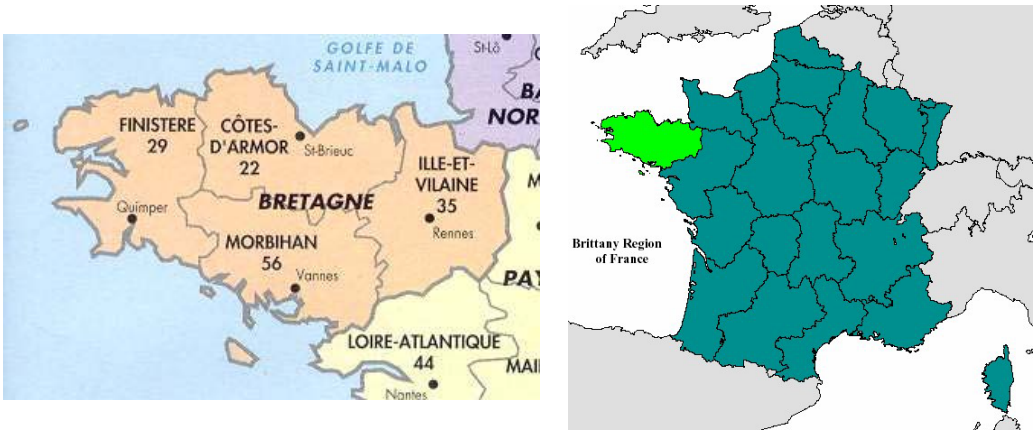

Figure 3 -Map of Brittany (Bretagne) region

The exchange visits were carried out in the region of Brittany, located in the NW of France (figure 3). Brittany has a 2,730 km coastline, comprising one third of the coastline of mainland France and exhibiting the largest tidal range in Europe (maximum: 12 m).

The region is divided by numerous valleys, forming a complex network of brooks, streams, rivers and basins. In addition to the sedimentary basins that feed the main rivers Vilaine, Aulne and Blavet there are hundreds of smaller coastal basins. The low permeability underlying rock ensures rapid run-off of rainfall, which tends to be highest in the winter months. Certain rivers, particularly in the east, have severely low water levels, affecting the supply of drinking and industrial water. The coastal waters of Brittany are strongly affected by local currents, caused by wind and tides.

The Breton climate is oceanic mild with frequent rain. Annual average temperatures vary from 9-10°C in the centre of the region to 11-13°C on the coast, with minimal winter temperatures rarely below -4°C. Precipitation levels exhibit marked local variations, for example the extreme west receives 1500 mm/y, in contrast to 750 mm/y in central Brittany. The average population density is 105 inhabitants per km^2; however this number increases considerably during the summer months.

The main land use is agriculture (83% of land cover), predominantly for livestock farming. Brittany has a large number of recognised nature sites that have been designated as Natural Zones of Interest in Fauna and Flora by the French Government, including 41 islands and 61 sites of coastal mud flats.

1.5.3 Portugal

The Portuguese partners were the Instituo do Ambiente (IA), Instituto da Agua (INAG), Direcção-Geral de Saúde (DGS) and Instituto Superior Técnico (IST). IA, INAG and DGS are public bodies, whose functions vary from providing technical support on environmental policy issues to managing water resources and promoting conservation. IST forms part of Lisbon Technical University, conducting research on the hydrodynamics of aquatic environments.

Figure 4 – The Alentejo region of Portugal

The exchange visit in Portugal was carried out in the Alentejo region located in the South of Portugal (figure 4). The coastline extends over 165 km along the Atlantic Ocean and is exposed to high energy waves. The topography consists of gentle hills and large plains and the main land use is agriculture (89% of land cover), including the production of cork, grains, olives, fruit and livestock farming. The main rivers catchments in Alentejo are the Guadiana, the Sado and the Mira. Most of the rivers have minimal flow in the summer months. The region also contains 23 reservoirs, which are mainly used for agricultural irrigation.

In Portugal the climate is hot and dry with average temperatures between 21-25°C, with maxima in July and August reaching 37.5-4°C. However, along the Alentejo coast, summers are cooler and winters are milder, the average annual temperature being 16°C. The maximum precipitation occurs along the coast in January (129.6 mm) and the minimum in July (4.4 mm). The average population density is extremely low (19.5 individuals per km^2), although urban areas along the coast become considerably more populated during the summer months.

The sand dunes and rocky beaches of coastal Alentejo have seen limited human intervention, and have hence been designated as a SAC or SPA with important species of fauna and flora.

SECTION 2 – COMPARISON BETWEEN MEMBER STATES

Variation in each country methods for ensuring effective bathing water compliance, management and monitoring are outlined below. Examples of best practice are also included.

2.1 BATHING WATER COMPLIANCE

Compliance with the mandatory bacteriological water quality standards is shown below. Compliance is consistently high across all three countries.

2003	UK	France	Portugal
Mandatory Compliance (%)	97	96/88*	100
Guideline Compliance (%)	49	61	33

* - 96% at coastal sites and 88% at inland sites

All three countries have made improvements in compliance over the past 10 years, which can be attributed mostly to investment in sewage infrastructure and treatment.

However, compliance with guideline standards indicates that there is still considerable improvement work to be done before these standards are met at all sites.

This is important as the standards outlined in the new Bathing Water Directive are comparable to the guideline standards referred to above.

2.2 REASONS FOR NON-COMPLIANCE

2.2.1 Sewage Pollution

In England and France substantial investment over a number of years has lead to significant improvements in the sewerage network and at STWs. In Portugal improvements are being made, but these are more recent.

Figure 5 – Activate Sludge STW (Secondary treatment)

Upstream of Zambujeira Do Mar, Portugal

The most densely populated region is the NW of England which may increase pressure on sewage infrastructure and treatment. The highest density of the populations in Brittany and Alentejo are found mainly in the coastal areas. Large summer population influxes, especially in rural parts of Portugal and Brittany, can have an impact on the performance of STWs. This can also be seen in England, on a smaller scale, with septic tanks at rural caravan sites. Pilot Action 6 is looking into sustainable sewage solutions in areas where mains sewerage is not available.

Figure 6 – Septic tank overflowing due to overloading

In England UV radiation is the most widely used disinfection technique. In France, chlorination is the most developed technique. However, UV disinfection and sand filtration have recently been used to improve chlorination. In Portugal, chlorination is widely used but UV disinfection is now also being carried out.

2.2.2 Agriculture

The predominant land use across all three countries is agricultural/rural varying between 80% and 89% of land use. The majority of these areas are for used for livestock, and are associated with high bacterial counts through animal access into streams and direct run-off of faecal matter from farmyards and land. However, Alentejo is less intensively farmed than Brittany or the NW of England.

Figure 7 – Stream contaminated by faecal matter due to cattle access

In each country information and guidance, such as a Code of Good Agricultural Practice is available to farmers but there was variation in how this was disseminated. An advantage in England is that the environmental regulation and guidance to farmers comes from one source. However due to pressure on resources, farm visits tend to be reactionary in response to pollution incidents rather than preventative.

Brittany has minimal land available for spreading wastes from intensive farming, and the high number of watercourses increases the risk of contamination. This has led to problems with high nitrate and phosphate levels causing algal blooms. However, diffuse pollution is not considered to be an important influence on the bacterial quality of bathing waters, accounting for only 8% of failures in Brittany. In England diffuse pollution from agricultural run-off is considered to be a significant contributory factor in the bacteriological quality of bathing water.

In England a lack of slurry storage capacity is considered a major issue, which pressures farmers into spreading organic wastes to land during unsuitable weather conditions, particularly over winter. Currently there is little money available, due to low farm incomes and lack of grants, for investing in such farm structures.

2.2.3 Other sources of pollution

In each country dogs are generally banned on beaches during the bathing season, particularly on urban beaches. This is dependent on the Local Authority that manages the beach. However, enforcement is difficult in all countries as the law is not well respected, and fines are seldom imposed.

In Portugal and France horses are often banned but sometimes allowed on beaches early in the morning and in the evening.

In England it has been found that birds roosting on the piers at Blackpool can affect the quality of the three designated bathing waters in the vicinity.

Spring tides in England have been associated with bathing water exceedences due to flooding of coastal marshes where sheep graze. This causes droppings to be picked up and deposited on beaches. Additionally, the silty waters of the Irish Sea provide a substrate which can enhance the survival rate of bacteria.

2.3 Bathing Water Management and Monitoring

2.3.1 Bathing water designation

In each country bathing waters are designated where people are known to bathe, and where there is easy access. The current Directive states that sites should be designated where they are used by "a large number of bathers".

However, in Portugal an average of 100 bathers is considered applicable; in France it is taken to be greater than 10 people. However, many designated sites in England, particularly rural sites, have less than 10 bathers on average. In all countries the presence of facilities such as toilet blocks and car-parking are also taken into account but the main criteria is bathing water use.

In Portugal if a bathing water area is found to be of poor quality prior to designation, then it is classed as a "Recreation Zone", rather than designated as a bathing water. In this zone any contact with water is prohibited. Choosing not to designate a bathing water may be a suitable option where there are a large number of sites and the public are able to find an alternative beach. It may be better to invest in improving good sites than continue to invest in areas which may always have poor water quality due to their geographical position, or high natural background levels of bacteria, for example from bird populations.

2.3.2 Classification of Bathing Waters

Under the current Bathing Water Directive there are 3 categories of water quality; guideline (excellent), mandatory (good) and failure (poor). England and Portugal adhere to these categories when reporting classification (however different colours are used on results leaflets).

France reports a fourth category with classifications of; high quality, average quality, momentarily polluted, and low quality but only three classifications are submitted to the EU. Using different classification systems increases the complexity of comparing results between Member States.

2.3.3 Roles and responsibilities of organisations

In England, the same organisation (the EA) takes samples, produces reports, investigates pollution incidents and regulates discharges to controlled waters. The day to day beach management, including cleaning and posting of results is the responsibility of the Local Authority (LA). There is a perceived lack of communication between authorities and a delay in displaying results, which has implications for public confidence. Where algal blooms are present at a bathing water site, required analysis is also undertaken by the EA. However, if subsequent action is required then responsibility lies with the health department of the LA. There is the potential for a lack of co-ordination between the two authorities.

In most counties in France, it is the responsibility of the county Environmental Health service of DDASS to undertake the sampling, interpret the results and, if necessary, propose any closure to the local mayor. DDASS investigate pollution incidents in conjunction with the water services and the municipalities. As it is the Environmental Health Department which undertakes

monitoring, bathers are also made aware through leaflets about other risks in addition to those from the water quality, including sun burn, de-hydration, litter, and personal hygiene. These are not roles undertaken by the EA (England) or IA (Portugal).

In Alentejo the Regional Department of the Environment (CCDR) and the Institute of the Environment (IA) both have roles with regard to bathing water sampling and management but common and balanced positions between ministries are generally achieved.

2.3.4 Beach Cleaning

In Portugal and England, the Local Environmental Health Authority is responsible for maintaining clean beaches. In France it is the responsibility of the Mayor. In England voluntary groups can also become involved in beach cleaning, and the EA can influence management of the beach through partnerships with other organisations.

2.3.5 Bathing water closures

In France the mayor can pass a temporary bathing ban, following a pollution event. In Portugal if the health authority considers that the bathing water quality may put human health at risk, the Regional Health Delegate prohibits the use of those waters for bathing purposes. In England it is the responsibility of the LA to impose a bathing ban, but this occurs very rarely.

2.3.6 Public information - use of media

The EA web-site does not provide up-to-date bathing water information, presenting information slowly and in a complicated manner. In contrast, the results are up to date and clearly presented on the French and Portuguese Internet sites.

Reports and press releases are made in each country outlining the season's results on a national and regional basis. In England and Portugal these are produced at the end of the bathing water season. In France they are produced shortly prior to the next bathing season to increase awareness of the monitoring programme and highlight any improvements.

Within Portugal the promotion of bathing water quality is carried out using a variety of different media formats. These include; free SMS text messages; a dedicated web-site promoting the beaches and an "info-van" which tours beaches and provides games and information to educate the public about beach management. The location of the info-van is linked interactively via GPS to the web-site.

Figure 8 – Viv'a Praia 'infovan' and SMS.

In Alentejo, a local scheme supplies education packs to schools as teaching aids to help children become more interested in the environmental science of their beaches.

2.3.7 Public information - notice boards

In France and England the presentation of results currently varies regionally, however, in Brittany the health services have developed a common notice to present the results.

In Portugal there is a national standard for signs used to present bathing water results. This assists the public in becoming familiar with the programme and aids common interpretation.

In addition, common information signs are used throughout Portugal to indicate where swimming is deemed safe, not safe, forbidden, and where the site is a recreational water (i.e. used but untested).

Figure 9 – Information signs

2.3.8 Beach ownership

In England (and Wales and Northern Ireland) 55% of the coastline is state owned and leased to other organisations such as LAs. The remaining 45% is privately owned. In France and Portugal all the coastline is owned by the state (up to the highest tide line), and there are no private beaches. Management issues are likely to be less complex in these instances.

2.3.9 Bathing water numbers/information

Brittany, partly due to the geography and length of coastline, has the highest number of bathing waters (501 coastal & 53 inland), compared to much lower numbers in the NW of England (37 coastal & 3 inland) and the Alentejo region of Portugal (25 coastal & 4 inland). In England and Portugal the numbers of inland bathing waters are very low and further sites may warrant designation. The higher number of sites in Brittany has obvious implications on resources (e.g. transport, staff, time, and funds).

2.3.10 Bathing water type

In Brittany and NW England bathing waters vary greatly in topography and surrounding land use. The Alentejo's sites are similar in type, coastal sites are usually sandy and inland sites are mainly reservoirs.

Within all three countries the available facilities varies greatly between bathing waters depending upon their location (e.g. rural beaches compared to tourist beaches).

2.3.11 Numbers of people using the bathing waters

In each country the number of bathing water users varies greatly through the season, depending on weather conditions and holiday patterns. In France and Portugal bathing water use is much higher at coastal sites than inland.

2.3.12 Sampling procedure

Each country has written procedures for sampling, and methods that reduce the chance of contamination of samples.

2.3.13 Sample programming/bathing water season

In each country the sampling programme is well organised and a sampling calendar is created before the start of the season.

Country	Season	Length (weeks)
Canary Islands (Spain)	50 weeks out of 52	50
UK	15 May to 30 September	20
Portugal	1 June to 30 September	18
Ireland	Finishes end August	16
France – Coastal France – Inland	15 June to 15 September 01 July to 31 August	13 9

England, despite having a relatively wetter climate, has the longest bathing season of the 3 countries. This increases the probability of a sample failing as it increases the risk of sampling during wet weather. Exceedences particularly appear to occur towards the end of the season. However, peak use is in July and August. Therefore, bather numbers are likely to be low during periods of highest risk.

2.3.14 Timing of sampling

In Brittany sampling is usually carried out from Monday to Thursday.

In Portugal samples are only taken from Monday to Wednesday. This allows results to be available to the public by the weekend and for investigation samples to be taken if necessary.

In England samples are taken on all days of the week.

In many areas of England and France, in order for the sea to be accessible, sampling occurs within 3 hours of high tide but in Portugal samples are taken independently of the tide state.

2.3.15 Location of sample point

Generally in each country, the sample point is positioned as required by the Directive; where the number of bathers is the highest. This is usually near an access point to the beach.

In England, where possible, compliance samples are taken away from rivers or surface water as these are not considered to be representative of the bathing water.

However, in France and Portugal such points are sometimes targeted to obtain results from the area of highest potential contamination and therefore of highest risk to health. In Portugal, samples are taken at each point so that there are 2 designated sites (e.g. near the stream and in the middle of the beach) and both samples are submitted to the EU. In England such extra points would be monitored as "investigation samples" and not submitted to the EU.

2.3.16 Training and competencies

All countries undertake similar sampler training in accordance with national standards. In France, an interactive CD-ROM has been developed which outlines objectives and good practice that the sampler can use when training.

2.3.17 Health and safety

In England health and safety is a key priority when sampling. Samplers are provided with Personal Protective Equipment (PPE), (including life jackets and mobile phones) and sampling is always undertaken double manned.

In France it is not considered necessary to wear a life jacket or to be double manned as the majority of the beaches have a lifeguard and such measures place a greater demand on resources. In Portugal, equipment is provided as deemed necessary and seasonal samplers are provided with a first aid course.

2.3.18 Bathing water profiles

Currently none of the countries have detailed bathing water profiles to the exact standard required by the new Directive, but certain information is available.

In the NW of England, the EA maintains a bathing water record which outlines access, sampling point maps and descriptions, site photographs and health & safety information for the sampler. This profile does not currently describe the pollution risks to the bathing water, or specific management procedures, although this information is available for many sites in separate reports.

DDASS in France maintains a bathing water profile record, though this also highlights potential pollution sources and the hydrodynamics of the sites, which is recorded in electronic databases and paper files.

In 2003 the IA in Portugal started a programme to create bathing water profiles outlining the compliance history and known problems at each designated site.

2.3.19 Sampling frequency and parameters

England takes the highest number of samples (20 samples per beach, 1 per week). This produces a larger dataset, with more representative summary statistics. This in turn gives a higher degree of confidence when making comparisons between years and between individual sites. The sampling programme is maintained even where sites have consistently high quality results and additional investigation samples may also be taken in the event of a sample failure. Whilst producing a large and representative dataset, this methodology does create a high demand on resources.

France and Portugal undertake a more risk-based approach. Between 7 (5 for French inland points) and 20 samples may be taken.

In the NW chemical samples are always taken in addition to the bacteriological samples. Analysis parameters include suspended solids (105°C), non-volatile solids (500°C), chloride, and turbidity. This increases the available information and can help identify sources of pollution. However, the additional data collected may not always be used sufficiently to justify the extra cost.

In France and Portugal, pH, temperature and transparency (inland water) are measured as required by the Directive but extra chemical samples are only taken whenever visual analysis shows some possible contamination. Routine monitoring is also carried out at freshwater sites for cyanobacteria (unlike NW) and in Alentejo studies of sand quality are being carried out.

Figure 10 – *In Situ* analysis of a bathing water sample in the NW

2.3.20 Labelling

In England, bar-coded labels are used. The same bar-code is placed on the sample and the field sheet. This gives details about the site and date. It prevents accidental mixing of sampling and facilitates the analysis of large numbers of samples in the laboratory.

2.3.21 Sampling technique

Each country ensures that samples are taken at a depth of 1 metre. This depth represents the typical immersion depth and helps ensure the sample is not affected by sediment, which may be disturbed by the sampler and can affect the bacteriological result. In each country, the bottle is opened by hand underneath the water, facing away from the land to prevent sampling water disturbed by the motion of the sampler.

2.3.22 Samplers field sheet

The sampling field sheet in England is the most detailed providing good quality information to assist an investigation in the event of a sample failure.

The Portuguese field sheet although less detailed recorded whether or not the quality results on the site notice board were being kept up to date.

In France, each department uses a field sheet defined by a regional working group on "certification". The field sheet may vary slightly between departments.

2.3.23 Transport and storage of samples

In each country the sample is transported in a cool box chilled using ice packs. In England, the permitted temperature range is 2-8°C. In France and Portugal the temperature is specified to be 4°C, however no temperature checks are made to confirm this. The reliability of cool boxes is questionable; to ensure the correct temperature range is maintained portable electric refrigerators or refrigerated vehicles would be required. Electric cool boxes are also available, but do not operate very well in warm weather.

In England the samples are deposited in refrigerators at regional depots. Refrigerated vehicles then transport the samples to national laboratories. The depot refrigerators are monitored to ensure the temperature stays within a range of 2-8°C.

In France, samples are usually stored in the laboratories where the temperature is monitored. Occasionally samples are stored in the fridge of DDASS but no checks are made of these.

In Portugal microbiological samples are analysed immediately on arrival at the laboratory so are not stored. Chemical samples are stored in refrigerator chambers at a temperature between 2-8ºC.

2.3.24 Analysis of samples

In each country analysis is undertaken within 24 hours. In England and France (for samples taken after 4 pm) due to the constraints of travel time, tides and lab opening times, analysis is carried out the following day. In Portugal sampling begins early in the day (from 7 am) to allow for samples to be delivered on the same day. Studies into the impact of time between sampling and analysis on bacterial counts have shown that the 'scatter' of results increases with storage time. Best practice is therefore to analyse as soon as possible after collection. A period of up to 24 hours is considered acceptable provided samples are stored correctly.

In each country, a presumptive result is available within 48 hours. Confirmed results are provided to the regional programme co-ordinator within 48 hours in Portugal, 3 to 5 days in Brittany, and 7 to 10 days in England.

The analytical method used by England and Portugal is the membrane filtration method. In France, the methods used are microplates (ISO) for enterococci and *E. coli* and counting on solid or liquid media for total coliforms.

2.3.25 Result distribution

Each country has a database for processing and storing the results obtained. In France a common national database holds information on bathing water profiles and water quality results.

In each country results are disseminated to the relevant authorities, usually within one week of the sample being taken. However the time taken to post results on notice boards at the bathing sites is variable.

In England, the results are emailed to the LA, sewerage undertakers (United Utilities in NW), ENCAMS, and the EA web-site once the confirmed results have been received (7 to 10 days). In France, the results are sent to the Municipality by post within 7 days and put onto the Health Ministry database within 3 to 5 days, which automatically updates the web-site. In Portugal the municipality are informed of the results within 24 hours of the confirmed results being received.

At the end of the season an annual report is produced in each country.

2.3.26 Procedure in the events of a sample failure

In England, the LA Environmental Health department is advised. However, closure by the LA is only likely to occur if there is extreme contamination of the bathing water.

If a sample fails in France the local municipality reports any known irregularities or discharges. The mayor may be asked to close the bathing water, depending upon the degree of contamination and the cause. Generally additional samples may be taken until the source of contamination has stopped and if closed the beach will only be re-opened when samples are compliant.

In Portugal repeat sampling may be undertaken only if there is suspicion of contamination, or to help control any contamination which has occurred.

2.3.27 Wet weather waivers

In all 3 countries wet weather waivers are only occasionally applied.

2.3.28 Beach awards

All 3 countries use the European Blue Flag Awards, however, Portugal link additional criteria to the award. In England and France independent awards can also be made, the Seaside Award in England and the Black flag award in France. The Blag flag is an 'award' for contaminated sites which also apply to recreational zones. The use of different award schemes can create confusion amongst beach users.

2.3.29 Conservation groups

In England various conservation groups are involved in aspects of beach quality such as marine litter, sewage debris, and marine wildlife. Portugal is involved in the OSPAR marine litter project. There are no known conservation groups in France.

SECTION 3 – RECOMMENDATIONS

The following recommendations are based on findings from the project. Most of the recommendations are general and apply to all EU member states. Some recommendations are specific to a particular country and these are indicated in capital letters.

3.1 IMPROVING BATHING WATER QUALITY

3.1.1 Bathing water profiles

Bathing water profiles aim to improve knowledge of the pollution risks and impacts at bathing water sites in order to reduce health risks to bathers.

Although a description has been proposed as to what will be required of a bathing water profile, there may be variation between countries in how this is interpreted. In addition it is unclear what resources are available/required to create the bathing water profile. For example, due to poor water quality problems in England some sites have already had a great deal of modelling and investigation carried out; this may not be the case for other countries/member states.

Queries include:

- How far would the study go beyond the designated bathing water point?
- Potential pollution sources may be some distance away.
- What type of modelling would be required, if any?
- Would further investigation sampling be required, and in what detail?
- Can the profile vary in detail based on the complexity of the bathing water?

Recommendations

It is recommended that a common view be developed on best practices in completing a bathing water profile, for example, the extent of the bathing water catchment needs to be defined. The profile must be a simple document understandable by all users.

It is recommended that each country review all existing information available concerning each bathing water site to begin the process of building bathing water profiles

Chemical parameters such as salinity should be used where appropriate to investigate bathing water quality, as it can indicate the input of freshwater and provide information for the bathing water profile.

Investigations should be made into all inputs to the bathing water catchment, not just those which discharge directly onto the beach.

3.1.2 Sampling parameters

The new Directive focuses on those pollutants most likely to put public health at risk, specifically microbiological quality. Several parameters are no longer to be listed, including pesticides, metals, nutrients and ammonia and no specific limits for these were set in the original Directive.

The new bacteriological standards may have a significant impact on bathing water compliance at those sites that do not currently meet guideline standards.

By 2015 all bathing waters will need to be of at least satisfactory/acceptable. Those bathing waters that are classed as 'poor' for 5 consecutive years will have a bathing water ban introduced for at least the duration of one season. This would have an adverse impact on tourism and public perception. In order to avoid a ban pollution problems will need to be resolved within 5 years. However, diffuse pollution from agriculture could take many years to resolve.

In addition "*realistic and proportionate measures"* will need to be taken with a view to increasing the number of bathing waters classified as 'excellent' and 'good'.

Recommendations

Future bathing water compliance problems that are due to changes in parameters should be managed carefully through the media to ensure that the public understands such changes, and that tourism is not adversely affected.

In cases of non-compliance, action procedures must be established at national and European level.

Pollution prevention advice should be included along with bathing water information on leaflets, web-sites and notice boards.

A protocol will need to be developed in order to ensure "*realistic and proportionate"* measures are taken with a view to increasing the number of bathing waters classified as 'excellent' and 'good'

It is recommended that the banning of dogs and horses from beaches during the bathing season is looked into in more detail for example analysing the results of different studies about the impact of animals presence on beaches such as WHO Guidelines for recreational waters (WHO, 2003.)

ENGLAND More pro-active visits should be made to advise/regulate farms/hotels/caravan sites etc. Due to lack of staff available visits tend to be reactionary to an incident that has occurred rather than advisory visits which may prevent a pollution event occurring/reduce impact of diffuse pollution (Pilot Action 2).

ENGLAND More grants should be made easily available to carry out farm improvements. Farm incomes are low (England average £15,000 per/yr) and little extra is available for improvement work which may help reduce pollution risks, for example, extra slurry storage.

ENGLAND In order to reduce pollution risks enforcement action should be taken against polluters in all countries when ever appropriate as a deterrent to others. (e.g. in Portugal environmental breaches do not receive proportionate fines due to a lack of understanding of the environmental impacts by the courts).

3.2 CONSISTENT MONITORING OF BATHING WATERS

3.2.1 Sample programming

The new Directive proposes that a monitoring calendar for each bathing water shall be established before the start of each bathing season and that monitoring should be carried out within four days of the date specified in the calendar.

This raises the questions:

- To whom should the monitoring calendar be submitted and how is it recorded?
- How will it be audited to record/justify deviations?

Recommendations

Further clarification should be developed on the recording and submitting of the monitoring calendar, including alterations to it.

It is recommended that if a sample exceeds the mandatory standards, it is important that further investigation samples are taken, but that these extra results are not submitted to the EU with the routine results for classification purposes.

3.2.2 Sampling point location

A proposal of the new Directive is that the sampling point location of a bathing water should be "*where most bathers are expected, or where the greatest risk of pollution is expected according to the bathing water profile".*

This is open to different interpretation. Should the monitoring point be located where there are the greatest number of bathers or at the point of highest risk

of pollution? In addition it is not clear whether additional sampling points should be for investigation or should be included in the compliance data set. Should there then be more than one designated site, how would the data be interpreted?

Recommendations

It is recommended that Member States agree upon a common interpretation regarding the sample location. This is to ensure consistency as different countries have different approaches.

ENGLAND AND FRANCE It is recommended that one homogeneous area is identified that leads to one sampling point that leads to one classification (as England and France do now). Extra designation points with differing results at one bathing water site would confuse the public.

PORTUGAL There should also be the possibility of altering the specific location of the sampling points, since some bathing waters have individual characteristics and it is sometimes necessary to adapt to them. For example, in the Alentejo region of Portugal the majority of bathing water sites are situated at reservoirs, which have the main purpose of field watering. The consequence is that a big decrease in the water level can be expected during summer- making it impossible to carry on sampling in the initially defined point.

3.2.3 Sampling frequency

Proposals of the new Directive have more emphasis on management than the number of samples taken. It is proposed that the minimum frequency for monitoring bathing waters will be normally be 4 samples per season on at least a monthly basis. This sampling frequency will result in less data to support beach management decisions and to protect public health.

Recommendations

The frequency and number of samples taken should depend directly on the bathing water classification history and the associated risks to each bathing water. This allows resources to be targeted at high risk/inconsistent sites. The risk should be established according to the bathing water profile, taking into account local and intermediate sources of pollution.

3.2.4 Sample, handling, analysis and storage

Currently all 3 countries, follow the proposals regarding sample handling, analysis and storage so few changes will need to be made. However refrigerators are not used routinely in vehicles.

Recommendations

It is agreed that specifications are made for sampling, *in situ* measurements, storage, transport and analysis of samples. However it is recommended that a good practice guide is developed to ensure standardisation between Member States, for example, the sampling depth, and the way measurements such as temperature and transparency are taken.

Temperature checks should be made of cool boxes/refrigerators when transporting samples. In most cases the trip to the lab is longer than 4 hours so refrigerators would be required (also with temperature checks). This would be more reliable than cool boxes. Refrigerated vans could also be an option.

It is agreed that the time between sampling and analysis must be as short as possible, preferably on the same working day and never exceeding 24 hours. This is already the case in all 3 partner countries.

As is the case for the 3 partner countries involved, structured training for all samplers should be given, particularly for temporary staff.

Health and Safety should be a priority. A good level of security should be developed by all countries (i.e. risk assessments, life jacket, mobile phone).

ENGLAND The sampling sheet should prompt the sampler to record all relevant information. A "comments" box alone leads to inconsistent observations. This can then be used in the bathing water profile to provide more detailed knowledge about the site.

ENGLAND There should be a prompt on the field sheet to record how up-to-date the notice board info is.

3.3 IMPROVING THE MANAGEMENT OF BATHING WATERS

3.3.1 Designation of bathing water sites

In current and proposed versions of the Directive bathing waters are said to be areas where "*bathing is traditionally practiced by large numbers*" The current definition of 'large' in relation to bathers, is "*a number that the competent authority considers to be large having regard, in particular, to past trends or to any infrastructure or facilities provided, or other measures taken,*

to promote bathing". However it has been found that there is great variation between countries as to how this is interpreted.

Clarification is needed as to how large number of bathers are assessed. It is accepted that standardised figures cannot be imposed as there are such wide variations in bathing water use between countries.

ICREW is developing a robust protocol for assessing new sites for designation. This sort of common process should be considered for wider adoption throughout the EU.

Recommendations

All 3 countries agree that further guidance should be developed on the designation of sites. This may be based upon the extent of use in comparison to a 'norm' for that country, and the standardisation of other factors such as promotion and provision of facilities.

Each Member State should review their bathing water sites (where not already carried out) to assess how many existing sites may have been unsuitably designated due to low numbers of bathers and lack of facilities. Potential new sites should also be investigated.

The option not to designate waters which have known water quality problems should remain. However in order to protect public health these sites should be identified via signs as not suitable for bathing, as is the case in Portugal.

In addition there should also remain an option to de-designate waters should changing circumstances require it, e.g. where the number of bathers has reduced.

3.3.2 Classification of bathing waters

Under the current Bathing Water Directive there are 3 categories of waters quality; guideline (excellent), mandatory (good) and failure (insufficient quality).

The latest proposals would create 4 categories. Classifications will be "poor", "satisfactory/acceptable", "good" and "excellent" and will be on the basis of the set of bathing water quality data compiled in relation to that bathing season and the 3 preceding bathing seasons. In addition the proposed method of statistical analysis of the data set has become more robust.

Recommendations

It is recommended that Member States adhere to the categories in the Directive to allow better understanding by the public/tourists and easier comparison between countries.

In order to target resources (if not already undertaken), research into the impact on retrospective compliance of basing classification on 3 years worth of data instead of 1 year should be carried out.

3.3.3 'Discounting' of bathing water pollution

It is proposed that samples taken during short-term microbiological pollution incidents (i.e. not lasting more than approximately 72 hours) may be disregarded and if necessary a replacement sample taken 7 days after the short term pollution has ended. However only 15% of samples or 1 sample per season (which ever is the greater) may be disregarded. For a bathing water site subject to short-term pollution not to be downgraded, it must have adequate management measures in place to protect public health and reduce or eliminate the cause of the pollution.

Measures should include information to the public and, if necessary, a temporary prohibition on bathing. In order to inform the public, surveillance, monitoring, and early warning systems would be required. As part of ICREW models are being developed to predict bathing water quality in advance in support of the discounting provisions within the new Directive.

The ability to discount samples raises the questions;

- When a sample fails, how will the decision be taken on sample 'discounting'
- How early would a warning be required?
- What type of system would be suitable?
- Is the hydrometry information and infrastructure available/adequate?
- At what level of pollution should a ban be imposed.

Recommendations

A protocol needs to be developed in order to ensure consistency between Member States regarding adequate management measures adversely impacting on tourism (e.g. advisory notice versus closure, at different levels of quality, this would require the trigger levels for closing a beach to be standardised).

ENGLAND. It is recommended that a Memorandum of Understanding (MOU) is created between competent Authorities (i.e. LA and EA) with regard to roles and responsibilities for beach management (including beach inspections, temporary/permanent signs) and closure. This has been demonstrated to be effective in other areas of work including co-ordinating responses with regard to illegal waste disposal.

3.3.4 Length of Bathing Water Season

The current Directive and the proposals of the new Directive are not clear as to how the length of bathing season should be assessed, which has lead to inconsistencies between countries.

Recommendations

Common criteria should be developed for assessing the length of season. Member States should be required to justify the length of their bathing season, based around patterns of tourism and weather conditions.

It is recommended each country investigates the numbers of bathers throughout the season and reviews the duration of the season accordingly as part of the implementation of the revised Directive.

As the weather conditions can vary from year to year, it is recommended that in the case of especially long hot seasons, where bathing is continued for longer than predicted, the option to extend monitoring is available.

3.3.5 Algae

It is a proposal of the new Directive that when a bathing water profile indicates a potential for specific cyanobacterial blooms or macro-algae proliferation, "*appropriate monitoring*" must be carried out to ensure the "*timely identification of health risks*". In addition "*adequate management measures*" must be taken to prevent exposure, including "*information to the public*".

This will involve extra costs but it is important that it is undertaken at bathing water sites for public safety. Further clarification is required on the classification of bathing water sites that have been closed due to cynobacteria contamination but the bacteriological quality is good.

Recommendations

It is recommended that the bathing water site is closed and standardised signs used if there is evidence of a health risk from green algae or cyanobacteria. This will require a management agreement between those authorities involved.

Standardised trigger levels for the closure of sites at risk of cynobacteria contamination need to be developed using information gathered from cynobacteria studies/monitoring already carried out in other countries (France and Portugal).

It is recommended that the measurement of transparency is carried out at inland waters using a Secchi disk, as this can be linked with the development of cyanobacteria.

3.4 PROVISION OF INFORMATION TO THE PUBLIC

It is proposed that information should be "*actively disseminated and promptly made available during the bathing season in an easily accessible place in the near vicinity of each bathing water".* Currently information provided on notice boards is limited and often out of date.

In addition it is proposed that Member States "*shall use appropriate media and technologies, including the Internet to actively and promptly disseminate information concerning bathing waters".* The results of monitoring would need to be made available within a week.

The provision of better and more up-to-date information will enable the public to make their own informed choice about where and if to bathe.

Recommendations

A list of required information should be developed so that it is clearly defined for communication to the public.

It is recommended that each Member State develop a dedicated reporting method for the public to formulate suggestions/remarks/complaints as required in the new Directive. A procedure is needed to take account of this information. National data protection laws will also need to be taken into account.

Methods of supplying information to the public as quickly as possible, using communication methods that can reach the biggest possible number of bathing water users, need to be developed.

Space, dedication and improvement of information on notice boards is needed in all countries in order for the required information to be adequately displayed at the beach. It is also extremely important that this information is available in visible places at the beach.

A common use of advisory signs at bathing water sites needs to be developed to ensure the right level of information is used, without impacting adversely on tourism.

Internationally common signs/flags for public information and beach awards must be established using simple and easy to understand symbols. This will require communication and agreement between Member States regarding signs and symbols on reports. This will ease interpretation for travellers and tourists. (The French task group should disseminate their results to other countries).

Permanent signs (or warnings on notice boards) should be displayed stating that there is an increased risk of poor water quality following periods of rainfall. This is already undertaken in America and New Zealand.

It is recommended that information in databases be standardised so that it is easier to share or compare between different countries. However this will be very difficult to achieve.

Other countries should learn from the example set by Portugal in providing information to the public, for example, the use of SMS texting and 'info-vans'.

ENGLAND More information on other health risks should be provided as in France, for example, the effects of the sun and sand. Information could be included on bathing water results leaflets and on beach notice boards. This could involve joint work with the Health Protection Agency.

3.5 Recreational Waters

The management of recreational waters is not included in the new Directive. However, it is still an issue that will need to be addressed. The popularity of recreational use of waters is increasing and is less seasonal and weather dependent.

Some water-contact sports will necessitate a longer immersion time than traditional bathing bringing a greater risk of exposure to infection.

Recommendations

The health risks of undertaking recreational activities such as surfing etc. need to be assessed. It is recommended that (if not already undertaken) each Member State should carry out a survey (including bacteriological sampling) to assess recreational use of coastal and inland waters and the potential health risks.

ENGLAND Approaches to management of water quality at recreational waters should be developed, to sit alongside the implementation of the revised directive.

4 CONCLUSIONS

The UK, France and Portugal currently all have a high rate of compliance with the current Bathing Water Directive (between 96% and 100% in 2003); however guideline results vary. At those sites which do not meet the standards in the new Directive further improvements will be required in order to ensure future compliance.

Tighter standards will require other sources of bacterial pollution to be taken into account, particularly agricultural pollution. A whole catchment approach to pollution investigation and control will be required and this is in line with the proposals under the Water Framework Directive which will operate alongside the Bathing Water Directive.

A common approach to catchment investigation based on best practice techniques developed elsewhere in the ICREW project will be vital in ensuring that water quality improvements are realised and resources are targeted to the most significant areas of river catchments.

The new Bathing Water Directive will also require more information to be delivered to beach users. Clear guidance is required on the development of beach profiles, together with acceptable methods for communicating information to the public. These will be key in ensuring public confidence in beach management and water quality. Examples from Spain and Portugal on beach profile development and effective communication to the public using a variety of media should be made available for use by other member states.

Active beach management will be a key feature of the new Directive and guidance on the use of sample discounting, closure of beaches, length of bathing season and location of sample point will help to ensure that the Directive is applied fairly without environmental or economic disadvantage between regions.

This report highlights that variations in application of the current Bathing Water Directive exist between three (in some instances five) of the member states within the EU.

These variations have arisen through differing interpretations of the requirements of the Bathing Water Directive. These variations can result in differing amounts of resource being expended by member states to secure compliance, potentially resulting in skewed impacts on local environments and economies.

In addition, the unilateral development of mechanisms by Member States to ensure compliance is inefficient.

Based on the findings of this report, it is recommended that a series of best practice guidance documents on implementation of the new Bathing Water Directive should be drawn up to accompany the Directive. These should be made freely available to Member States.

This would encourage a more efficient system of implementation and a consistent approach to management and compliance within Member States.

As noted, the guidance should accompany the new Directive and whilst not being mandatory in application should assist by:

- ensuring the resource is not wasted developing techniques and protocols that already exist elsewhere.
- ensuring that the Directive is implemented in a consistent manner across all member states, without undue economic, environmental or health impacts on any one member state.