



**The PREMIAM Conference**  
**Pollution Response in Emergencies**  
**Marine Impact Assessment and Monitoring**  
**Guidelines, Co-ordination and Future Challenges**  
**4 July 2012 - SOAS, University of London**



## **Delegate Notes**

*The aim of this conference is to provide a forum for scientists, regulators and other professionals working in the field of marine oil/chemical spill monitoring to share experience, best practice and knowledge to the wider marine emergency response community. We hope to promote the use of sound science, co-operation and co-ordination in the design, conduct and management of environmental monitoring and impact assessment practices following accidental releases of oil/chemicals to the marine environment.*

With thanks to our sponsors:



**A conference run by CMS – Communications and Management for Sustainability in conjunction with the PREMIAM Project**

## Welcome to the conference

This information gives the answers to some of the most frequently raised questions that arise at the conferences we organise.

**Conference Outputs** The Power Point presentations and delegate notes will be available shortly after the event on the CMS [www.coastms.co.uk](http://www.coastms.co.uk) website. We will notify you by email when these have been uploaded.

**Questions – Bookings – Receipts – In house information** If you have any questions during the event about bookings, finances, or logistics please see **Christina Beech** at the registration desk; she will be pleased to help.

**Timing** We will try to ensure that the conference runs on time to allow the allocated time for speakers and as importantly for discussion. A bell will be rung 5 minutes before the start of sessions.

**Refreshment Breaks** In running events in London over the last 16 years we have used two main refreshment breaks during the day that enable us to split the sessions and breaks more evenly. A sandwich buffet is available in the first break and sweet course during the second.

**Food** There is always ample food at the events and you can come back for more. Once you have collected your food **could you move away** from the serving table. Catering staff are on hand if you need anything, including extra drinks.

**Delegate list** A list of the delegates to 25 June is at the end of the delegate notes.

**Evaluation form** There is a questionnaire and evaluation form in your delegate pack; your views will help us improve future events. Please leave these at the registration desk along with your badge when you leave.

**NB Valuables** **If you have anything you value keep it with you i.e. do not leave laptops unattended.**

**Before you leave** Check you haven't left anything in the conference hall.

**Please also take any leaflets or reports.**

## **Introduction**

PREMIAM - an ongoing project with a long-term legacy - is being co-ordinated by emergency response and impact assessment experts from Cefas (Centre for Environment, Fisheries and Aquaculture Science). It has wide support from all important government stakeholders and fully engages the scientific and emergency response community in delivering its aims.

## **What's the problem?**

Spills of oils and chemicals in the marine environment remain a significant threat. Therefore, the requirement for response capability, improved preparedness and effective post-incident monitoring and assessment remains undiminished.

## **Why the need for better and more effective post-incident monitoring?**

- We need to ensure we provide early evidence of potential impact to government and the general public.
- We need to have an appropriate and effective way of investigating the impact on the wider marine environment.
- Impact assessment methodology needs to be considered that not only assesses the short-term impacts, but also allows the prediction of potential longer-term impacts.
- We need to ensure a more effective use of resources so that unnecessary procedures are avoided but that potentially useful ones are not overlooked.
- We need provide important information about the effectiveness, or not, of spill response activities including the use of dispersants.

Following the *Sea Empress* spill in 1996 the Donaldson Report recommended the setting up of Environment Groups (EGs) to provide the response units with environmental advice and guidance. In addition the establishment of an Impact Assessment Group was recommended in the *Sea Empress* Environmental Evaluation Committee report. The MCA has actioned much of this (e.g. through the setting up of standing Environment Groups) but no agreed process for establishing an operational monitoring and impact assessment co-ordinating body has yet emerged. The PREMIAM project, through the development of guidelines, networks and co-ordination processes, has successfully aimed to improve this situation. The Premium conference looks to broaden the focus to wider post-spill environmental issues and to help share best practice.

The aim of this conference is to provide a forum for scientists, regulators and other professionals working in the field of marine oil/chemical spill monitoring to share experience, best practice and knowledge to the wider marine emergency response community. We hope to promote the use of sound science, co-operation and co-ordination in the design, conduct and management of environmental monitoring and impact assessment practices following accidental releases of oil/chemicals to the marine environment.

## **The external objectives**

- Publicise and promote best practice in the application of sound science to monitoring and impact assessment following marine spill incidents.
- To hear the views of emergency response professionals charged with commissioning and conducting post-spill marine monitoring and impact assessment.
- To learn about relevant emerging issues and risk assessment approaches.
- To share best practice in the planning, management and conduct of marine monitoring activities following marine incidents and to learn from recent incident case studies.
- To understand the drivers and importance of quality post spill monitoring programmes from the perspective of key stakeholders: Regulators, Responders, Conservationists, Scientists and Offshore Industry.
- To learn about specific approaches and their potential use in post-spill monitoring and impact assessment.
- To understand how post-spill monitoring fits in to the wider response, clean-up and advice activities following a spill.

## Programme

The main format of the event is pairs of 15 minute presentations with 20 minute discussion slots

9.00 **Registration and refreshments**

**Session 1:**

**Chairman: Colin Moffat** Marine Scotland

9.45 -9.55

**Welcome to the conference**

**John Robbs** Defra

9.55-10.35

**Keynote opening speech: Environmental monitoring of major oil & chemical spills – the importance and challenge – an overview of the developing landscape**

**Tracy Collier** NOAA

20 min presentation 20 mins Q&A

**PREMIAM**

10.35-10.50

**Establishing the best guidance of post spill environmental monitoring.**

**Effectively the story and content of the PREMIAM Guidelines**

**Robin Law** Cefas

10.50-11.05

**Effective and quick monitoring – decisions and co-ordination.**

**Wider PREMIAM deliverables e.g. network, co-ordination, links with EG and others**

**Mark Kirby** Cefas

11.05-11.25

Panel Discussion of the two presentations

**The Science of effective monitoring**

11.25-11.40

**Measuring oil and chemicals following spills – what does it tell us?** **Robin Law** Cefas

11.40-11.55

**Establishing biological impact through monitoring – cells to the population**

**Jon Moore** CALM

11.55-12.15

Panel Discussion of the two presentations

12.15-12.55

First network break and refreshments

**Session 2:**

**Chairman: Malcolm Lythgo**, Head Monitoring & Analytical Services,  
Environment Agency

**Planning and co-ordination of monitoring programmes**

12.55 -13.10

**How monitoring fits into the National Contingency Plan**

**Kevin Colcomb** MCGA

13.10- 13.25

**Linking environmental monitoring and response**

**Emma Hughes** OSRL

13.25-13.45

Panel Discussion of the two presentations

**Regulation and Compensation – the Role of Monitoring**

13.45 -14.00

**Meeting the Regulatory Obligations** **Roger Proudfoot** – Environment Agency

14.00 -14.15

**Compensation Issues – the role of monitoring** **Matthew Sommerville** IOPC Funds

14.15 -14.35

Panel Discussion of the two presentations

14.35 -15.10

Second network break and refreshments

**Session 3:**

**Chairman: Kevin Colcomb** MCGA

**Where to target the monitoring effort**

15.10-15.25

**Modelling – where is it going?**

**Jon Rees** Cefas

15.25-15.40

**Monitoring priorities – Ecological or Commercial sensitivities?**

**Kevan Cook** Natural

England

15.40-16.00

Panel Discussion of the two presentations

16.00-16.15

**Final wrap up – the future – emerging issues**  
15 mins presentation

**Dr Michael O'Brien** ITOFF

## **Environmental monitoring of major oil & chemical spills – the importance and challenge – an overview of the developing landscape**

### **Tracy Collier**

Science Advisor to NOAA's Oceans and Human Health Initiative and Technical Advisor on Natural Resource Damage Assessment to Sea Turtles and Marine Mammals for the Deepwater Horizon oil spill

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- To be able to respond to spills in such a way as to protect public health and assess environmental impacts, both advance preparations, as well as informed environmental monitoring, are essential;
- Example: assessing seafood safety after the Deepwater Horizon oil spill, including measuring levels of dispersant components. In addition to the coordinated response that did occur, what could have been done before, during, and after the spill to improve public confidence?
- Example: determining exposure of marine mammals and sea turtles to spilled oil is problematic in part because of the protected status of these species. What research could have better informed efforts to understand the effects of the Deepwater Horizon event on these animals, and what research will better inform us going into the future?
- A discussion of the types of studies and environmental data collection, in general, that would support improved abilities to respond to future spills of oil and other hazardous chemicals.

<http://www.noaa.gov/deepwaterhorizon/>

[http://sero.nmfs.noaa.gov/deepwater\\_horizon\\_oil\\_spill.htm](http://sero.nmfs.noaa.gov/deepwater_horizon_oil_spill.htm)

## **Establishing the best guidance for post spill environmental monitoring**

### **Robin Law**

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Within the UK National Contingency Plan for Marine Pollution from Shipping and Offshore Installations there is a requirement that “if a marine pollution incident is expected to have a significant environmental impact, arrangements should be made to monitor and assess the long-term, as well as the short- and medium-term, impacts”. It does not, however, go into detail regarding post-incident monitoring activities, and that is the explicit role of the PREMIAM guidelines published last year.

Section 1 provides a series of questions, answers to which help to define the scale and components of the monitoring to be undertaken (when do we need to monitor? why do we monitor? what do we monitor? where do we monitor? how frequently do we monitor?).

Section 2 is about implementing a monitoring programme, and includes guidance on survey design, sampling strategies and methods, chemical analytical methods, ecological impact assessment and biological resources at risk, ecotoxicology and a variety of other topics which describe the toolbox available and ways in which to use it. References to the primary literature on post-incident monitoring are also provided.

## **Effective and quick monitoring – decisions and co-ordination – the broader aspects of the Premium initiative**

### **Mark Kirby**

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Although the need for agreed and credible guidance is essential the Premium initiative is also concerned with a range of other issues that are collectively essential to conducting effective post-spill monitoring and impact assessment. This talk describes the importance of these other issues and how they are being addressed.

Firstly, there is a need to have necessary equipment and trained personnel pre-identified so that any programme of sampling and assessment can be initiated quickly. Therefore a network of skills and suppliers is being nurtured to that end. Secondly, the process initiated needs to have wide support from all of the key stakeholders and actions taken need to be co-ordinated.

The talk will describe the formation of the Premium partnership and work being undertaken to expand that group further including outreach to non-government and industry organisations. The important work being undertaken in conjunction with all the national authorities and devolved administrations to implement a pre-considered decision making and funding process as well as the concept of the Premium monitoring co-ordination cell (PMCC) and the essential links with environment groups (EGs) will also be covered.

Finally, the importance of linking effective monitoring processes with the National Contingency and other response plans and the plans for enhancing and maintaining readiness (e.g. via exercises and further targeted guidance) as part of the ongoing Premium initiative are considered.

## Measuring oil and chemicals following spills – what does it tell us ?

### Robin Law

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Determination of concentrations of polycyclic aromatic hydrocarbons (PAH) in a variety of matrices is a common component of post-oil spill monitoring programmes, particularly in support of the protection of seafood consumers and any associated fishery closures.

Chemical spills have seldom (if ever) required such studies to be undertaken but, given the wide range of chemicals transported by sea in both bulk and packaged form, the potential is there.

Appropriate and fully validated methods are available for the determination of PAH but, for chemicals, these exist only for compounds which are included in monitoring programmes undertaken for other purposes.

For broad surveys, screening techniques can be used to identify compounds and estimate (not properly quantify) their concentrations. The utility of these methods and the information that they present is assessed.

## **Establishing biological impact through monitoring – cells to the population**

### **Jon Moore**

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The science of biological effects studies associated with oil spills (and, to a lesser extent, chemical spills) is enormous, and increasing rapidly as researchers look for more and better ways to detect sub-lethal and exposure effects in genetic, biochemical, pathological, physiological and behavioural functions.

Ecological methods have also developed and expanded as we better understand natural variability and the difficulties of detecting population level effects. There is still a gulf, however, between the work of laboratory based sub-lethal/exposure effects studies and field based ecological effects studies.

This is a major challenge that requires collaboration and more studies that link the two. An even greater challenge is to expand our understanding to the ecosystem level, because that science is still in its infancy.

## The UK National Contingency Plan: Environmental monitoring

### Kevin Colcomb

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The MCA first set up Environment Groups (EGs) in 1999, a Donaldson recommendation. We have come a long way since then. We have a network of Standing EGs covering all the UK coastline, comprised of all the responsibilities and skills required to deliver the seamless environmental and health protection advice stream to incident responders. All EGs are well rehearsed with the maritime response process and are ready to key into operations with little notice.

The Maritime and Coastguard Agency are currently reviewing the UK National Contingency Plan for Marine Pollution from Shipping and Offshore Installations. 5 Working Groups have been set up to prepare new text ahead of going out to full consultation in August 2012. The key areas for review are: Command, Control and Communications and Operations; Environment, Scientific and Technical Advisory; Shoreline Response and Civil Contingency Act; Claims Management & Legal and Waste Management. The environment, scientific and technical advisory WG has met twice and has identified areas for updating and change. One key feature is the discussion over how environmental and public health advice is delivered to the response cells through the formal Environment Groups (EGs - NCP) and Scientific and Technical Advisory Cells (STACs - CCA). Are we detecting conflict of operations or a complimentary new fully flexible approach? Another area is the mechanism for the Assessment of Long Term Environmental Impact. This is where the work of PREMIAM will bring something novel and helpful to the way monitoring is prepared for and carried out during and after maritime pollution incidents in the UK. Previous incidents where formal environmental impact monitoring has been carried out include the BRAER in Shetland (ESGOSS) and the SEA EMPRESS (SEEEC). Each of those environment evaluations were carried out in the absence of a formal protocol of guidance to aid the development of a focused work programme in a situation where it is likely to have little or no warning. PREMIAM promises to provide the working mechanism.

## Linking environmental monitoring and response

### Emma Hughes

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The primary aim of any spill response activity is to mitigate damage to environmental and socio-economic resources predicted to be at risk whilst simultaneously considering the varying recovery times of impacted resources and ecosystems.

'Environmental Impact Monitoring' involves observing, measuring and reporting on the receiving environment in order to detect measurable impacts, or unnatural changes such as those caused by an oil spill.

Response operations, environmental monitoring and impact assessment are directly linked by the process known as net environmental benefit analysis (NEBA). NEBA can be considered a cyclical process in which selected response strategies will affect the choice of operational monitoring protocols to monitor effectiveness of the response with environmental monitoring used to assess the potential impacts on species, community and ecosystem levels. In order for NEBA to be effective environmental impact monitoring must be accurate, timely and appropriate.

## **Pollution Incident Monitoring: Meeting the Environmental Regulatory Obligations**

### **Roger Proudfoot**

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We have come a long way in the last century in order to control polluting activities. More recent obligations focus on the improvement and protection of the marine environment with various International Conventions, European Directives and Acts of Parliament. These instruments have put in place the regulatory framework and environmental standards which are now applied to polluting activities.

For England and Wales the principal water pollution offences are contained in the Environmental Permitting (England and Wales) Regulations 2010. This legislation is very new but the offences are similar to ones that used to be set out in the Water Resources Act 1991. So what do the regulations say: "It is an offence to cause or knowingly permit a water discharge activity unless complying with an environmental permit or registered exemption". This includes: "discharging poisonous, noxious or polluting matter, waste matter or trade effluent or sewage effluent into inland freshwater, coastal waters and relevant territorial waters". Poisonous, noxious or polluting is not defined but environmental standards such as those defined by the Water Framework Directive are an important bench mark for assessment.

What penalty applies to such incidents? A case in the magistrates' court can attract anything up to £50K and 6 months imprisonment but if referred to the Crown Court unlimited fines and 5 years imprisonment may be applied depending on the gravity of the incident. For example, the initial fine imposed for the Sea Empress spill was in the order of £4 million which was later reduced. Such penalties act as a deterrent and provide encouragement for appropriate risk assessment and controls to ensure the potential for an incident is minimised.

Monitoring the impact of an incident is an essential part of the response effort in order to assess the gravity of the environmental damage and provides information to assist prosecution in determining the gravity of an incident. National contingency plans and environmental advice mechanisms state commitments to relevant monitoring, research and environmental impact assessment and we now have PREMIAM which provides comprehensive guidance on marine assessment and monitoring programmes.

We also have a number of important drivers that require us to assess the impact of major incidents and assess recovery. The Habitats and Wild Birds Directives afford protection to special areas of conservation and special protection areas. In addition the Marine and Coastal Access Act 2009 provides for the creation of Marine Conservation Zones currently being considered for designation. The Water Framework Directive sets out objectives for achieving good ecological status with directions on the environmental standards used to assess status of water bodies to 1nm for ecological status and out to 12nm for chemical status. The objectives for both directives operate at scales relevant to a major pollution incident and, more specifically in the case of WFD, sets out the requirement to carry out investigative monitoring "to ascertain the magnitude and impacts of accidental pollution" to "inform the establishment of a programme of measures for the achievement of the environmental objectives and specific measures necessary to remedy the effects of accidental pollution".

Another important aspect for monitoring is the availability of data and information to assist the targeting of monitoring and to provide baseline data against which any impact can be compared. The UK Marine Monitoring and Assessment Strategy, to which the EA amongst others, is

a contributor, has provided a major driver in the UK to communicate more effectively what monitoring programmes are currently underway (available through UK Directory of Marine Observing Systems) and that the resulting data and information is more widely available through the Marine Environmental Data and Information Network (MEDIN) and other initiatives such as the Data Archive for Species and Seabed Habitats (DASSH). These important initiatives continue to make environmental data more widely available and will provide an important backdrop to any future incident.

In summary the level of preparedness through regulatory mechanisms and contingency planning level and through PREMIAM and initiatives such as UKMMAS mean that the UK is well prepared for any major incidents in the future which we hope will not need to be tested.

## Compensation Issues – the role of monitoring

### Matthew Sommerville

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Liability and compensation for marine accidents is governed by a variety of either domestic laws or more commonly under a series of international conventions developed by IMO and adopted by maritime states into domestic law. While the various conventions (LLMC, Bunkers, CLC 1992, 1992 Fund, Supplementary Fund developed with the international Maritime Authority) which cover liability for pollution damage resulting from marine oil spills vary in scope and some detail they all include the same basic principles.

Compensation is payable only for proven, justifiable and reasonable actions, activities, resources and losses incurred by those presenting claims.

The international compensation conventions are intended to place those effected in the same financial position they would have been had the incident not occurred and is often paid before the final cause or fault in an incident has been determined. A ships owner has under the conventions what is called strict liability which is limited to a maximum sum established under the conventions and linked to the size (Gross Tonnage) of the vessel.

Compensation is normally paid on the owners behalf by the ships insurer (Protection and Indemnity Club) or in applicable incidents exceeding the ship owners limit of liability by the IOPC Funds.

As noted above compensation is payable only for, resources and losses incurred by those presenting claims which could include post incident monitoring and studies provided they were admissibility criteria. In the case of the IOPC Funds the requirements are laid out in the claim manual meet conditions as published in the IOPC Funds claims manual.

A selection of which are identified below.

Paragraph 2.3.2: 'A claim should be presented clearly and with sufficient information and supporting documentation to enable the amount of the damage to be assessed. Each item of a claim must be substantiated by an invoice or other relevant supporting documentation such as work sheets, explanatory notes, accounts and photographs. It is the responsibility of the claimant to submit sufficient evidence to support their claims. ....'

Paragraph 3.1.2: '*Compensation is payable for the costs of reasonable measures taken to combat oil at sea... ... Compensation is also paid for the costs of mobilising clean-up equipment and salvage resources for the purpose of preventive measures even if no pollution occurs, provided that the incident created a grave and imminent threat of causing pollution damage and on the condition that the measures were in proportion to the threat posed.*'

Paragraph 3.1.5: '*Claims for the costs of measures to prevent or minimise pollution damage are assessed on the basis of objective criteria. The fact that a government or other public body decides to take certain measures does not in itself mean that the measures are reasonable for the purpose of compensation under the Conventions. The technical reasonableness is assessed on the basis of the facts available at the time of the decision to take the measures.*'

Paragraph 3.1.6: *'Claims for costs of response measures are not accepted when it could have been foreseen that the measures taken would be ineffective.'*

Paragraph 3.1.7: *'The costs incurred, and the relationship between those costs and the benefits derived or expected, should be reasonable... ..Account is taken of the particular circumstances of an incident.'*

There should therefore be no reason why post incident monitoring where it has been undertaken has not been compensated. In reality however the success rate of monitoring programmes and studies is poor. In most cases the failure to obtain compensation is a result of failure to document the claims, provide supporting data or reports and consider some simple points

- They are not required after all oil spills
- They should not repeat work already done
- Not all parts of the work may be applicable for but P+I clubs and or IOPCF Fund may contribute to elements that relate to pollution damage
- Studies required to establish nature and extent of environmental damage and whether reinstatement is necessary and feasible
- Studies should be carried out with scientific rigour and objectivity

Not Objective --- Monitoring the death of mangroves as a result of the devastating oil spill disaster

Objective --- Monitoring of the effects and needs and potential to enhance recovery in oil effected mangroves

- No report no monitoring

Other ways to improve the possibility claims being accepted

- Establish committee to design and co-ordinate studies
- Scale of studies should be in proportion to extent of contamination and predictable effects
- Invited compensation bodies to participate or provide there experts to participate during planning and preparation, determination of the need for the study, establishing terms of reference, selecting experts, project timescales and techniques to be followed.

Much of that is discussed above is also incorporated in the Premium guidelines and this conferences objectives in promoting the use of sound science, co-operation and co-ordination in the design, conduct and management of environmental monitoring and impact assessment practices following accidental releases of oil/chemicals to the marine environment.

Following of such guidelines is not guaranteed to result in compensation for monitoring and post spill studies but it is likely to help.

## Modelling – where is it going?

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Numerical models are an essential tool for response managers as they provide forecasts of potential trajectories of oil/contaminants. Historically, these have used particle tracking algorithms to predict movements and the fate of oil/contaminants. Increasingly, maximum concentrations at sensitive receptor sites (e.g. Shellfish beds, nursery zones, bathing beaches, conservation sites) are required in order to assess if these activities should be closed or monitored. Models can also be used to plan and optimise monitoring surveys.

#### Future Challenges:

- Higher resolution in the forecasts
  - Higher resolution required both temporal and spatially so that responders can move resources to incident hotspots.
  - Longer forecasts – incident managers manage resources up to 48 hours in advance and need to plan up to 96 hours in advance.
- Types of oil are changing and increasing trans shipments.
- Learning the lessons from the Macondo Incident in the Gulf of Mexico (see the Maitland report [www.decc.gov.uk/assets/decc/11/meeting-energy-demand/oil-gas/3875-offshore-oil-gas-uk-ind-rev.pdf](http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/oil-gas/3875-offshore-oil-gas-uk-ind-rev.pdf)) as UK exploration enters deeper waters e.g. West of Shetland. This “extreme” oceanographic environment with a wide variety of physical processes will need to be modelled.
- Concentration Time-series will be required in the near future to assess chronic vs acute ecotoxicological effects.
- Model validation using observations of oil/contaminant trajectories – improving model performance.
- Communicating model uncertainty in light of poor input parameters especially at the earlier stages of an incident (frequently key parameters such as release rates, types of oil are unknown). Often need expert judgement to specify model parameters.
- Need to model interactions of different chemical releases from container ship or ferry incidents.

## Monitoring priorities – Ecological or Commercial sensitivities?

### Kevan Cook

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With ever increasing amounts of hazardous materials being transported round our coasts, there is a constant risk of damaging pollution reaching and adversely impacting both commercially and ecologically important sites. As a nation we are becoming more prepared to respond to such pollution events and the PREMIAM post spill monitoring is an important addition to our ability to monitor any impacts. However, it is vital that we recognise both the environmental and commercial importance of maintaining a healthy and diverse range of coastal habitats.

The drivers for post pollution monitoring come from a variety of sources. Local authorities have a commercial need to maintain the health of their coastlines to meet the demands of visiting tourists who expect access to clean beaches and the estuaries and coastlines to be examples of clean, healthy and diverse natural environments. Local fishermen have a right to expect their traditional coastal fisheries, be it shell fisheries, bass nursery areas or inshore fisheries to also be clean, diverse and productive. Furthermore, industries benefit from clean coastlines and sea.

The fact that so much of our estuarine and coastal environments are designated bears testimony to their importance as natural environments and pollution events have the potential to adversely impact the ecological status of these sites. Post incident monitoring is therefore vital to ensure that any management measures of the sites is effective and is carried out in such a way as to benefit **both** commercial site requirements and ecological sensitivities.

