interspill

LONDON 2012

SPILL CONFERENCE & EXHIBITION

Long term sponsor:

Oil Spill Response

Environmental Monitoring and Impact Assessment of Marine Spill Incidents: The Premiam Project

Mark Kirby

Cefas

Interspill, London, 14th March 2012

premiam

Pollution **R**esponse in **E**mergencies – **M**arine **I**mpact **A**ssessment and **M**onitoring

Cefas

The Premiam Partners

defra

Cefas

Environment Agency

mca

Department of Energy & Climate Change

Food Standards Agency

mmo marine management organisation

Natural England

JNCC Joint Nature Conservation Committee

Local Government Association

Health Protection Agency

Cyngor Cefn Gwlad Cymru Countryside Council for Wales

premiam

Scottish Natural Heritage All of nature for all of Scotland

SEPA Scottish Environment Protection Agency

NIEA Northern Ireland Environment Agency www.ni-environment.gov.uk

marinescotland

Department of Agriculture and Rural Development www.dardni.gov.uk

Llywodraeth Cymru Welsh Government

The Secretary of State's Representative

afbi Agri-Food and Biosciences Institute

Cefas

Oil Spill Statistics

www.itopf.com

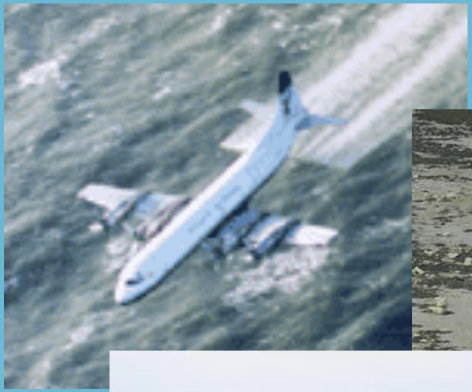
Cefas

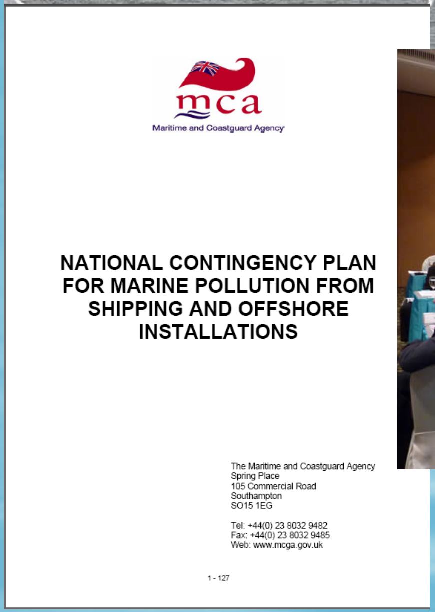
Cefas

Preparedness is vital

Training/Planning happens for

- Spill response
- Shoreline clean-up
- Contingency planning
- Environmental advice





mca
Maritime and Coastguard Agency

NATIONAL CONTINGENCY PLAN FOR MARINE POLLUTION FROM SHIPPING AND OFFSHORE INSTALLATIONS

The Maritime and Coastguard Agency
Spring Place
105 Commercial Road
Southampton
SO15 1EG

Tel: +44(0) 23 8032 9482
Fax: +44(0) 23 8032 9485
Web: www.mcga.gov.uk

1 - 127

Cefas

But we have not pre-prepared and exercised for major (or even minor) marine environmental monitoring programmes!

Cefas

Why Do Post Incident Monitoring?

- Human health and safety.
- Understanding what the impact to the environment is (including the long-term!).
- Understand impact on commercial resources.
- Effective use of technology and resource.
- Input to compensation issues.
- Effectiveness of response and clean up.
- Learn for the future.

Cefas

premiam

Develop procedures and practices to ensure a fast, pre-considered and efficient response to impact assessment and monitoring.

Cefas

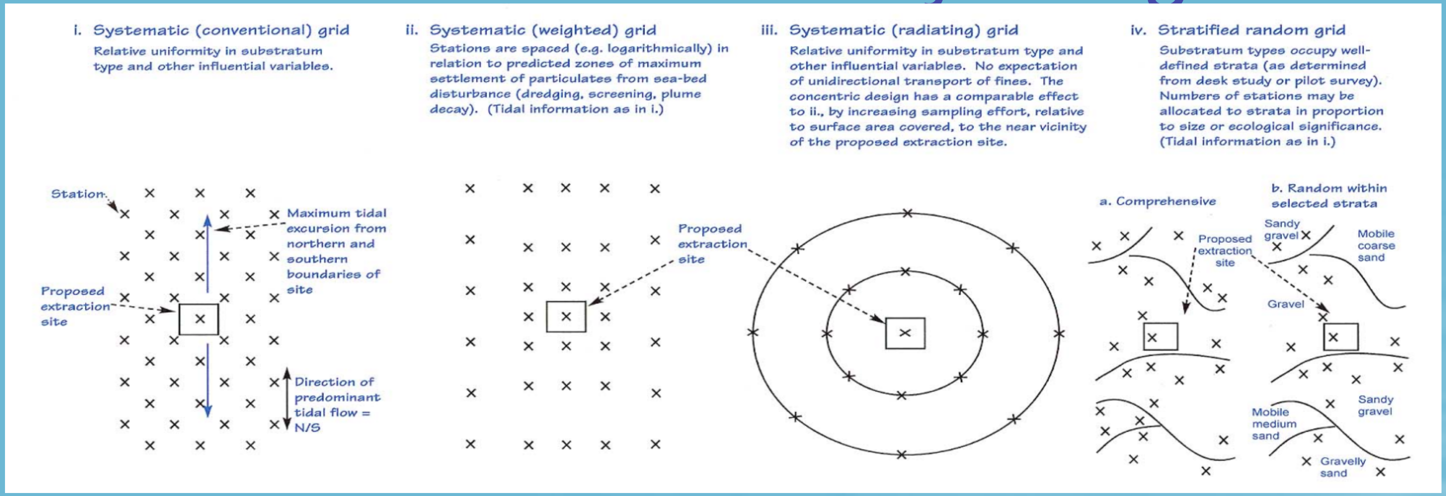
Improvement through

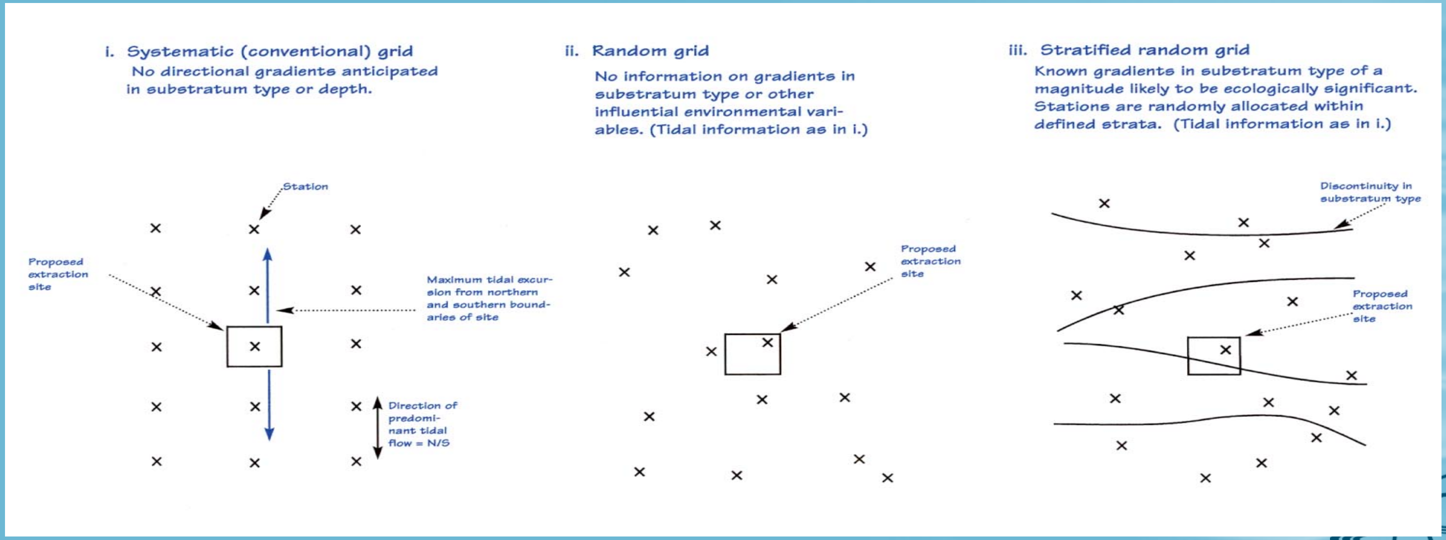
- Guidelines
- Structure
- Preparedness
- Best practice
- Co-ordination

Guidelines

What needs to be included

- Recommended survey design

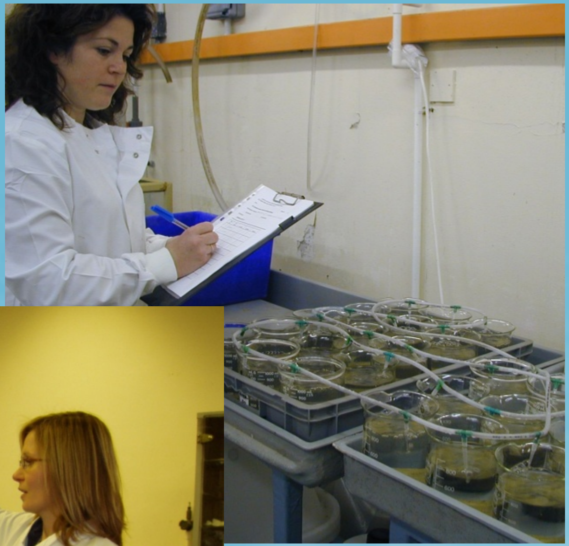


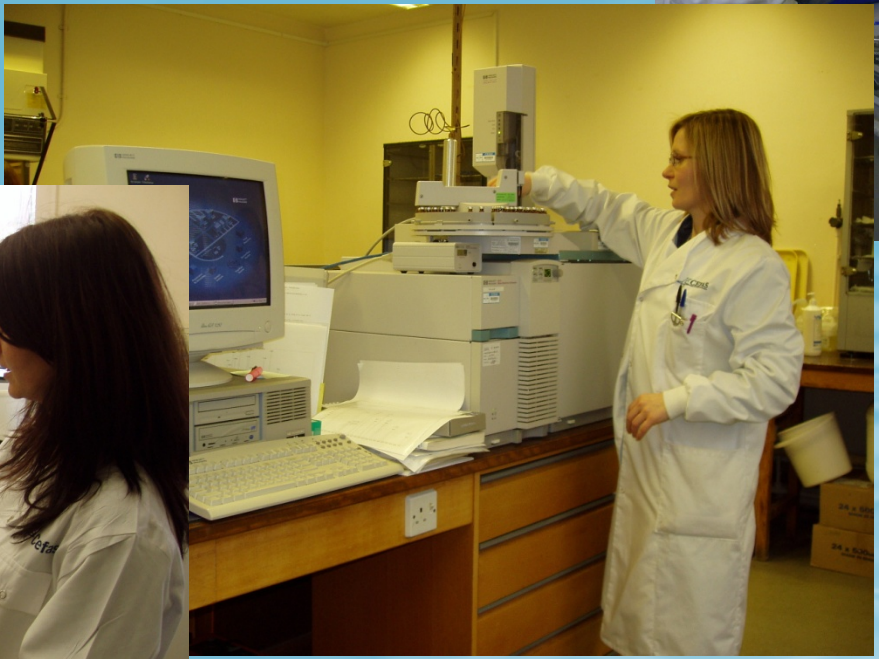


Cefas

What needs to be included

- Recommended survey design
- Analytical Techniques





Cefas

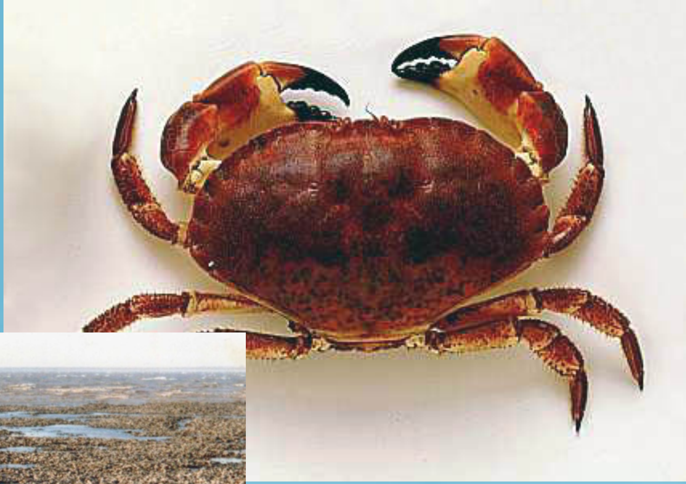
What needs to be included

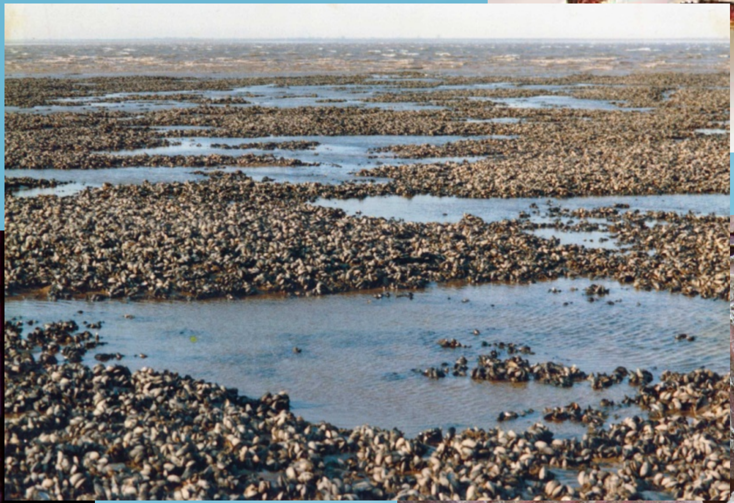
- Recommended survey design
- Analytical Techniques
- Ecological survey approaches

Cefas

What needs to be included

- Sampling and storage
  - Water
  - Sediments
  - Biota
- QA/QC





Cefas


premiam
POLLUTION RESPONSE IN EMERGENCIES
MARINE IMPACT ASSESSMENT AND MONITORING
POST-INCIDENT MONITORING GUIDELINES

Cefas

2

PREMIAM POST-SPILL MONITORING GUIDELINES

IMPLEMENTING A MONITORING PROGRAMME: HOW DO WE MONITOR?

2.1 IMMEDIATELY, IDENTIFY AND ACCESS ANY PRE-EXISTING BASELINE DATA

Information on pre-existing baseline data is gathered by Standing Environment Groups as part of their role between incidents, and so the local SEG(s) should be the first port of call. Monitoring programmes undertaken by the relevant environmental regulator (e.g. the Environment Agency in England and Wales) may also yield useful information, as may the UK's national marine monitoring programme (the Clean Seas Environmental Monitoring Programme). Relevant surveys and studies may also have been undertaken by local Wildlife Trusts and other nature conservation agencies, the Royal Society for the Protection of Birds and the British Trust for Ornithology, universities and research institutes.

2.2 IMMEDIATELY, COLLECT SAMPLES AND STORE TO PROVIDE A BASELINE

The availability of pre-incident monitoring data is one of the topics which the Standing Environment Groups in each area should have addressed. They should be contacted very rapidly in order to establish what is available and where it can be obtained from. In the absence of pre-existing baseline information, samples (sediments and biota, preferably) can be collected from selected locations and stored frozen against future need for analysis. This will be particularly useful in the case of chemicals (HNS compounds) where, for the vast majority of chemicals transported by sea, there is very little likelihood of data having been collected before. Ideally, sampling locations should be chosen so as to represent both reference sites (those which are unlikely to be impacted during the incident) and sites which are likely to be impacted. In order to help define these, computer modelling of the likely movement of slicks or floating or dissolved chemicals should be used, as was done successfully during the MSC Napoli container ship incident in 2007 (Law, 2008). Also, the characteristics of the samples taken from the two sets of locations should be similar wherever possible – e.g. muddy sediment; mussels or fish/invertebrates of the same species. When selecting species, consideration should also be given to the commercial fishery activities in the local area so that those contributing significantly to the local landings in terms of quantity or value are included. Similarly, species of significant nature conservation importance should be considered for inclusion.

REFERENCE

Law, R., 2008 (compiler). Environmental monitoring conducted in Lyme Bay following the grounding of MSC Napoli in January 2007, with an assessment of impact. Science Series, Aquatic Environment Monitoring Report, Cefas, Lowestoft, 61: 36pp. http://www.cefas.co.uk/publications/aquatic/aemr61.pdf accessed 26 May 2010.

Cefas

2

2.3 SURVEY DESIGN

Designing a damage assessment study for a particular ecological resource must be undertaken with considerable attention to detail. A large number of decisions need to be taken which will affect the value of the study and its ability to provide useful conclusions. The following sections aim to provide guidance on how to design appropriate studies, but more technical guidance on specific methods requires reference to other literature. Various methodological manuals are available, providing standard methods and procedures that have been used in previous oil spill studies (e.g. Australian Maritime Safety Authority, 2003a & b; Moreira et al., 2007; Robertson, 2001).

After careful prioritization, each damage assessment study would typically be based on:

- selected biological features key indicators, chosen according to their ecological significance and their sensitivity;
- essential environmental parameters (chemical/physical characteristics of the habitat which help identify changes from previous environmental conditions);
- chemical analysis of the pollutant (to confirm its identity and to allow monitoring of the decline of the pollutant toward baseline level).

It is not usually necessary to investigate all the ecosystems' components in order to build-up a picture of the damage caused by the accident. Sometimes indicator species can be selected to give a general indication of the scale and extent of the impact. In general, amphipods (a diverse group of small shrimp-like crustacea widespread in the marine environment) are sensitive to hydrocarbons in water and are often used as indicators in biological effects studies or sediment bioassays. On rocky shores, limpets are another indicator species that may act as a surrogate for the whole rocky shore community.

Studies should also aim to establish a link of causation between the damage and the spill, and this will be a strict requirement if compensation is to be sought under the International Oil Pollution Compensation Conventions.

REFERENCES

Australian Maritime Safety Authority, 2003a. Oil spill monitoring handbook. AMSA, Canberra. http://www.amsa.gov.au/marine_environment_protection/national_plan/contingency_plans_and_management/research_development_and_technology/Oil_Spill_Monitoring_Handbook.pdf accessed 24 May 2010.

Australian Maritime Safety Authority, 2003b. Oil spill monitoring background paper. AMSA, Canberra. http://www.amsa.gov.au/marine_environment_protection/national_plan/contingency_plans_and_management/research_development_and_technology/oil_spill_monitoring_background_paper.pdf accessed 24 May 2010.

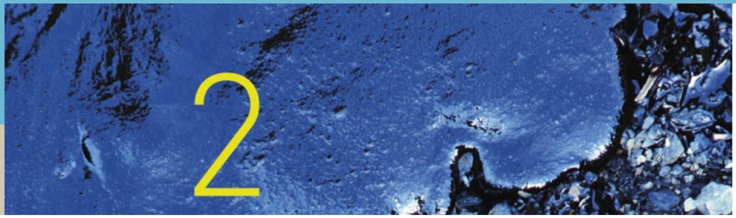
Moreira, S., Santos, M., Cunha, I., Sousa, A., Lima, D., Coimbra, J., Reis-Henriques, M.A., Guilhermino, L., 2007. EROCIPS Report for Task 7.3.5: Environmental monitoring report. http://www.erocips.org/reports_press_releases.htm accessed 24 May 2010.

Robertson S.B., 2001. Guidelines and methods for determining oil spill effects. Proceedings of the 2001 International Oil Spill Conference. American Petroleum Institute, Washington D.C. pp. 1545-1548.

2.3.1 Design process

The following points describe a logical process for designing a survey of a natural resource:

1. Select the natural resource for which there is concern and carry out reconnaissance surveys to assess the spatial extent and level of exposure to oil.
2. Define aims and objectives of the study – first understand clearly what question(s) you want answered. Examples of typical questions and their consequences are given in Appendix 2.
3. Define the geographic scope, time limits and the scale of the study. A balance is needed here between the desire to understand the full extent of the effects in space and time and the imperatives of budgets and deadlines. A focus on the worst affected areas and typical timescales of effects, with an associated but less intensive strategy for the wider area, may be appropriate.
4. Examine information from studies of the resource in the affected area or elsewhere to evaluate whether the methodologies used are appropriate for application to oil spill impact assessment, whether a modified methodology would work or whether a new methodology needs to be devised. Evaluation of the pre-spill data from the affected area should also be made to assess its usefulness as a baseline.
5. With the above in mind, select suitable parameters / attributes for measurement – ensuring that they are suitable for detecting relevant change, that they are technically and logistically feasible within the timescale of the study, and that they will produce reliable and reproducible results.
6. Select or design an appropriate method to obtain the necessary data, including preparation of detailed protocols to ensure quality and consistency.
7. Analyse existing pre-spill data from the site or from similar resources elsewhere to understand the potential levels of natural variability (temporal fluctuations and spatial patchiness).
8. Decide on the level of accuracy that is required. A specialist in the resource, possibly with the aid of a statistician, will be able to interpret the available information on natural variability and advise on the consequences of under or over sampling. This will be particularly important if it is expected that the results of the study will be used as part of a claim for compensation or could be challenged in a legal or scientific forum.



2.3 SURVEY DESIGN

Designing a damage assess
undertaken with considerab
taken which will affect the v
The following sections aim
more technical guidance on
Various methodological ma
procedures that have been
Safety Authority, 2003a & b
After careful prioritizatio

- selected biological featu
significance and their se
- essential environmental
which help identify char
- chemical analysis of the
the decline of the pollut

It is not usually necessary t
up a picture of the damage
selected to give a general ir
amphipods (a diverse group
environment) are sensitive
biological effects studies or
indicator species that may a
Studies should also aim
spill, and this will be a strict
International Oil Pollution C

REFERENCES

Australian Maritime Safety Aut
http://www.amsa.gov.au/marin
management/research_develop
24 May 2010.

Australian Maritime Safety Aut
Canberra. http://www.amsa.gov
plans_and_management/resea
paper.pdf accessed 24 May 201

Moreira, S., Santos, M., Cunha,
Guilhermino, L., 2007. EROCIPS
http://www.erocips.org/reports

Robertson S.B., 2001. Guideline
2001 International Oil Spill Con

2.4 SAMPLING STRATEGIES AND METHODS

Sampling should include both impacted and reference (unimpacted) sites, ideally with similar characteristics as outlined in section 2.3.3 above. Sites which are not impacted at the time of sampling but which are thought likely to be impacted later on during the incident (for instance, as indicated by predictive modelling of the trajectory of the spilled material) can provide excellent reference (pre-spill) information.

The range of samples to be collected can be very wide, including water, subtidal and intertidal sediments, subtidal and intertidal biota, commercial fish and shellfish, and samples of the spilled oil or chemical(s) from the sea surface or from beaches. Dissolved concentrations of determinands are usually very low in marine incidents, and great care must be taken in selection of sampling devices, their cleaning prior to use and the avoidance of cross-contamination. Plastics are generally not suitable materials as they are not resistant to solvents commonly used to clean sampling devices, and phthalate esters added as plasticizers (substances added to plastics to increase their flexibility, transparency, durability, and longevity) can leach into water samples. For oils and chemicals generally, glass is the preferred material. A simple subsurface water sampler is described in Kelly et al. (2000). Glass Winchester solvent bottles (2.7 l volume) are mounted in a weighted stainless steel frame which is deployed by means of a nylon rope. The bottle is sealed using a PTFE stopper which may be removed when the sampler is at the required sampling depth by means of a second nylon rope. The stopper is spring-loaded so that the bottle may be resealed when full, being open therefore only during sample collection, and sealed during deployment and recovery. This prevents contamination by any surface films which may be present on the sea. Sample bottles are rigorously cleaned with pentane (the solvent used for extraction of water samples) before use. The sampler (particularly the stopper) is cleaned with pentane at the start of each day's sampling, periodically during sampling, following a period of inactivity, or after use in areas in which high concentrations of the determinands may have been encountered.

This shallow water sampler has been in use for over 25 years, and has proved to be both robust and reliable. It has been shown to be capable of collecting uncontaminated samples for a variety of other trace organic contaminants as well as hydrocarbons, including iso-propyl benzene, tetrachloroethene and phthalate esters in the low ngl-1 concentration range. When deployed from a hydrowire following the addition of mounting clips and an aluminium vane to prevent spinning (see Figure 6), the bottles can be used to a depth of at least 50 m without imploding (Law and Whinnett, 1993); whilst for sampling at depths of 10 m or less, the sampler can be operated by hand using two lines. When deployed from a hydrowire (Kevlar preferred) only the opening/closing line is used once the sampler is at the required depth.

Recent experience in the Gulf of Mexico following the Deepwater Horizon oil spill suggest that sampling may also be needed in deeper waters, such as those to the west of the Shetland Islands. Oil production is already underway in water depths of 140-600 m. Production in the Foinaven, Schiehallion and Clair oilfields began in 1997-2005. Drilling in the Lagavulin prospect, in a water depth > 1500 m, began in 2010. Water sampling for oil and chemicals can be undertaken using hydrographic sampling bottles, preferably with a PTFE internal lining, such as available for the GO-FLO bottle produced by General Oceanics in the USA. These are deployed by hydrowire and the bottles closed at sampling depth using either a messenger or by signal from the deploying vessel via a rosette sampler. Oil concentrations in deeper water can be monitoring semi-continuously using a Chelsea Instruments Ltd (UK based) UV AQUAtracka fluorimeter, which is towed behind a

Figure 5.
Design of a Cefas shallow water sampler.

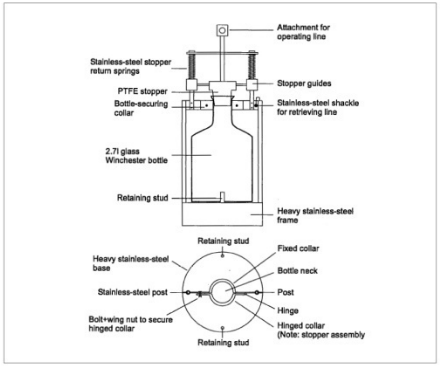


Figure 6.
Cefas shallow water sampler rigged for use. The sampler is lowered using the white rope, and opened and closed using the red rope.

Cefas

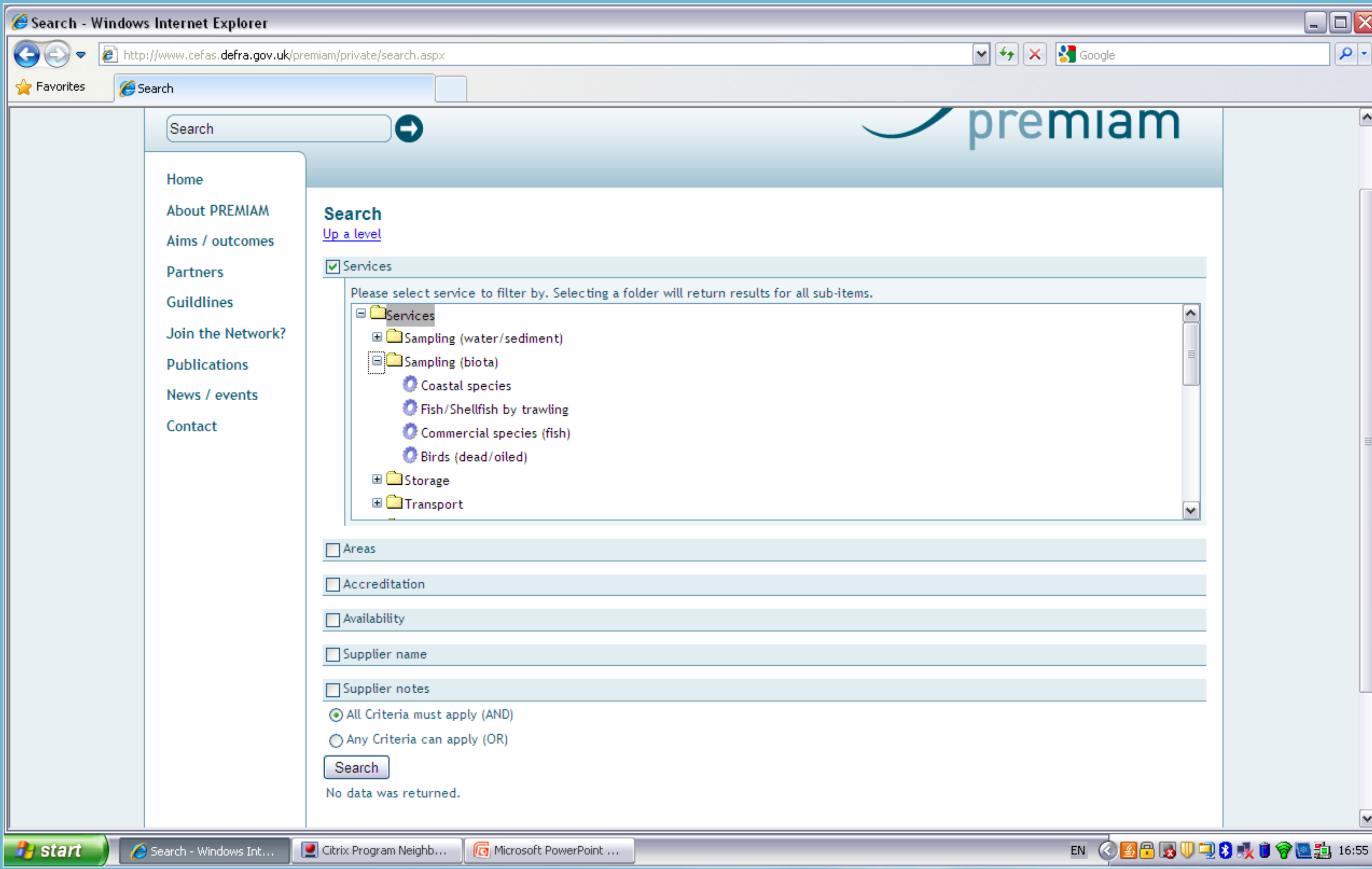
Network

It’s no good having guidelines without anyone primed to use them!

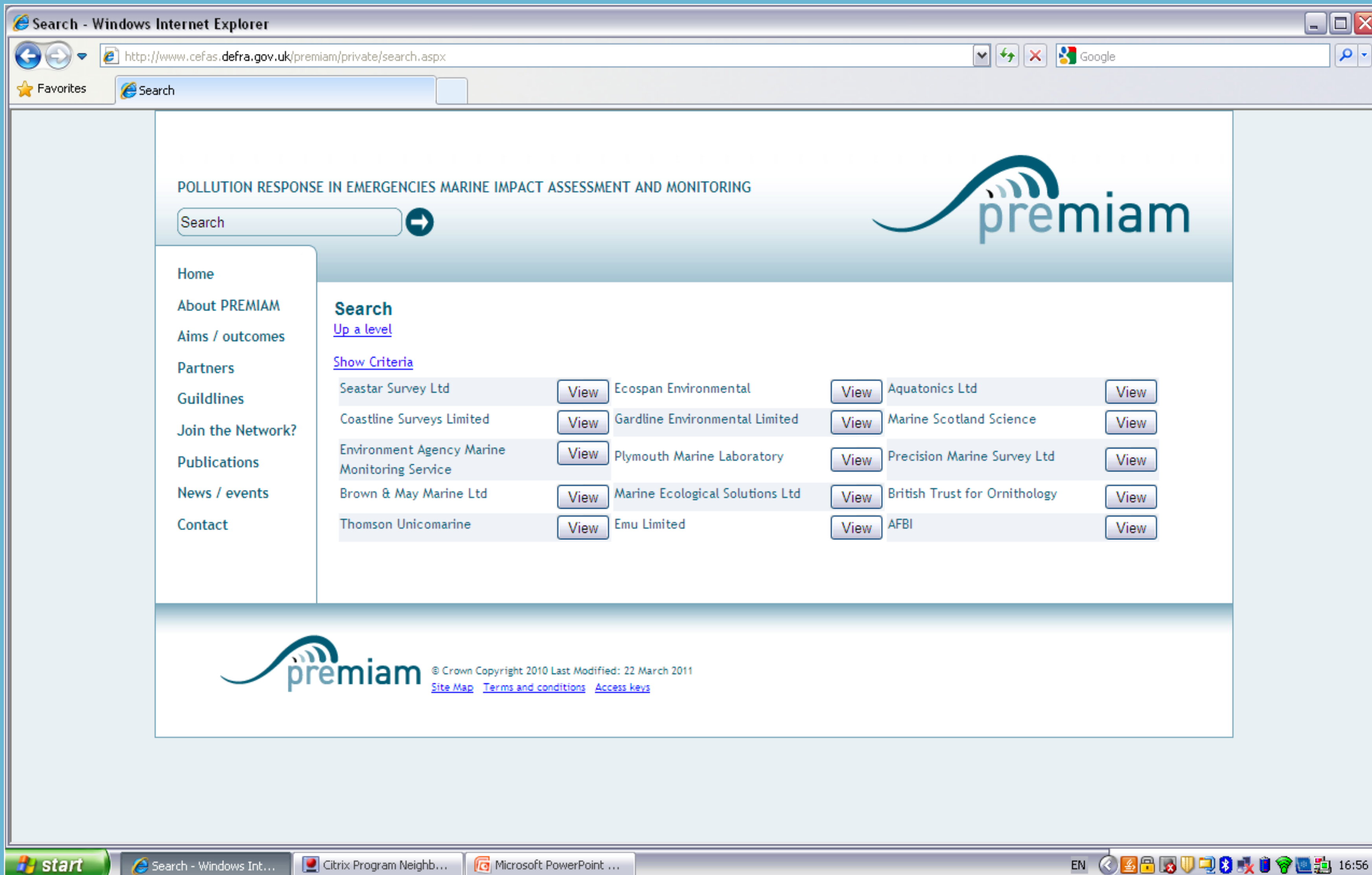
- Scientific/analytical services
- Sampling services
- Transport and storage
- Modelling services
- Local knowledge/advice

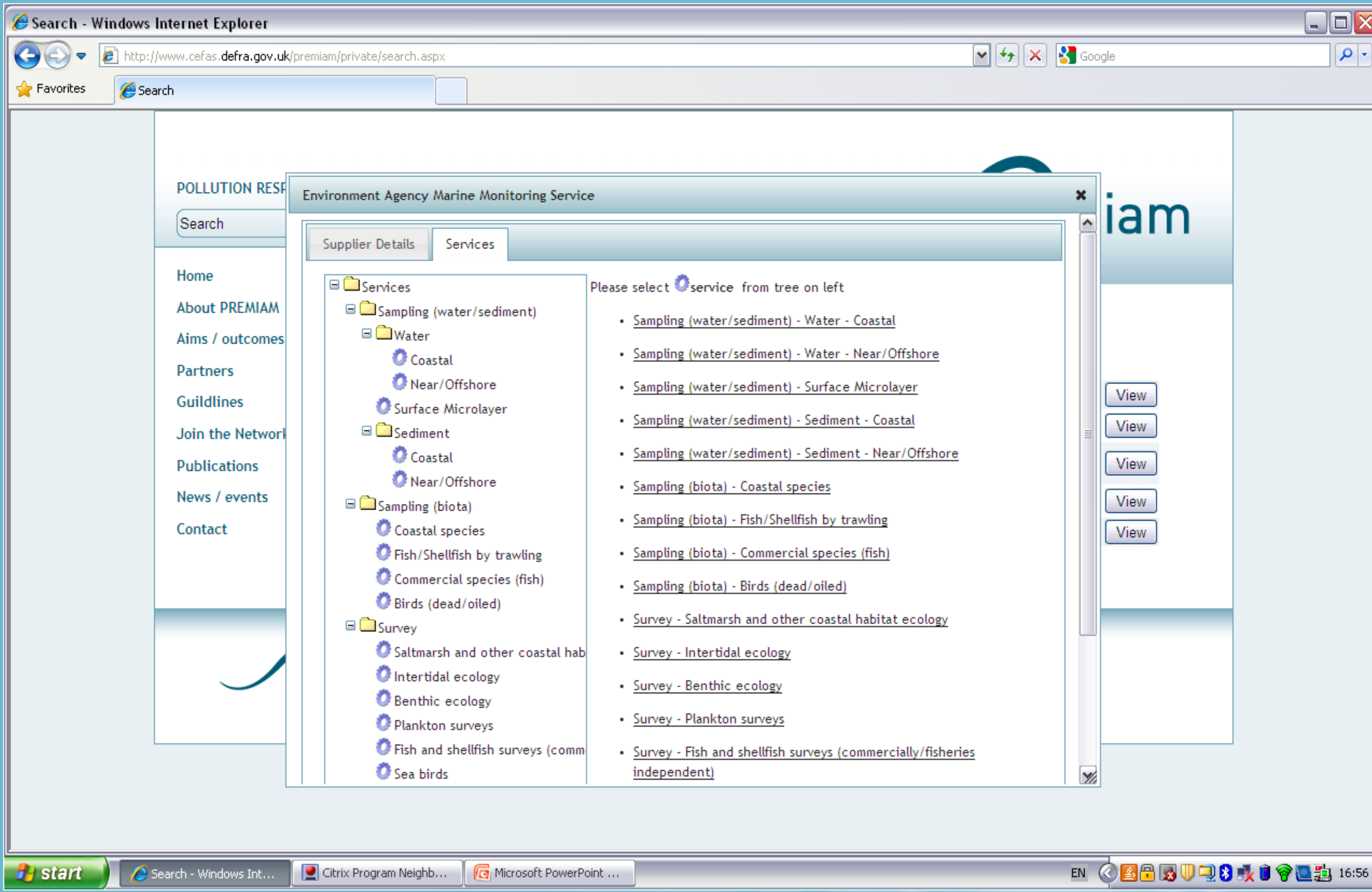
Cefas


Private - Windows Internet Explorer
http://www.cefas.defra.gov.uk/premiam/private.aspx
Google
Favorites
Private
POLLUTION RESPONSE IN EMERGENCIES MARINE IMPACT ASSESSMENT AND MONITORING
Search
premiam
Home
About PREMIAM
Aims / outcomes
Partners
Guildlines
Join the Network?
Publications
News / events
Contact
Private
Search
Edit
Import Data from Excel
Edit Service List
Edit Accreditation List
premiam
© Crown Copyright 2010 Last Modified: 22 March 2011
Site Map Terms and conditions Access keys
start
Private - Windows Int...
Microsoft PowerPoint ...
EN
16:57

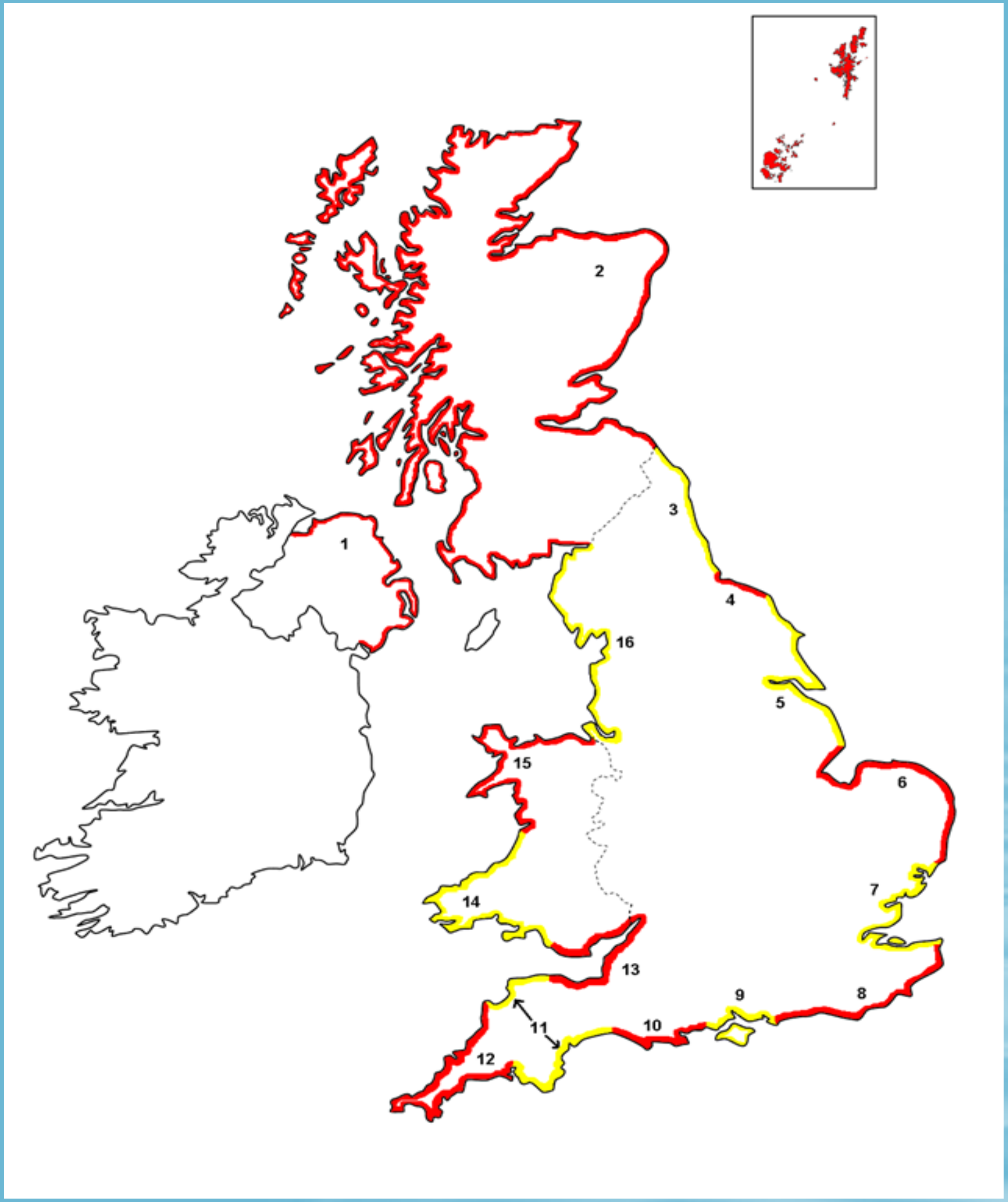

Search - Windows Internet Explorer
http://www.cefas.defra.gov.uk/premiam/private/search.aspx
Google
Favorites
Search
Search
premiam
Home
About PREMIAM
Aims / outcomes
Partners
Guildlines
Join the Network?
Publications
News / events
Contact
Search
Up a level
Services
Please select service to filter by. Selecting a folder will return results for all sub-items.
Services
Sampling (water/sediment)
Sampling (biota)
Coastal species
Fish/Shellfish by trawling
Commercial species (fish)
Birds (dead/oiled)
Storage
Transport
Areas
Accreditation
Availability
Supplier name
Supplier notes
All Criteria must apply (AND)
Any Criteria can apply (OR)
Search
No data was returned.
start
Search - Windows Int...
Citrix Program Neighb...
Microsoft PowerPoint ...
EN
16:55

Cefas


Search - Windows Internet Explorer
http://www.cefas.defra.gov.uk/premiam/private/search.aspx
Favorites
Search
POLLUTION RESPONSE IN EMERGENCIES MARINE IMPACT ASSESSMENT AND MONITORING
Search
premiam
Home
About PREMIAM
Aims / outcomes
Partners
Guildlines
Join the Network?
Publications
News / events
Contact
Search
Up a level
Show Criteria
Seastar Survey Ltd View
Ecospan Environmental View
Aquatonics Ltd View
Coastline Surveys Limited View
Gardline Environmental Limited View
Marine Scotland Science View
Environment Agency Marine Monitoring Service View
Plymouth Marine Laboratory View
Precision Marine Survey Ltd View
Brown & May Marine Ltd View
Marine Ecological Solutions Ltd View
British Trust for Ornithology View
Thomson Unicomarine View
Emu Limited View
AFBI View
premiam
© Crown Copyright 2010 Last Modified: 22 March 2011
Site Map Terms and conditions Access keys
start
Search - Windows Int...
Citrix Program Neighb...
Microsoft PowerPoint ...
EN
16:56


Search - Windows Internet Explorer
http://www.cefas.defra.gov.uk/premiam/private/search.aspx
Google
Favorites
Search
POLLUTION RESP
Search
Home
About PREMIAM
Aims / outcomes
Partners
Guildlines
Join the Networ
Publications
News / events
Contact
iam
Environment Agency Marine Monitoring Service
Supplier Details
Services
Services
Sampling (water/sediment)
Water
Coastal
Near/Offshore
Surface Microlayer
Sediment
Coastal
Near/Offshore
Sampling (biota)
Coastal species
Fish/Shellfish by trawling
Commercial species (fish)
Birds (dead/oiled)
Survey
Saltmarsh and other coastal hab
Intertidal ecology
Benthic ecology
Plankton surveys
Fish and shellfish surveys (comm
Sea birds
Please select service from tree on left
Sampling (water/sediment) - Water - Coastal
Sampling (water/sediment) - Water - Near/Offshore
Sampling (water/sediment) - Surface Microlayer
Sampling (water/sediment) - Sediment - Coastal
Sampling (water/sediment) - Sediment - Near/Offshore
Sampling (biota) - Coastal species
Sampling (biota) - Fish/Shellfish by trawling
Sampling (biota) - Commercial species (fish)
Sampling (biota) - Birds (dead/oiled)
Survey - Saltmarsh and other coastal habitat ecology
Survey - Intertidal ecology
Survey - Benthic ecology
Survey - Plankton surveys
Survey - Fish and shellfish surveys (commercially/fisheries independent)
View
View
View
View
View
start
Search - Windows Int...
Citrix Program Neighb...
Microsoft PowerPoint ...
EN
16:56

UK Standing Environment Groups



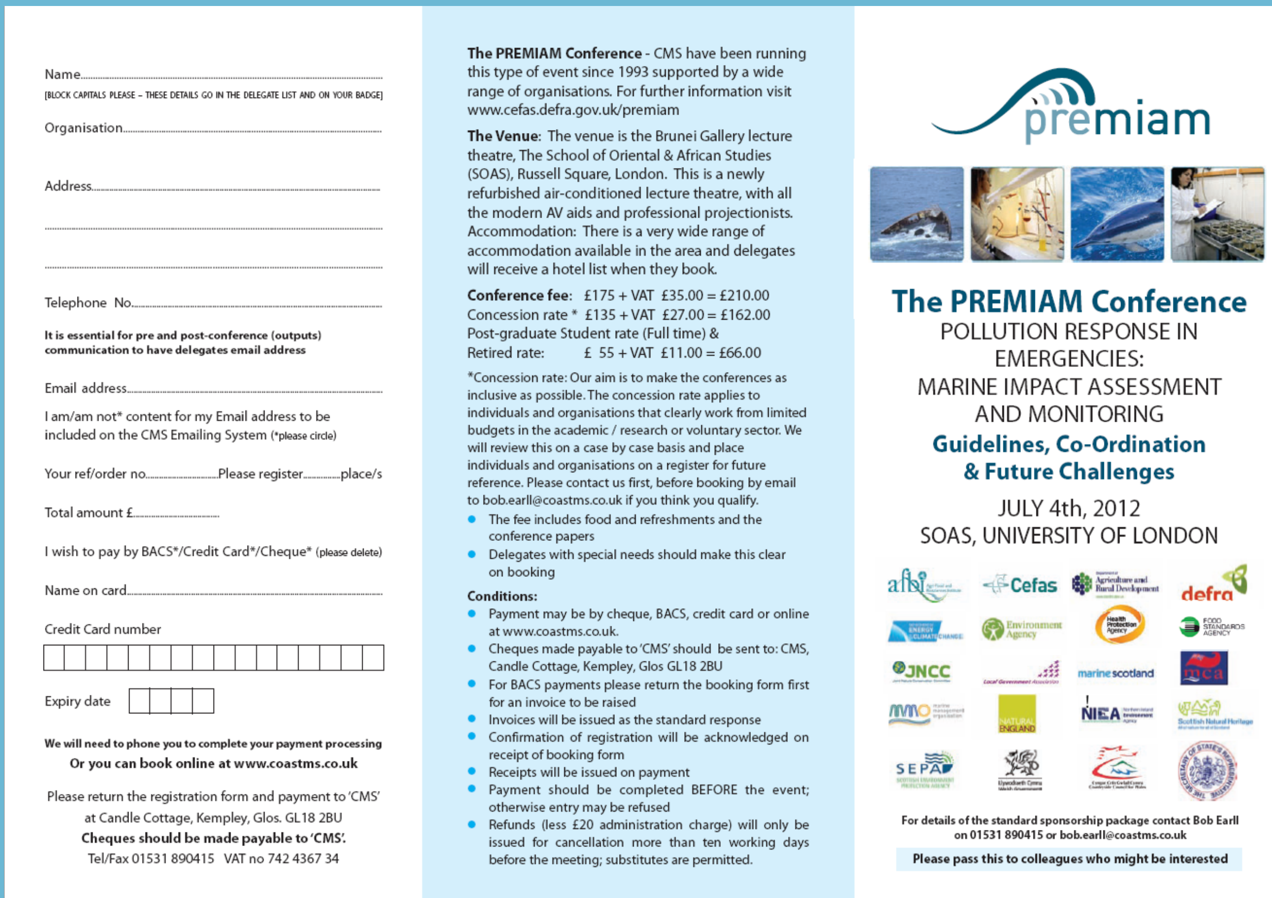
Co-ordination, management and communication

- Integration with plans (e.g. NCP, OPEPs etc.)
- Exercises
- Supplementary guidance
- Integration with Environment Groups
- Links with wider industry, NGO and other response organisations.
- A hub for debate and development.
- Annual Conference?

Cefas

The Premiam Conference

4th July 2012, SOAS, London



Name..
[BLOCK CAPITALS PLEASE – THESE DETAILS GO IN THE DELEGATE LIST AND ON YOUR BADGE]

Organisation..

Address..

Telephone No..

It is essential for pre and post-conference (outputs) communication to have delegates email address

Email address..

I am/am not* content for my Email address to be included on the CMS Emailing System (*please circle)

Your ref/order no..................Please register...........place/s

Total amount £..........................

I wish to pay by BACS*/Credit Card*/Cheque* (please delete)

Name on card..

Credit Card number

Expiry date

We will need to phone you to complete your payment processing
Or you can book online at www.coastms.co.uk

Please return the registration form and payment to 'CMS' at Candle Cottage, Kempley, Glos. GL18 2BU
Cheques should be made payable to 'CMS'.
Tel/Fax 01531 890415 VAT no 742 4367 34

The PREMIAM Conference - CMS have been running this type of event since 1993 supported by a wide range of organisations. For further information visit www.cefas.defra.gov.uk/premiam

The Venue: The venue is the Brunei Gallery lecture theatre, The School of Oriental & African Studies (SOAS), Russell Square, London. This is a newly refurbished air-conditioned lecture theatre, with all the modern AV aids and professional projectionists. Accommodation: There is a very wide range of accommodation available in the area and delegates will receive a hotel list when they book.

Conference fee: £175 + VAT £35.00 = £210.00
Concession rate * £135 + VAT £27.00 = £162.00
Post-graduate Student rate (Full time) &
Retired rate: £ 55 + VAT £11.00 = £66.00

*Concession rate: Our aim is to make the conferences as inclusive as possible. The concession rate applies to individuals and organisations that clearly work from limited budgets in the academic / research or voluntary sector. We will review this on a case by case basis and place individuals and organisations on a register for future reference. Please contact us first, before booking by email to bob.earll@coastms.co.uk if you think you qualify.

- The fee includes food and refreshments and the conference papers
- Delegates with special needs should make this clear on booking

Conditions:

- Payment may be by cheque, BACS, credit card or online at www.coastms.co.uk.
- Cheques made payable to 'CMS' should be sent to: CMS, Candle Cottage, Kempley, Glos GL18 2BU
- For BACS payments please return the booking form first for an invoice to be raised
- Invoices will be issued as the standard response
- Confirmation of registration will be acknowledged on receipt of booking form
- Receipts will be issued on payment
- Payment should be completed BEFORE the event; otherwise entry may be refused
- Refunds (less £20 administration charge) will only be issued for cancellation more than ten working days before the meeting; substitutes are permitted.

premiam

The PREMIAM Conference
POLLUTION RESPONSE IN EMERGENCIES:
MARINE IMPACT ASSESSMENT AND MONITORING
Guidelines, Co-Ordination & Future Challenges
JULY 4th, 2012
SOAS, UNIVERSITY OF LONDON

For details of the standard sponsorship package contact Bob Earll on 01531 890415 or bob.earll@coastms.co.uk

Please pass this to colleagues who might be interested

- NOAA – DWH
- Guidelines
- Science
- Planning and co-ordination
- Regulation and compensation
- Environmental & commercial sensitivities

http://www.coastms.co.uk/conferences/459

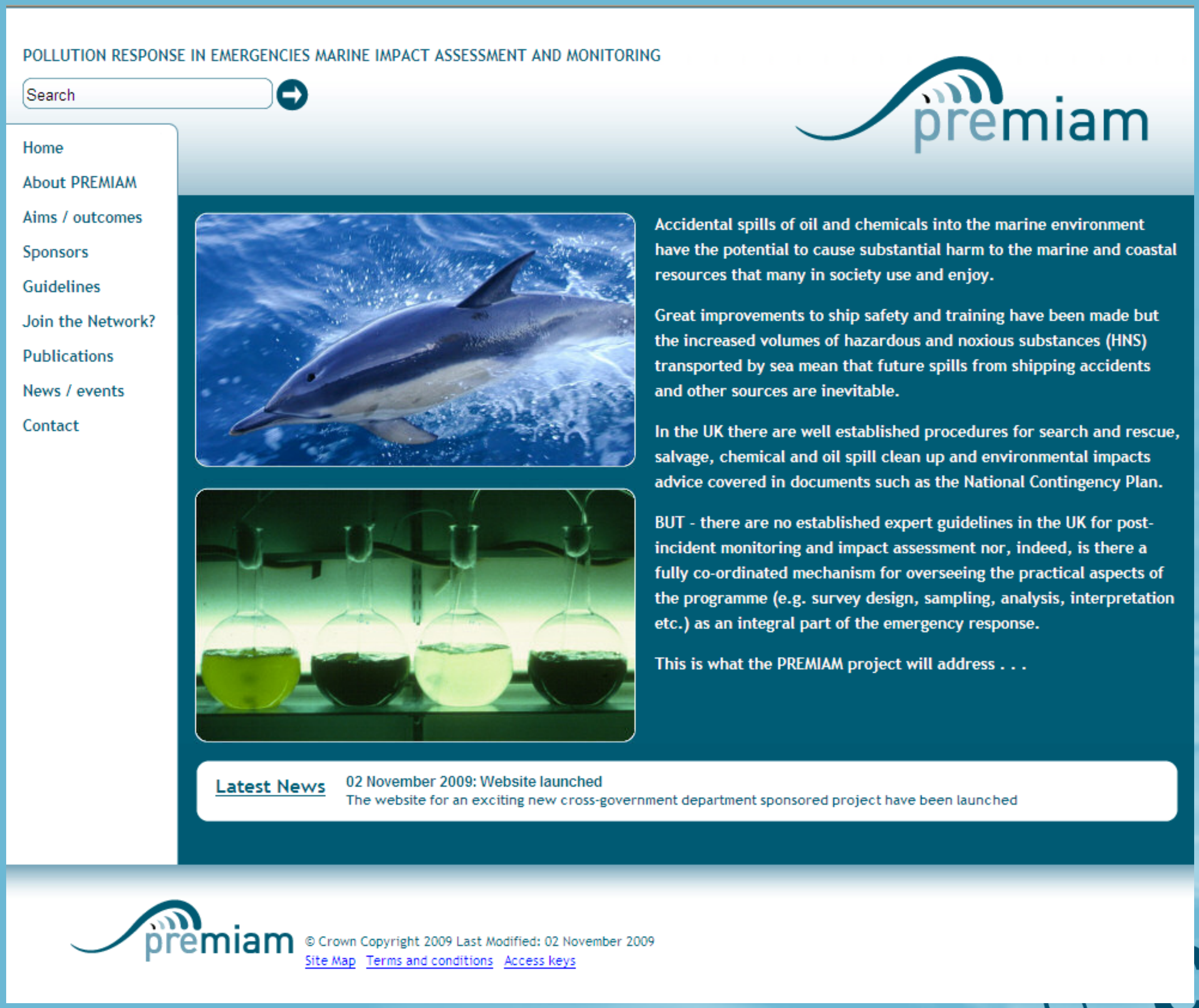
Cefas

The Benefits

- Prompt response
- The right (including cost-effective) response
- Fully integrated and co-ordinated response
- Public reassurance
- Full stakeholder integration

Cefas

www.cefas.defra.gov.uk/premiam



Cefas