

# Scientific Data Sharing and Availability – How it is Essential in Environmental Monitoring Responses

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**Session1: From Science to Decision Making**



Centre for Environment  
Fisheries & Aquaculture  
Science

World Class Science for the Marine and  
Freshwater Environment



**Cefas**



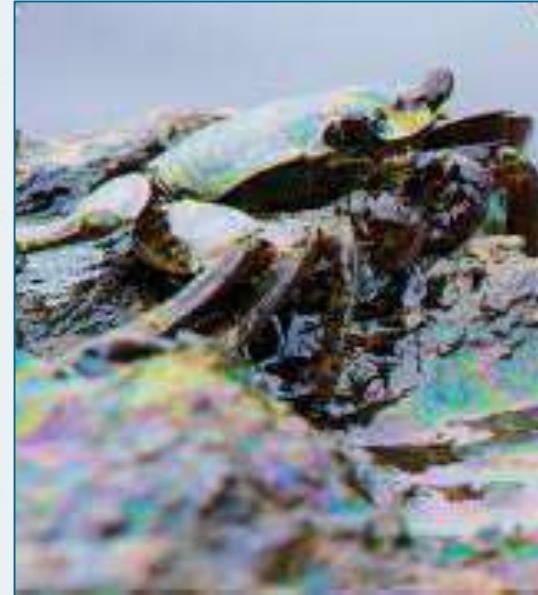
# Environmental monitoring responses

Whilst the **number of oil spills has decreased in recent decades**, there is still the potential for occasional large, high profile incidents.

As such, there remains a need for national authorities to continue to maintain and develop effective incident response and clean up capability, including the ability to initiate and conduct **scientifically robust post-incident environmental monitoring and post impact assessment**.

## This ensures that:

- Stakeholders are provided with timely evidence of the potential hazards and risks posed by the incident;
- Short and longer term impacts are effectively investigated; and
- Information relating to the effectiveness of response and clean up activities is shared, thereby providing input into evolving response strategies.



# What are the data and evidence needs?

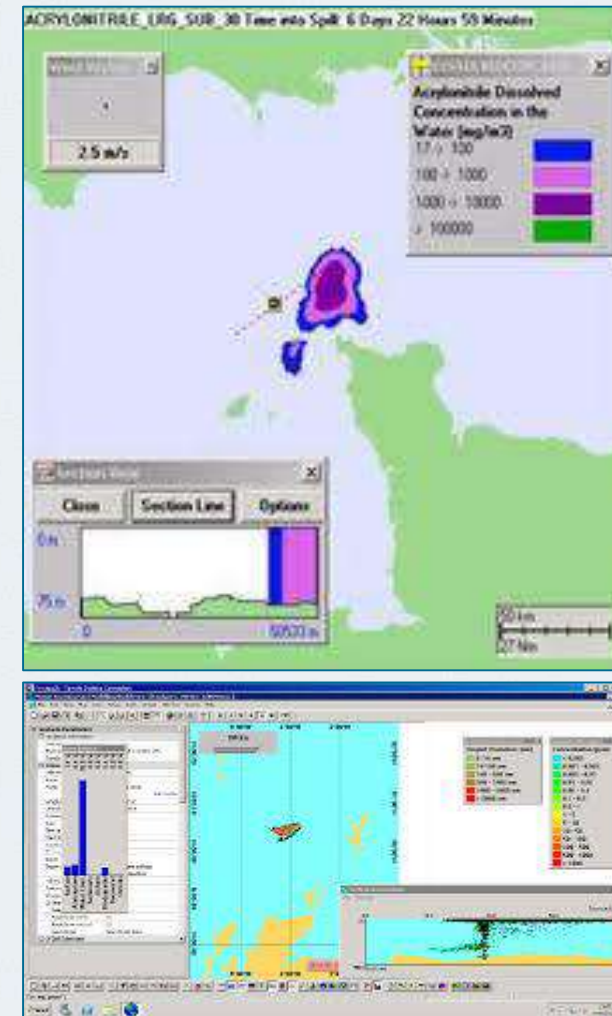
## LIKELY FOOTPRINT OF IMPACT

In the event of a spill, a number of data and information sources are available which will provide an indication of the likely footprint of impact.

## Fate and transport models:

- Type and quantity of substance spilled;
- Rate of release;
- Prevailing conditions (wind strength/direction, sea state/waves, sea/air temperature, ocean currents/tides, salinity, SPM);

*(Issues: accuracy and availability of data, disagreement between model outputs)*



# What are the data and evidence needs?

## LIKELY SIGNIFICANCE OF IMPACTS

### Overlap of footprint of impact with extent of sensitive receptors:

- **Public health** impacts (e.g., bathing waters);
- **Species/habitats of conservation importance** (e.g., intertidal and subtidal habitat maps);
- Important **commercial fish and shellfish** species (e.g., commercial shellfish beds); and
- Baseline **contaminant concentrations** (water, sediment, biota).





# What are the data and evidence needs?

## POST SPILL RECOVERY

**Data and evidence to understand the efficacy of emergency response/remedial action in promoting recovery:**

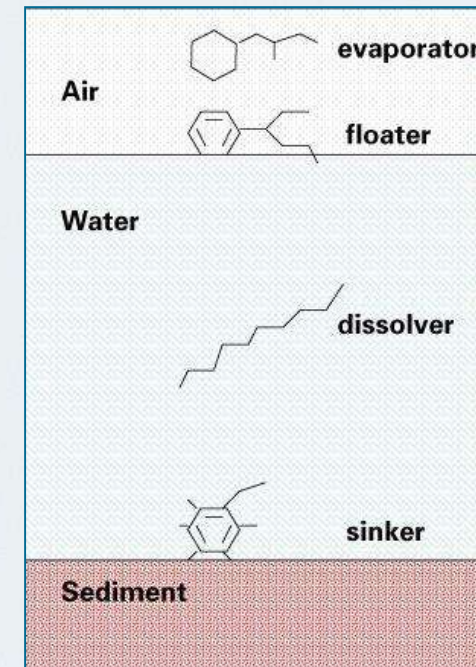
- Impacted/Reference areas;
- Pre-incident baseline data (habitat extent and condition, contaminant concentrations);
- Distinguish impact recovery from natural trends;
- Feedback into continual improvement of approaches for emergency response and impact mitigation.



# Data types: availability and accessibility

## TRANSPORT AND FATE OF SPILLED SUBSTANCES

- Numerous modelling outputs available (potential differences in their predicted footprint of impact, likelihood of landfall);
- Whilst oil pollution events are relatively well understood, less so for transport and fate of other hazardous and noxious substances (HNS);  
*(e.g., HNS chemicals exhibit a far greater range of properties that determine where they end up in the environment)*
- For HNS, need to consider properties such as density, solubility and volatility.



### SEA SURFACE



### WATER COLUMN



### SEA FLOOR



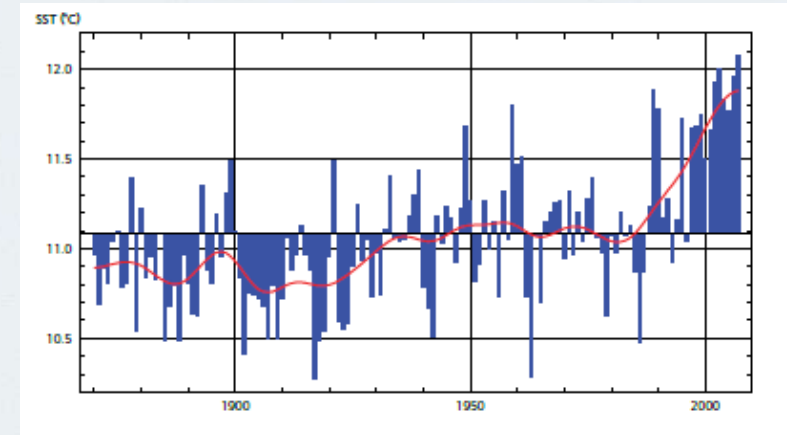


# Data types: availability and accessibility

## TRANSPORT AND FATE OF SPILLED SUBSTANCE

### Prevailing environmental conditions:

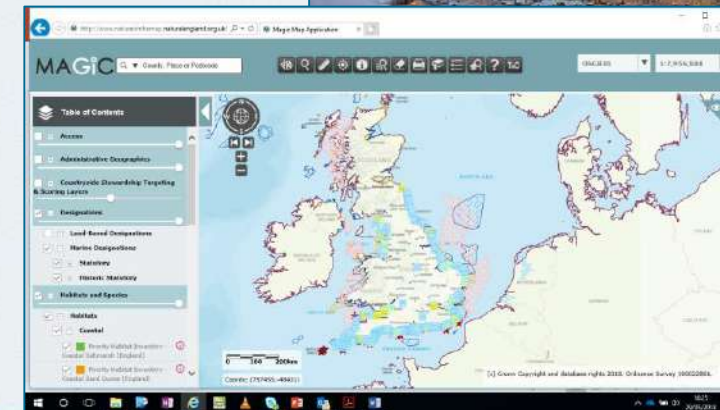
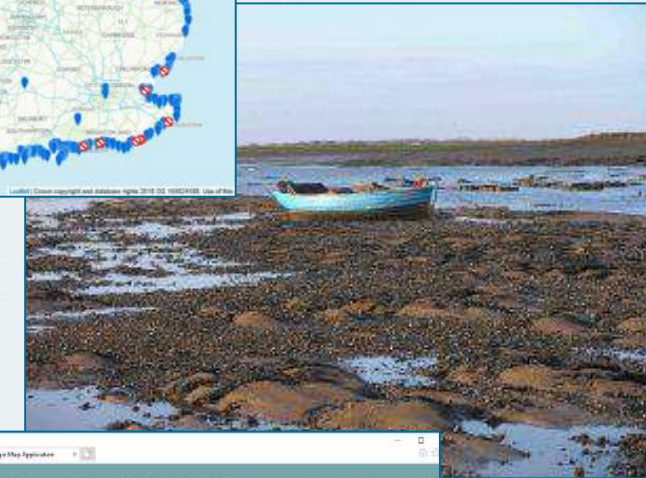
- **Sea temperature/salinity** (*sources: drifting/moored buoys, vessels e.g., ferrybox, coastal stations, earth observation (EO) data*);
- **Sea state/waves/wind** (*sources: satellite altimetry, moored buoys (e.g., wavenet)*);
- **Suspended particulate matter (SPM)** (*sources: secchi disk data, EO data*);
- **Currents/tides** (*sources: in situ observations e.g., ADCP, predictive models*).



# Data types: availability and accessibility

## VULNERABLE RESOURCES:

- **Bathing waters** (*source:* <https://environment.data.gov.uk/bwq/profiles/>);
- **Commercial fish and shellfish resources** (*source:* *Local Inshore Fisheries and Conservation Authority (IFCA), Food Standards Agency (FSA)*);
- **Conservation features (habitats & species)** (*source:* *Statutory Nature Conservation Bodies (SNCBs) e.g., Natural England (<http://www.natureonthemap.naturalengland.org.uk/magicmap.aspx>), the Joint Nature Conservation Committee (JNCC)*).

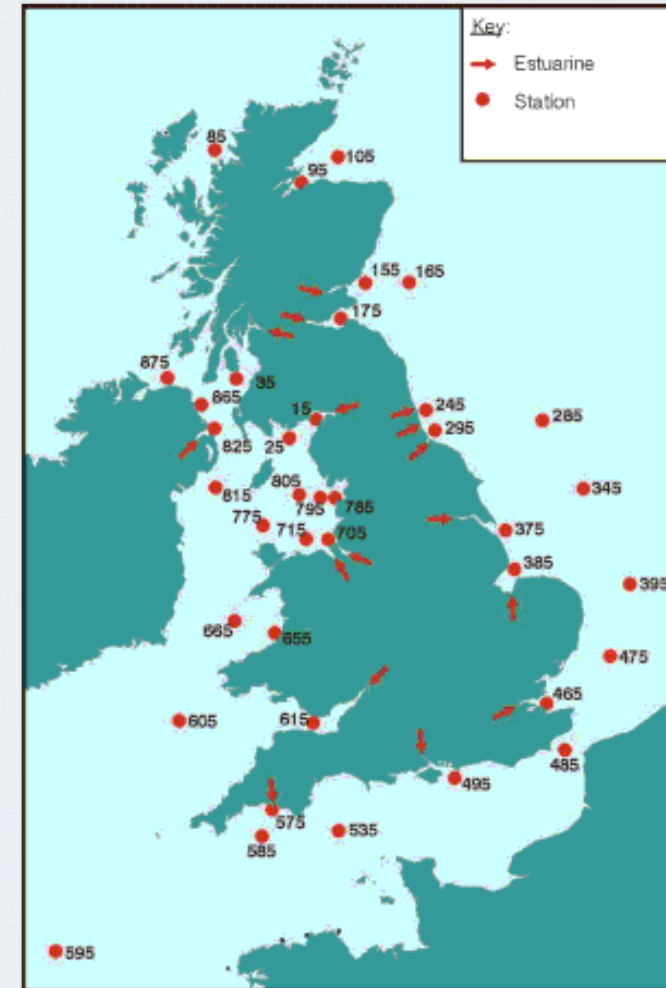




# Data types: availability and accessibility

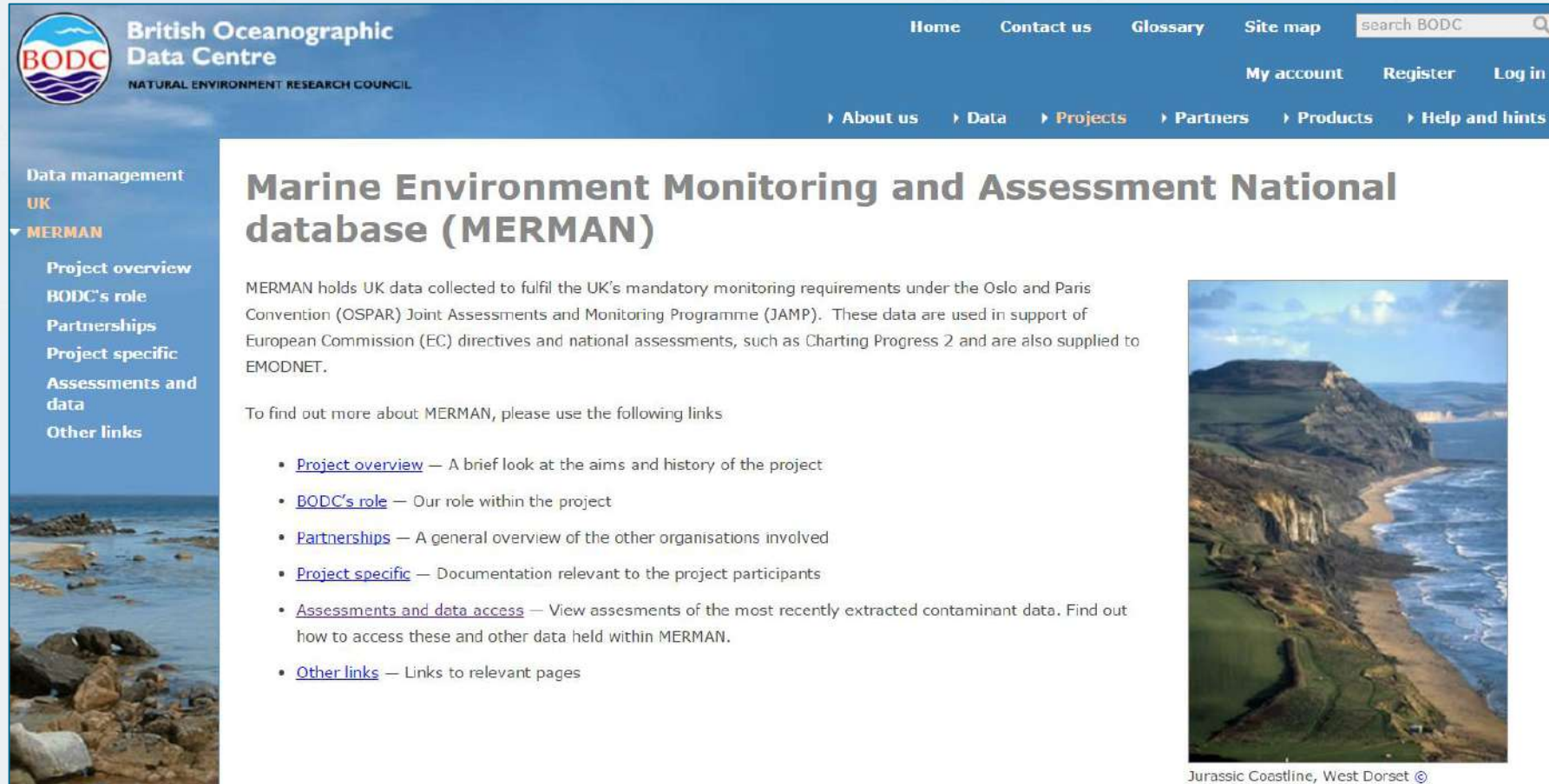
## CONTAMINANT DATA: ENVIRONMENTAL BASELINE/REFERENCE

- **Data Sources: Clean Seas Environmental Monitoring Programme (CSEMP):**
  - OSPAR/MSFD focused spatial and temporal programme (status & trend);
  - Applying internationally recommended biological and chemical techniques with approved QA/QC (developed by ICES/OSPAR);
  - Integrated monitoring focusing on water, sediment and biota:
    - Analytical chemistry (metals, PAHs, PCB, PBDEs, Dioxins);
    - Ecotoxicology (limited geographically and mainly historical);
    - Biomarkers (linked to metals and pollution by PAHs/PCBs); and
    - Fish/shellfish disease (general and pollutant specific health markers).
- **Other data sources:** OSPAR riverine inputs and direct discharges – RID, WFD priority pollutants, dredge disposal site monitoring and other industry data.



# Data types: availability and accessibility

## ACCESS TO CSEMP BASELINE DATA: MERMAN DATABASE



The screenshot shows the BODC website interface. At the top left is the BODC logo and the text 'British Oceanographic Data Centre' and 'NATURAL ENVIRONMENT RESEARCH COUNCIL'. The top navigation bar includes links for 'Home', 'Contact us', 'Glossary', 'Site map', and a search box labeled 'search BODC'. Below this is a secondary navigation bar with 'My account', 'Register', and 'Log in'. A breadcrumb trail shows 'About us' > 'Data' > 'Projects' > 'Partners' > 'Products' > 'Help and hints'. The main content area features a sidebar on the left with 'Data management UK' and 'MERMAN' expanded to show 'Project overview', 'BODC's role', 'Partnerships', 'Project specific', 'Assessments and data', and 'Other links'. The main heading is 'Marine Environment Monitoring and Assessment National database (MERMAN)'. The text below explains that MERMAN holds UK data for OSPAR JAMP and EC directives. A list of links provides further information on project overview, BODC's role, partnerships, project specifics, data access, and other links. A photograph of the Jurassic Coastline in West Dorset is shown on the right.

British Oceanographic Data Centre  
NATURAL ENVIRONMENT RESEARCH COUNCIL

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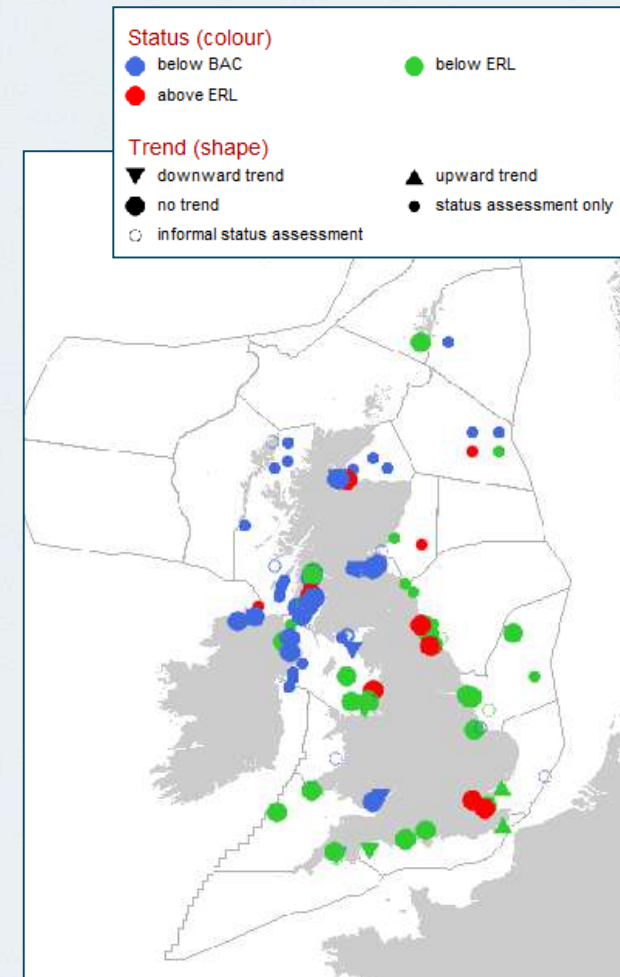
### Marine Environment Monitoring and Assessment National database (MERMAN)

MERMAN holds UK data collected to fulfil the UK's mandatory monitoring requirements under the Oslo and Paris Convention (OSPAR) Joint Assessments and Monitoring Programme (JAMP). These data are used in support of European Commission (EC) directives and national assessments, such as Charting Progress 2 and are also supplied to EMODNET.

To find out more about MERMAN, please use the following links

- [Project overview](#) — A brief look at the aims and history of the project
- [BODC's role](#) — Our role within the project
- [Partnerships](#) — A general overview of the other organisations involved
- [Project specific](#) — Documentation relevant to the project participants
- [Assessments and data access](#) — View assessments of the most recently extracted contaminant data. Find out how to access these and other data held within MERMAN.
- [Other links](#) — Links to relevant pages

Jurassic Coastline, West Dorset ©



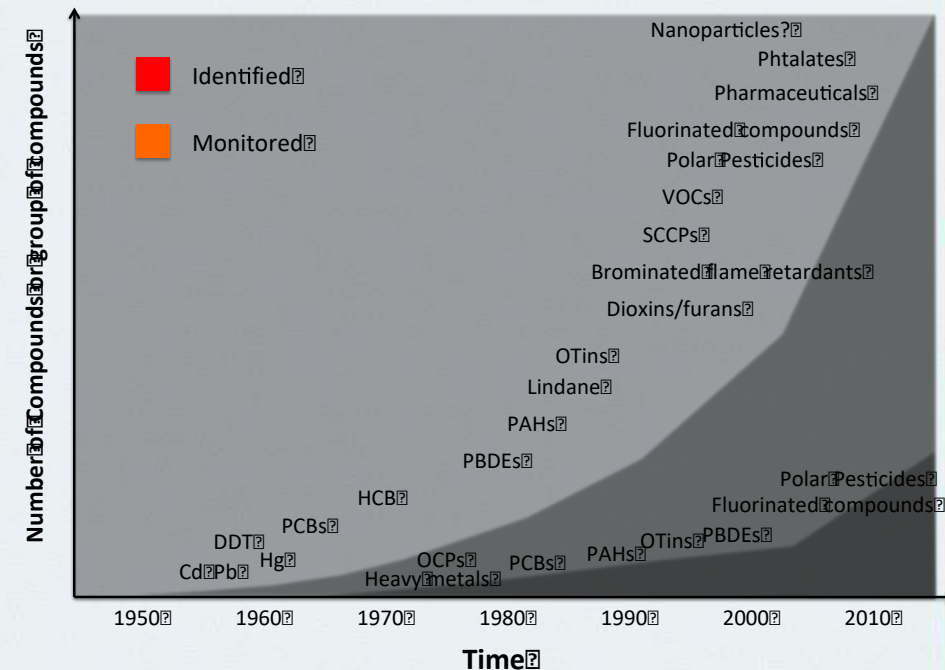


# Data types: availability and accessibility

## CONTAMINANT DATA: ECOTOXICOLOGY/BIOLOGICAL EFFECTS

Lack of baseline data and understanding of biological effects for all HNS:

- HNS vary in terms of toxicity, bioaccumulation potential, persistence, biological effects (e.g., carcinogenic);
- Laboratory studies to explore differences in fate and biological effects under different environmental conditions (e.g., temperature, salinity);
- In most cases, higher toxicity with increasing temperature and lower toxicity with increasing salinity.



# Optimisation of coordinated data collection and sharing

## USE OF STANDARD OPERATING PROCEDURES (SOPs): DATA COLLECTION, SAMPLE PROCESSING, ASSESSMENT

- Sediment sample collection and processing guidelines (e.g., [https://www.bodc.ac.uk/data/documents/nodb/pdf/nmmp\\_green\\_book.pdf](https://www.bodc.ac.uk/data/documents/nodb/pdf/nmmp_green_book.pdf))
- Contaminant assessment tools based on international standards (e.g. sediment quality guidelines);
- Applying internationally recommended biological and chemical techniques with approved QA/QC (developed by ICES/OSPAR);
- Benthic sampling techniques and best practise for habitat mapping and biological sampling.

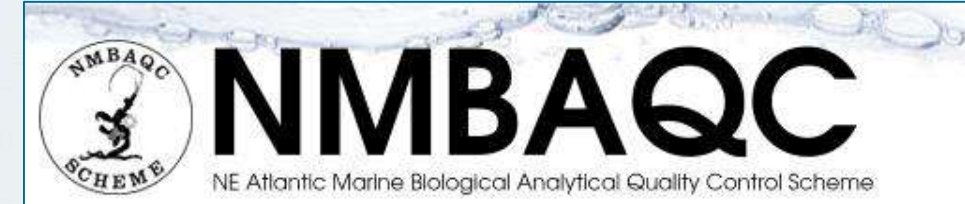




# Optimisation of coordinated data collection and sharing

## QUALITY CONTROL SCHEMES AND BEST PRACTISE GUIDANCE

- North East Atlantic Marine Biological Analytical Quality Control Scheme (NMBAQC) <http://www.nmbaqcs.org/>
- Biological Effects Quality Assurance in Monitoring Programmes (BEQUALM) <http://www.bequalm.org/>
- Quality Assurance of Information for Marine Environmental Monitoring in Europe (QUASIMEME) <http://www.quasimeme.org/>



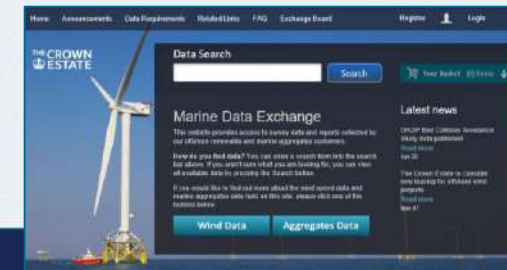
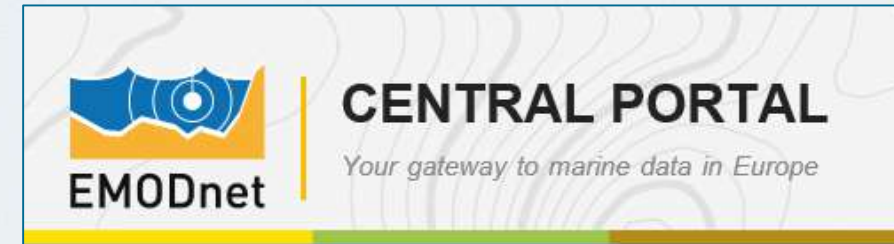
# Optimisation of coordinated data collection and sharing

## DATA MANAGEMENT AND DISSEMINATION

- Marine Environment Monitoring and Assessment National (MERMAN) database  
[https://www.bodc.ac.uk/projects/data\\_management/uk/merman/](https://www.bodc.ac.uk/projects/data_management/uk/merman/)
- Marine Environmental Data and Information Network (MEDIN)  
<http://www.oceannet.org/>
- The European Marine Observation and Data Network (EMODnet)  
<http://www.emodnet.eu/>
- The Crown Estate Marine Data Exchange  
<http://www.marinedataexchange.co.uk/>



**MERMAN**





# Summary & Forward look....

**Data requirements to inform post incident impact assessment and monitoring are varied:**

- Likely location and spatial extent of the area affected by the spill (e.g., offshore/on land);
- Likely interaction with/impacts on sensitive receptors (e.g., bathing waters, habitats/species of conservation importance, fish/shellfish resources);
- Baseline data to aid post-spill monitoring (e.g., recovery).

**Data collection and sharing can be optimised by:**

- Use of use of agreed SOPs and best practice guidance (e.g., QA/QC protocols and analytical accreditation);
- Commitment to ensuring rigorous organisation data management;
- Commitment to making data available via the relevant DACs and portals.

