

# A Strategy for Marine Environment and Human Health



**Plymouth  
May 12th 2010**

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**+**

**MEHH SOFI  
workshop participants**



## Healthy environment – healthy people

1. **Natural environments provide numerous challenges to human health and well-being**
2. **Estimated that 25-30% of human diseases have environmental causes**
3. **Many of these challenges are continuing to grow and develop in ways that we can reasonably forecast and ways that we cannot**

# Beneficial or Harmful?

**Coastal marine environments provide many beneficial goods and services, but at the same time pose a risk to coastal populations.**

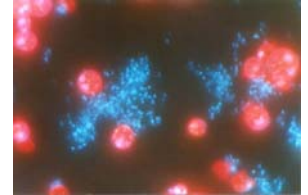
- Mankind benefits from the marine environment in many ways.
  - *Food supply*
  - *Economic activity (fisheries, aquaculture, tourism)*
  - *Wellbeing*
  - *Ecosystem good and services*
- However, coastal/shelf seas are also highly impacted by human activity. Human populations, industries, and agriculture/ aquaculture along the world's coastlines give rise to significant inputs of
  - *pollutants*
  - *pathogens*
  - *(in addition to natural sources)*
- Potentially leading to environmental degradation, HABs, disease, and contamination of the human foodchain.

**Both aspects are highly dependent on the physical, chemical and ecological state of the sea, all of which are strongly affected by the global environment (ocean, atmosphere and land).**

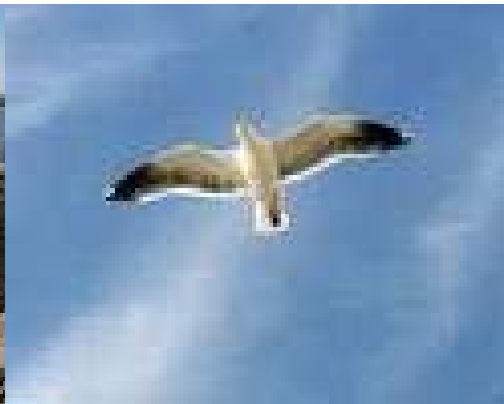
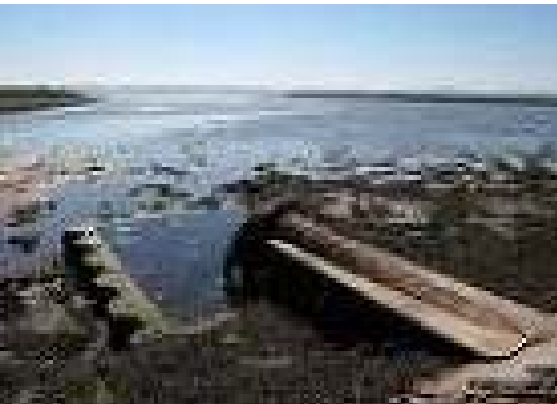
# Challenges: Pathogens

**Pathogens impact directly on human health through;**

- *recreational activity for example bathing*
- *shellfish into the human food chain,*

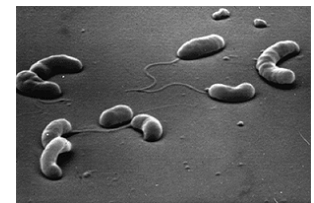


Both of these areas being subject to stringent regulation.



**Climate change** may exacerbate these effects,

*e.g. seawater temperature rise may encourage the migration of *Vibrio cholera* and other marine bacteria, such as toxigenic vibrios and pseudomonads, into UK coastal waters;*

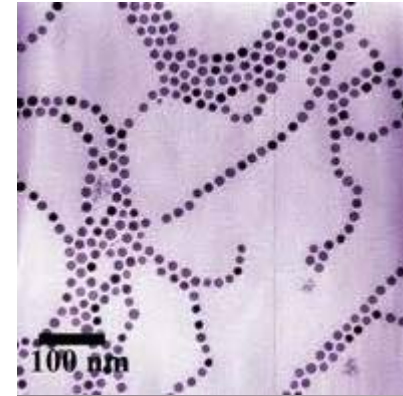


# Challenges: Pollutants

## Pollutant Impacts

- *Degradation of marine organism health,*
- *Loss of ecosystem function*
- *Disruption of carbon and macronutrient cycling,*
- *impacts on fisheries,*
- *Loss the recreation value of the marine environment*
- *General reduction of wellbeing.*

The direct accumulation of pollutants in human food sources (e.g. shellfish) provides additional pathways for impact on human health.



**Targets include**

**Nano-particles, radio-nuclides, nutrients, antibiotics & chemical mixtures**

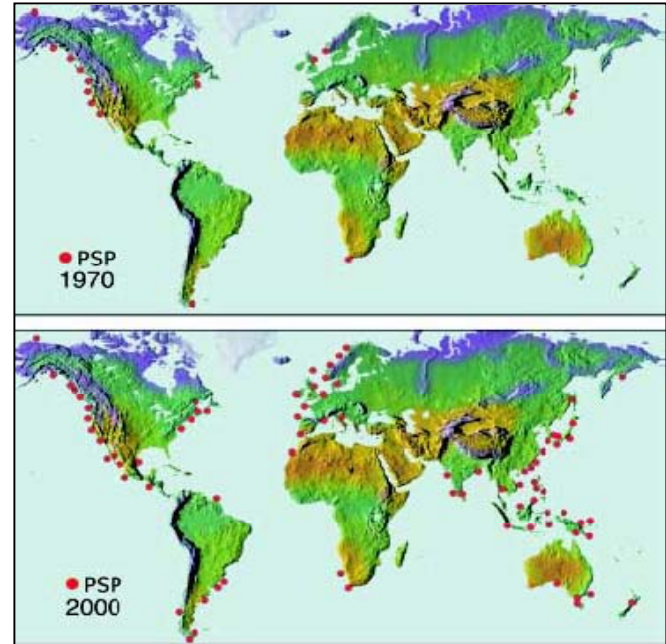
# Challenges: Harmful Algal Blooms

## Toxins in the Food Chain



- *PSP: Paralytic Shellfish Poisoning*
- *ASP: Amnesiac Shellfish Poisoning*
- *DSP: Diarrhetic Shellfish Poisoning*

## Airborne Toxins



***Increasing outbreaks of paralytic shell fish poisoning***

### Areas effected

- *Fjords and Coastal Embayment's*
- *Upwelling Systems*
- *Eutrophied Systems*
- *Stratified Systems*
- *Benthic Systems*



# Challenges: Wellbeing

Regular contact with the natural environment results in many benefits including:

- *Reduction in Stress*
- *Increased Physical Activity and therefore fitness*
- *Stronger Communities*
- *An increased awareness of the value of the natural environment*



<http://www.bluegym.org.uk>

# Challenges: Goods and Services

Millennium Ecosystem Assessment categories	Good/Service
Provisioning	Food provision
	Raw materials
Regulating	Gas and climate regulation
	Disturbance prevention
	Bioremediation of waste
Cultural	Recreational heritage and identity
	Scientific and cognitive values
	Leisure and recreation
	Non-use values
Option	Option
Supporting	Nutrient cycles
	Resilience and resistance
	Biologically mediated habitat formation

**+ WELL BEING**

# Challenges: Scientific & Policy Needs

## International

- *OSPAR List of Chemicals for Priority Action*
- *OSPAR Eutrophication*
- *Stockholm Convention (Persistent Organic Pollutants)*

## Europe

- EU Water Framework Directive*
  - *classify into one of the five ecological status classes and chemical status class (pass / fail)*
- Single chemicals (REACH regulation)*
- Good Ecological Status (MSFD)*
- Bathing waters*
- Shellfish*



# SOFI Workshop

**A SOFI workshop on Marine Environment and Human Health brought together key members of the Oceans2025, HEI, CEFAS and Defra to assess the current state of UK research.  
Weymouth Feb. 2010.**

## **The goals of the workshop were**

- *To consider emerging scientific issues and relevant policy drivers*
- *To identify gaps and synergies in current capability.*
- *To produce a plan for future research designed to address the identified gaps in understanding and capacity.*
- *Enhance communication within the community.*
- *Coordination of the community to provide inputs to theme action plans*

## **Keynote presentations:**

- *Challenges for Protecting the European Marine Environment and Human Health' . Tom Hutchinson (Cefas)*
- *Oceans and Human Health in the USA a Lora Fleming (University of Miami)*
- *Blue Gym William Bird (Natural England)*

**Topic sessions on pathogens, pollutants, nano-particles and harmful algal blooms.**

**The final part of the workshop focused on how we might seek synergy and bring the community together around a systems approach to the problem.**

*Thanks go to CEFAS Weymouth for their assistance and splendid hospitality*

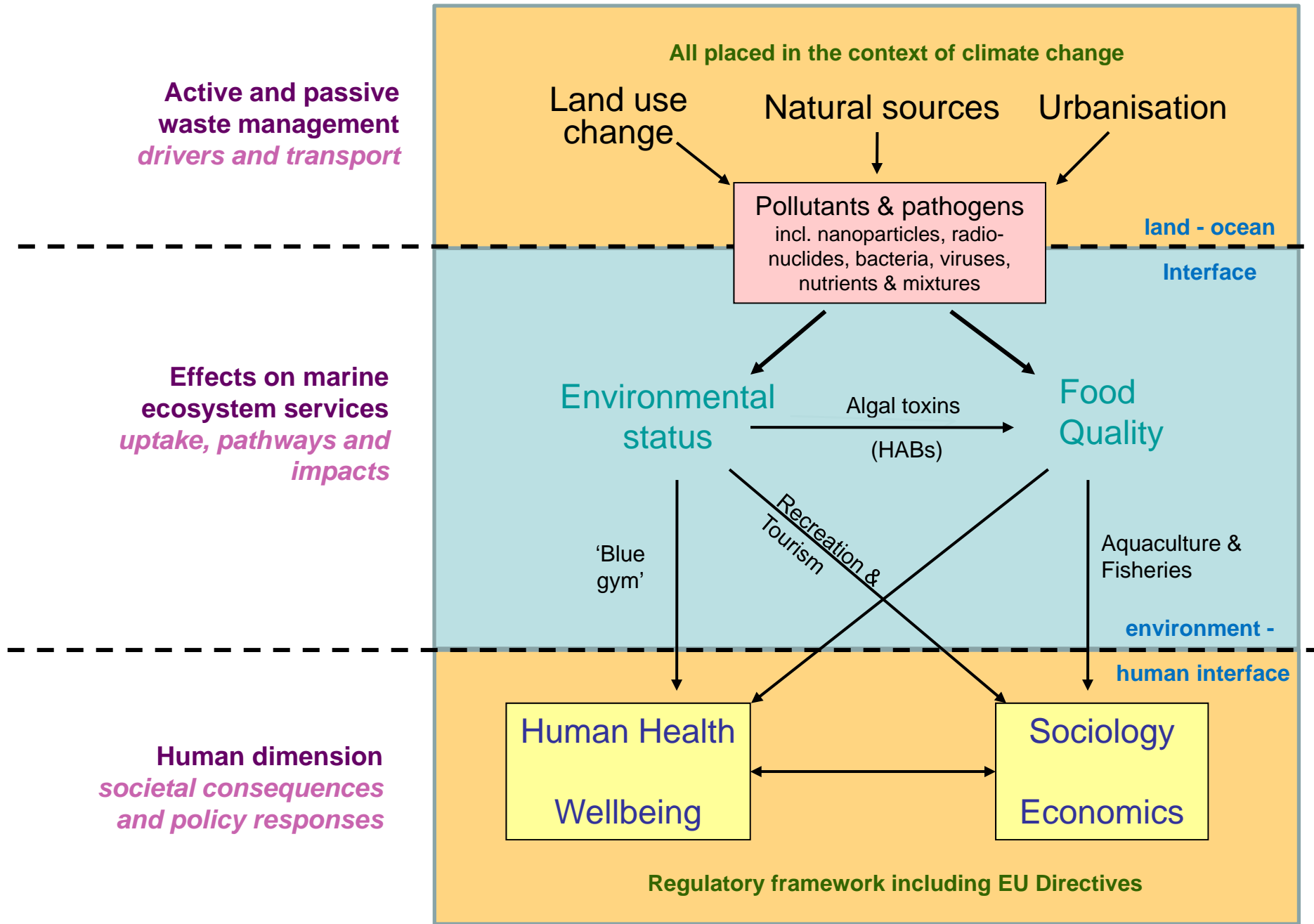
## **The Challenge for MEHH is whole system understanding and prediction of changes in key resources.**

- *Impacts of land derived contaminants*
- *Impacts of climate change,*
- *Socio-economic consequences*
- *Implications for human health and wellbeing*

# SOFI Workshop: Research Foci

We identified four key research foci:

- **PATHOGENS:** *Improved understanding and quantification of sources of pathogens and pollutants and how they are transported into the marine environment considering active and passive waste management, river catchments, estuaries and coastal seas.*
- **POLLUTANTS:** *Assessment of the impacts of pollutants on environmental status and human food quality. This requires improved understanding of how contaminants are taken up, the pathways both within and between organisms and the impacts on key species and ecosystems.*
- **IMPACTS:** *Quantification of the consequences of changes in the marine environment (both positive and negative) on human health and wellbeing taking account of the social and economic impacts.*
- **FEEDBACKS:** *How do such changes feedback via policy and economic activity on the anthropogenic sources pathogens and pollutants?*



All placed in the context of climate change

Active and passive waste management drivers and transport

Land use change      Natural sources      Urbanisation

land - ocean Interface

Pollutants & pathogens  
incl. nanoparticles, radio-nuclides, bacteria, viruses, nutrients & mixtures

Effects on marine ecosystem services uptake, pathways and impacts

Environmental status      Algal toxins (HABs)      Food Quality

'Blue gym'

Recreation & Tourism

Aquaculture & Fisheries

environment - human interface

Human dimension societal consequences and policy responses

Human Health Wellbeing

Sociology Economics

Regulatory framework including EU Directives

Thank you