

# Impacts of ocean acidification on key benthic ecosystems, communities, habitats, species and life cycles.

*Dr Steve Widdicombe and the UKOARP Benthic Consortium*



- A £2 million consortium project
- 35+ researchers from 12 UK universities & research laboratories
- Impacts on biodiversity and ecosystem function in 3 key benthic ecosystems
- Adopting a systems approach to studying the effects of ocean acidification from molecules to ecosystems
- 3 year project, started 1<sup>st</sup> July 2010
- Strong links to international programmes and research groups; EPOCA, Bioacid, MedSea, US programme, European and Australian collaborators.
- Web site – <http://www.benthic-acidification.org>

## *Soft sediments*



## *Biogenic habitats*



## *Rocky intertidal*



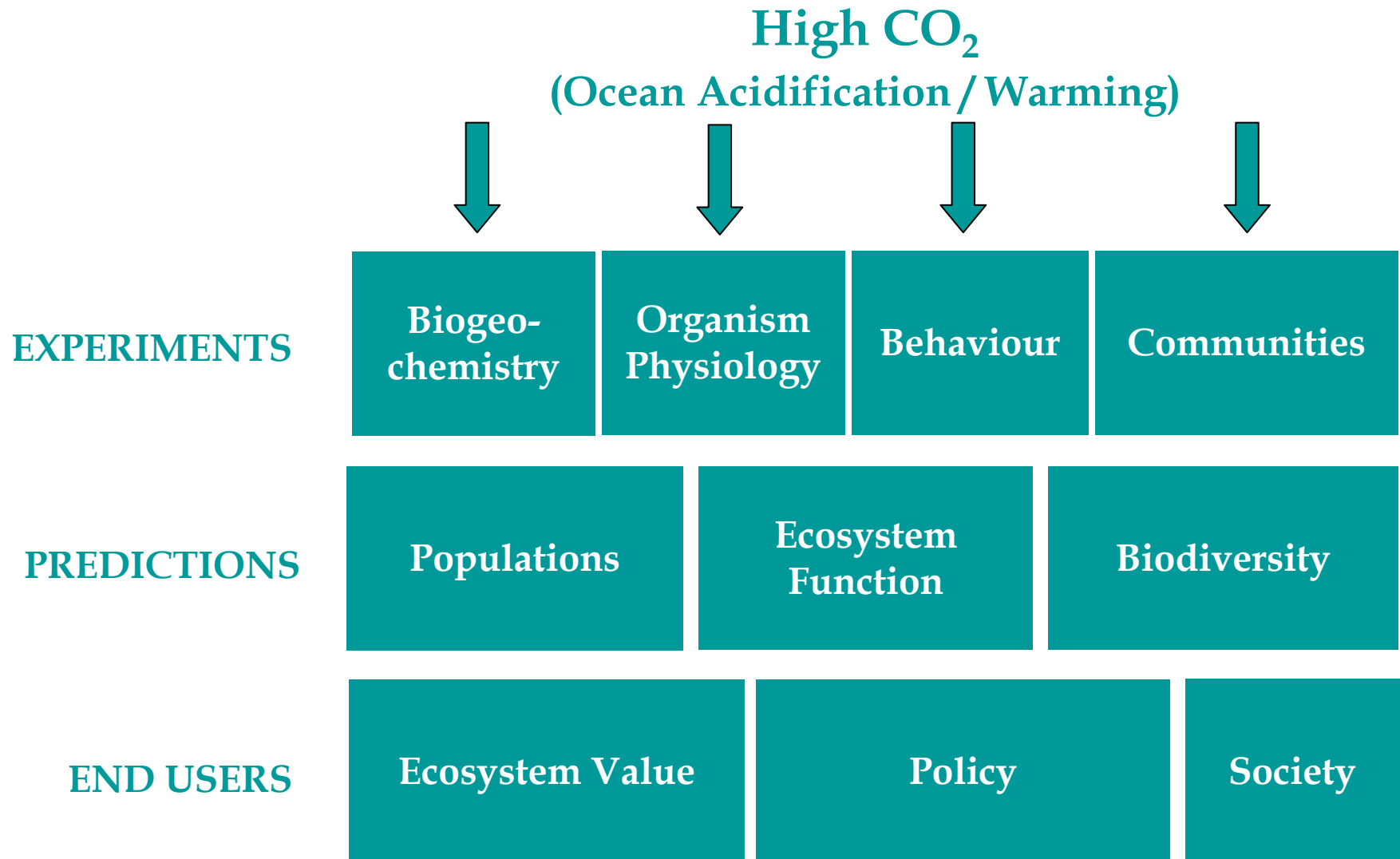
# The Consortium Vision

By understanding the effects of elevated CO<sub>2</sub> on the processes, organisms, populations and communities within UK coastal benthic ecosystems, the consortium will

*quantify, predict, and communicate*

the impact of high CO<sub>2</sub> (OA & warming) on ecosystem functioning and biodiversity.

# Delivering the Vision



Use laboratory joint experiments, field observations, numerical models and expert workshops to generate conceptual understanding

# Project Structure

***Aim 1: Determine the effect of ocean acidification on the performance, life history and population dynamics of individual benthic species.*** (coordinated by Nia Whiteley, Bangor)

**Task 1.1** Determine the impact of acidification and warming on the function of key species (*Martin Solan, Aberdeen*)

**Task 1.2** Identify the physiological responses that underpin changes in organism performance and function (*Chris Hauton, Southampton*)

**Task 1.3** Compare the vulnerability of different life stages and model the implications for population dynamics (*Mike Burrows, SAMS*)

**Task 1.4** Identify the potential for organism resistance and adaptation to prolonged CO<sub>2</sub> exposure (*John Spicer, Piero Calosi, Plymouth*)

***Aim 2: Quantify the impacts of ocean acidification on microbial communities and elemental cycling in coastal ecosystems.*** (coordinated by Glud, SAMS)

**Task 2.1** Determine the impact of acidification on the distribution and fluxes of nutrients in sediment (*Henrik Stahl, SAMS*)

**Task 2.2** Quantify the response of sediment microbial communities and N-cycling functional guilds to high CO<sub>2</sub> (*Mark Osborn, Sheffield*)

**Task 2.3** Model the impact of ocean acidification on sediment nutrient cycling and shelf productivity (*Jerry Blackford, PML*)

**Task 2.4** Quantify the impact of ocean acidification on biofilms from rocky habitats (*Karen Tait, PML*)

***Aim 3: Determine the effects of ocean acidification on the overall function of key benthic habitats.*** (coordinated by Paterson, St Andrews).

**Task 3.1** Sediment habitats (*Ruth Parker, Silvana Birchenough CEFAS*)

**Task 3.2** Calcifying, biogenic habitats (*Murray Roberts, Heriot-Watt*)

**Task 3.3** Rocky, intertidal habitats (*Nova Mieszkowska, MBA*)

# Following Presentations:

## **Consortium facilities and joint activities**

***Long term exposure facilities*** - Jasmin Godbold (University of Aberdeen)

***Flume and percolation facilities*** - Henrik Stahl (Scottish Association for Marine Science)

***High CO<sub>2</sub> panels for field experiments*** - Tom Vance (Plymouth Marine Laboratory)

***Research cruises to Lophelia reefs*** - Murray Roberts (Heriot Watt University)

## **Research aims**

***Aim 1: Determine the effect of ocean acidification on the performance, life history and population dynamics of individual benthic species*** - Nia Whiteley (Bangor University)

***Aim 2: Quantify the impacts of ocean acidification on microbial communities and elemental cycling in coastal ecosystems*** - Mark Osborn (Hull University)

***Aim 3: Determine the effects of ocean acidification on the overall function of key benthic habitats*** - David Paterson (University of St Andrews)