

Ecosystem Health & Sustainability



Defining ecosystem health

Definition of ecosystem health is framed by legislation and requires:

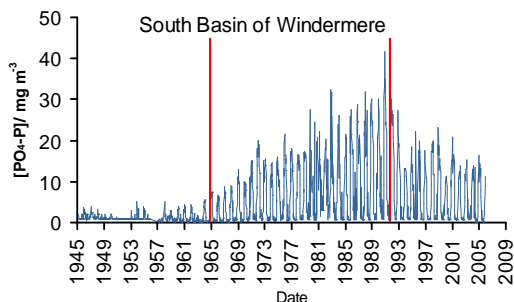
- Interdisciplinary approaches
- Interactions between natural scientists of different types and regulators
- An appreciation of ecological structure & ecosystem function.

The challenge



The approach

- Involves:
 - Defining reference conditions
 - Detecting causes of change
 - Attributing causes of change
 - Forecasting future responses
- The tools;
 - Long-term datasets
 - Large-scale datasets
 - Process-based models



Nutrient enrichment in Windermere (source FBA/CEH). The red lines show installation of STW in 1965 and installation of tertiary treatment in 1992

Attribution of causes

- Attribution of causes of change is crucial to suggesting successful remediation.
- Attribution is based on scientific understanding combined with:
 - Data analysis
 - Mechanistic understanding
 - Catchment-based view

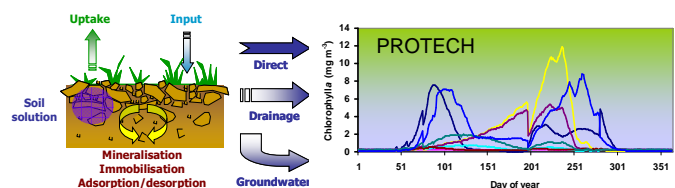


Measuring exchange of nutrients between the surface and subsurface zones in the River Lambourn

Forecasting future responses

- Models, especially in combination, are an effective way of encapsulating knowledge and using this to forecast future ecosystem responses to:
 - Management remediation
 - Species invasion
 - Climate Change

INCA-P Internal mechanisms ($\text{kg ha}^{-1} \text{ day}^{-1}$)



INCA is a catchment-delivery model. PROTECH is a lake model that forecasts algal responses to external stressors.

... and Sustainability?

- Ensuring sustainability is achieved is also a highly interdisciplinary issue that builds on the interaction between different groups of natural scientists and combines them with expertise in social science and economics.
- This interchange is needed to provide a balance between a healthy ecosystem and a healthy economy.

Find out more.. www.hydra.uk.net