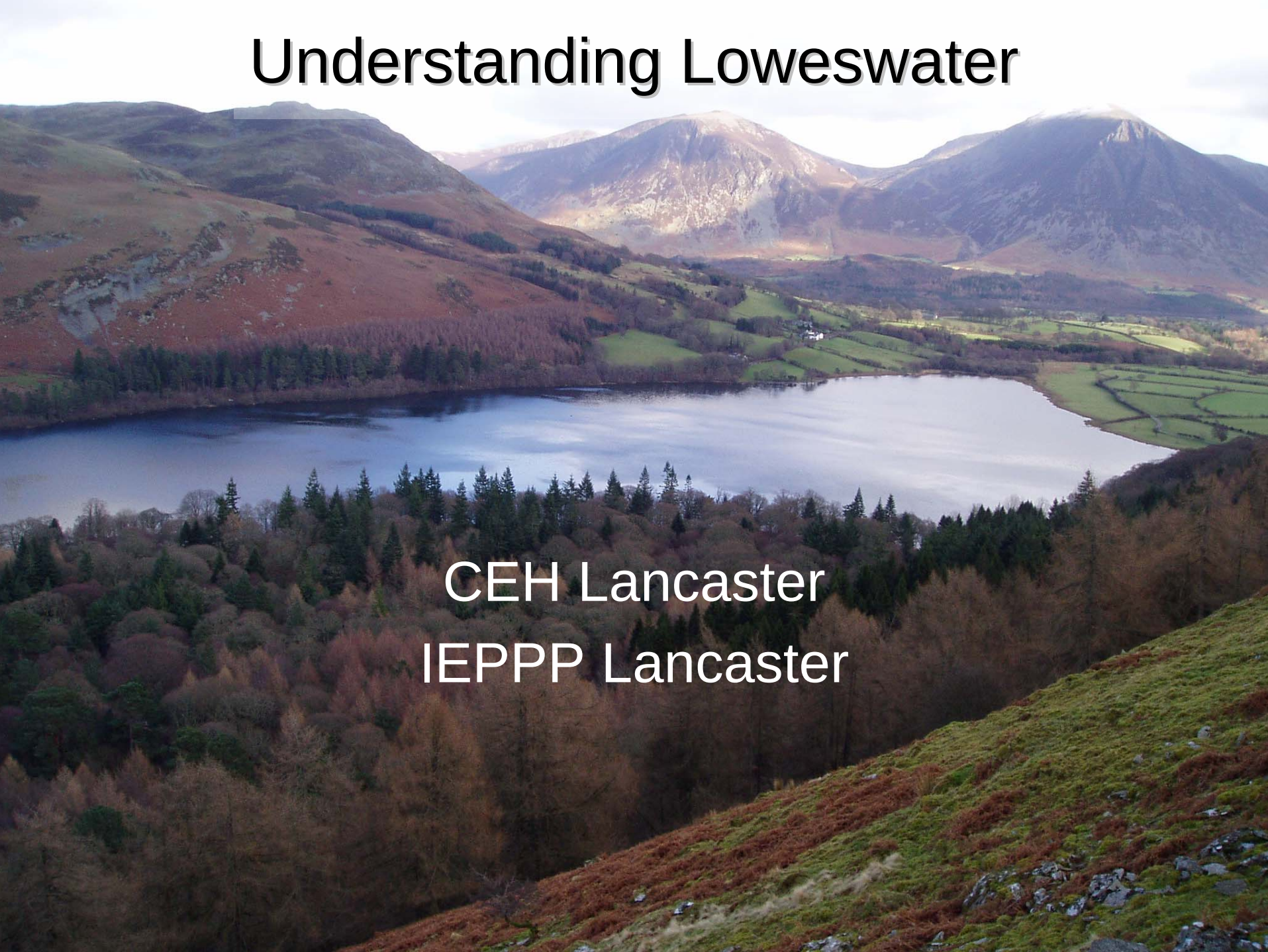
Understanding Loweswater



CEH Lancaster

IEPPP Lancaster

How would natural scientists typically approach an understanding of Loweswater?

Previous work in the Lake District

Land - Terrestrial ecology
(ITE)

Water – Freshwater ecology
(IFE)

Land

General Methodologies, e.g. Countryside Survey, Cumbria survey

Rigorous statistical stratification of land class types on the basis of major environmental gradients: geology, topography, climate.

Random selection of 1km squares

Mapping of habitats and landscape features & condition recording

‘Marked’ plots for vegetation sampling – plots varying according to habitat type

Repeat surveys allow analysis of change (approx every 10 years)

Squares not identified for reasons of confidentiality precise locations considered unimportant as the sample is ‘statistically representative’

Water

General methodologies e.g. Lakes Tour

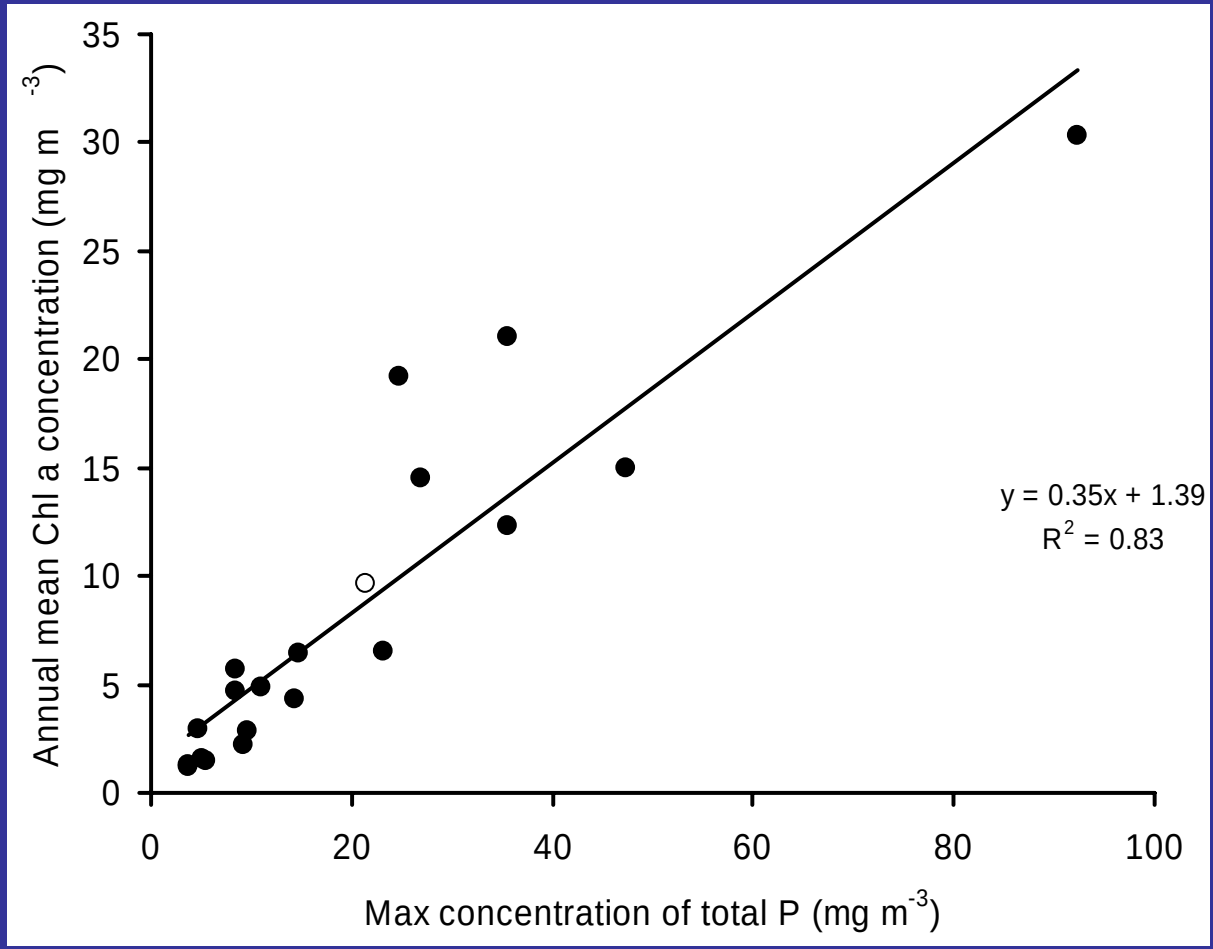
Sampling exercise carried out on the 20 major lakes and tarns in the English Lake District every 5-6 years since 1978

Since 1984 four samples have been collected in each year and since 1991 data has been collected consistently

Water samples are taken from the lakes and the following recorded from lab analysis of samples;

nutrients, cations, ph, alkalinity, temperature, oxygen, chorophyll a and algae

Repeat surveys allow analysis of change



Relationship of average annual phytoplankton concentration chlorophyll a and maximum concentration of total phosphorus from the 20 lakes in the Lakes Tour in 2000.

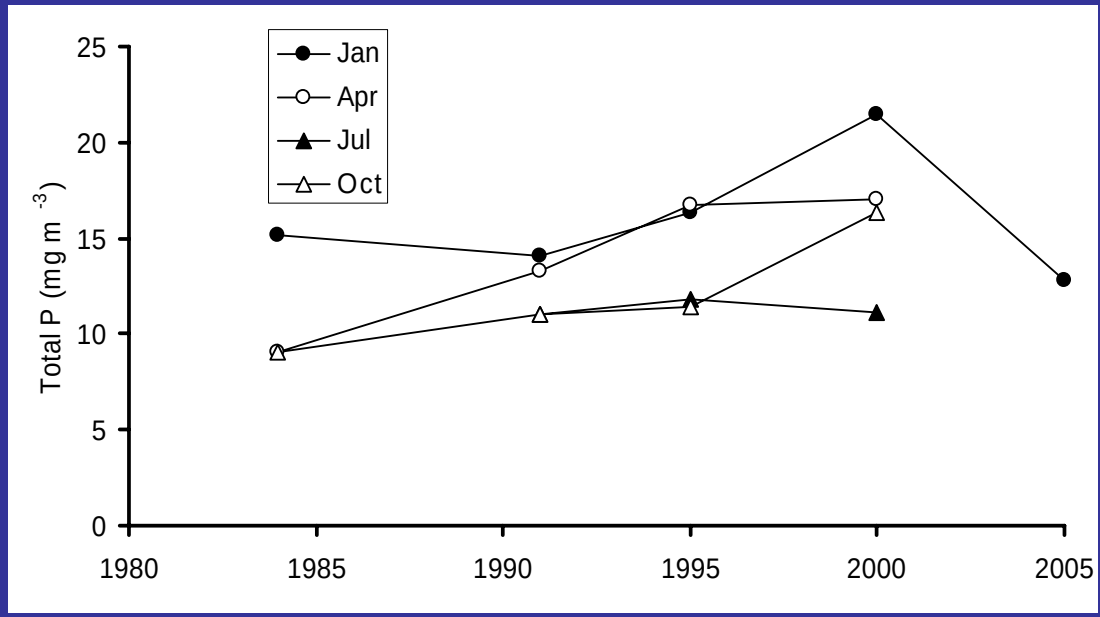


Figure 4. *Concentration of total phosphorus in Loweswater between 1984 and 2005.*

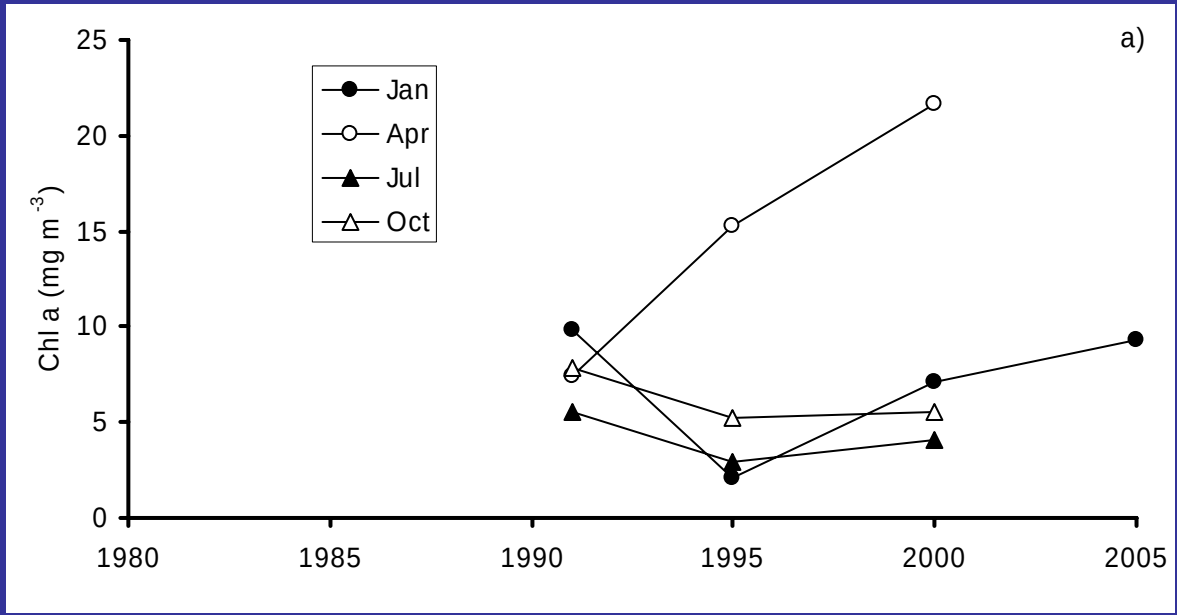


Figure 6. Concentration of phytoplankton chlorophyll a between 1991 and 2005.

Moving forward

Land

Recognising the importance of land managers in shaping vegetation

Data on current and past practices; ownership, applications, stocking levels, re-seeding, management of landscape features, government scheme agreements, economics etc

Moving forward

Water

Defra/NT funded work on Loweswater

- Recognising the importance of land management to nutrient inputs to the lake
- Analysis of long-term lake data
- Increased targeted sampling of lake waters and inflowing streams (including sampling by a farmer in catchment at critical periods)
- Export coefficient modelling approach to investigate expected levels of nutrient inputs to the catchment (enhanced by information from farmers and Defra)
- Algal modelling using PROTECH to investigate the effect of changing different sources of nutrient input on the amount and type of algae in the lake (enhanced by weather data for the catchment from the EA)

- The ‘Loweswater Project’ - farmers in the catchment working together
- A common problem but:

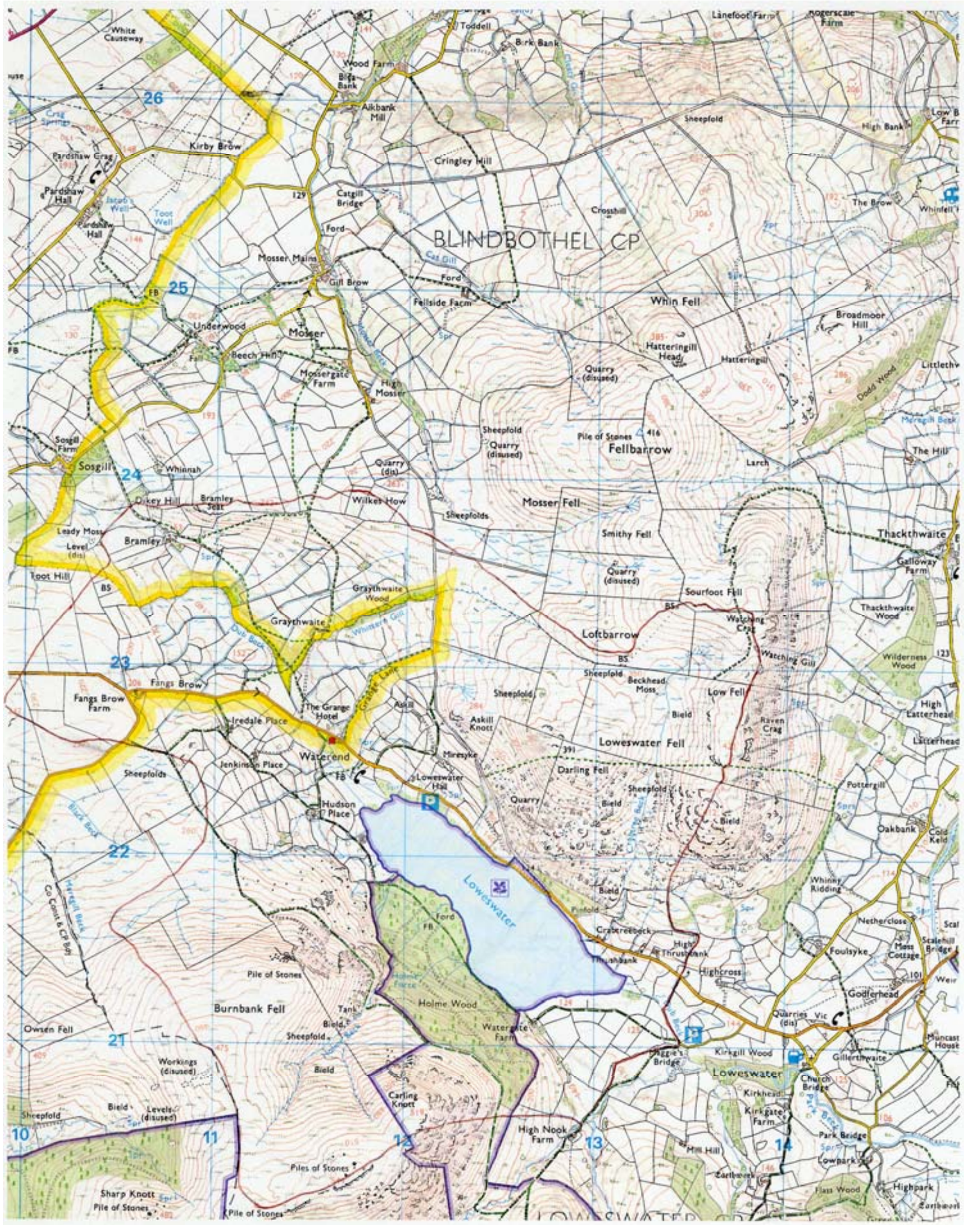
  Ecologists’ perspectives and methods

  Farmers’ perspectives and ‘methods’

  Very different!
- Farmers often deferential towards scientific knowledge, but Loweswater Project offered opportunity to look at farmers’ knowledge on their own terms

Some qualities of farmers' knowledge

- Knowledge gained through work and farm *practices*
- Knowledge *tacitly* held (usually not made explicit)
- Knowledge is connected to *context* (farmers tend not to separate out economic, from social, from ecological, from political/policy factors)



BLINDBOTHEL CP
LOWESWATER CP
Loweswater
Whin Fell
Fellbarrow
Mosser Fell
Smithy Fell
Loftbarrow
Low Fell
Loweswater Fell
Darling Fell
Burnbank Fell
Holme Wood
Carling Knott
Mosser
Mosser Mains
Underwood
Sosgill
Bramley
Graythwaite
Waterend
The Grange Hotel
Loweswater Hall
Thackthwaite
High Nook Farm
Watergate Farm
Kirkgate Farm
Park Bridge
Lowpark
Highpark
Godferhead
Foulsyke
Crossgates
Pardshaw Hall
Kirby Brow
Cringley Hill
Hatteringill Head
Broadmoor Hill
Dodd Wood
Wilderness Wood
Thackthwaite Wood
Sharp Knott
Owsen Fell

Integrating farm-based, ecological and other knowledges

1. Farmers as data collectors/providers? (In Wynne's 1989 case study this could have happened)
2. Farmers' knowledge used to revise assumptions and re-set parameters of the objects studied (e.g. Irwin 1995 on 2,4,5 T)?
3. Institutional thinking together

What could occur in Loweswater? 1. Farmers as data providers

1. Knowledge of actual stocking rates
2. Knowledge of pollution issues through farm practices

   Fertiliser/slurry application – when, where, why?

   Varied practices within the catchment

   In-depth knowledge of holdings and waste management
3. Potentially this informal knowledge could help with sites and timing of formal monitoring (e.g. NHM and anglers monitoring river water quality)

   Contributory expertise (Collins and Evans 2002)

What could occur in Loweswater?
2. Revision of assumptions about 'the problem'/object of study

e.g. ESA scheme in mid 1990s
Farmers' disposable income increased
Increase in stock (outside valley)
Overwintered inside valley
Effective increase in P loading

So?

- The P issue is connected to apparently unconnected policy change a decade ago
- Policy change was important then and is now: 'With the single farm payments ranching will increase'.

What could occur in Loweswater?
3. Working together

- Stakeholder workshop (Dec 2004) gave hope that it is possible to think in an integrated way about catchments
- Broad common goals not just about P loading in the catchment/lake
- Sustaining ‘working together’ = challenge
- Creating ‘new collectives’ – and realising that it may mean re-thinking some of our accepted roles (farmers and ecologists working together; National Trust opening dialogue with farmers etc.)

Expertise of the ‘third-wave’ of science studies (Hamlin 2003)

- Will include more than technical competence
- The ability to recognise the need for action
- Ability to recognise and criticise multiple options
- Ability to understand the political and social structures in which knowledge is to be applied
- Privilege practicability and flexibility

- Need to create ‘bridging social capital’ (Putnam)