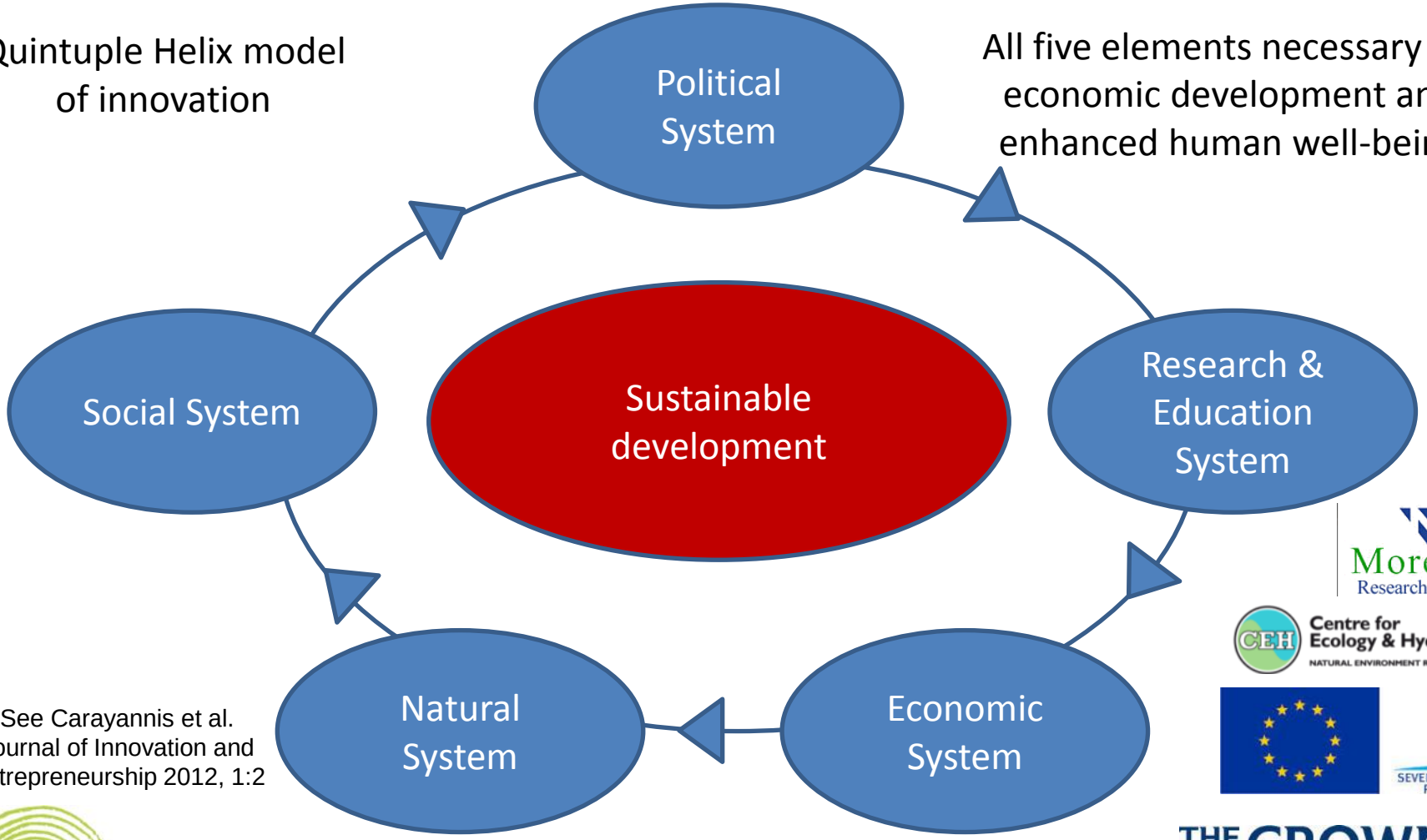
Ecosystem service concept to aid management and economic development

Andy Wells, Jan Dick, & Beth Wells

Quintuple Helix model of innovation

All five elements necessary for economic development and enhanced human well-being



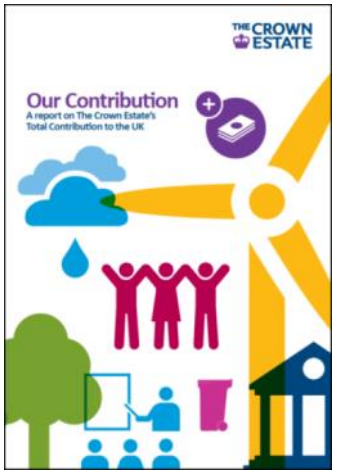
See Carayannis et al. Journal of Innovation and Entrepreneurship 2012, 1:2

How we view the Natural Capital and Ecosystem Service concepts - Why these are important to our business

- Long-term business sustainability - addressing economic, environmental and social impact of doing business / 'Licence to Operate'
- Commercial advantage
- Understanding/capturing the added value generated by land management activities
- Good Stewardship – part of our core values
- Integrating land use / delivery of multiple benefits
- Added value for our business partners /tenants
- Managing risk and opportunities

THE CROWN ESTATE

What we are doing



- Total Contribution (Integrated Reporting)
- Landscape scale evaluation (OpenNess Project)
- Land management partnerships
- Facilitating Payment for Ecosystem Services (PES) schemes

THE CROWN ESTATE

Payment for Ecosystem Services (PES) Examples

- Soil management incentives – included in agricultural leases
- Carbon funding for woodlands creation:

  Internal offsetting scheme for Regent Street Xmas lights

  Tenant/Forest Carbon partnership – new native woodland at Glenlivet funded by carbon funding
- Peatland restoration
- Mitigation of Cryptosporidium in water supplies in a catchment at Glenlivet

THE CROWN ESTATE

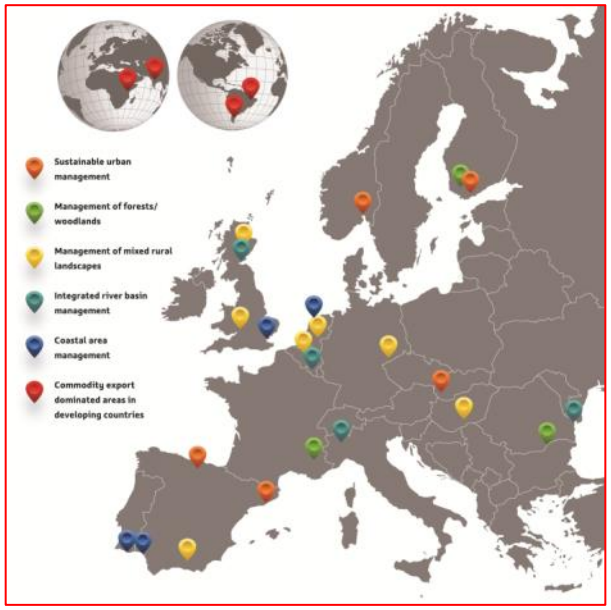
Research Priorities? (CNPA)

- New opportunities for PES schemes / incentivising land manager's behaviour / matching potential buyers and sellers of ES.
- Interdisciplinary research working with land businesses – helping to understand social and economic outcomes / contributions to rural development.
- The Language! Awareness and understanding of the concepts - what benefits/services do local communities value ?
- Understanding the complex relationships and relative values between different ES (cause and effect mechanisms) to help decision making. Dealing with trade-offs.
- Quantitative evidence to investigate the impact of support payments / develop PES schemes on ecosystem services of direct benefit to agricultural production.

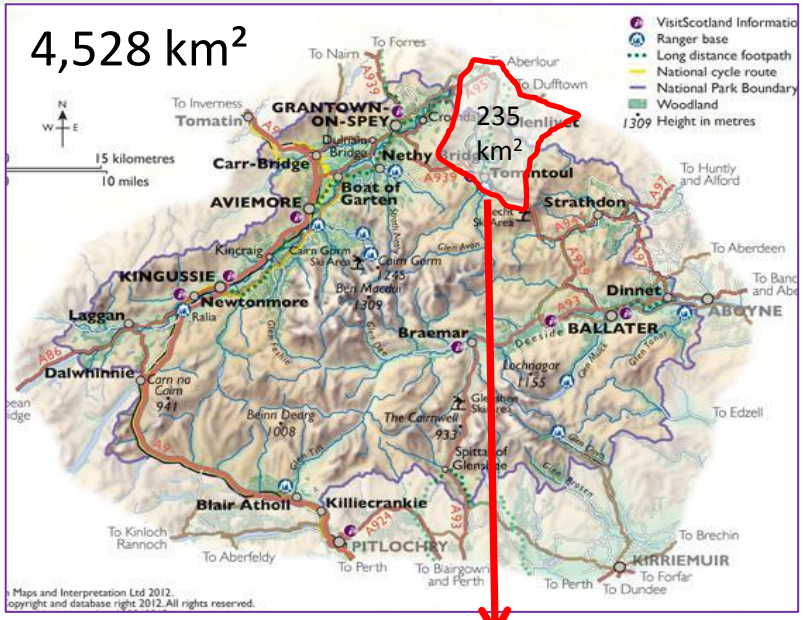
THE CROWN ESTATE

Ecosystem service concept to aid management and economic development– Place based research

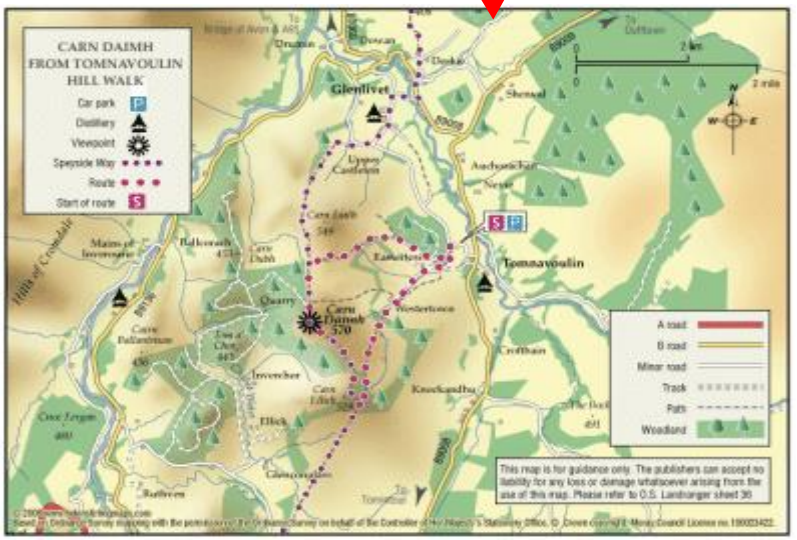
LTSER Platform: Cairngorms National Park



OpenNESS
Operationalisation of Natural Capital and Ecosystem Services



AQUAVALENS



Description of Work

OpenNESS

AIM

To work **collaboratively with stakeholders** in each case study to **identify the problems** they face in **operationalising the Natural Capital (NC) and Ecosystem Services (ES) concepts** in their specific policy and decision-making context;

Method

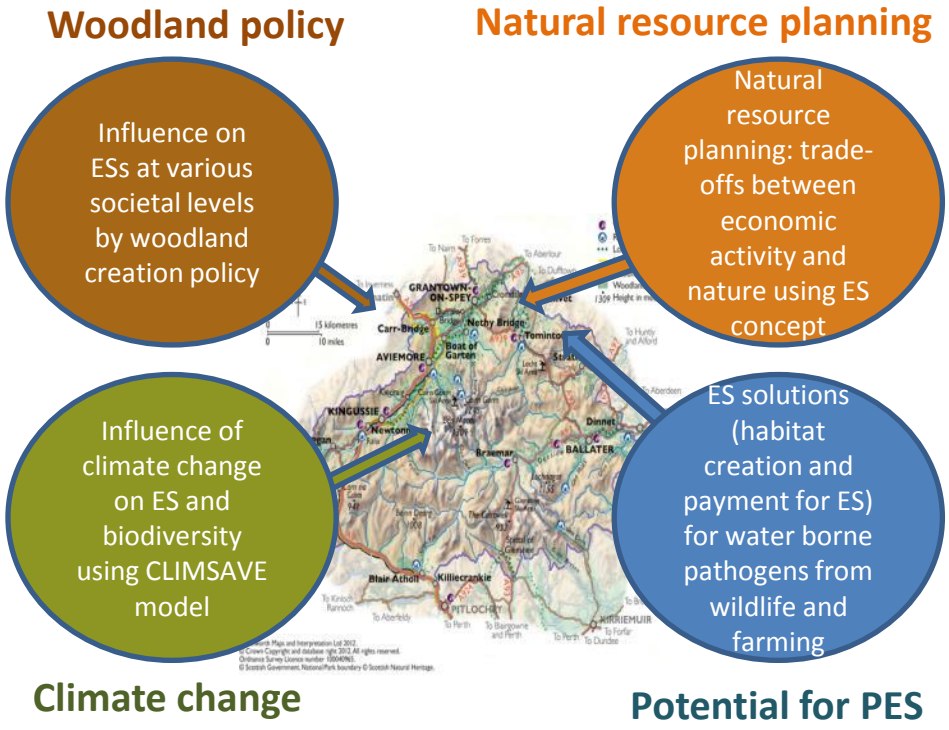
To **apply and refine the methods** and models developed in the project to the case studies to **test their relevance and usefulness** in an iterative manner

Output

Characterise any common lessons that can be learnt on the operational potential of the ES and NC concepts **across the multi-scale case studies.**

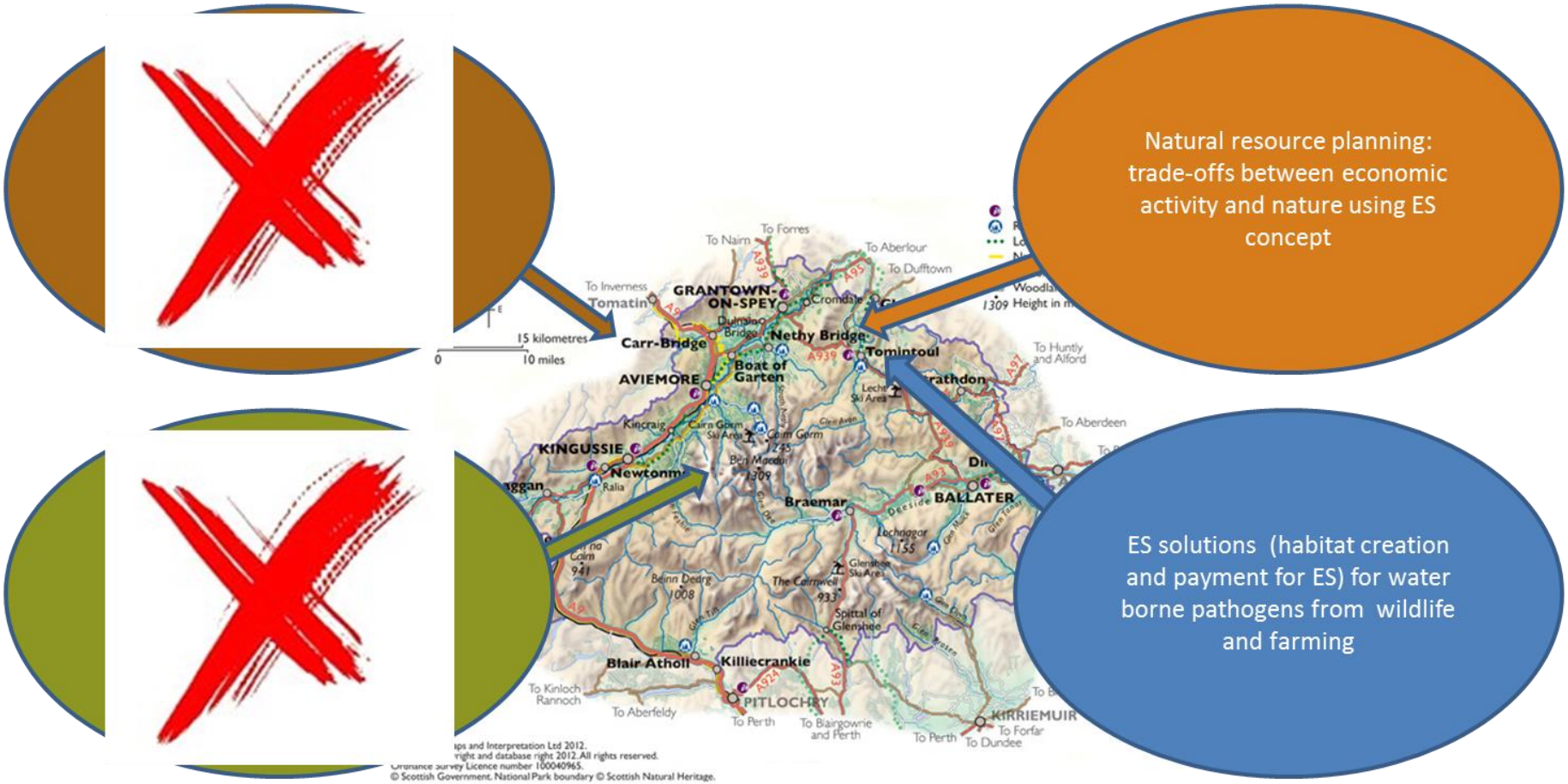
CAIRNGORMS NATURE

Case Study Advisory Board



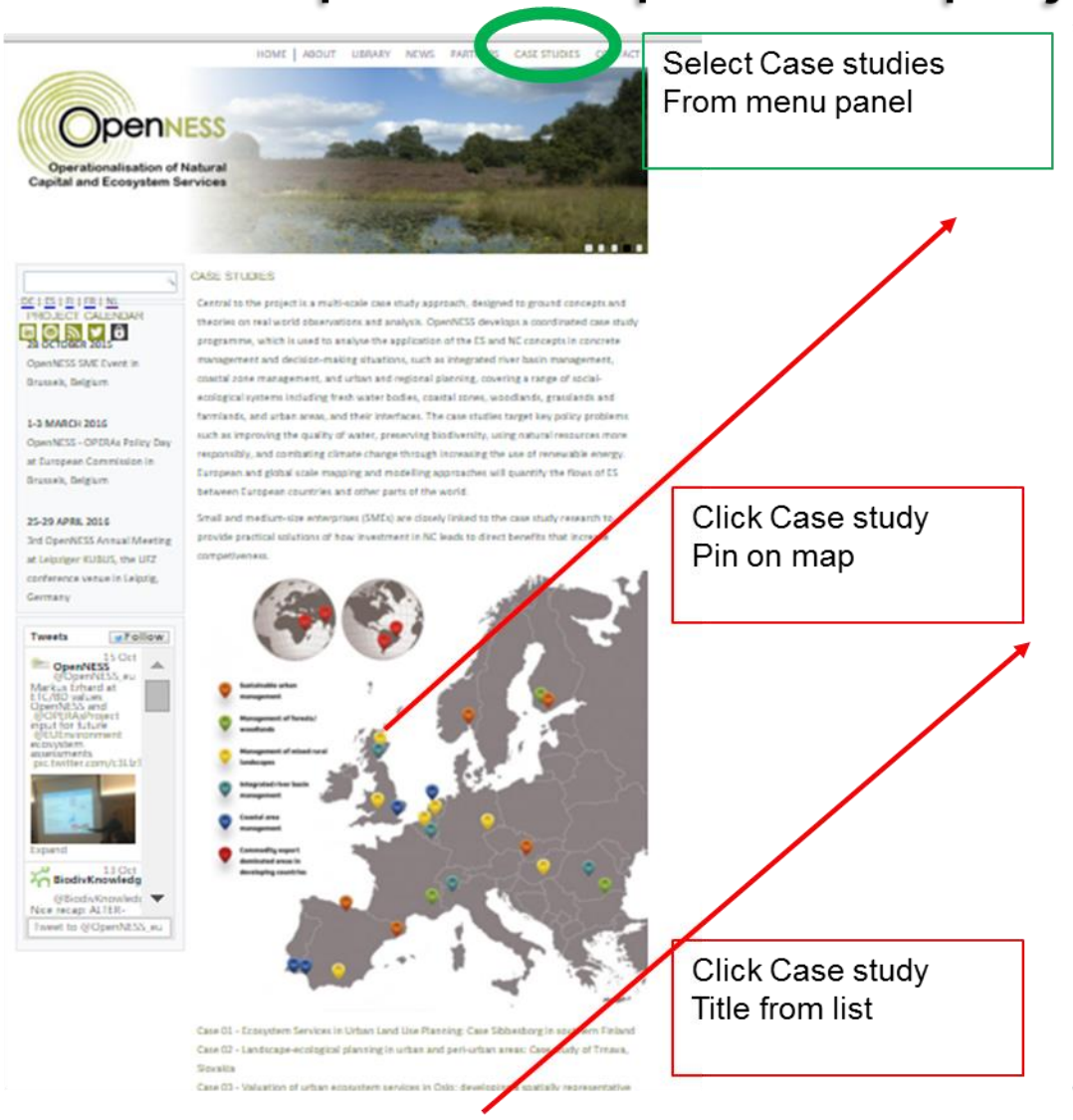
Ideas discussed at Case Study Advisory Board meeting
24 June 2013

CAIRNGORMS NATURE- Case Study Advisory Board Decision



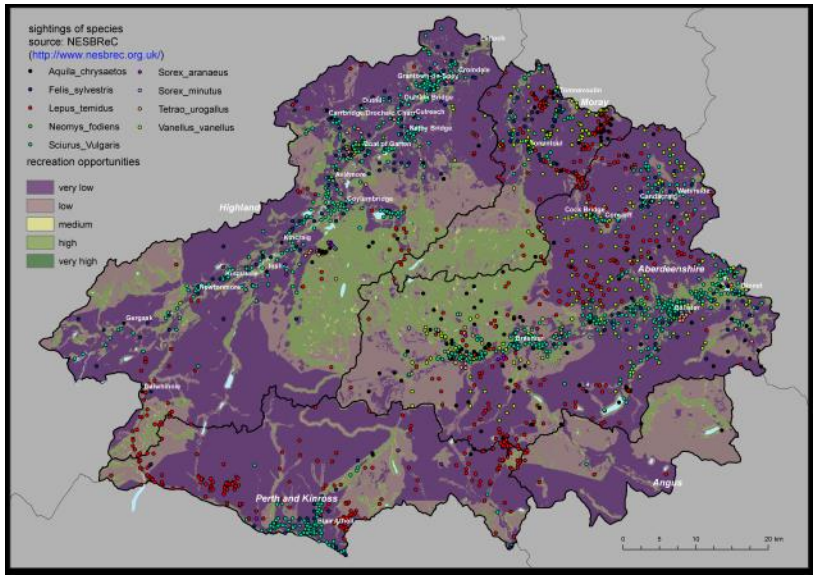
CAB agreed we should work on two specific issues but also wanted a park wide issue addressed. Agreed with Chairman and vice-chairman to investigate recreation and biodiversity conflict

Full details of OpenNESS case studies available http://www.openness-project.eu/cases

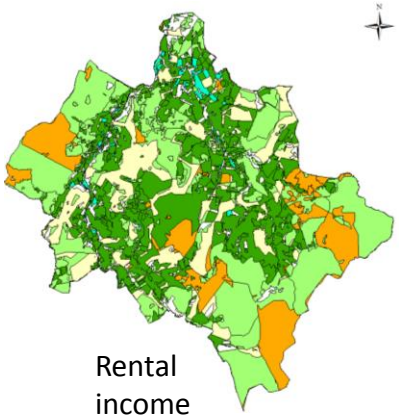


OpenNESS – Sustainable development and human well being

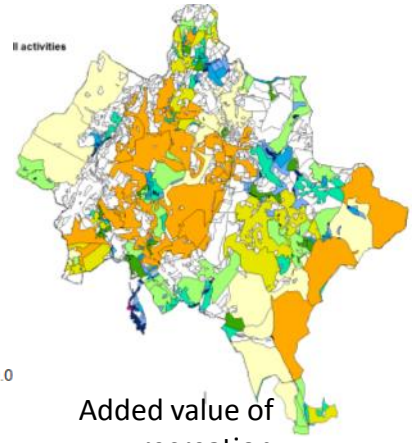
Managing urban, rural access and biodiversity



Economic & Social Values - Glenlivet

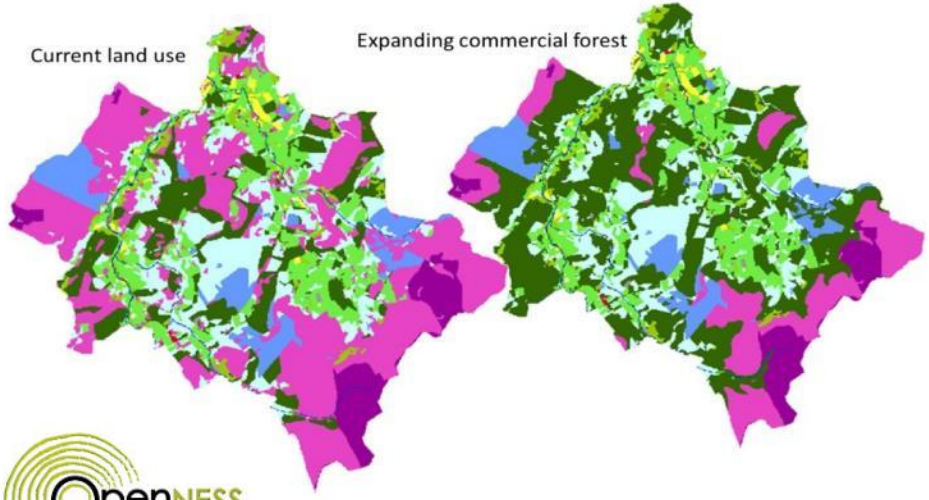


Rental income £/ha/year



Added value of recreation £/Person/ha/year

QuickScan tool tested to identify trade-offs in land use decision making



Farmers perception of payment for ecosystem services schemes

A whole catchment approach to *Cryptosporidium* control

Beth Wells, Moredun Research Institute

Cryptosporidium parvum

Protozoan parasite of livestock health, water quality and public health concern

+

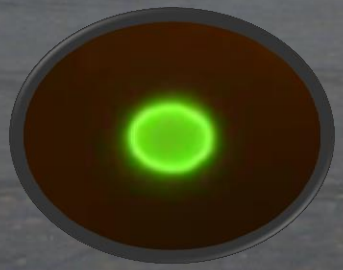
Difficult to control both on farm and in the environment

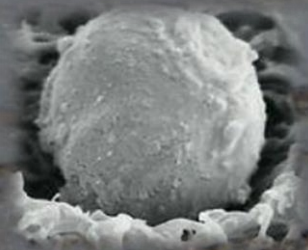
+

Water is considered an important mechanism in the transmission of *Cryptosporidium*

=

Headache for Scottish Water!





Assessing *Cryptosporidium* prevalence and transmission in a catchment in the Cairngorms National Park with a history of contamination in the public water supply

Collaborators: Moredun Research Institute, Scottish Water and The Crown Estate

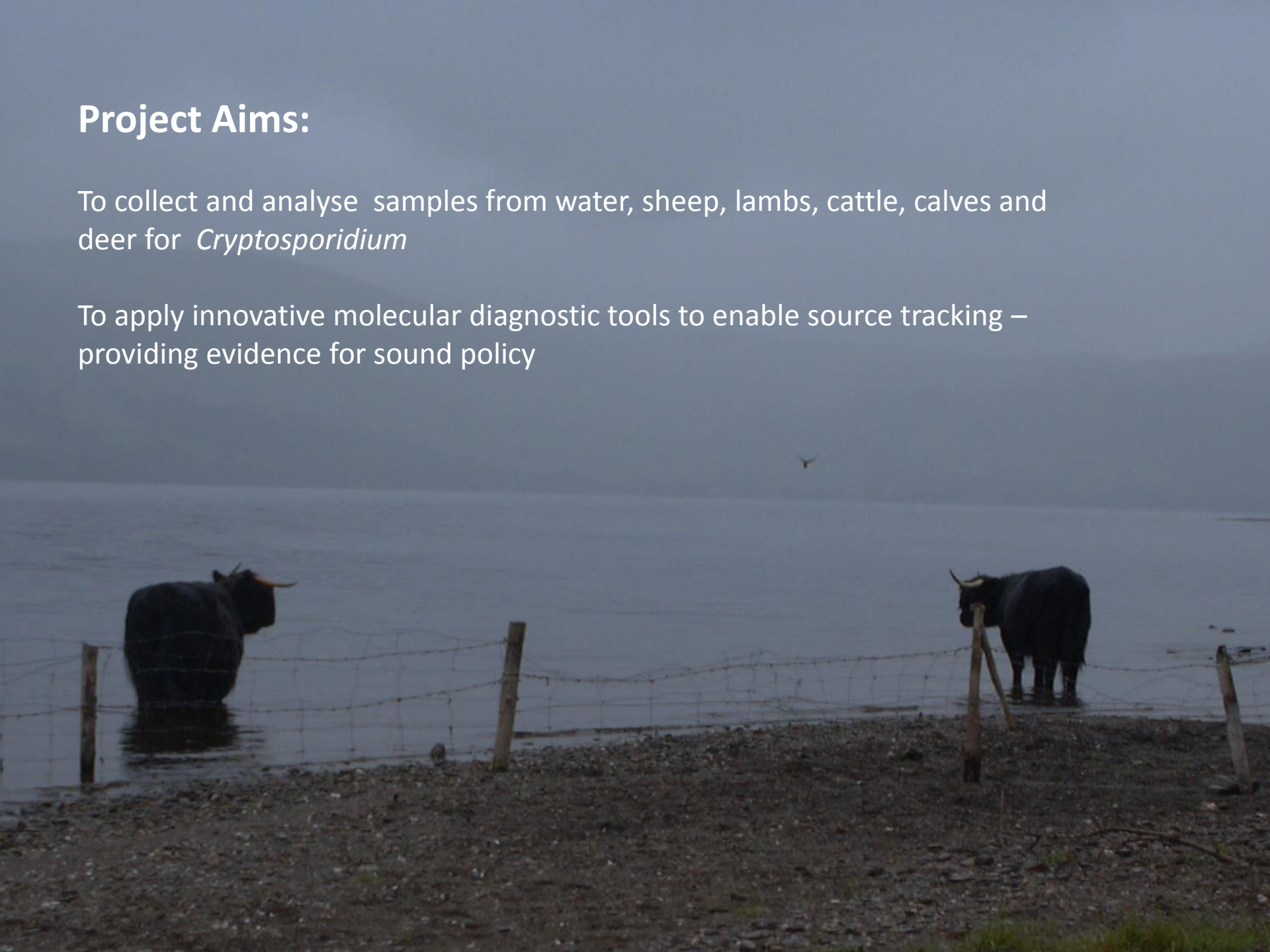
Transmission of *Cryptosporidium* oocysts in catchments

Moredun

Project Aims:

To collect and analyse samples from water, sheep, lambs, cattle, calves and deer for *Cryptosporidium*

To apply innovative molecular diagnostic tools to enable source tracking – providing evidence for sound policy



C. parvum prevalence : farms and red deer tested

33%
n=6

70%
n=20

63%
n=57

80%
n=30

69%
n=23

22%
n=47

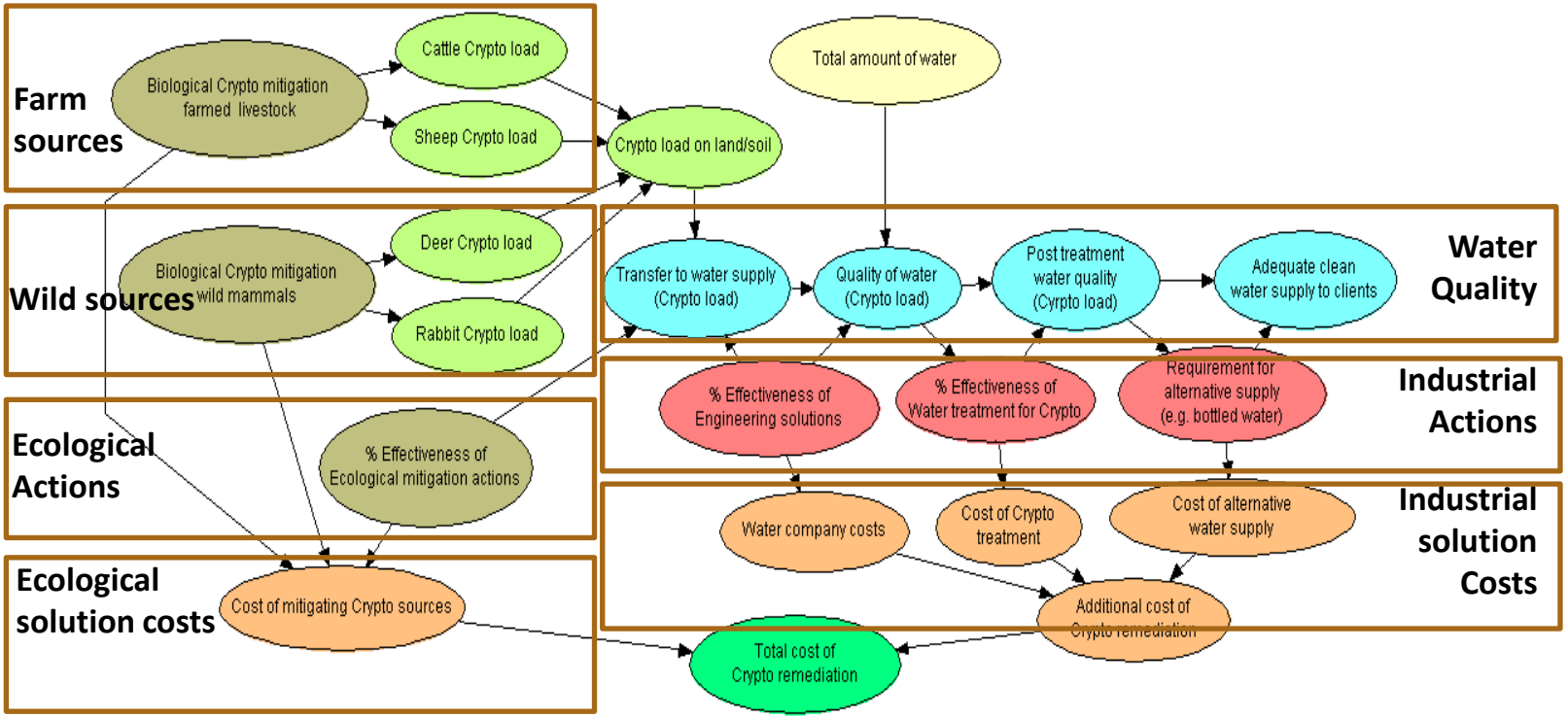
Water: *C. parvum* detected at each site

Genotyping *C. parvum*: Molecular tool allowing tracking of parasite transmission routes

Moredun

Bayesian Belief Network (BBN)

Testing a BBN as a decision support tool to inform us of the most effective way to prevent *Cryptosporidium* parasite species entering the drinking water supply.



Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL

OpenNESS
Operationalisation of Natural Capital and Ecosystem Services

Moredun Research Institute

AQUAVALENS

NERC SCIENCE OF THE ENVIRONMENT

Project outputs

1. **Improved land management:**

- Fencing, riparian woodland creation and grazing management
- Provision of water troughs

2. **Knowledge Exchange**:

- Meetings with Scottish Water Catchment Officers – improving understanding and dialogue
- Management advice to farmers and vets – reduction of *Cryptosporidium* prevalence

Outcomes for the catchment: Scientific data informing management

Potential Payment for Ecosystems Services (PES) schemes :

- reduce water treatment costs
- improve water quality
- improve fish habitat
- enhance biodiversity
- landscape benefits

Reduction in oocyst burden in the catchment:

- healthier livestock and improved production
- improved food security
- less risk to the human population

OpenNESS
Operationalisation of Natural Capital and Ecosystem Services

Thank you for listening

Moredun Research Institute

AQUAVALENS
Powerful water - purity and safety tested

THE CROWN ESTATE

CEH
Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH CO