Catchment Management Modelling Platform

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Project aims

- Enable better access to data and modelling for catchment management

- Develop more integrated modelling to deliver holistic solutions for multiple pollutants, services & policies

- Community building to develop questions and encourage joint working

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UKWP report on 'Agriculture's Impact on Water Quality'

Project aims

- Enable better access to data and modelling for catchment management

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UKWP Report Key finding 2: We need unified predictive models encompassing all key aspects of agriculture and water management that inform future policy and commercial interests.

- Community building to develop questions and encourage joint working

UKWP Report Key finding 7: We need greater collaboration between researchers, industry and policy makers with the necessary framework to deliver effective joint working.

UKWP report on 'Agriculture's Impact on Water Quality'

ADAS   ATKINS   Centre for Ecology & Hydrology NATURAL ENVIRONMENT RESEARCH COUNCIL   crew centre of expertise for waters   The James Hutton Institute   University of Reading   ROTHAMSTED RESEARCH   UEA University of East Anglia   Water Resource Associates

What will the project deliver?

- A web-based platform for catchment management

- Case studies to identify key data and models <u>as defined by users</u> and benefits of model coupling

- Standards to facilitate model coupling

- Model selection tool

- Signposting and access to the key datasets

- Input and output library from Case Studies to enable re-use
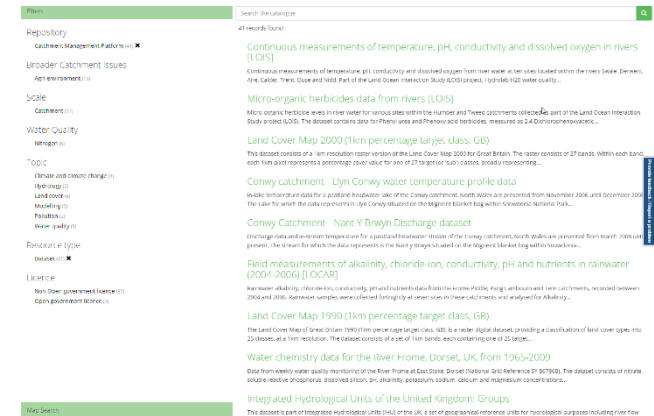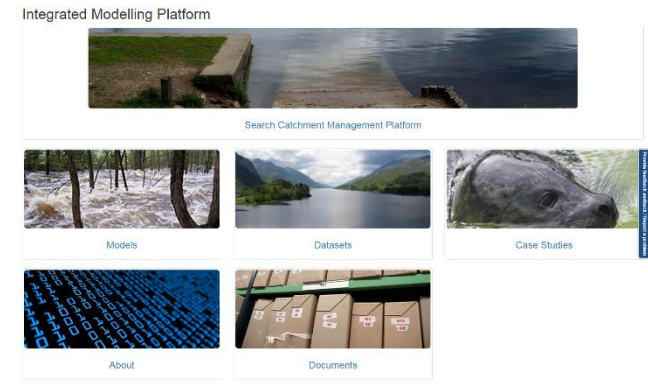
# A user led Project:
The Community Forum

- Community Forum No. 1
  - More than 280 questions identified in the first Forum and 1:1 phone interviews from > 40 organisations

- Community Forum No. 2
  - Developed 7 case studies to cover:
    - As many of these issues as possible
    - Other issues specified by the funders

- Community Forum No. 3
  - Feedback on the Platform
    - Function / content
    - Look and feel

Summary of all 280 questions received

280 questions from 40 organisations summarised into 22 issues. Many captured in our 7 case studies
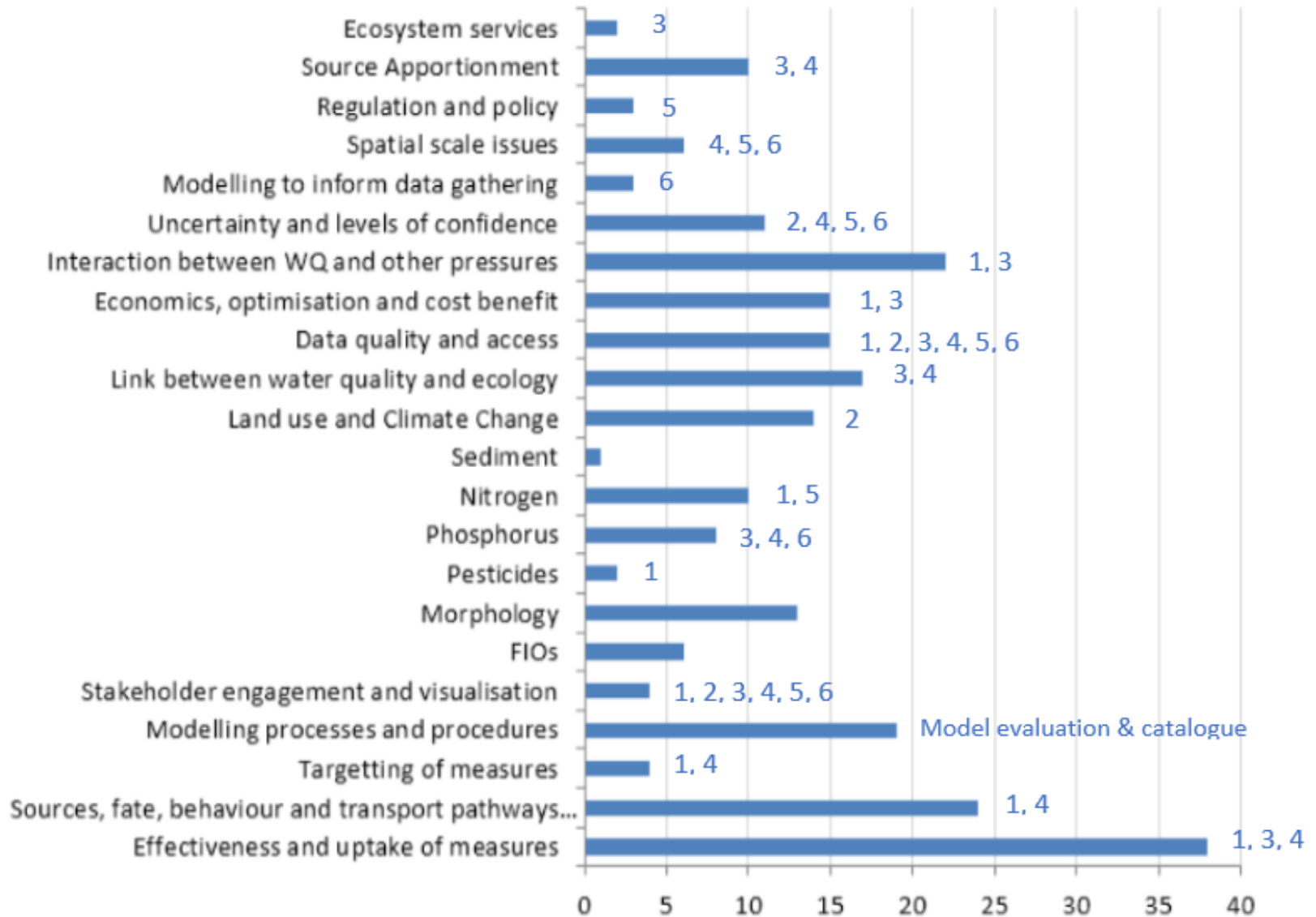
+ questions/issues from the funders

- Actions/interventions limited to those carried out for water quality
  - But to include models and tools to explore impacts on wider ecosystem services (GHG, biodiversity, cultural etc)
- The project funders also asked for Case Studies to cover the following:
  - Scale
  - Effectiveness of measures
  - Multiple pollutants
  - Interpolation from catchment to national and monitored to unmonitored sites
  - Performance of catchments under future climate change
  - Cost –effectiveness of measures
  - Apportionment
  - Uncertainty and ensemble approaches

Case Studies

1. What are the multiple pollutant and ecosystem services responses to agri environment interventions at the <u>farm to catchment scale.</u>

2. And then at the national scale?

3. <u>What are the costs and benefits</u> of mitigation measures to reduce multi-pollutants upstream of intakes.

4. Will the effectiveness of pollution control measures continue under <u>scenarios of future climate and land cover</u> change at the catchment scale

Case studies (cont.)

5. What is the <u>uncertainty</u> in ecological responses to water quality control measures at the river basin scale.

6. How does input <u>data quality</u> affect evaluations of interventions at catchment to national scales.

7. How can we <u>interpolate</u> from highly monitored to non-monitored catchments?

Models and data used to deliver Case Studies and available on the Platform

Models
- SAGIS
- FARMSCOPER
- QUESTOR
- INCA N and P
- LUCI ecosystem services

Community fund
- SWAT (Metaldehyde)
- INCA-FIO
- SEPARATE

Data
- Landcover 1km
- Catchment boundaries
- River Flow data
- Diffuse pollution source inputs
- Harmonised world soil database / NSI Scotland
- DTMs
- ……….etc

Data catalogue: contents

Datasets used by models (SAGIS, Farmscoper, INCA, LUCI, QUESTOR, ...)

Key national scale datasets imported (Land Cover Map, Soils, Hydro-met variables)

Monitoring data: national (NRFA, WIMS, NWIS), and catchment (DTC, Avon, Tarland, Thames, Conwy, LOCAR, etc.)

Land Use and Farm Practice information
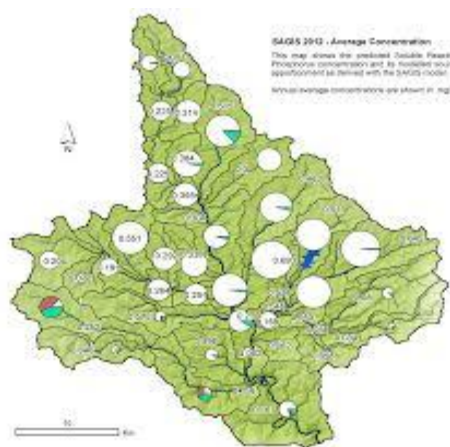
Datasets: different approaches

Datasets from existing catalogues (CEH EIP, data.gov.uk, JHI)

New metadata records to describe existing online resources (Scottish soils data, EDINA, Defra Farm Practice data)

New metadata where data is currently unavailable on the web (e.g. EA WIMS, IACS)
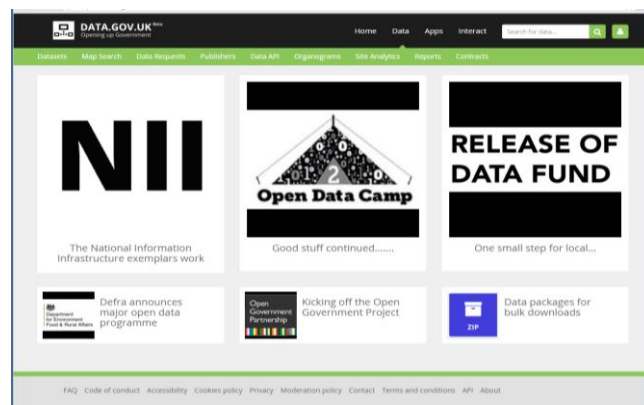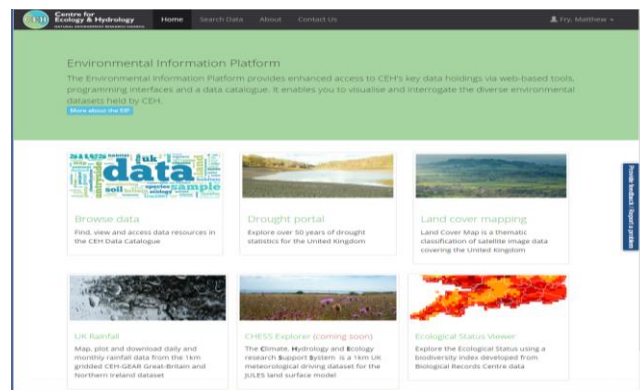
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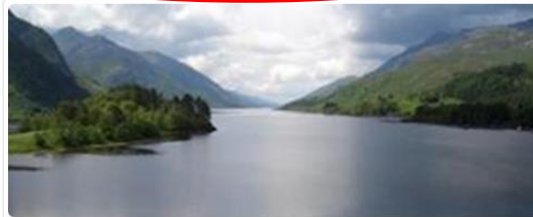
Search/Model Selection Tool

Model Selection Tool - 2

Model Selection Tool - 3

Homepage

Model Catalogue

Model Catalogue & Application

Homepage

Data Catalogue

Data catalogue: metadata

Existing text

New text to provide better information

Information on access

Data catalogue: metadata

Links to other information on the web

Additional (subjective?) information on data quality

Homepage

Case Studies 4

2 years into a 3 years project

- Identified data and model needs of Case Studies
- Captured these resources for the Platform including additional resources through an open call from the Community Fund
- Started model runs for the Case Studies
- Developed a model database and selection tool
- Undertaken a review of barriers and opportunities for model integration
- Scoped out design and functionality of the Platform and started testing with Users
- Platform launch data 31st March 2017

Benefits to communities

- Practitioners
  - Access to data and practical models
  - Sharing of problems and solutions
  - Community to develop joint commissioning
  - More holistic solutions

- Academics
  - Better understanding of needs and timing of practitioners
  - Translation of science to practitioners
  - Access to data and models
  - Standards and protocols for coupling

Funding sought to enhance Platform;
CEH/NERC to provide legacy as Platform host

Test benefits of model integration on outcomes

User input into platform design and functionality

Forum 3 & UKWP

Select data, models and tools

| Data | Models | Tools |

funding pot

funding pot

Select case studies

Forum 2

What are the key questions?

Forum 1

Breakout group questions

- Feedback on data catalogue, case studies and model selection tool

- Feedback on 'look and feel' of the platform

- Could and should this approach be extended to other aspects of water resources, and how?

Questions?

Case Studies matched to funders priorities

Funder issue	Case Study Number						
	1	2	3	4	5	6	7
Effectiveness of measures	░	░					
Performance of catchments under future climate change (and land management)				░			
Cost –effectiveness of measures			░				
Apportionment		░	░				
Uncertainty and data quantity and quality					░	░	
Interpolation from catchment to national and monitored to unmonitored sites							░
Multiple Pollutants	Sediment; N; P; FIO; (biodiversity; carbon; flood mitigation)	N; P; FIO; agri-GHG	N; P; Metal-dehyde	Sediment; N; P	N; P	Based on Case Studies 1-5	To be agreed
Multiple scales	Catchment	National	River System	Catchment	River Basin	Catchment - National	Catchment – National

ADAS ATKINS CEH Centre for Ecology & Hydrology NATURAL ENVIRONMENT RESEARCH COUNCIL crew centre of expertise for waters The James Hutton Institute University of Reading ROTHAMSTED RESEARCH UEA University of East Anglia Water Resource Associates