

Grand Challenge – Catchment Sensitive Farming (CSF)

Phil Smith & Juliette Hall
Agriculture, Risk & Evaluation
Environment Agency

23rd May 2017

The Challenge

To determine if there is a statistical relationship between CSF advice delivery and improved ground water quality?

Content

- Overview of Catchment Sensitive Farming
- CSF datasets
- Previous CSF evaluations:
 - surface water quality
 - ecology
 - ground water quality

CSF overview

- part of Defra policy framework for Agriculture & Water Quality (in England)
- targeted to WFD priorities (ca. 50% of England)
- advice-led approach (CSFOs)
- supported by grant scheme
- >10 years' delivery
- comprehensive evaluation programme



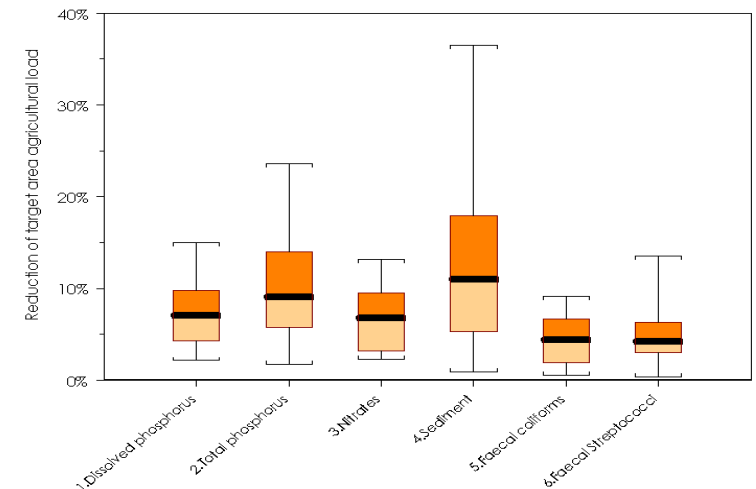
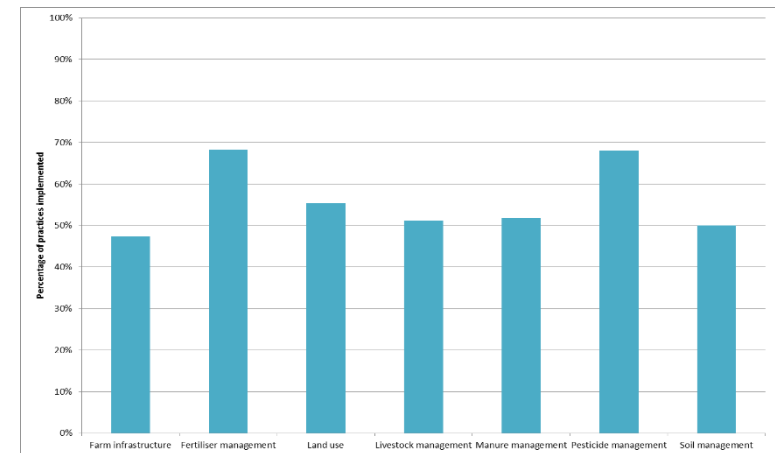
CSF delivery

- advice to > 17,000 farms covering >2.5M ha
- 31% of farms engaged 5+ times
- > 203,000 mitigation measures advised
- 54% of 1:1 advised measures implemented
- 87% of measures at least 'mostly effective'
- ca. £100M grant funding (matched by farmers)



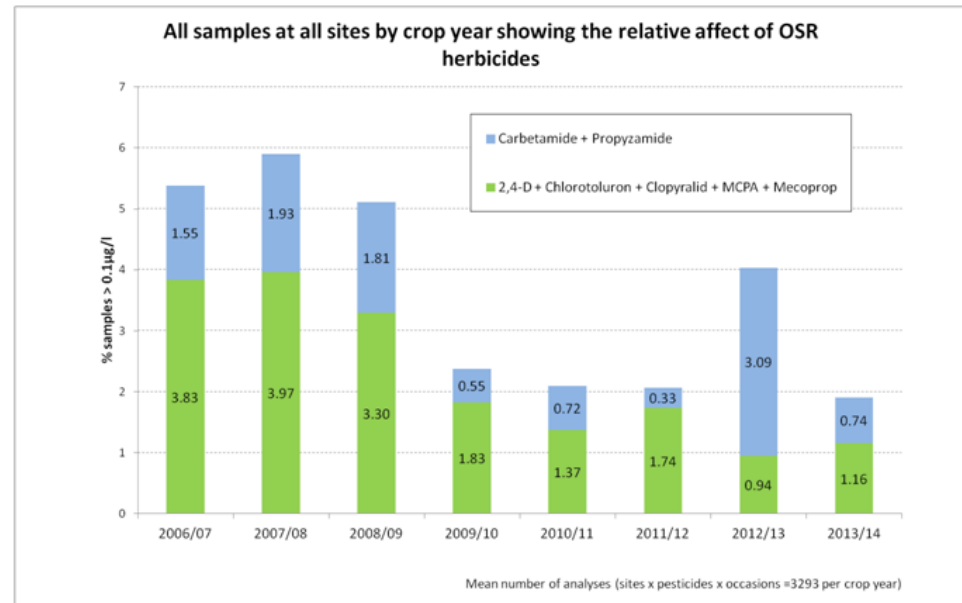
CSF datasets

- farmer awareness & attitude (annual survey)
- farmer engagement
- advice delivery / mitigation measures
- measure implementation rate (sample)
- (2x) weekly SWQ monitoring
- routine EA groundwater & ecology monitoring
- routine EA flow data
- modelled pollutant reductions
- modelled SWQ improvements



Surface WQ benefits - Pesticides

- 50% reduction in load & samples > 0.1 µg/l at a catchment scale
- de-coupling of load & flow
- set against increased usage + more intense OSR cropping
- 'blip' attributed to late use (March 2013)

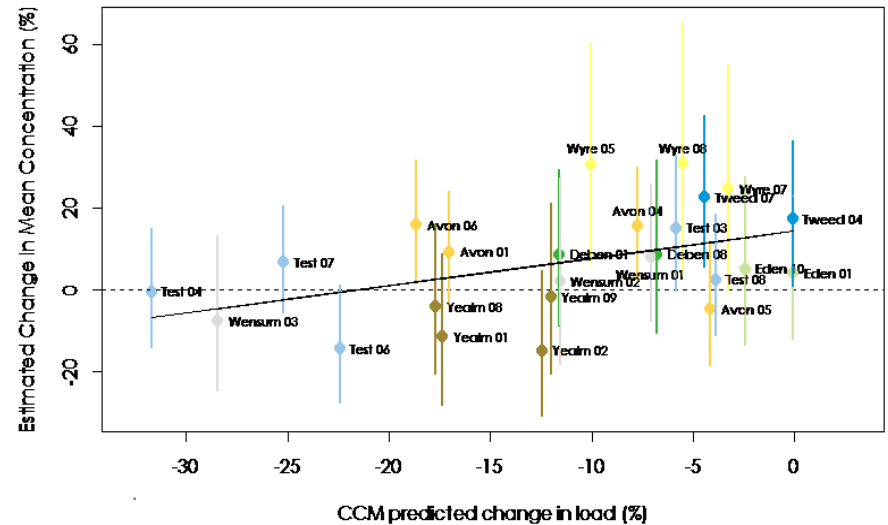


*(2 x weekly sampling at 6 sites
since 2006 – catchment scale)*

Surface WQ benefits

- Nutrients, Sediment & FIOs

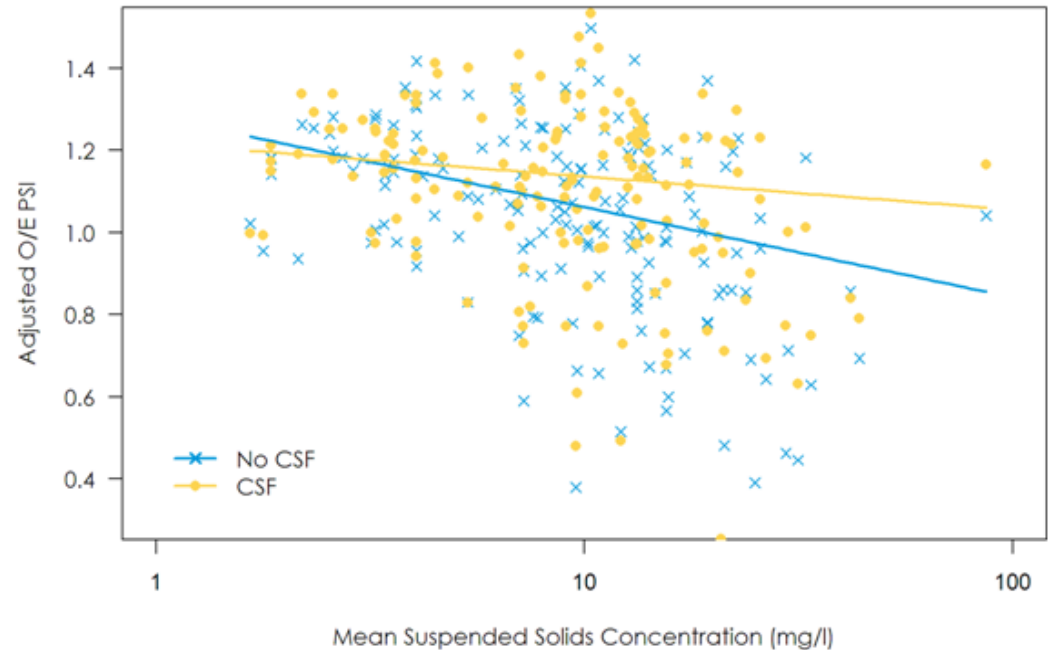
- CSF activity linked to monitored WQ improvement
- sediment provides clearest evidence
- time-lags mask further reductions?



(weekly sampling at ca. 25 sites since 2007)

Ecological benefits

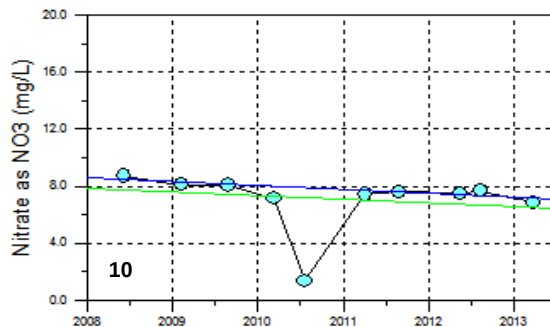
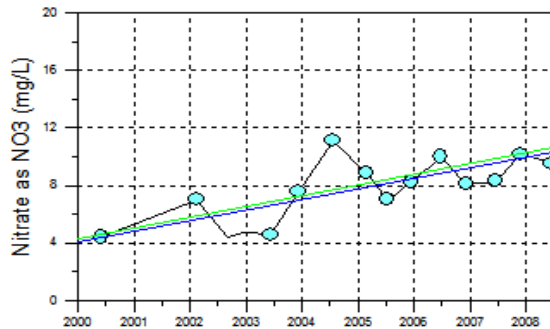
- examined spatial and temporal patterns in ecology
- evidence of improvement from CSF activity – after controlling other influences
- strongest response for invertebrates / PSI, esp. at more polluted sites



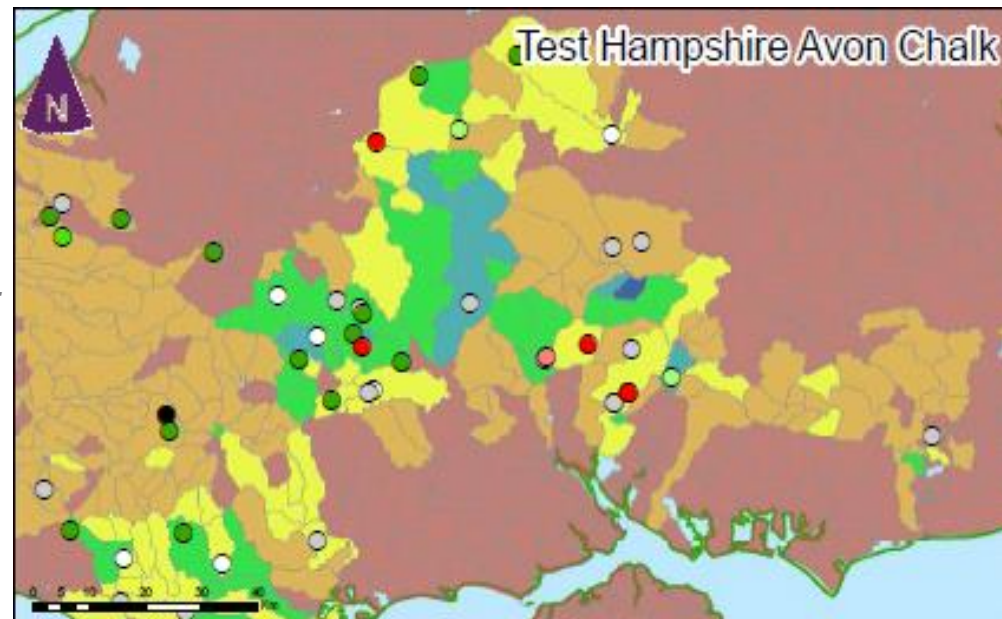
(EA invert & diatom monitoring across 62 CSF catchments)

Ground WQ benefits

- compared NO₃ trends pre- and post-CSF
- reduced number of 'increasing' trends (48 → 29) and increased number of 'decreasing' trends (40 → 67) at 192 selected monitoring points within CSF areas
- no obvious link to CSF activity



(N trends pre- & post- CSF)



Ground WQ benefits – limitations of previous analysis

- make better use of the data (vs trend analysis)
- utilise data from outside CSF areas
- how to represent CSF advice activity (vs modelled reductions across SW catchments)
- accommodating the lag in response (vs 2008 *cut-off*) & limited post-CSF data (5.5 years)
- account for climatic variation
- account for crop rotations / field management
- present summary results in simple / compelling format