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- Statements about the issues derived from the technical evidence which will help support action

- Comments of workshop participants from the July 2013 workshop on some of these statements and the evidence base.

- Individuals comments from pre-event survey included with survey result figures

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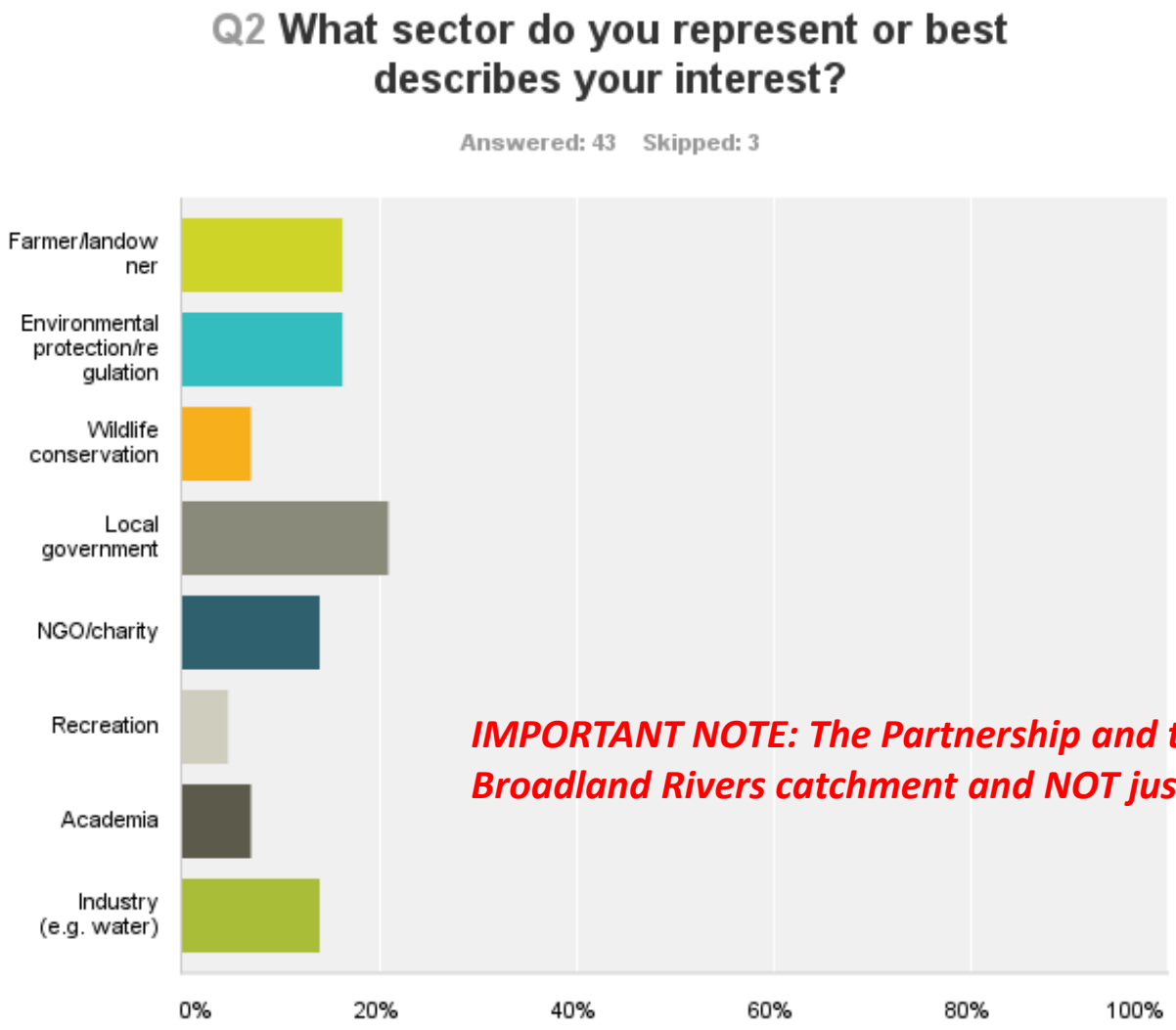
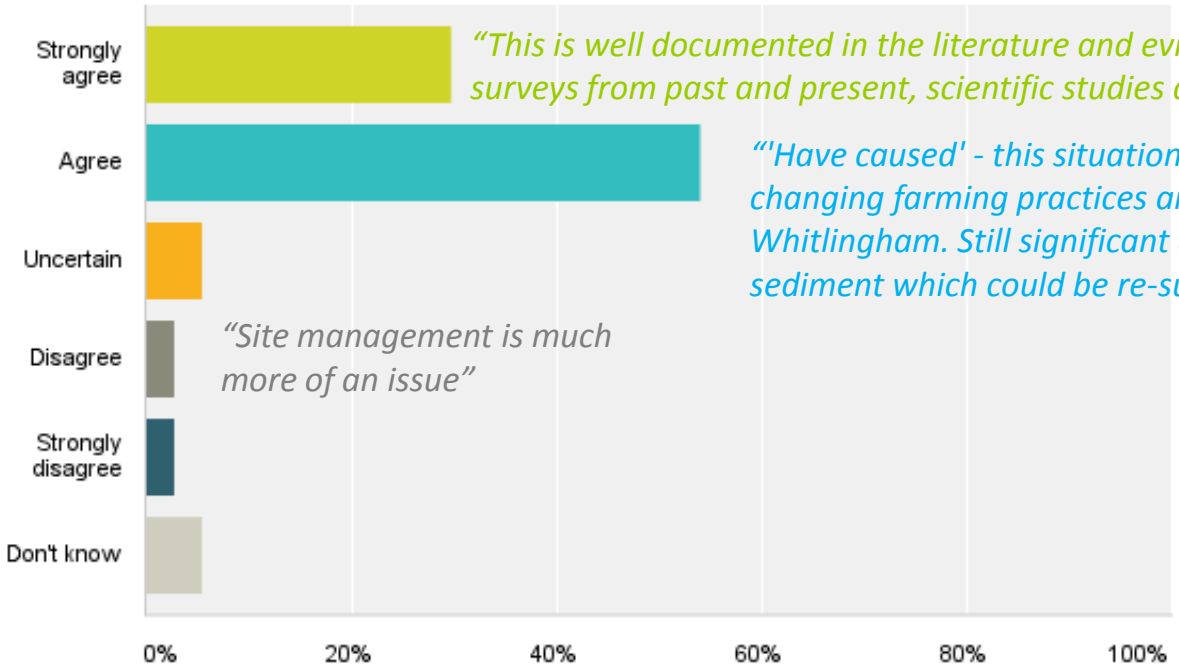


IMPORTANT NOTE: The Partnership and the Catchment Plan covers the Broadland Rivers catchment and NOT just the Broads catchment

Broadland Catchment Partnership

Q3 High levels of phosphorus and nitrogen have caused a change in the plant and animal communities in the rivers, dykes, broads & wetlands and a loss of rare species.

Answered: 37 Skipped: 9

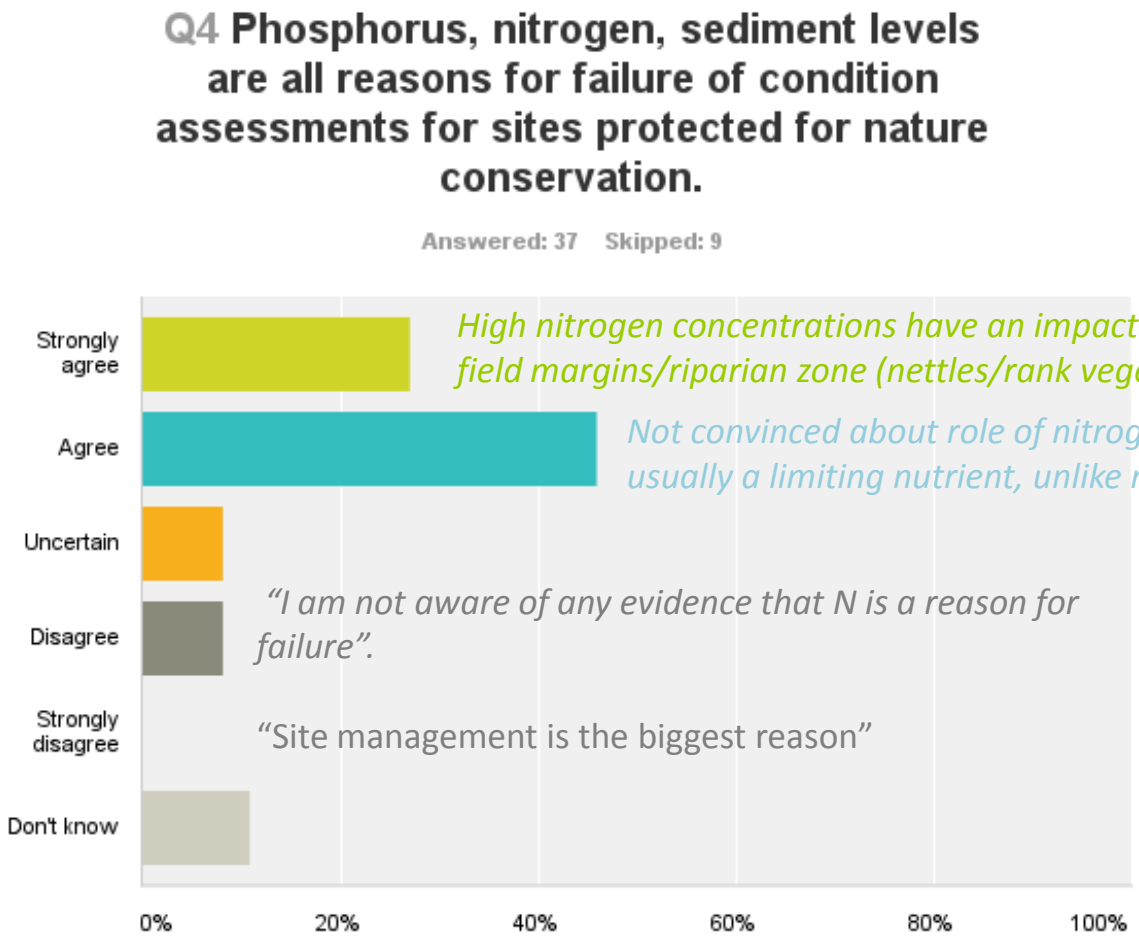


"This is well documented in the literature and evidenced by aerial photographs, comparison of surveys from past and present, scientific studies and comments in 'general' literature".

"'Have caused' - this situation is reduced since the 80's with changing farming practices and sewage treatment at Whitlingham. Still significant amounts of phosphorus locked in sediment which could be re-suspended."

"Site management is much more of an issue"

Broadland Catchment Partnership



High nitrogen concentrations have an impact in fen and wet grassland habitat and even field margins/riparian zone (nettles/rank vegetation)

Not convinced about role of nitrogen in freshwaters - not usually a limiting nutrient, unlike marine situation.

"I am not aware of any evidence that N is a reason for failure".

"Site management is the biggest reason"

Q4 Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Natural England condition assessments
- Environment Agency monthly river and lake water quality monitoring and WFD failure investigations
- Anglian Water Sewage Treatment Work (STW) monitoring of discharges
- Broads Authority Biodiversity Action Plan
- Norfolk Biodiversity Information Service and Records Centre
- Key Literature
  - Martin George (1992) Broadland: Land Use, Ecology and Conservation of Broadland

How adequate/credible/understood/agreed is this evidence?

- Evidence is often credible and understood by the Agencies but can be limited in its use.
- It is NOT understood outside of the agencies either in terms of the process of assessment and collection, or evidence that this is a problem.
-

Is there additional evidence we should consider using?

- Equipment for farmers to monitor water quality adjacent to their land (Waveney Catchment Sensitive Farming – Robert Camps).
- Voluntary monitoring over a larger area by landowners/farmers.

What more is needed to build a shared view of the issue?

- Better communication of how monitoring is conducted and how condition is assessed.

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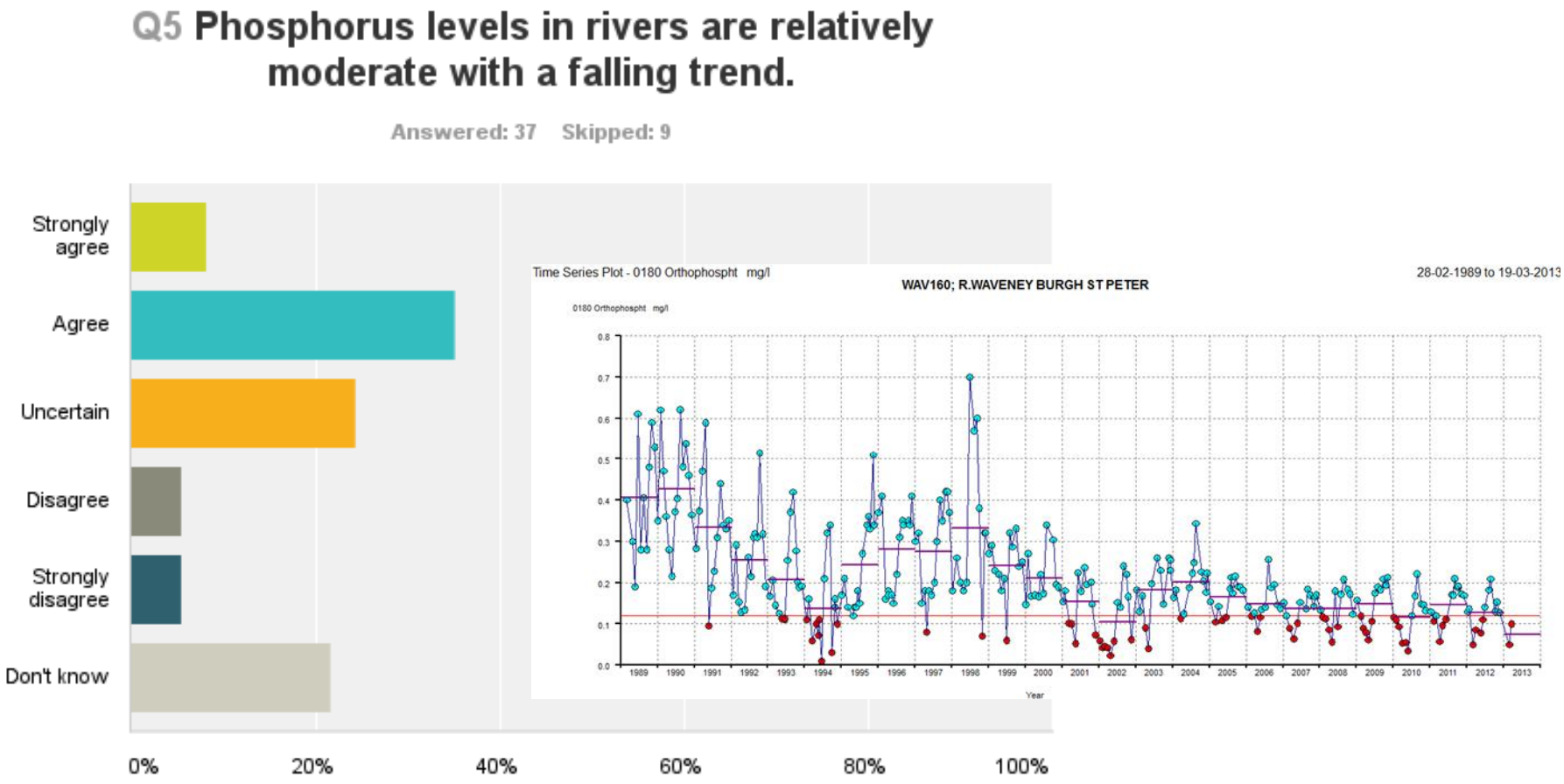

Q5 Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Anglian Water Sewage Treatment Work (STW) monitoring of discharges
- Environment Agency monthly river and lake water quality monitoring and WFD failure investigations

How adequate/credible/understood/agreed is this evidence?

- Peak events in rivers are missed
- Evidence is credible but limited in its use.

Is there additional evidence we should consider using?

- Equipment for farmers to monitor water quality adjacent to their land (Waveney Catchment Sensitive Farming – Robert Camps).

What more is needed to build a shared view of the issue?

- Targeted monitoring for high rainfall events.
- More regular/continuous and localised monitoring (e.g. headwaters) required.
- Share learning from the Wensum Demonstration Test Catchment (DTC) continuous and event monitoring across other local sub-catchments
- Pool data from multiple sources.
- Overcoming licensing issues with sharing data and investigations
- More and better use of case studies.

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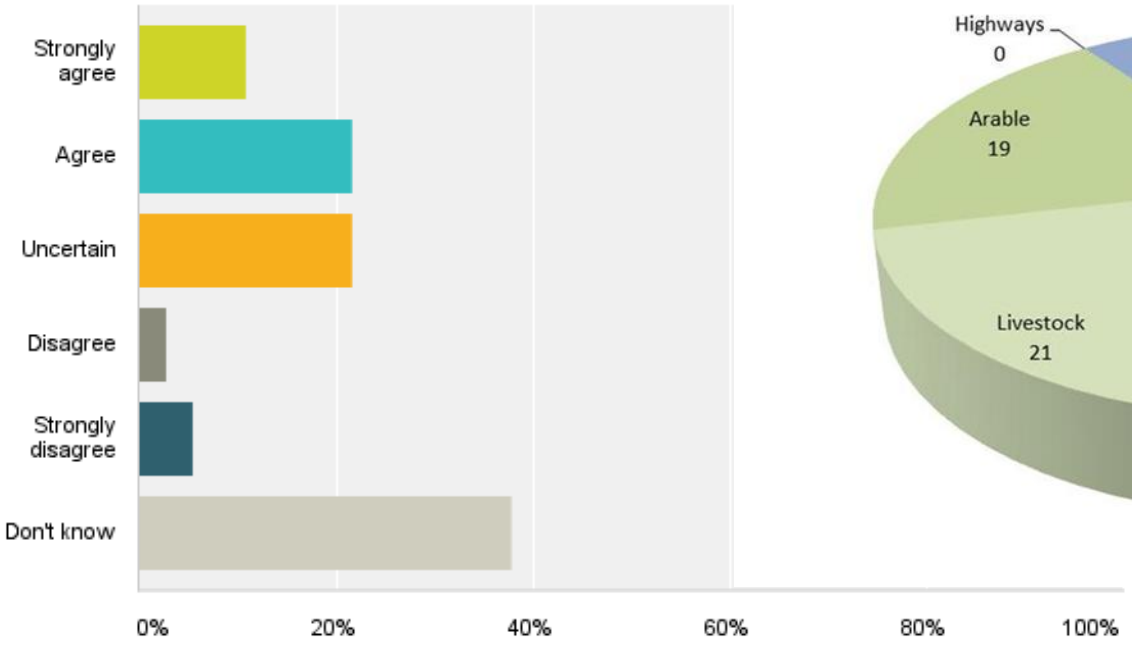
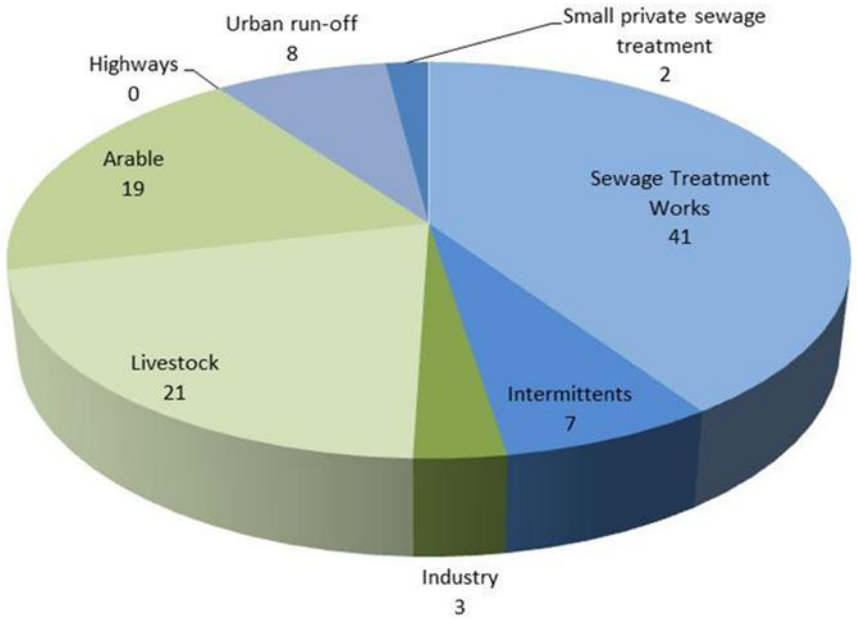
Q6 Sewage treatment works are no longer the main source of phosphorus for the upper catchment but contribute the majority of phosphorus in a form easily taken up by algae and plants in the main growing season (April-September).

Answered: 37 Skipped: 9



EA SAGIS SIMCAT

Total Phosphorus source apportionment % (preliminary)



Q6 Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Existing evidence base doesn't make sense.
- EA modelling - only a model and is for the whole of the Broadland catchment but is calibrated with phosphorus levels in rivers
- Whitlingham is the largest Sewage Treatment Works that discharges
- Evidence for uptake by plants is sound, but we don't know of proportion of soluble phosphorus in the upper catchment.

How adequate/credible/understood/agreed is this evidence?

- Not well communicated.
- EA data is not well shared – data licensing a big issue.
- 60% uncertain/don't know - reflecting that people hadn't seen the data re STWs.

Is there additional evidence we should consider using?

- Location and number of sampling points, timescale of sampling.
- Other source of phosphorus e.g. sediment.
- Fingerprinting trends of phosphorus.
- Legacy of phosphorus stores in river sediment and soils.

What more is needed to build a shared view of the issue?

- Better explanation of types of phosphorus (soluble/total), and concentration versus load
- Evidence that phosphorus stripping works.
- For second part of statement - more evidence required.
- Sub-catchment source apportionment would be useful, especially upstream of Norwich (Whitlingham), Stalham and Bungay
- We need more evidence re use of phosphorus by farmers.
- Need to explain why more focus is not given to waste water treatment improvement (already in place at all large sewage treatment works in the catchment but not in place at smaller works)

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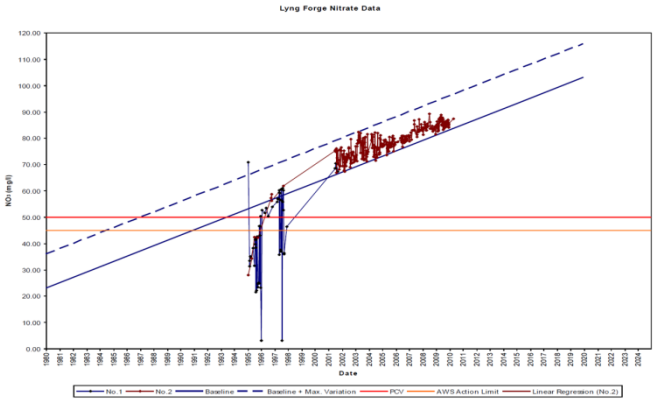
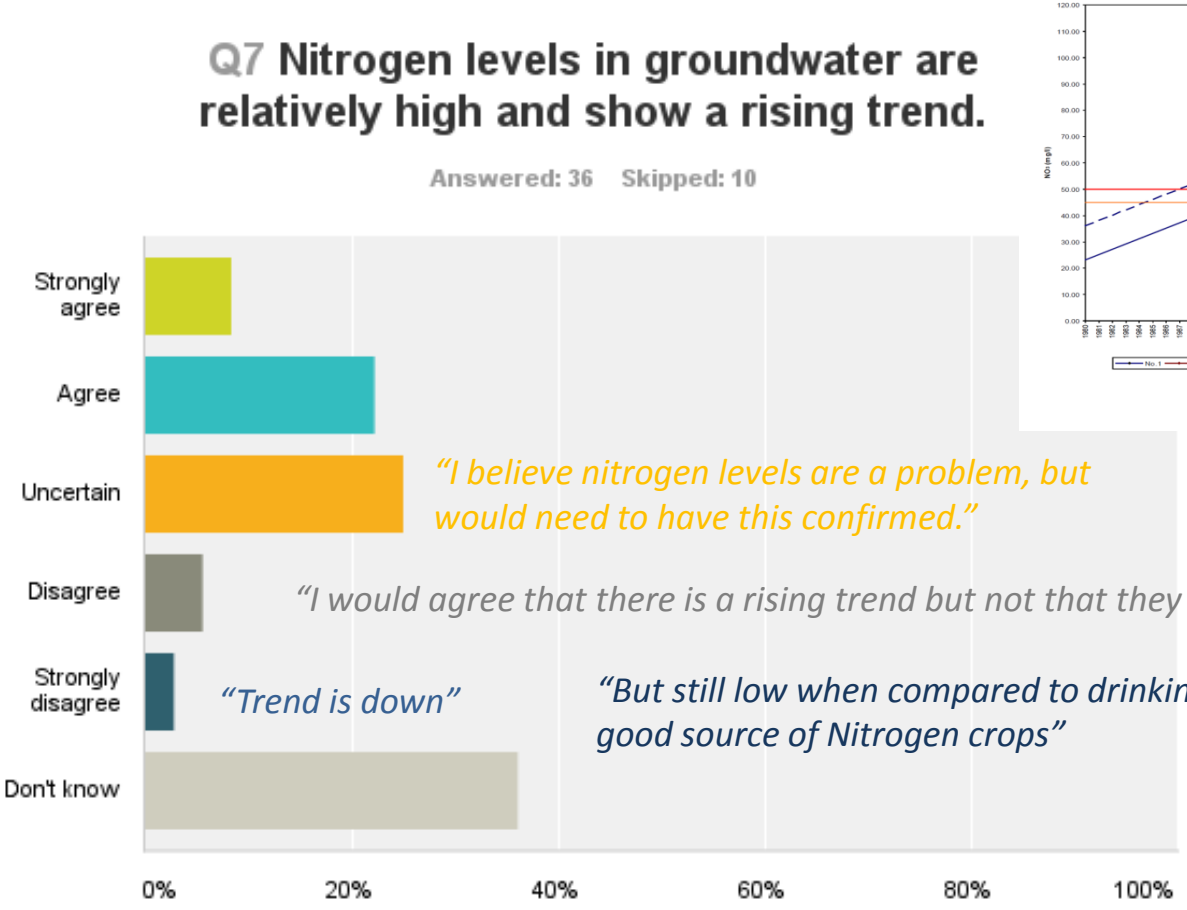
"Depends where you measure it! As in the Poole catchment, if you measure it at the borehole there may be a rising trend, but if you measure what is leaving the soil zone on its way to the groundwater the trend is likely to be falling."





"I believe nitrogen levels are a problem, but would need to have this confirmed."

"I would agree that there is a rising trend but not that they are relatively high generally"

"Trend is down"

"But still low when compared to drinking water. A good source of Nitrogen crops"

Q7 Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Environment Agency borehole water quality monitoring and WFD investigations
- Anglian Water and Essex and Suffolk Water water quality monitoring of raw and treated water (river and groundwater)

How adequate/credible/understood/agreed is this evidence?

- Must have caveat - only one source.
- Majority of ground waters confined and below DW standards.
- Historic/slow contribution/effect.
- Must quantify if public supply/ground water moving or that in aquifer.

Is there additional evidence we should consider using?

- Local authority private supply water quality monitoring.
- More than one place/level: deep ground, near surface.
- Known water travel to ident N source/Contributions.
- DrW sources monitored (AWS) trend of decline seen in some – on-going monitoring required.

What more is needed to build a shared view of the issue?

- Wider catchment/closer and surface water data so you get range (particularly SG2s and DrWPA)s.
- Aligning of targets (WFD/DrW).

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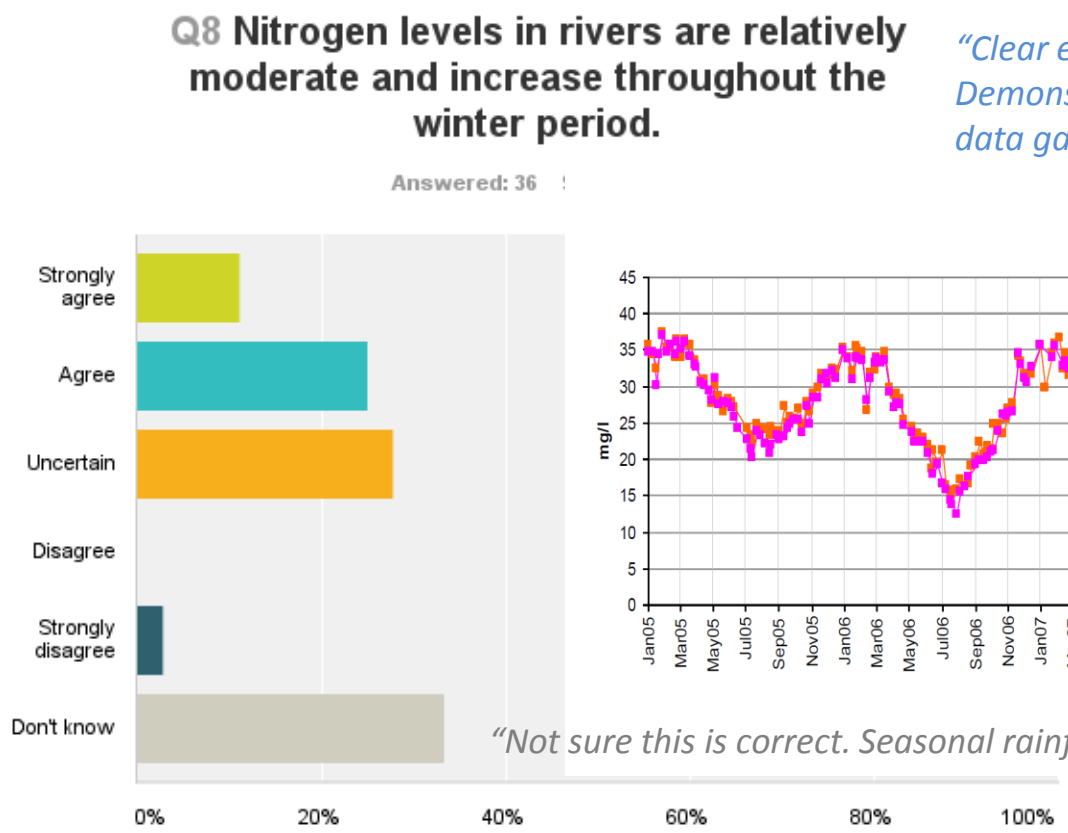
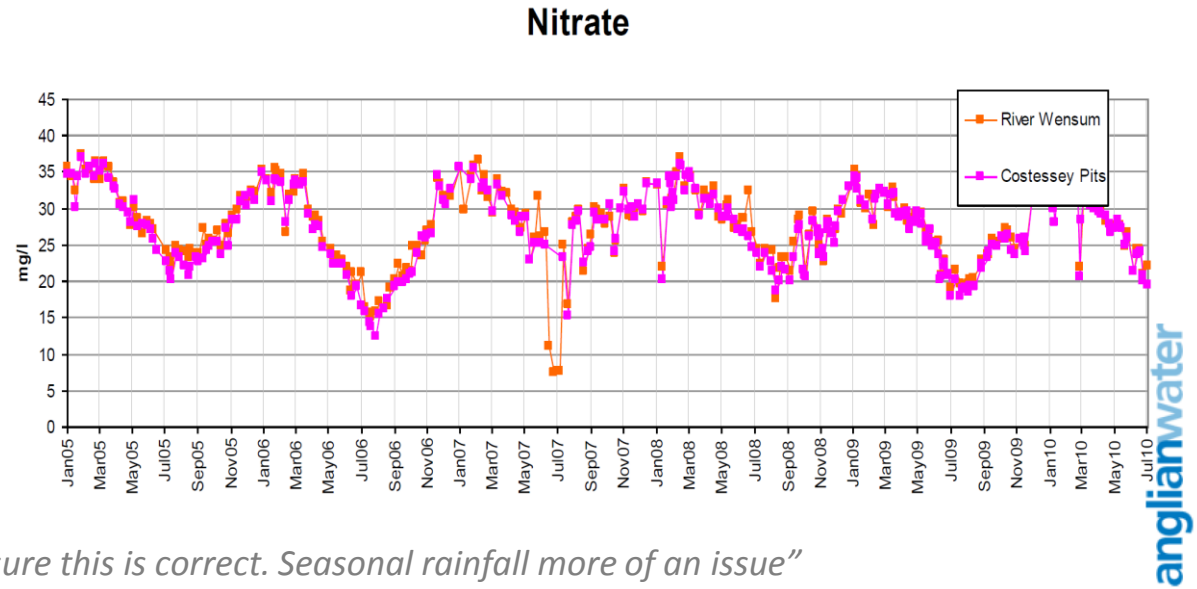
"They often increase throughout the winter period but I wouldn't say they were 'moderate', concentrations are very high ecologically speaking"

"N levels are moderate relative to groundwater, but still too high for optimal biodiversity - it does appear to rise in winter due to the flushing effect of winter rains and this is also the time of farm inputs"

"Clear evidence of this from the Wensum Demonstration Catchment and from RSPB data gathering at Sutton Fen."





"Not sure this is correct. Seasonal rainfall more of an issue"

Q8 Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Environment Agency borehole water quality monitoring and WFD investigations
- Anglian Water and Essex and Suffolk Water water quality monitoring of raw and treated water (river and groundwater)

How adequate/credible/understood/agreed is this evidence?

- Well understood seasonal peaks.
- Leached Nitrogen and from run-off during autumn winter rain fall events

Is there additional evidence we should consider using?

- Wensum Demonstration Test Catchment

What more is needed to build a shared view of the issue?

- How do we address the historic processes as well as 'future proof'?
- Spend time promoting the positive position at the moment.

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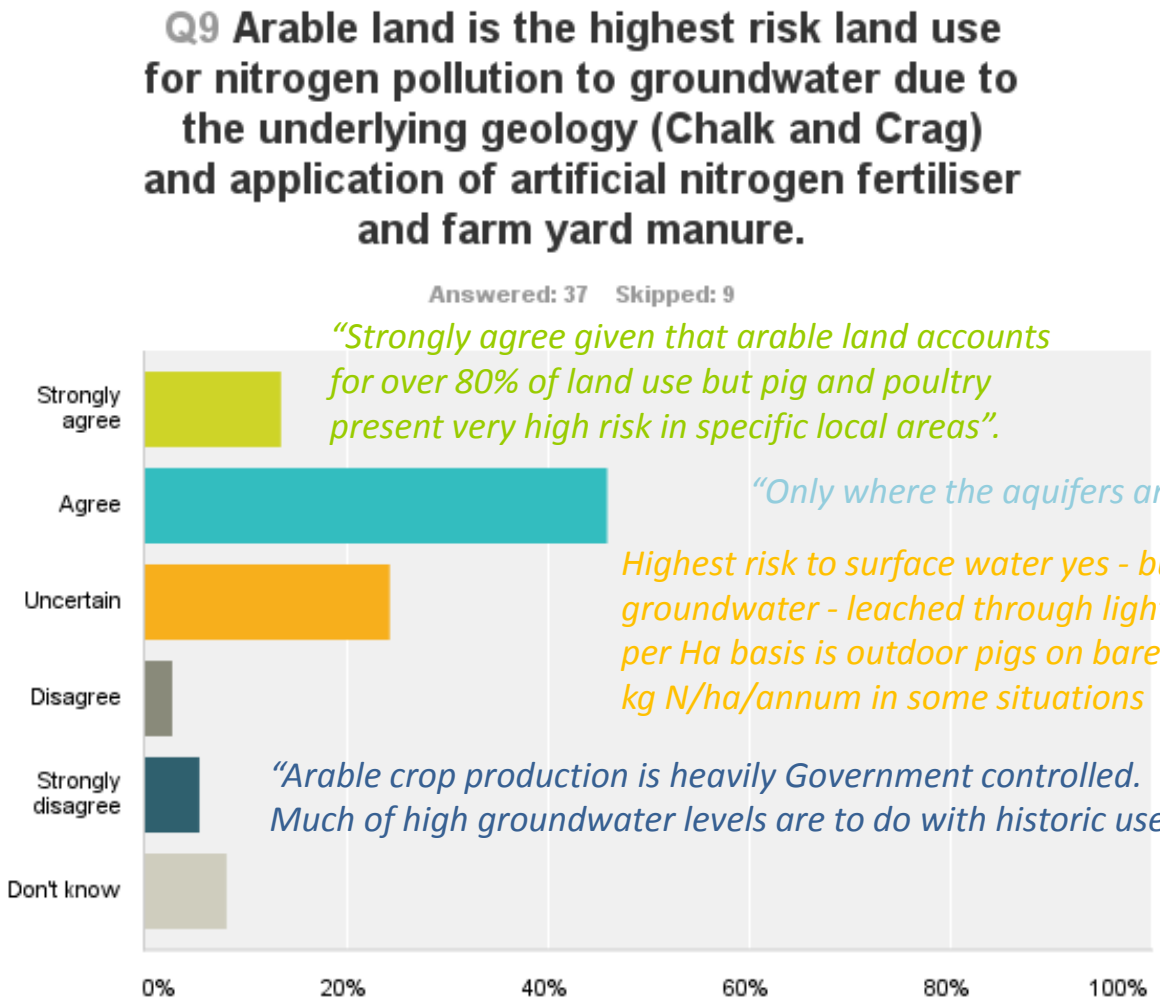

"Strongly agree given that arable land accounts for over 80% of land use but pig and poultry present very high risk in specific local areas".

"Only where the aquifers are exposed"

Highest risk to surface water yes - but the highest risk to groundwater - leached through lighter land into groundwater- on a per Ha basis is outdoor pigs on bare land/stubbles - e.g. 800 -1000 kg N/ha/annum in some situations

"Arable crop production is heavily Government controlled. Much of high groundwater levels are to do with historic use"

Q9 Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Risk models/maps – NEAP-N, ADAS research
- Arable highest nitrogen risk to ground water
- Environment Agency borehole water quality monitoring and WFD investigations
- Anglian Water and Essex and Suffolk Water water quality monitoring of raw and treated water (river and groundwater)

How adequate/credible/understood/agreed is this evidence?

- Most common land use equals arable therefore agree risk present.
- Not clear cut as cropping rotation /practices vary.
- Most aquifers have clay cover so isolated/contained limiting risk to groundwater from land use but not to fen habitat dependent on river /dyke systems.

Is there additional evidence we should consider using?

- Wensum Demonstration Test Catchment
- Other chalk catchment and soil profile monitoring e.g. Wessex
- Understanding of geology above chalk and quantify pathways.
- Ground water nitrogen contours mapping to understand where risk of pathways.

What more is needed to build a shared view of the issue?

- Mapping of geology/pathways for no spread of manure fields therefore not creating pathway.
- Being clear that some evidence does not make sense at a catchment scale as impacts and risks are localised depending on location, geology, soil type and structure, topography

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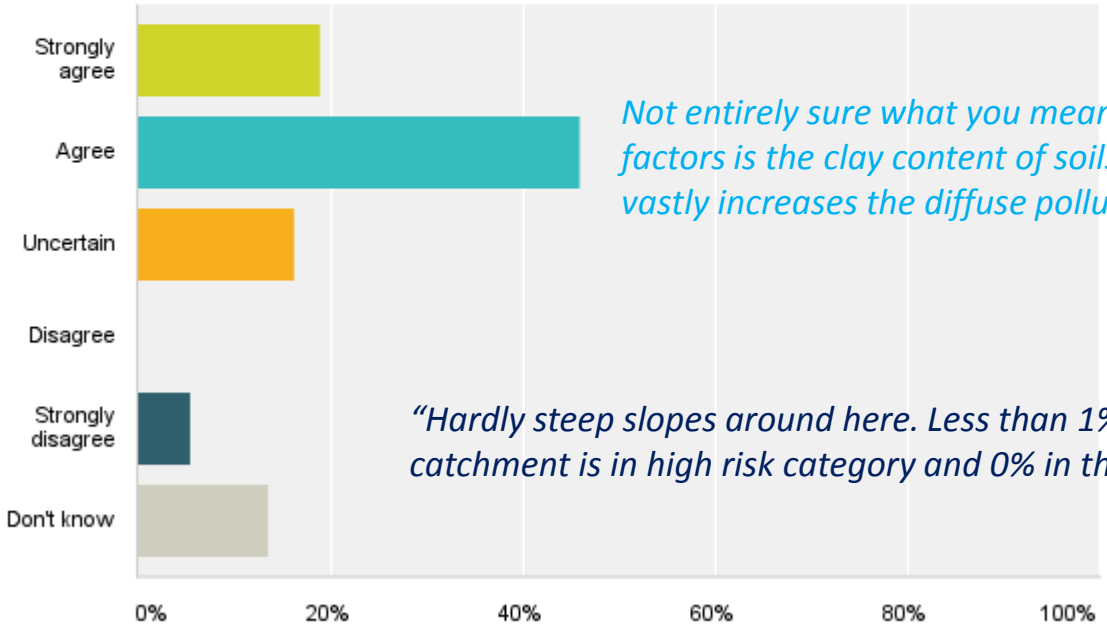
Q10 Sub-catchments with arable land use combined with steeper slopes and unstable soils within the Wensum, Upper Yare, Waveney and Upper Bure present the greatest risk for diffuse phosphorus, sediment and pesticide input to rivers.

Answered: 37 Skipped: 9



Not entirely sure what you mean by unstable soils. One of the risk factors is the clay content of soils and presence of underdraining which vastly increases the diffuse pollution risk from agricultural soils.

"Hardly steep slopes around here. Less than 1% of Wensum catchment is in high risk category and 0% in the other catchments"

Q10 Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Risk models/maps – PSYCHIC – ADAS
- Catchment Sensitive Farming work
- Sediment fingerprinting
- Soil stability maps (Cranfield University)
- Land use and topography/slope data/maps
- Wensum Demonstration Test catchment monitoring results

How adequate/credible/understood/agreed is this evidence?

- Most common land use equals arable therefore agree risk present.
- Quantify unstable soils as land management, a major factor in soil stability.
- Steepest slopes at top of Wensum and parts of Waveney and Tas
- Depends on direct connection to river/drain
- Modelling and anecdotal evidence now being backed up by evidence gathering.

Is there additional evidence we should consider using?

- Wensum Mass Scan Survey (pesticides) results and report
- Full and comprehensive understanding of the depth of monitoring.
- Linking into existing studies completed for 'other reasons' – such as planning applications/ EIA and gravel quarry work.

What more is needed to build a shared view of the issue?

- More accurate and recent land use/habitat mapping data e.g. remote sensing data from Norfolk Biodiversity Information Service
- Evolving system to move from desk based modelling to real time catchment.
- Data collection and monitoring at high risk.
- Areas on permanent and on going basis.

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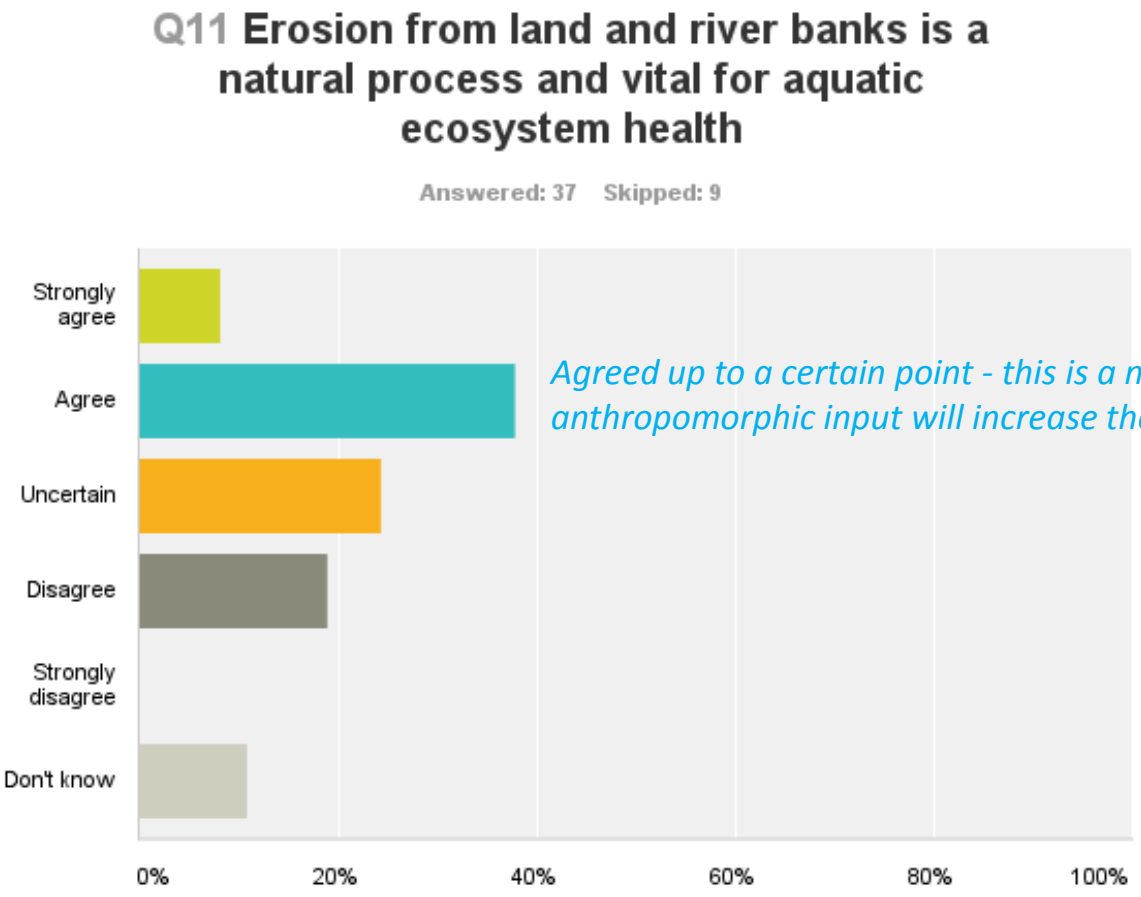

Agreed up to a certain point - this is a natural process but anthropomorphic input will increase the sediment in the water column.

Q11. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Publications e.g. by Malcolm Newson, Martin Perrow

The Handbook of Ecological Restoration - Volume 1: Principles of Restoration, Volume 2: Restoration in Practice. Perrow, M.R. & Davy, A.J. (eds.) (2002) Cambridge University Press

How adequate/credible/understood/agreed is this evidence?

- Sediment needed for river functioning and flushing.
- It is the level/spread of sediment that is relevant to ecosystem health.

Is there additional evidence we should consider using?

- Turbidity monitoring undertaken.
- Monitoring after specific events e.g. heavy rainfall but possibly not after emergencies (e.g. severe flood) due to other priorities.

What more is needed to build a shared view of the issue?

- Can existing evidence be extrapolated to show what is happening lower down the system?
- More research needed on how much nutrient sediment is releasing into water and on impacts on boat movements.
- Also impacts of engineered changes to water levels.
- Impact of pump drainage systems.

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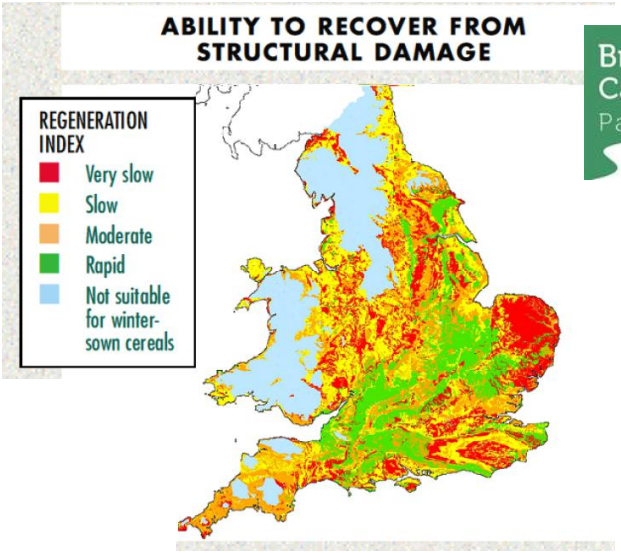
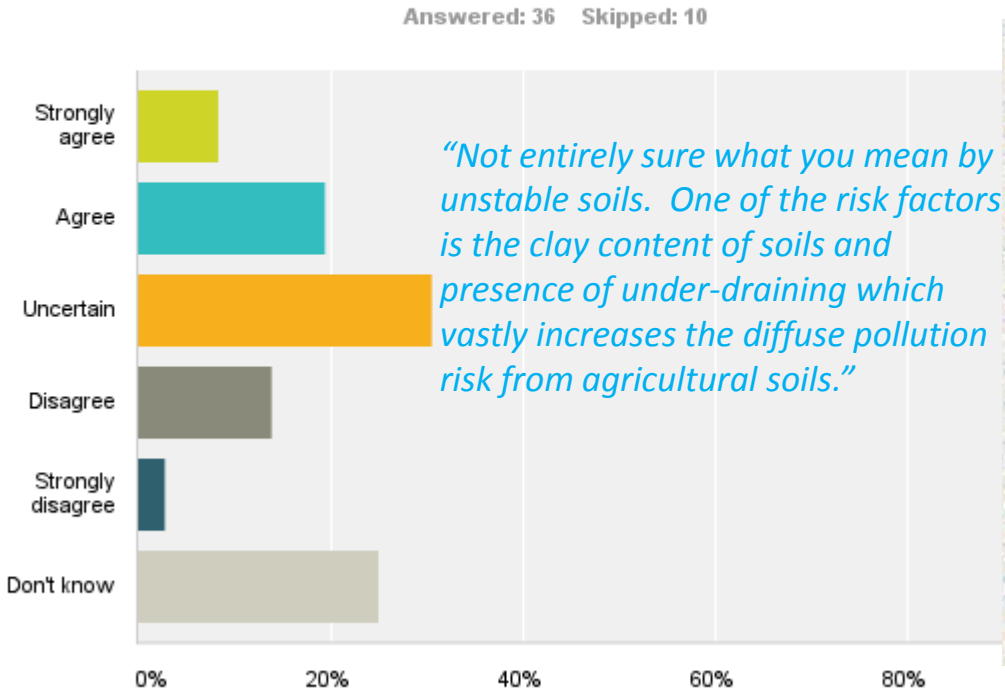
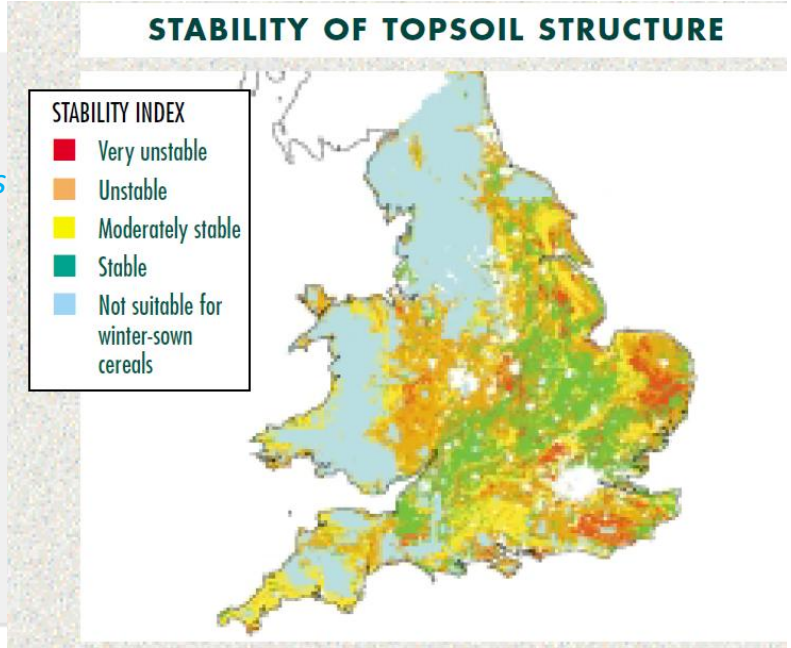




"Not entirely sure what you mean by unstable soils. One of the risk factors is the clay content of soils and presence of under-draining which vastly increases the diffuse pollution risk from agricultural soils."



Q12. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Publications
  - e.g. A guide to better soil structure National Soil Resources Institute http://www.landis.org.uk/downloads/downloads/structure_brochure.pdf

How adequate/credible/understood/agreed is this evidence?

- Need to better understand what 'unstable' means in this context (see above).

Is there additional evidence we should consider using?

- Wensum DTC
- Soils information
  - http://eusoils.jrc.ec.europa.eu/data.html
  - http://www.fiva.dk/doc/thesis/Omar.pdf

What more is needed to build a shared view of the issue?

- Soils harder to manage over past 20 years and more prone to collapse (farmer). Why has it got worse? Evidence needed. Better public information.
- Evidence needed on where washland areas could be to relieve pressures on other areas e.g. mapping.

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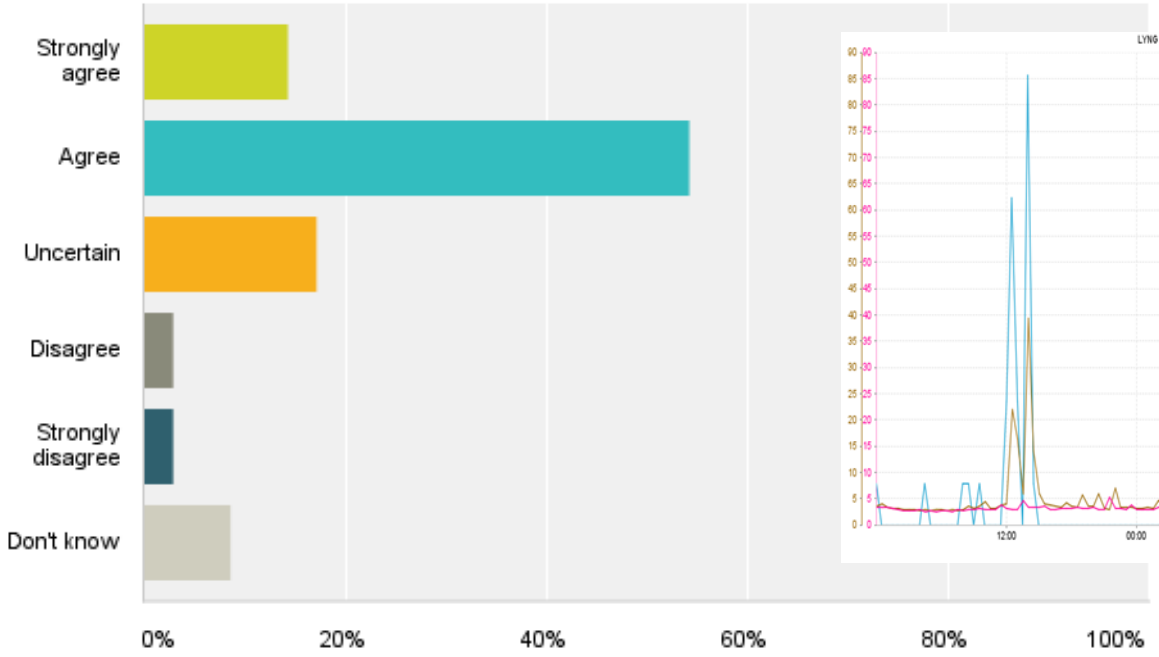
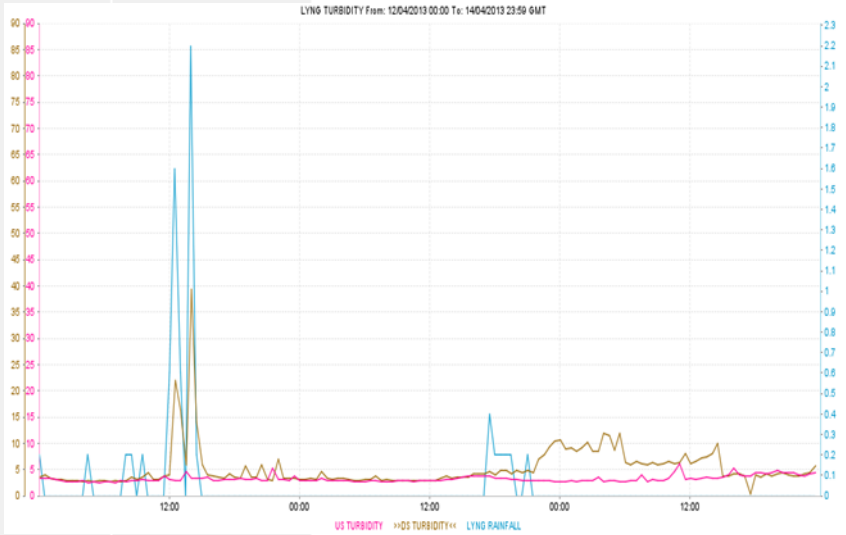
Q13 The majority of sediment entering rivers from land comes along specific "pathways" that include fields and roads.

Answered: 35 Skipped: 11





Courtesy of Lisa Turner, EA

Q13. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Environment Agency and Natural England evidence on road crossing points.

How adequate/credible/understood/agreed is this evidence?

- Strong agreement with statement.

Is there additional evidence we should consider using?

- EA Road Crossing survey (APEM) – report produced but not yet available
- Wensum DTC

What more is needed to build a shared view of the issue?

- More evidence needed on in stream sources channel works impacts e.g. BFAP soft engineering bank erosion

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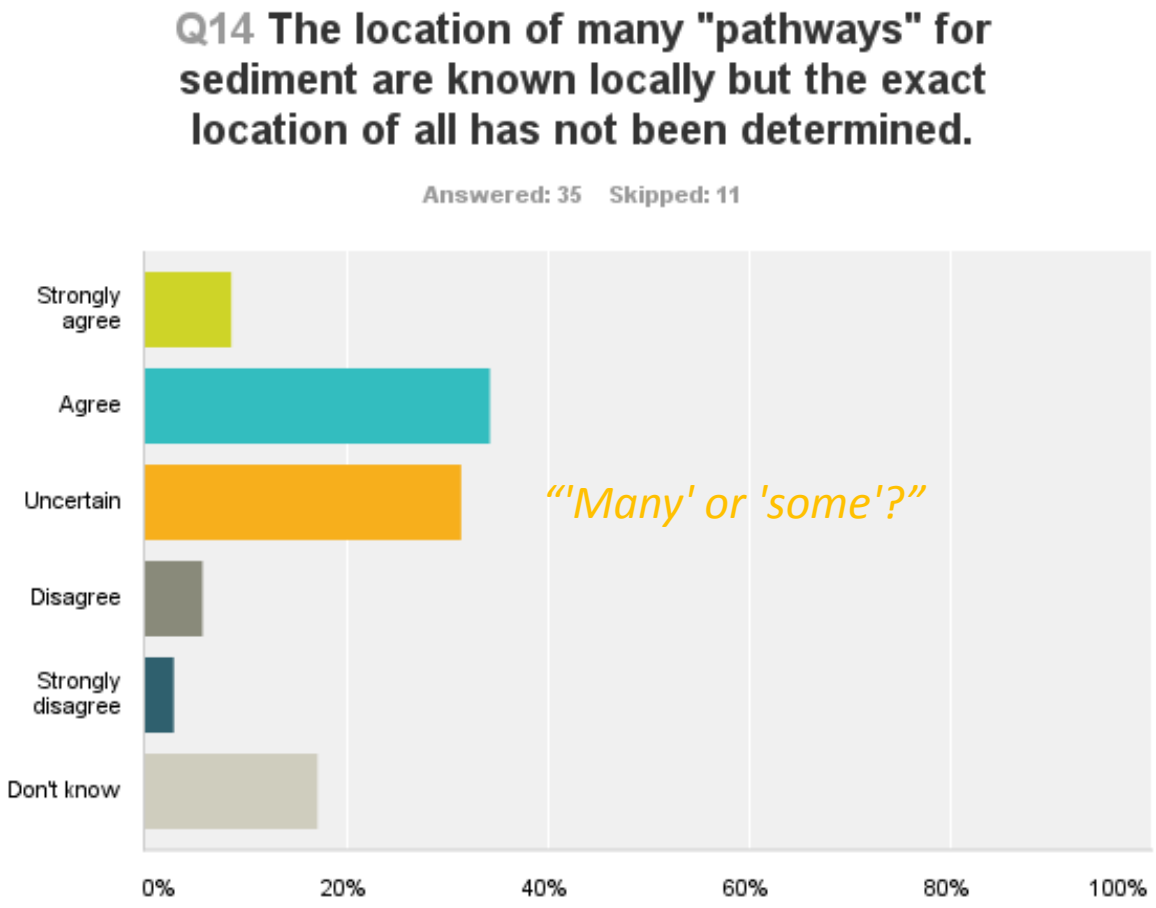

Q14. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Suffolk Wildlife Trust and Norfolk Wildlife Trust walkover surveys for the Environment Agency and site investigations for WFD failures
- Environment Agency and Natural England evidence on road crossing points.
- Wensum Demonstration Test Catchment

How adequate/credible/understood/agreed is this evidence?

- More evidence needed especially for unmanaged sites - knowledge is patchy.
- Disjoint between what is happening in water and on adjoining land.

Is there additional evidence we should consider using?

- No but Need access to the walkover surveys

What more is needed to build a shared view of the issue?

- SCIMAP to show high risk areas and potential flow pathways in relation to river
- Farmer local knowledge on where erosion and run-off occurs, how under-drainage works and where culverts are in place
- Collect more evidence at local level e.g. from landowners and water users, who see and can report on events when they are happening.
- Walkover surveys in and around the headwaters during or immediately after heavy rainfall events and/or aerial photographs

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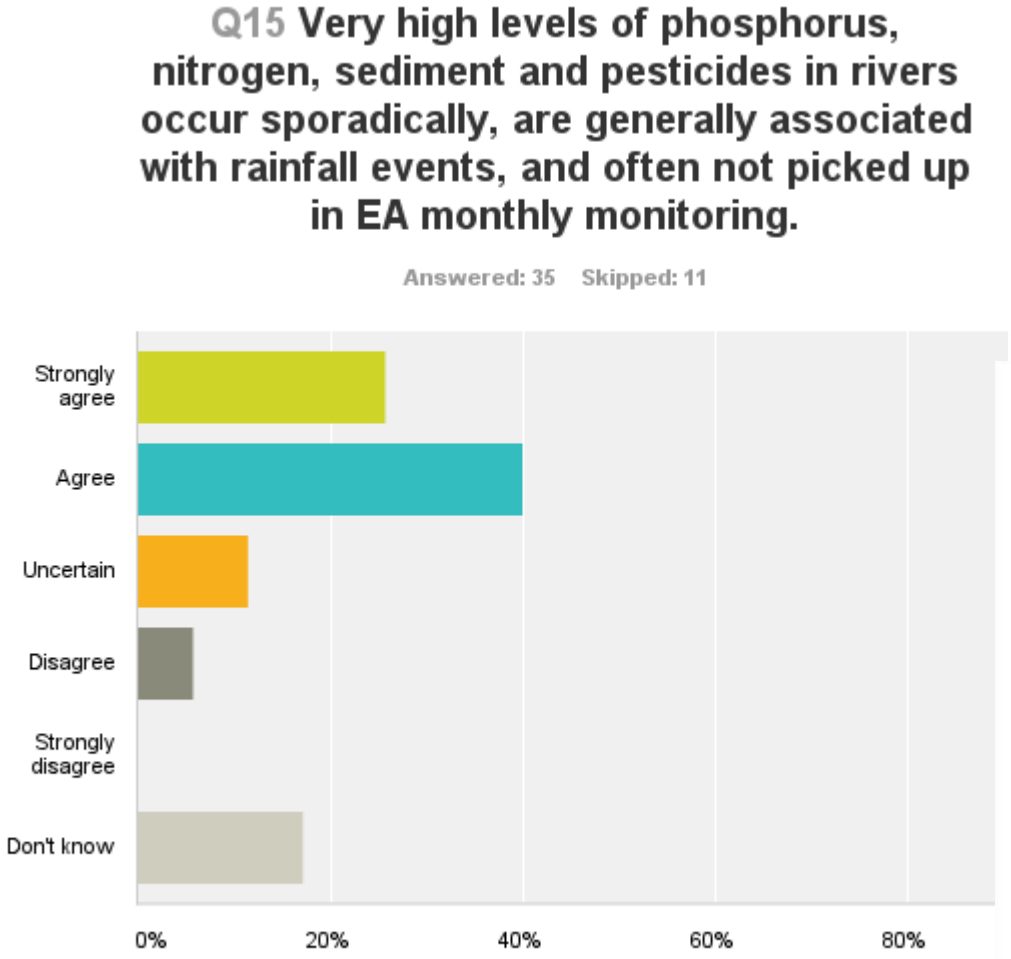

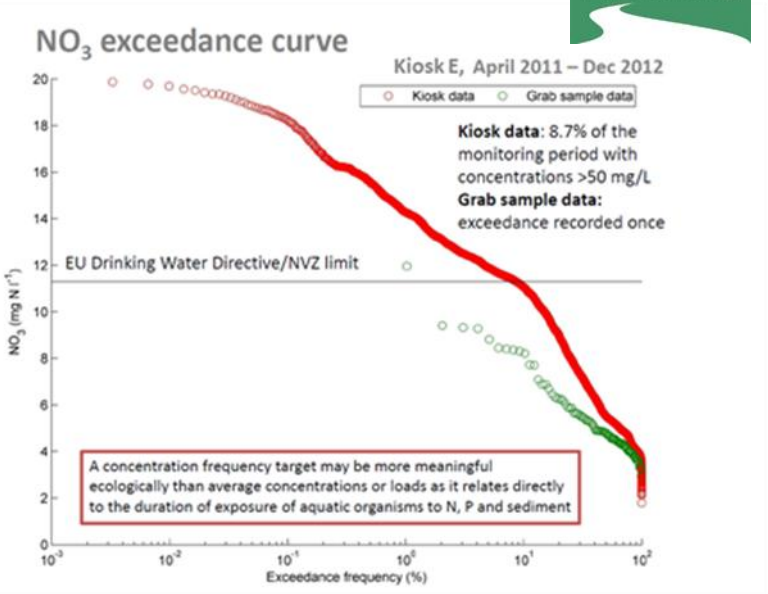

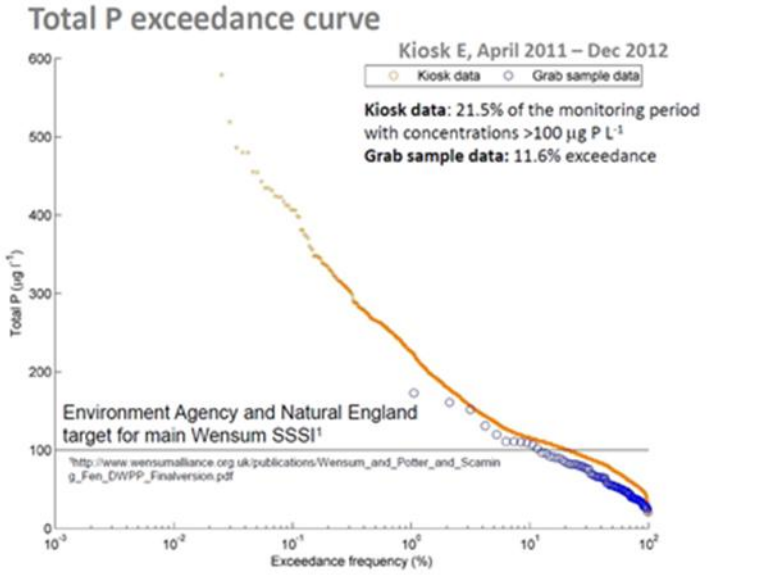

Courtesy of UEA – Wensum DTC

Q15. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Wensum Demonstration Test Catchment
- Environment Agency monthly river and lake water quality monitoring and WFD failure investigations
- Anglian Water Sewage Treatment Work (STW) monitoring of discharges

How adequate/credible/understood/agreed is this evidence?

- Evidence from Demonstration Test Catchment monitoring of peaks. Therefore likely to be missed elsewhere where monitoring not done. Coverage is patchy.
- Monthly monitoring may miss peak events.
- Better rainfall (event) monitoring and targeted monitoring e.g. rain gauges.

Is there additional evidence we should consider using?

- Could compare other similar UK catchments where continuous monitoring has occurred and infer results rather than wasting money and time on more monitoring when it could be spent on mitigation.

What more is needed to build a shared view of the issue?

- Risk-based approach to monitoring. Identify where there are sensitive sites.
- Farm management practices better understood. Farmers explain WHY they do things.

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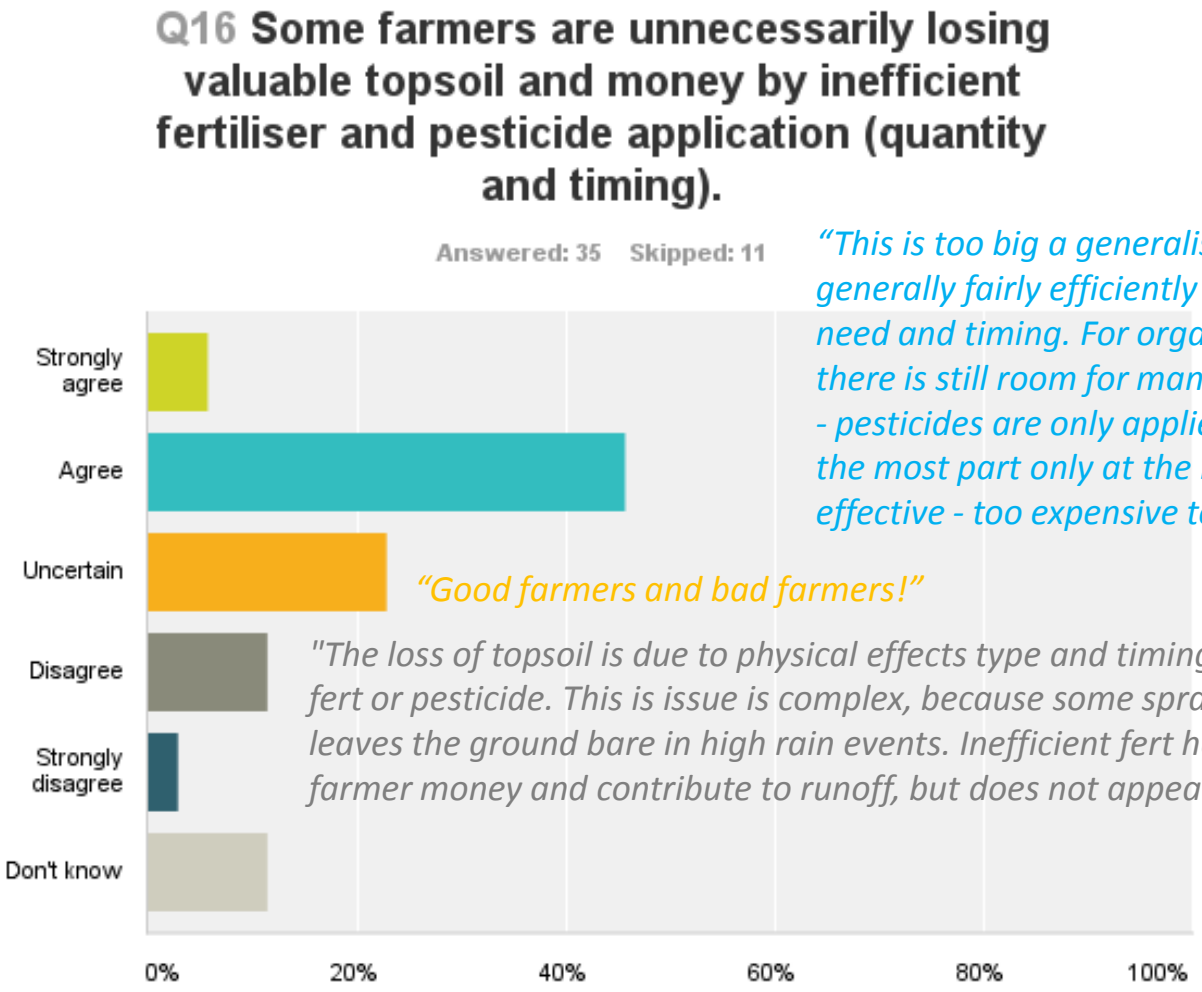

"This is too big a generalisation - I think artificial fertilisers are generally fairly efficiently applied according to Crop nutrient need and timing. For organic manures it is generally true & there is still room for many to improve. As with bagged fertiliser - pesticides are only applied as and when necessary - and for the most part only at the recommended rates necessary to be effective - too expensive to waste!"

"Good farmers and bad farmers!"

"The loss of topsoil is due to physical effects type and timing of cultivation, not the application of fert or pesticide. This is issue is complex, because some spraying off may increase run-off if it leaves the ground bare in high rain events. Inefficient fert handling and application does lose the farmer money and contribute to runoff, but does not appear to stimulate topsoil loss."

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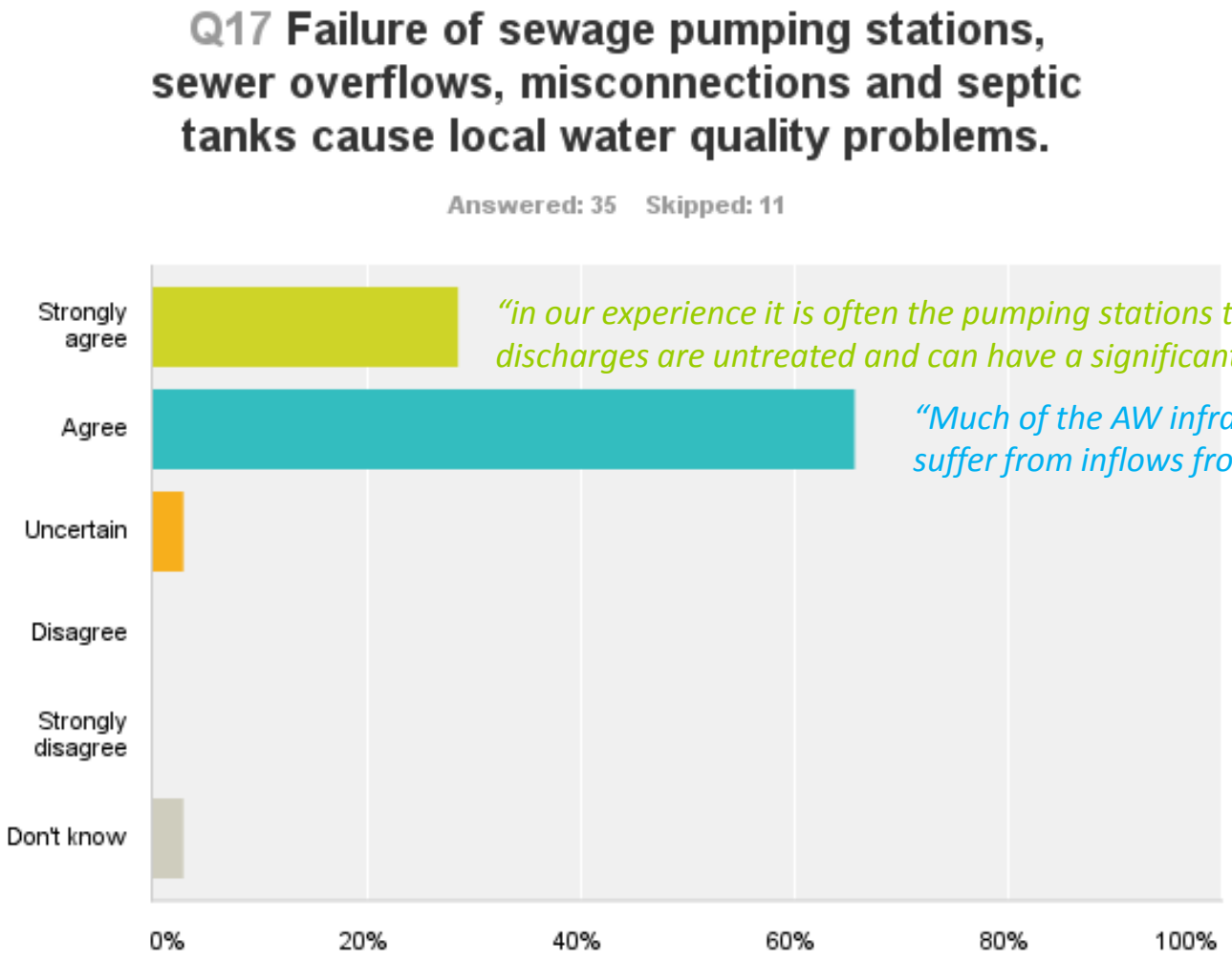

"in our experience it is often the pumping stations that pose the most risk as any discharges are untreated and can have a significant impact locally."

"Much of the AW infrastructure is old and does suffer from inflows from high groundwater levels"

Q17. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Confirmed pollution incidents available on 'What's in my back yard?' on EA website.
- Local complaints are also recorded.
- CEH study - septics.
- Water company reports.
- Some pollution incidents are entirely natural.
- Some overflows are consented.
- Some pollution incidents have had biological and chemical monitoring.

How adequate/credible/understood/agreed is this evidence?

- Can't infer impacts from EA website data.
- Lack of evidence on contribution from septics/misconnects.
- Evidence may become less reliable in future because of cutbacks to sampling.
- There is more self monitoring now, so this results in more uncertainty.
- Sewage Treatment Works telemetry issues.

Is there additional evidence we should consider using?

- Safe set back distances – septic tanks - CEH study.

What more is needed to build a shared view of the issue?

- All evidence should be pulled together e.g. EA could produce a pollution report for each catchment.

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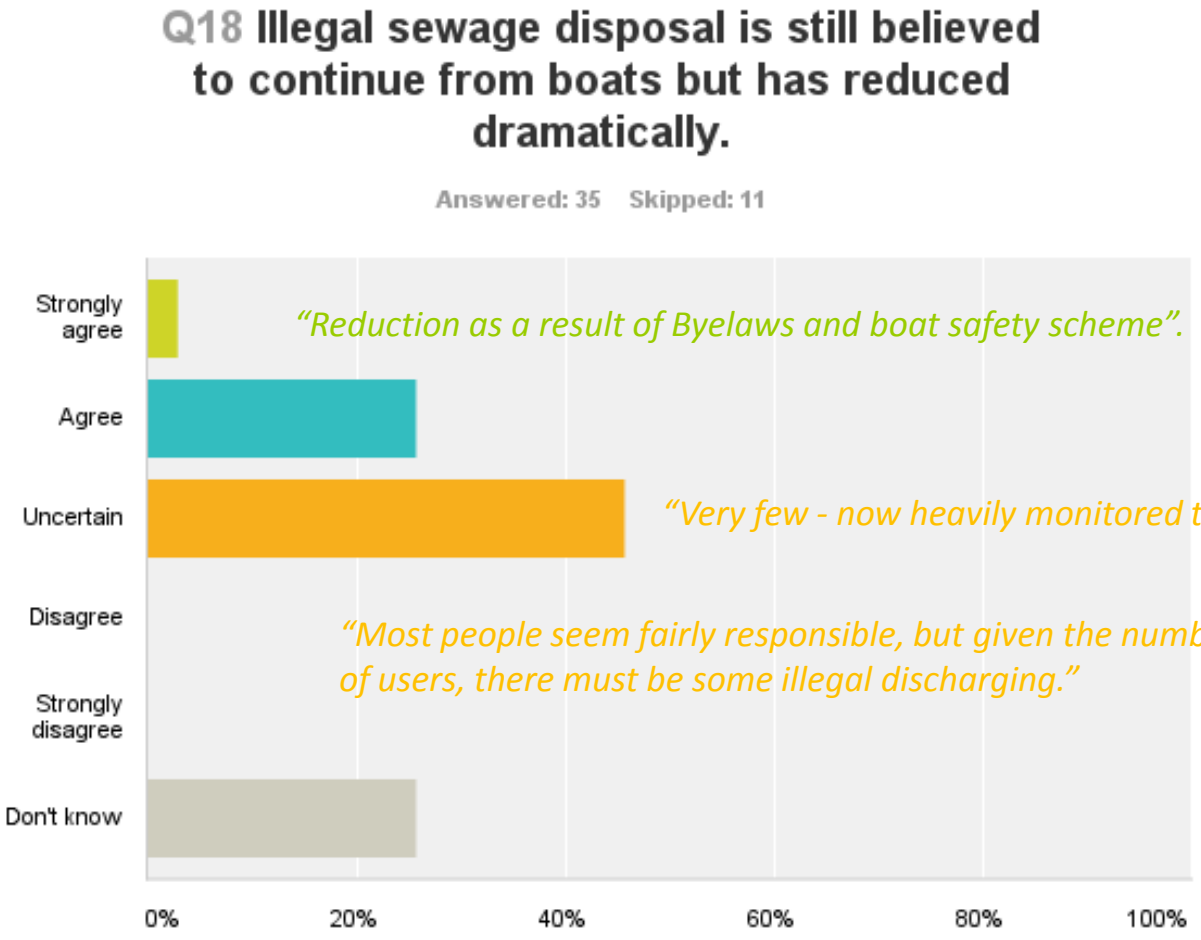


"Reduction as a result of Byelaws and boat safety scheme".

"Very few - now heavily monitored through Broads Authority"

"Most people seem fairly responsible, but given the number of users, there must be some illegal discharging."

Q18. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Environment Agency reports.
- Academic research
- Hearsay, personal reports to Broads Authority.

How adequate/credible/understood/agreed is this evidence?

- Agreeing that pollution has since 1960s but no evidence of recent reduction.
- Not very well understood and no way of finding out.
- Byelaw is unenforceable.
- No control/regulation of boats with regards to sewage containment.

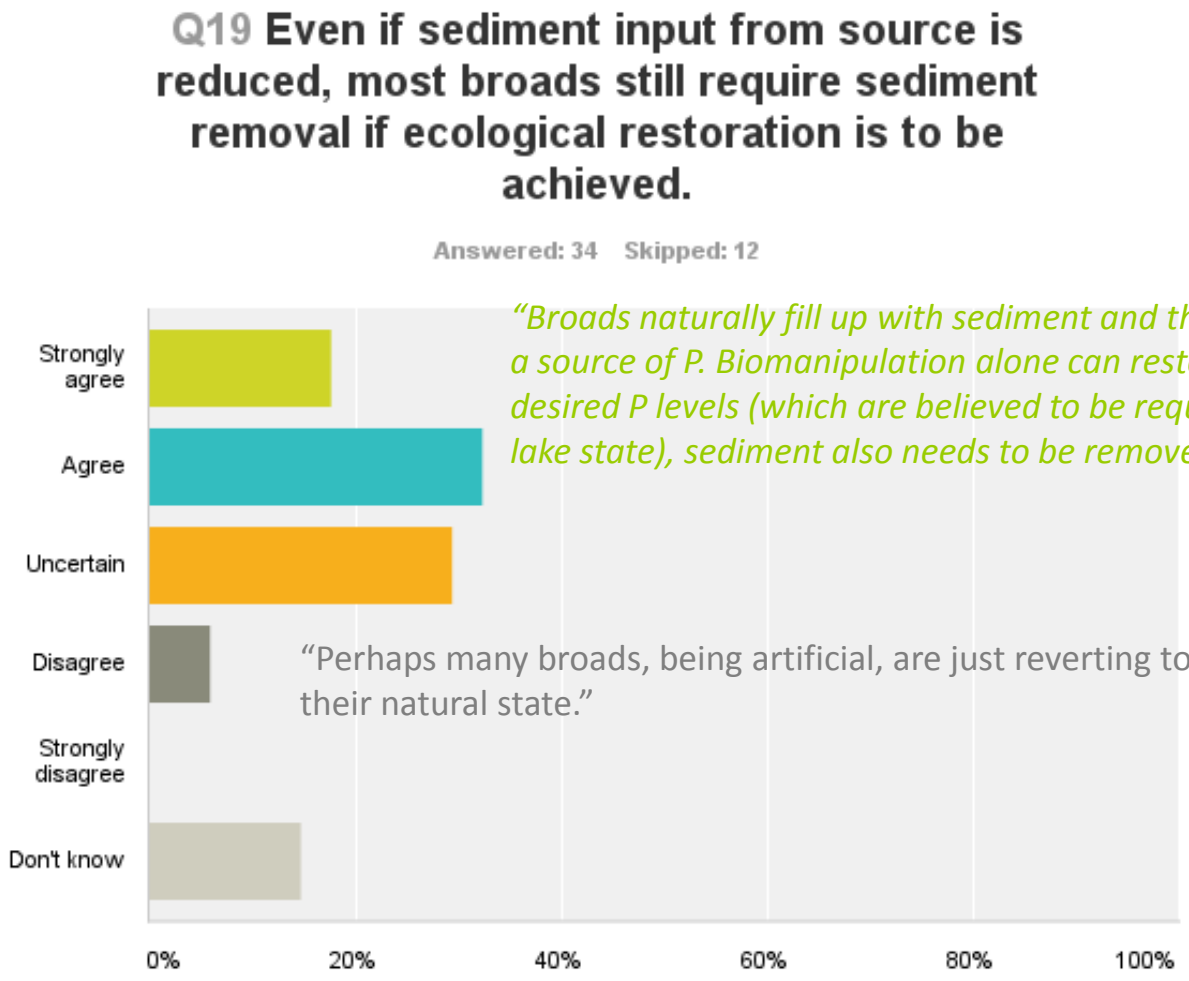
Is there additional evidence we should consider using?

- MSc research project on the impact of sewage from houseboats concluded no impact from the sewage due to dilution from the river (Yare at Thorpe St Andrew).
- More monitoring data by Broads Authority survey.

What more is needed to build a shared view of the issue?

- Better monitoring of boats' sewage containment systems and monitoring of pumped out sewage.

Broadland Catchment Partnership



"Broads naturally fill up with sediment and this sediment is likely to be a source of P. Biomanipulation alone can restore Broads but to achieve desired P levels (which are believed to be required to achieve a stable lake state), sediment also needs to be removed."

"Perhaps many broads, being artificial, are just reverting to their natural state."

Q19. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Sediment management strategy.
- Lake restoration strategy.
- In-lake phosphorus-budgeting.
- Water quality monitoring.
- Evidence of successful lake restoration – e.g Cockshoot Broad.

How adequate/credible/understood/agreed is this evidence?

- Most small broads do not require sediment removal, but large areas do (8 large broads).

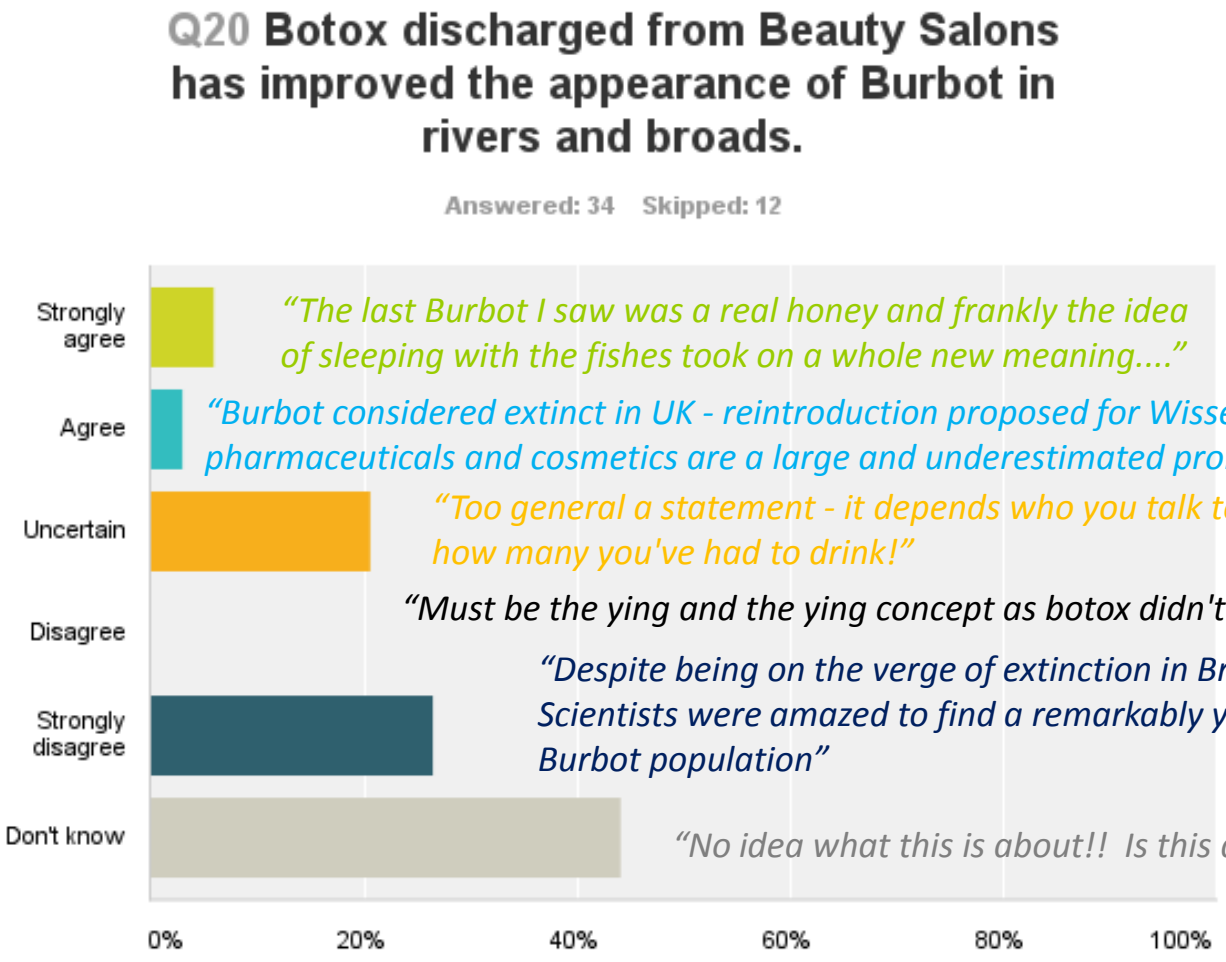
Is there additional evidence we should consider using?

- Review of all evidence required

What more is needed to build a shared view of the issue?

- Promoting multiple benefits of restoring the 8 large broads.

Broadland Catchment Partnership



"The last Burbot I saw was a real honey and frankly the idea of sleeping with the fishes took on a whole new meaning...."

"Burbot considered extinct in UK - reintroduction proposed for Wissey catchment. But the point that pharmaceuticals and cosmetics are a large and underestimated problem for water quality is a good one".

"Too general a statement - it depends who you talk to and how many you've had to drink!"

"Must be the ying and the ying concept as botox didn't improve my wife's appearance...".

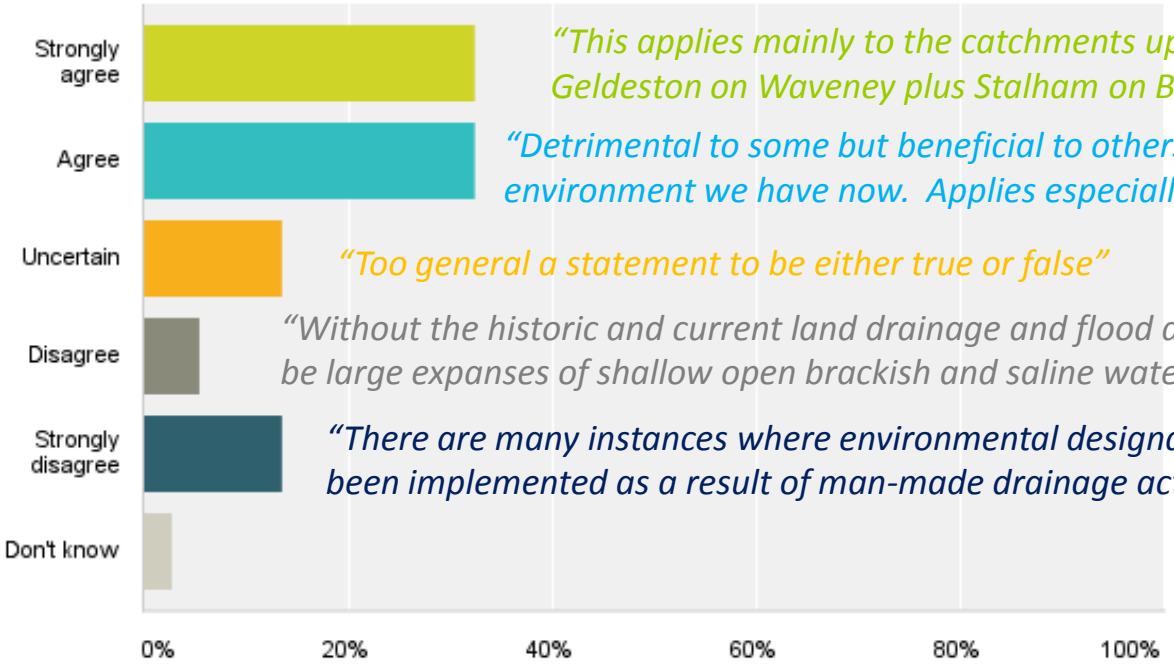
"Despite being on the verge of extinction in British waters, Scientists were amazed to find a remarkably young looking Burbot population"

"No idea what this is about!! Is this a trick question?"

Broadland Catchment Partnership

Q21 Modification of rivers has occurred as a result of historic land drainage, flood defence, and milling activity and this has had a detrimental affect on animal and plant communities.

Answered: 37 Skipped: 9



"This applies mainly to the catchments upstream of Norwich and Geldeston on Waveney plus Stalham on Bure"

"Detrimental to some but beneficial to others. It has led to the landscape and environment we have now. Applies especially in the tidal Broads."

"Too general a statement to be either true or false"

"Without the historic and current land drainage and flood defence activities the Broads would be large expanses of shallow open brackish and saline water with a different biodiversity."

"There are many instances where environmental designations have been implemented as a result of man-made drainage activity."

Q21. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Environment Agency River Corridor Surveys and River Habitat Surveys
- Water authority/NRA/EA fish survey long term fish surveys.
- Suffolk Wildlife Trust and Norfolk Wildlife Trust walkover surveys
- Environment Agency assessment of river impoundments

How adequate/credible/understood/agreed is this evidence?

- Evidence exists but also some beneficial effects so can be value judgements.

Is there additional evidence we should consider using?

- Fen habitat evidence.
- NFU numbers for stock/crops/irrigation etc.
- Broads ESA baseline.

What more is needed to build a shared view of the issue?

- Important to not that this had a beneficial impact for some species that prefer ponded water and also beneficial for farming and livestock.
- Understanding past/history re engagement, designations, mills etc.
- Understanding of concepts/historical landscape changes and historical built environment - retention/rich cultural heritage - balance. Questions about what point in history going back to.

Broadland Catchment Partnership

Q22 Rivers have been disconnected from their floodplain and the flood storage capacity of the catchment has been greatly reduced.

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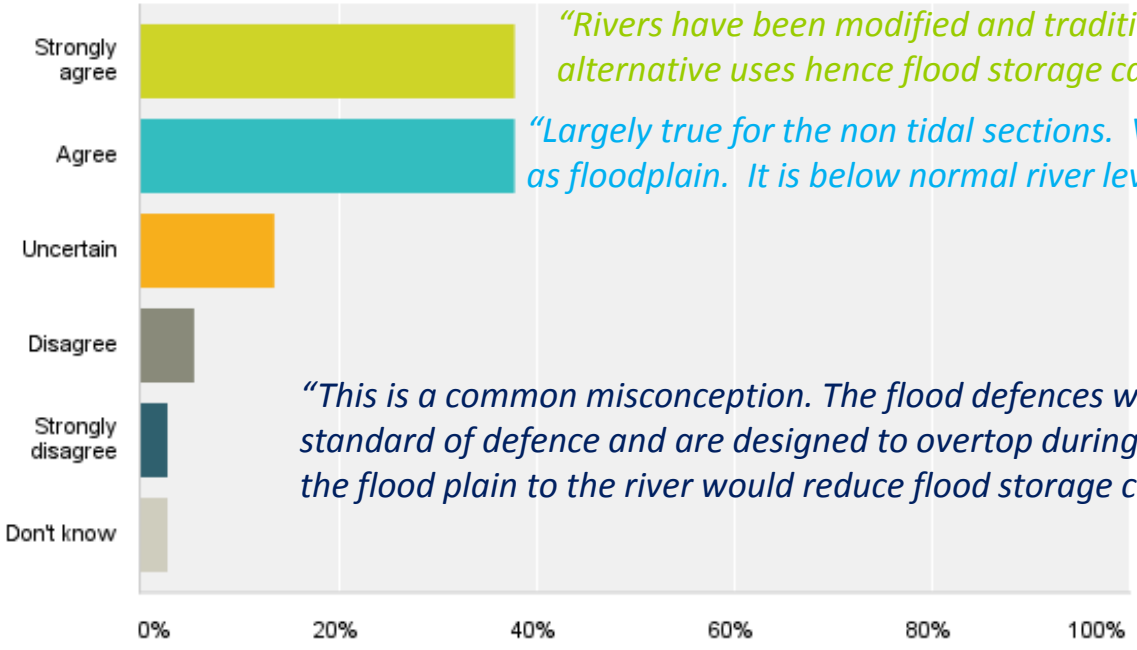

"Rivers have been modified and traditional floodplains used for alternative uses hence flood storage capacity has changed".

"Largely true for the non tidal sections. Very misleading to describe tidal broadland as floodplain. It is below normal river level and if flooded, stays flooded."

"This is a common misconception. The flood defences within the Broads have a relatively low standard of defence and are designed to overtop during surge tide events. Direct connection of the flood plain to the river would reduce flood storage capacity within the Broads catchment."

Q22. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Environment Agency River Corridor Surveys and River Habitat Surveys
- Environment Agency flood risk mapping data (zones 1, 2, 3)
- Increase in duration and magnitude of fluvial (river) flood events

How adequate/credible/understood/agreed is this evidence?

- Clarity needed regarding the lower catchment at or below sea level and the upper catchment

Is there additional evidence we should consider using?

- Recharge of aquifers/bore holes.

What more is needed to build a shared view of the issue?

- Discuss ways of financially rewarding landowners for retaining and storing water on their land and promote the multiple benefits including improved wildlife habitat and water quality.

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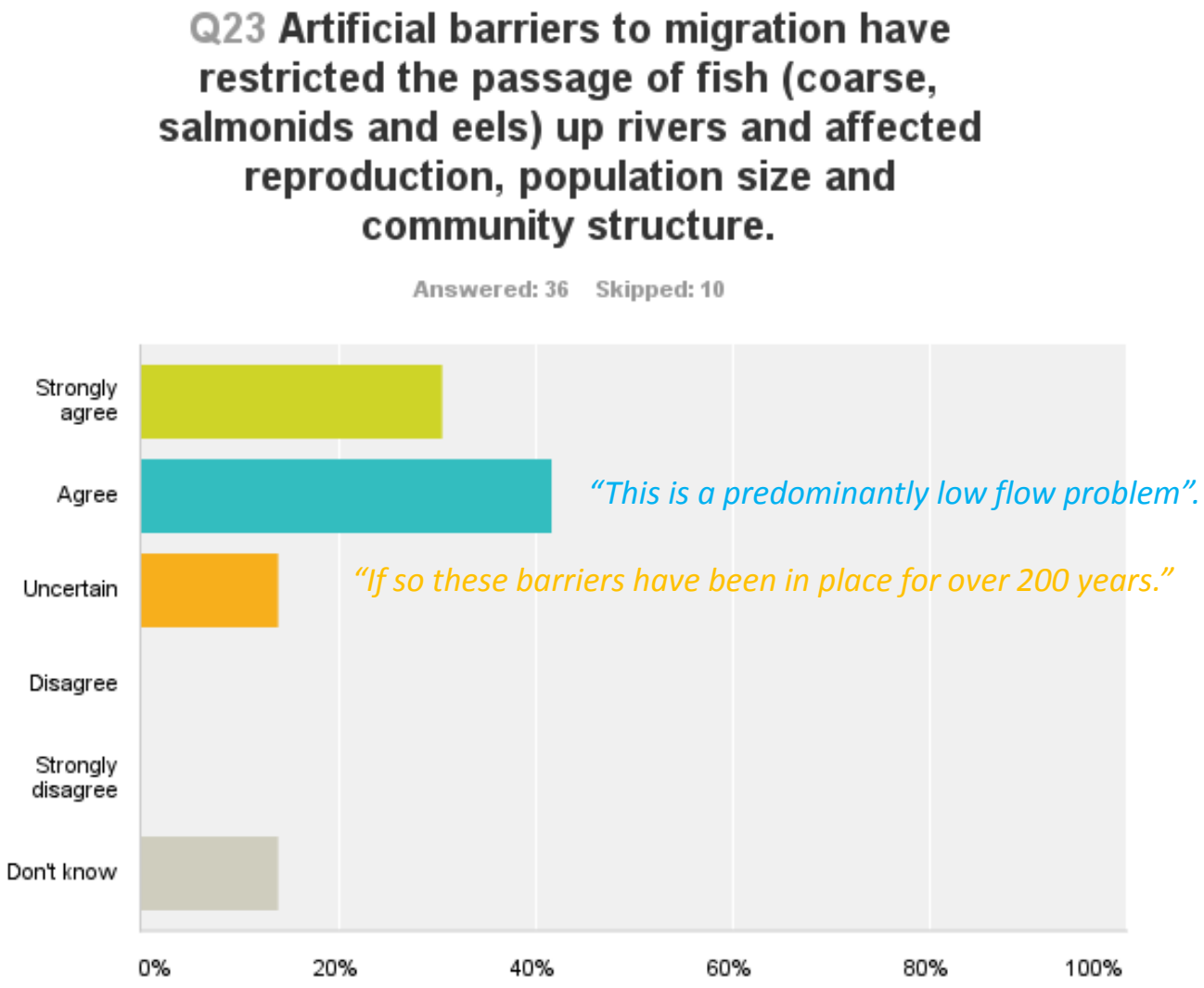


"This is a predominantly low flow problem".

"If so these barriers have been in place for over 200 years."

Q23. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Quantified data from Environment Agency fishery surveys (upstream and downstream), pre/post barrier removal/by-pass.
- Spawning success and redd counts during high and low flow years

How adequate/credible/understood/agreed is this evidence?

- Need to be clear about other factors affecting survival e.g. eels spawn in Sargasso sea and also able to move over land.

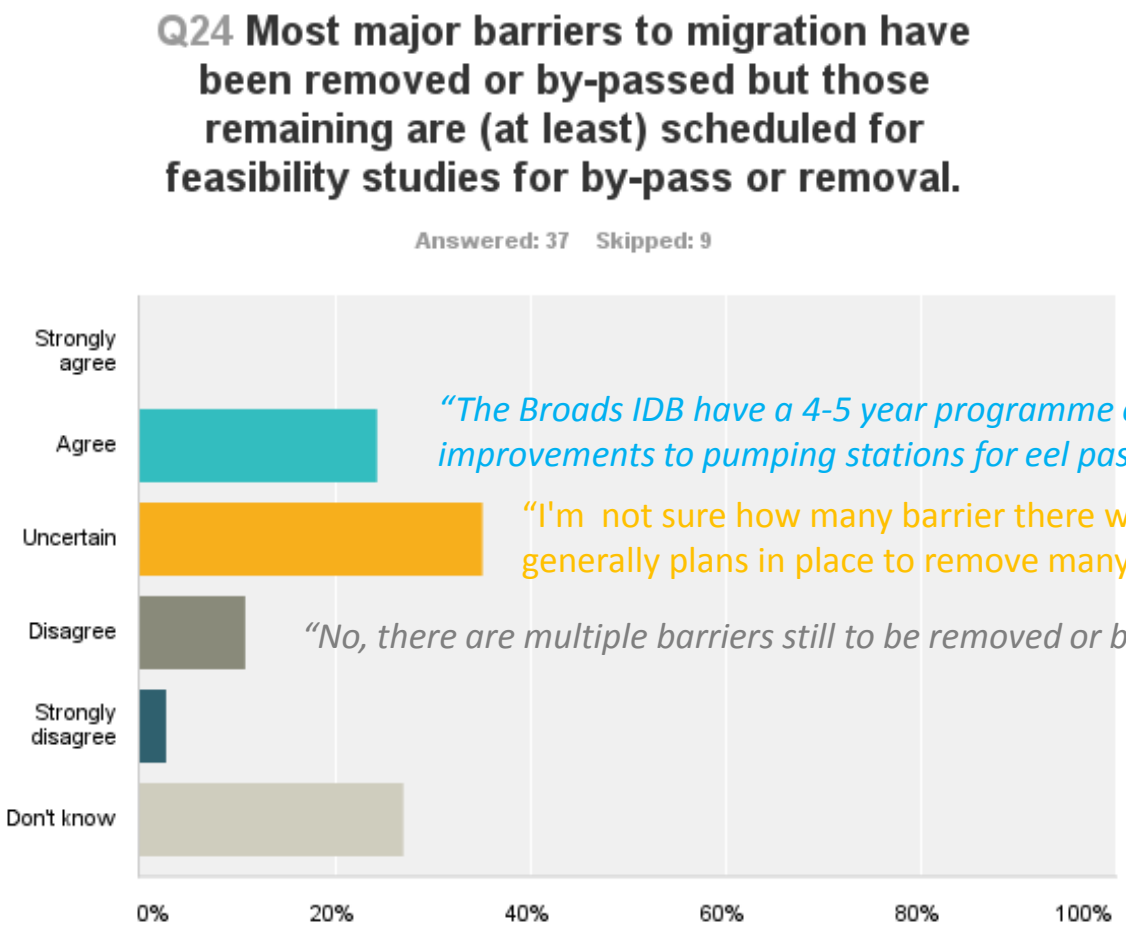
Is there additional evidence we should consider using?

- Given the length of time that many barriers have been in place it's difficult to predict what would have been present before they were in place and not always realistic to try and achieve this.
- River Restoration Centre have some good case studies and monitoring data for similar schemes

What more is needed to build a shared view of the issue?

- Case studies of good news stories

Broadland Catchment Partnership



"The Broads IDB have a 4-5 year programme of improvements to pumping stations for eel passes."

"I'm not sure how many barrier there were historically but I agree that there are generally plans in place to remove many of those that remain."

"No, there are multiple barriers still to be removed or bypassed"

Q24. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- EA spreadsheet of all barriers and assessment of ability of fish to pass.

How adequate/credible/understood/agreed is this evidence?

- Not widely known – mostly don't know or uncertain responses from stakeholders

Is there additional evidence we should consider using?

- Cost – fish by-pass is often very expensive. The Environment Agency will undertake a cost-effectiveness exercise on all potential measures by December 2013

What more is needed to build a shared view of the issue?

- Publicising any potential schemes more and using case studies of successful schemes in the catchment. Promoting multiple benefits including for canoeing where appropriate but also taking historic context and landscape into consideration before any barrier removal.

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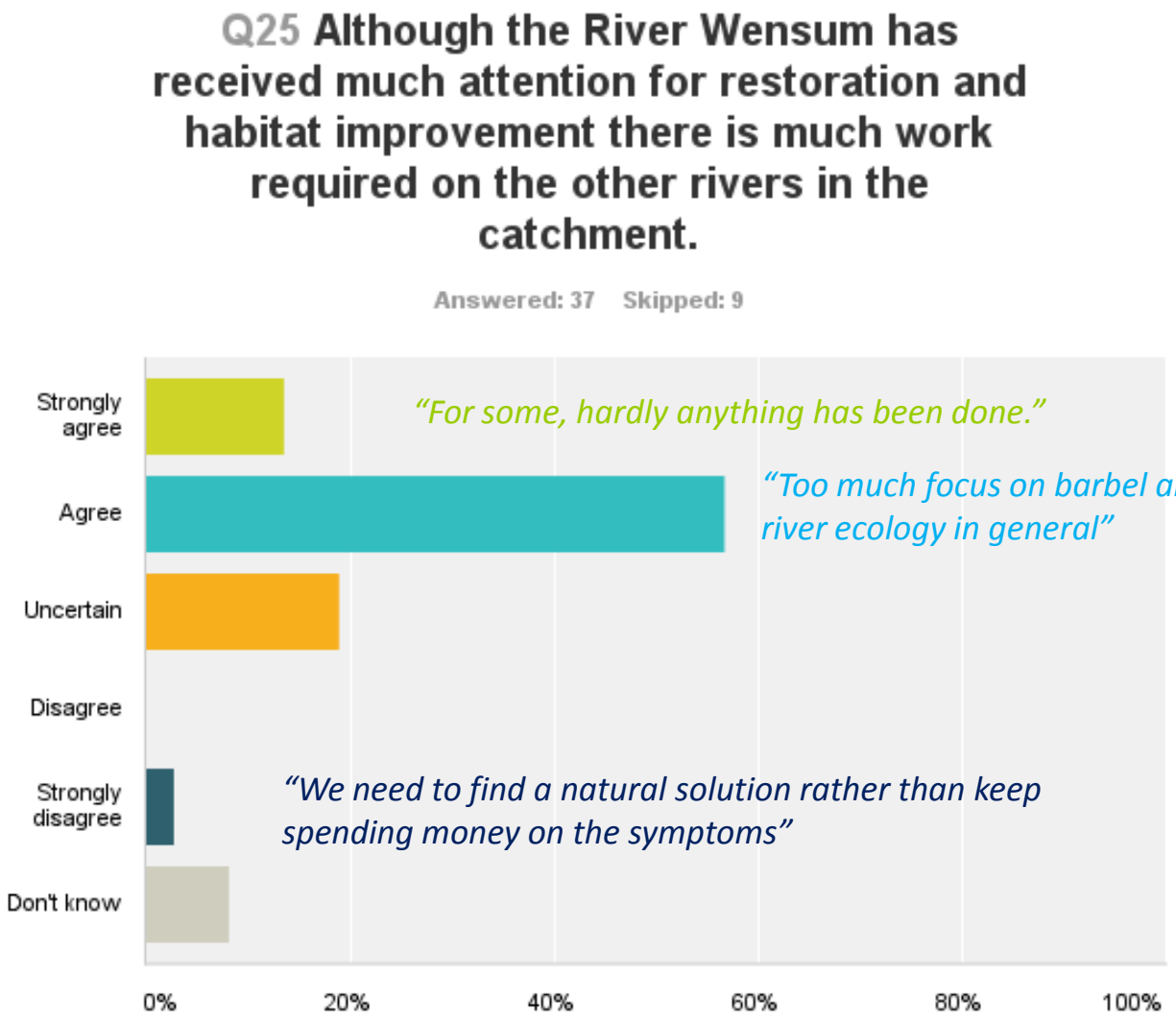

"For some, hardly anything has been done."

"Too much focus on barbel and trout fisheries and not on river ecology in general"

"We need to find a natural solution rather than keep spending money on the symptoms"

Q25. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- River Wensum Restoration Strategy.
- The fact that other rivers don't have designations!
- Environment Agency River Corridor Surveys and River Habitat Surveys
- Wildlife Trust Walkover Surveys

How adequate/credible/understood/agreed is this evidence?

- Pretty obvious

Is there additional evidence we should consider using?

- Cost – fish by-pass is often very expensive. The Environment Agency will undertake a cost-effectiveness exercise on all potential measures by December 2013

What more is needed to build a shared view of the issue?

- Publicising any potential schemes more and using case studies of successful schemes in the catchment. Promoting multiple benefits including for canoeing where appropriate but also taking historic context and landscape into consideration before any barrier removal.

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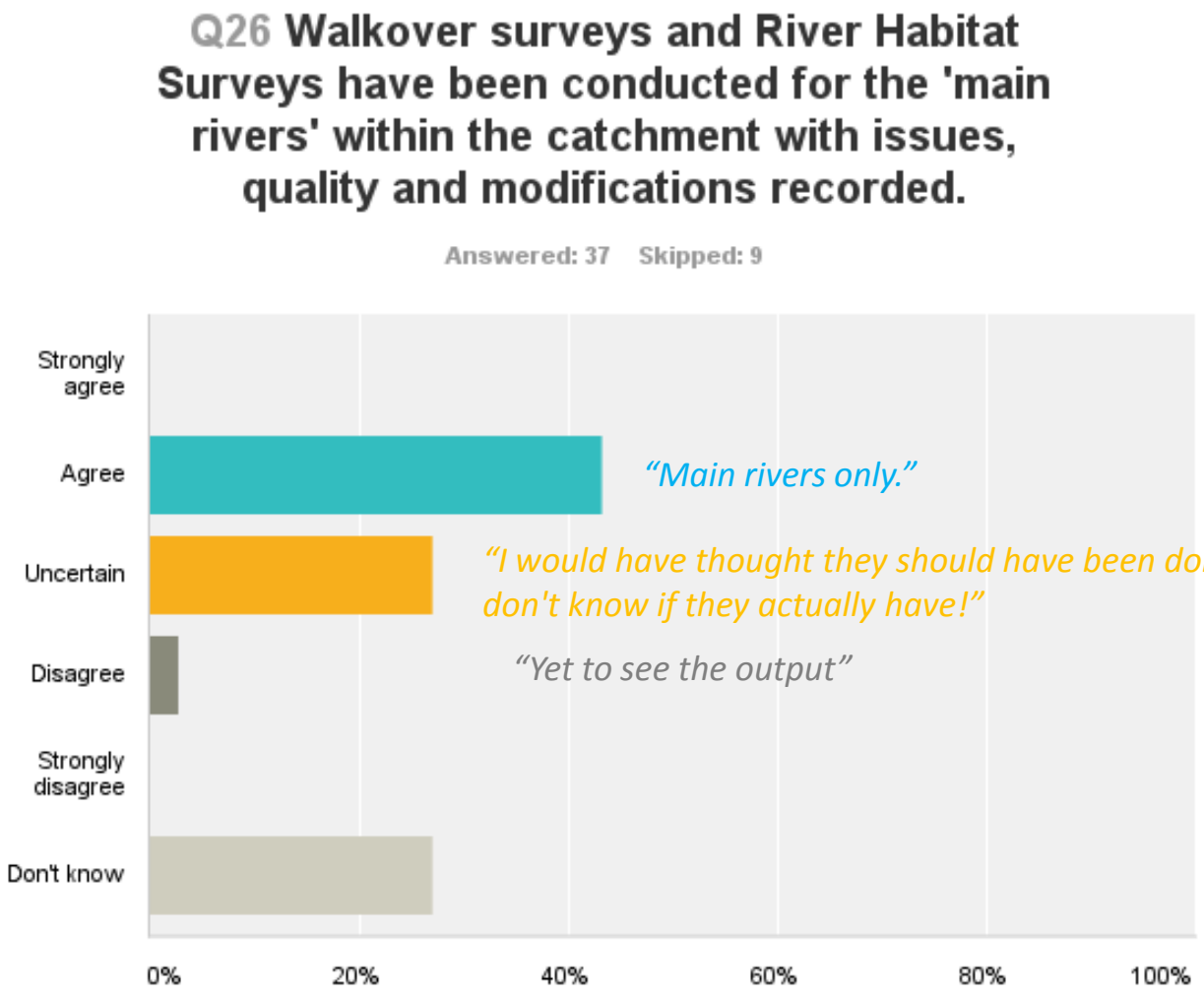

"Main rivers only."

"I would have thought they should have been done but I don't know if they actually have!"

"Yet to see the output"

Q26. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Environment Agency River Corridor Surveys and River Habitat Surveys
- Walkover Surveys by Suffolk Wildlife Trust and Norfolk Wildlife Trust

How adequate/credible/understood/agreed is this evidence?

- Credible but not currently shared
- Also only applies to main rivers

Is there additional evidence we should consider using?

- Older River Corridor Surveys are useful but many not digitised

What more is needed to build a shared view of the issue?

- Surveys of smaller tributaries and headwaters, moving away from river and into wider catchment. Use of aerial photography and remote sensing

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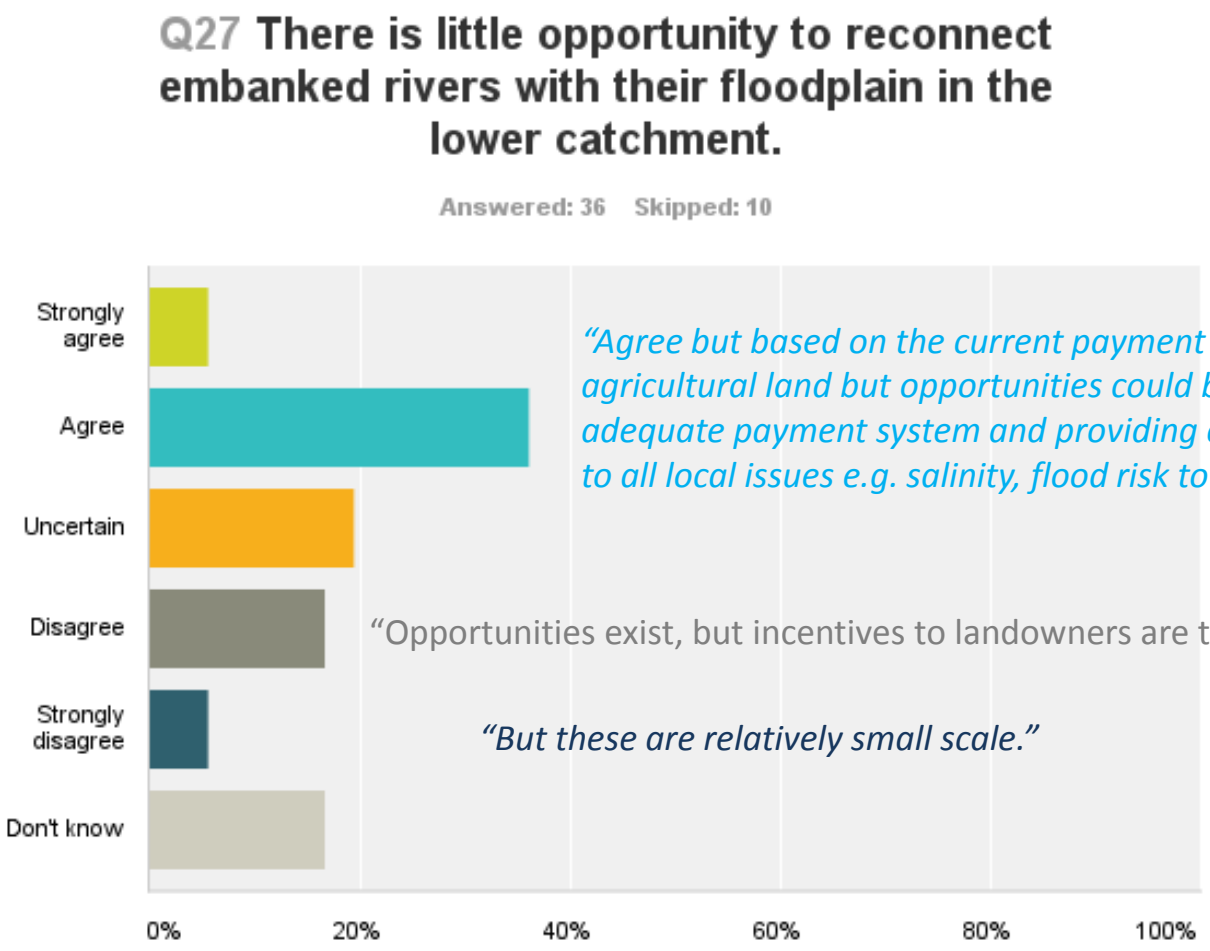


"Agree but based on the current payment options for agricultural land but opportunities could be available with adequate payment system and providing consideration given to all local issues e.g. salinity, flood risk to properties"

"Opportunities exist, but incentives to landowners are the limiting factor."

"But these are relatively small scale."

Q27. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Flooding risk to farm land and profitability
- Flooding risk to properties in floodplain
- Salinity a known risk to freshwater communities

How adequate/credible/understood/agreed is this evidence?

- Well known and not contested – lower catchment is heavily modified.

Is there additional evidence we should consider using?

- Flood risk maps, elevation maps to visually demonstrate

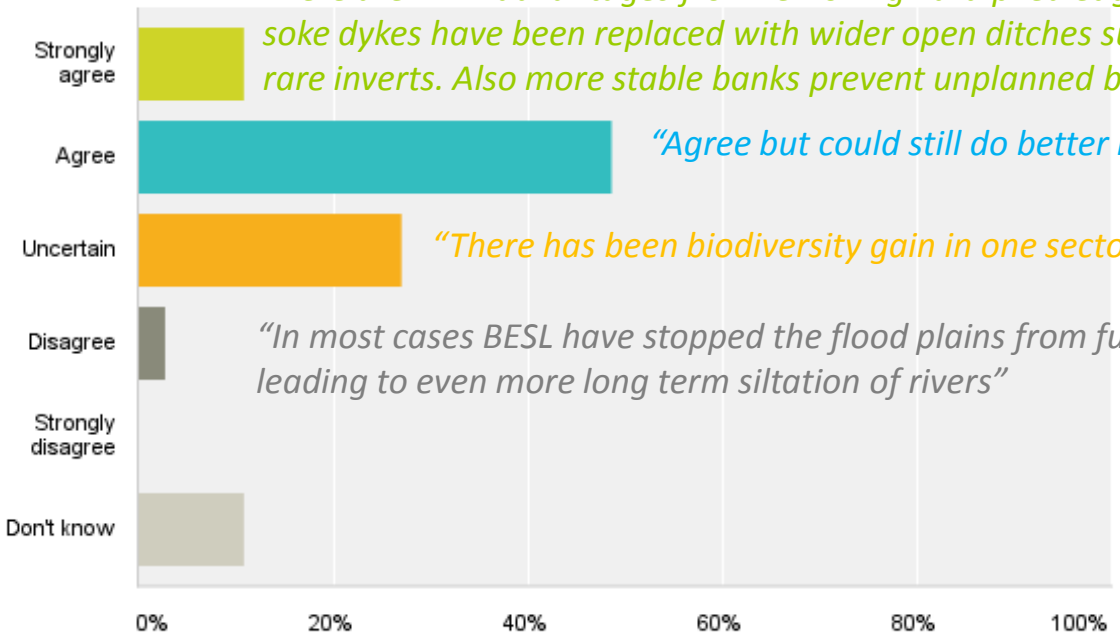
What more is needed to build a shared view of the issue?

- Better communication of restricting factors – often at or below sea level.

Broadland Catchment Partnership

Q28 Improvements to habitats have occurred as a result of the Broadland Flood Alleviation Project where setting back of floodbanks, wide soke dykes and increased reed ronds have been used.

Answered: 37 Skipped: 9



There are WFD advantages from removing hard piled edges and creating softer reeded fringes. Choked soke dykes have been replaced with wider open ditches supporting waterfowl and water voles plus rare inverts. Also more stable banks prevent unplanned breach and saltwater inundation.

"Agree but could still do better in places."

"There has been biodiversity gain in one sector at the expense of another"

"In most cases BESL have stopped the flood plains from functioning leading to even more long term siltation of rivers"

Broadland Catchment Partnership

Q29 Flooding and wetting of meadows in river valleys has occurred through agri-environment schemes but there are many further opportunities in the middle and upper catchment.

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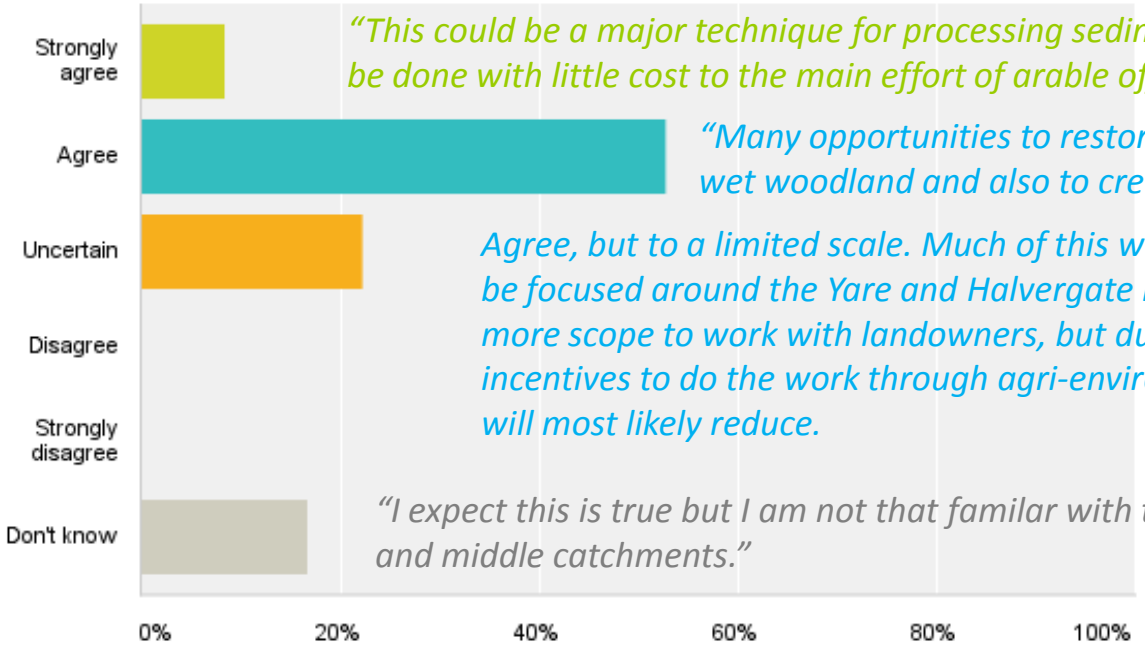

"This could be a major technique for processing sediment and nutrients, and could be done with little cost to the main effort of arable off the floodplain"

"Many opportunities to restore old water meadows and wet woodland and also to create constructed wetlands"

Agree, but to a limited scale. Much of this work appears to be focused around the Yare and Halvergate Marshes. Lots more scope to work with landowners, but due to CAP reform incentives to do the work through agri-environment schemes will most likely reduce.

"I expect this is true but I am not that familar with the upper and middle catchments."

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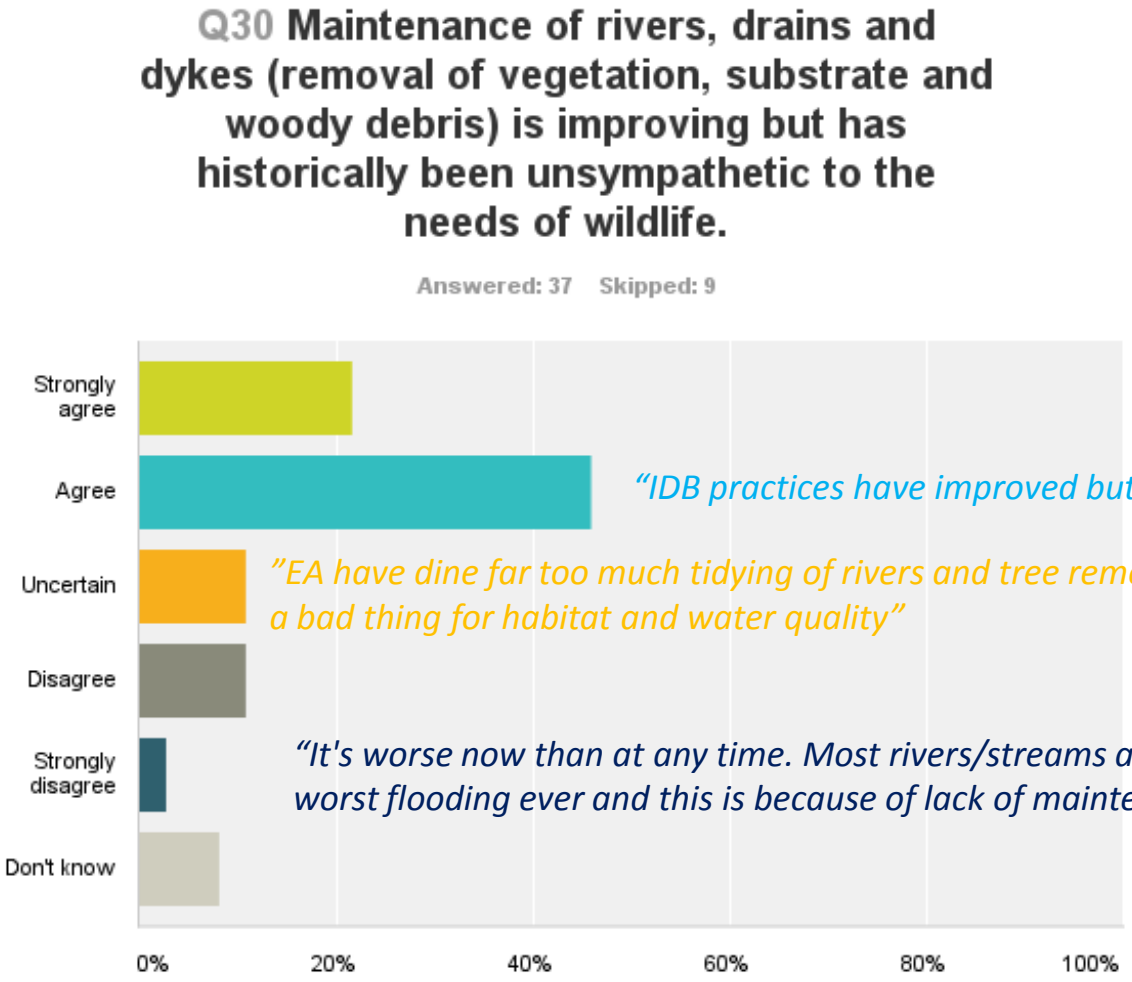

"IDB practices have improved but have further to go."

"EA have dine far too much tidying of rivers and tree removal (dead and alive) is a bad thing for habitat and water quality"

"It's worse now than at any time. Most rivers/streams are experiencing the worst flooding ever and this is because of lack of maintenance"

Q. 30 Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- HLS prescriptions.
- Link of fish to inverts, morphology. EA, WFD investigations and walkovers.
- Actual restoration projects - pre and post monitoring.
- Available monitoring reports e.g. DTC.
- Landowner knowledge.
- County council section 19 requests - flood investigation reports.

How adequate/credible/understood/agreed is this evidence?

- Scattered, anecdotal.
- Not gathered at catchment scale, mostly site specific for drains and ditches.
- Better understood in main rivers with available data.

Is there additional evidence we should consider using?

- Walkover surveys into smaller drains.
- Repeat of existing surveys - Broads grazing marsh drains.
- Learning from examples of others to improve wildlife habitat.

What more is needed to build a shared view of the issue?

- Catchment working but also individuals flexing roles to work together.
- Stop individual conflict of interest.
- Sharing of data and best practice between interested parties. Engage with landowners. Are they aware of ecological need. Education an issue.
- Build a base of trust with individuals involved e.g. landowners/business operating/managing water course.
- Environmental people - understand need for flow.

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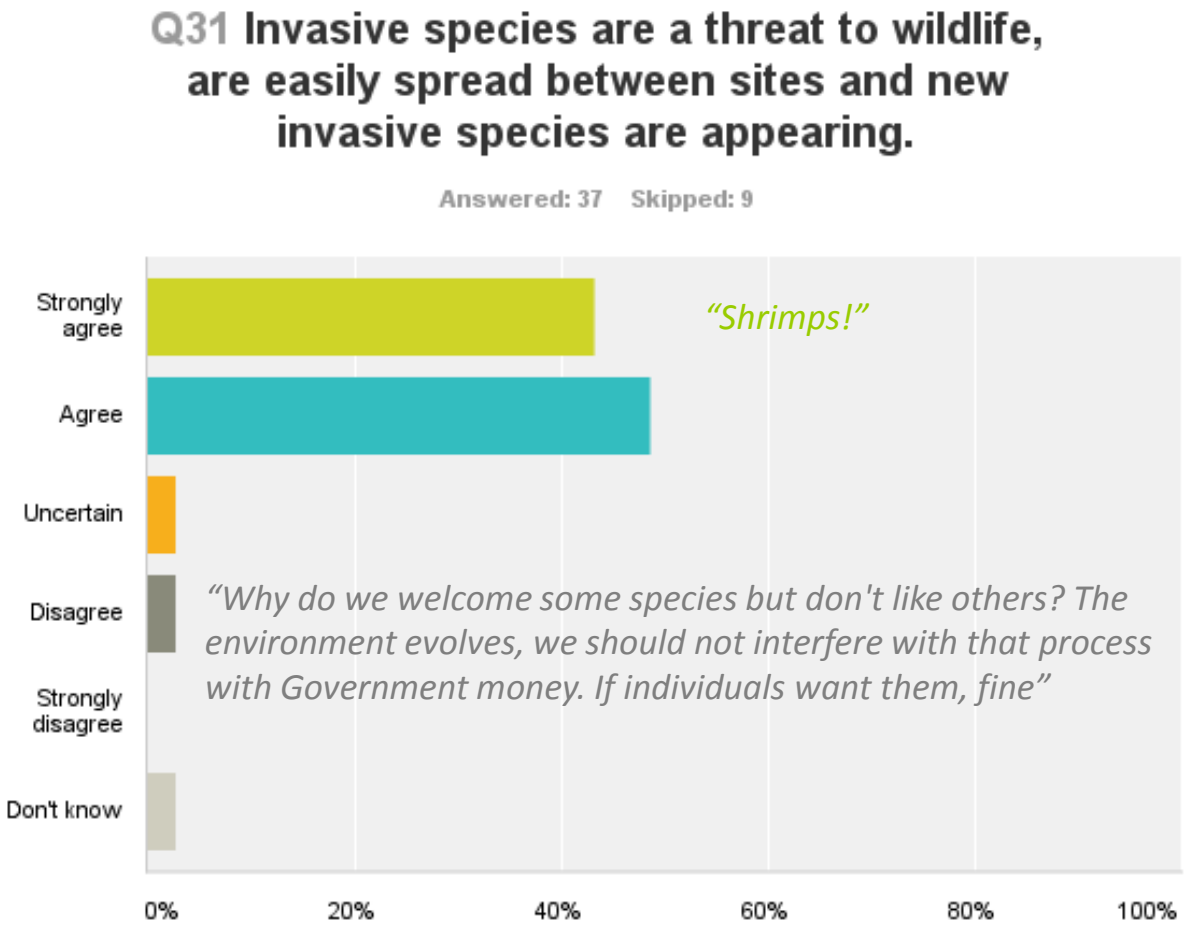


Q31. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Biological records.
- Observation records.
- NBIS centralised records.

How adequate/credible/understood/agreed is this evidence?

- Very credible.

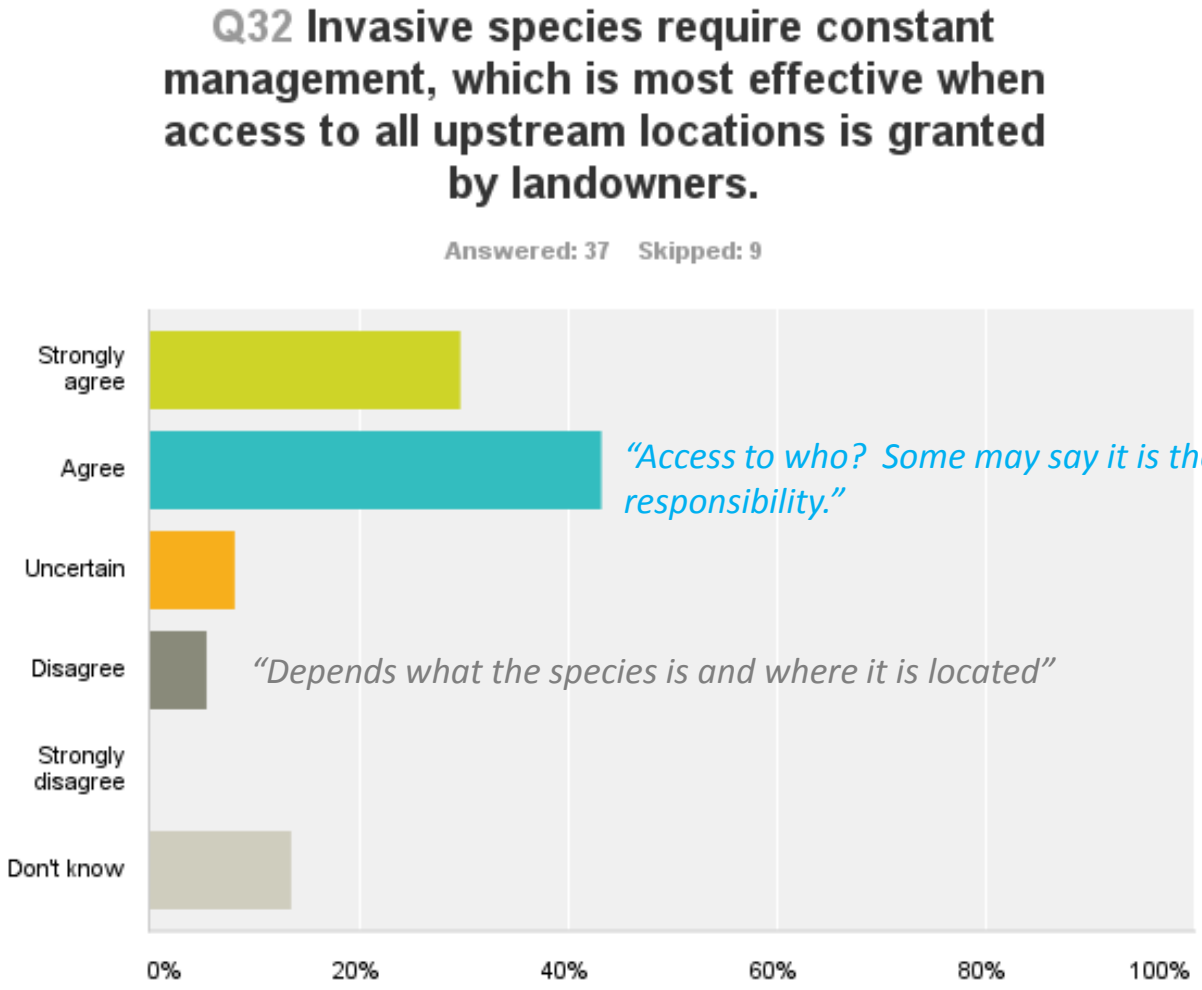
Is there additional evidence we should consider using?

- European evidence - horizon scanning.
- Increase reporting of biological records to central database.

What more is needed to build a shared view of the issue?

- Already shared view.

Broadland Catchment Partnership



"Access to who? Some may say it is the landowners responsibility."

"Depends what the species is and where it is located"

Q32. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Biological records.
- Observation records.
- NBIS centralised records

How adequate/credible/understood/agreed is this evidence?

- Species specific.
- Evidence understood in terms of river pathways.

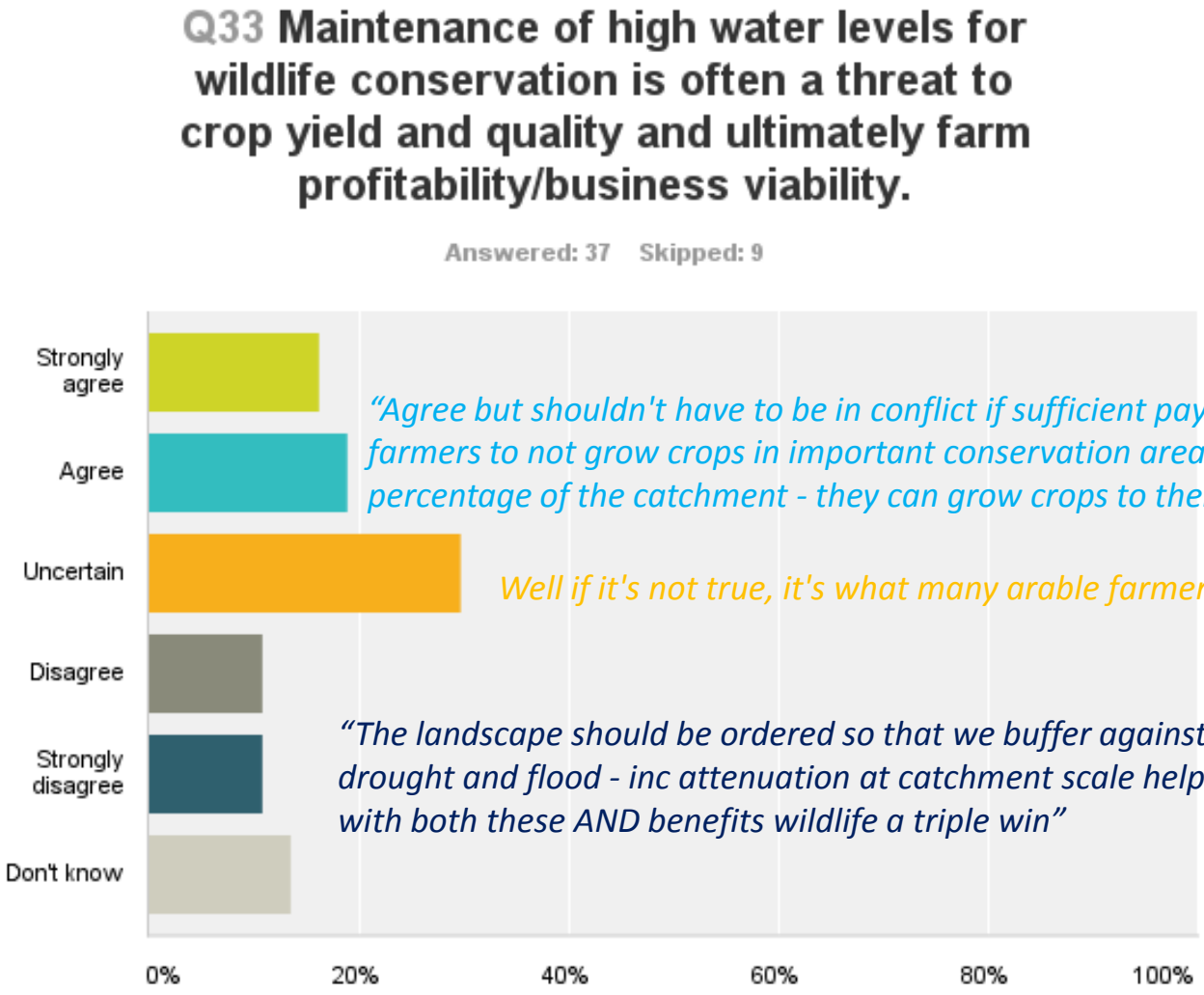
Is there additional evidence we should consider using?

- Present the economic case for impact of invasive species.

What more is needed to build a shared view of the issue?

- Already shared view.

Broadland Catchment Partnership



"Agree but shouldn't have to be in conflict if sufficient payments were available to incentivise farmers to not grow crops in important conservation areas, which are actually a small percentage of the catchment - they can grow crops to their hearts content in the rest!"

Well if it's not true, it's what many arable farmers think.

"The landscape should be ordered so that we buffer against drought and flood - inc attenuation at catchment scale helps with both these AND benefits wildlife a triple win"

Q33. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Farmers tell us this is the case. IDBs agree – IDBs receive pumping rates, farmers want to grow wheat.
- Basic agronomy.

How adequate/credible/understood/agreed is this evidence?

- Very (too) generic statement. Biased opinions?
- Very site specific to needs of land and wildlife.

Is there additional evidence we should consider using?

- Surveys? Data? Land use mapping?
- Trials of different crops/land use.

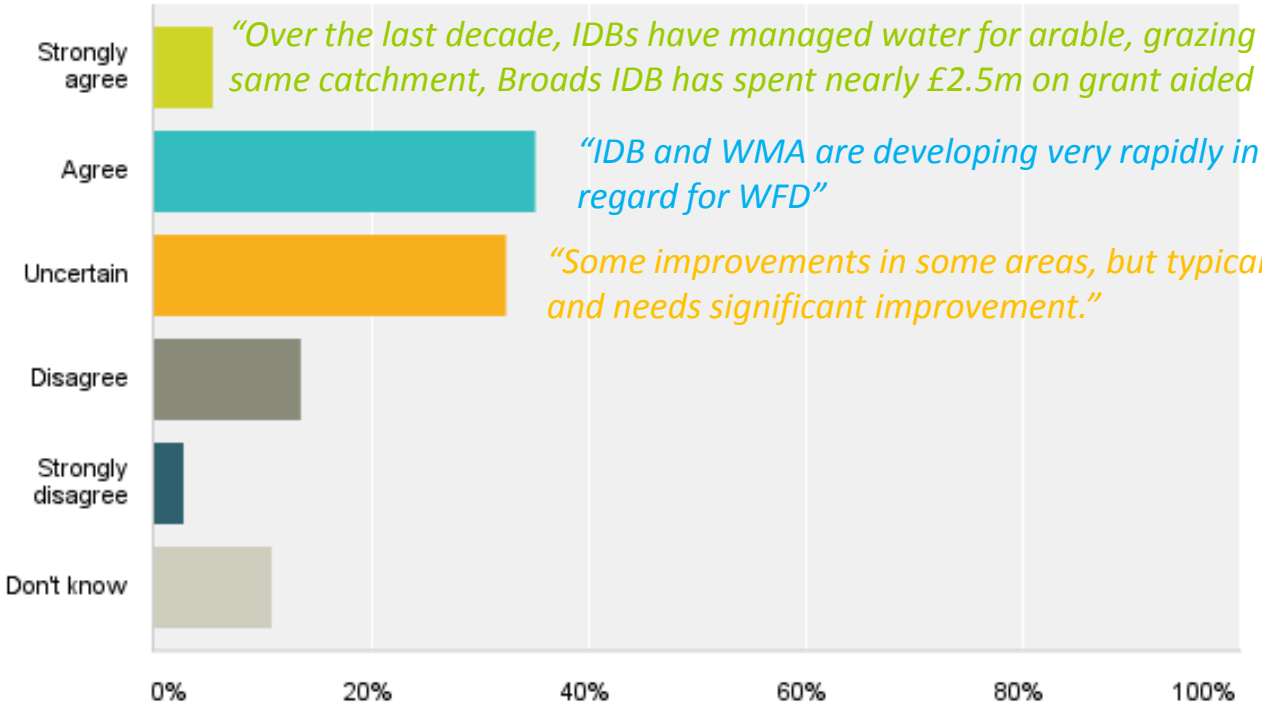
What more is needed to build a shared view of the issue?

- Catchment spatial mapping of water levels and land use requirement.

Broadland Catchment Partnership

Q34 Water level management by the Internal Drainage Boards is becoming more sympathetic and takes account of the needs of wildlife.

Answered: 37 Skipped: 9



"Over the last decade, IDBs have managed water for arable, grazing and conservation often within the same catchment, Broads IDB has spent nearly £2.5m on grant aided water management schemes"

"IDB and WMA are developing very rapidly in this area with regard for WFD"

"Some improvements in some areas, but typically limited and needs significant improvement."

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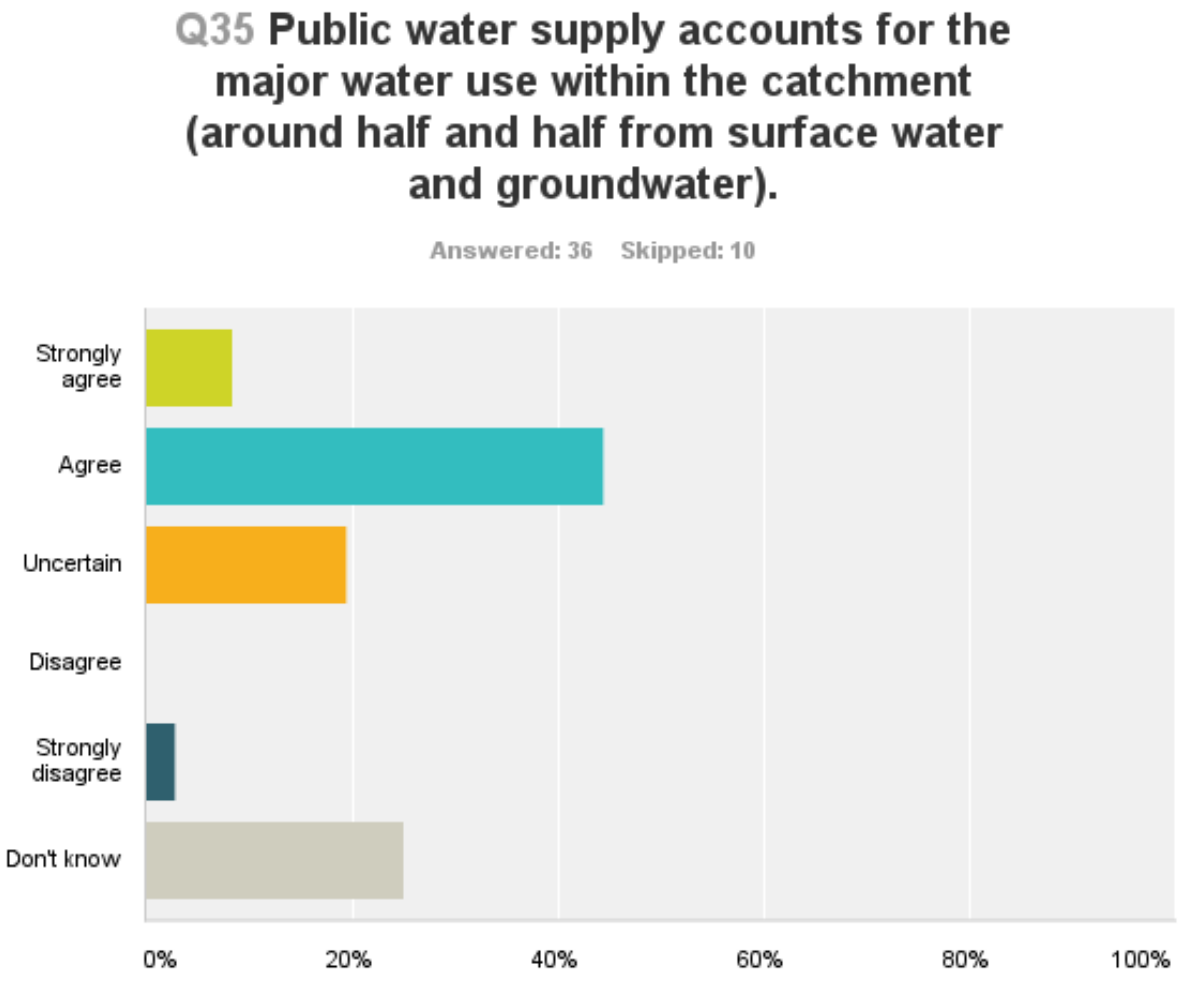

Broadland Catchment Partnership

Q36 A deficit in public water supply of greater than 10 million litres per day is forecast by 2040 (in the 'Norwich and the Broads Water Resource Zone') due to development, sustainability reductions and climate change predictions.

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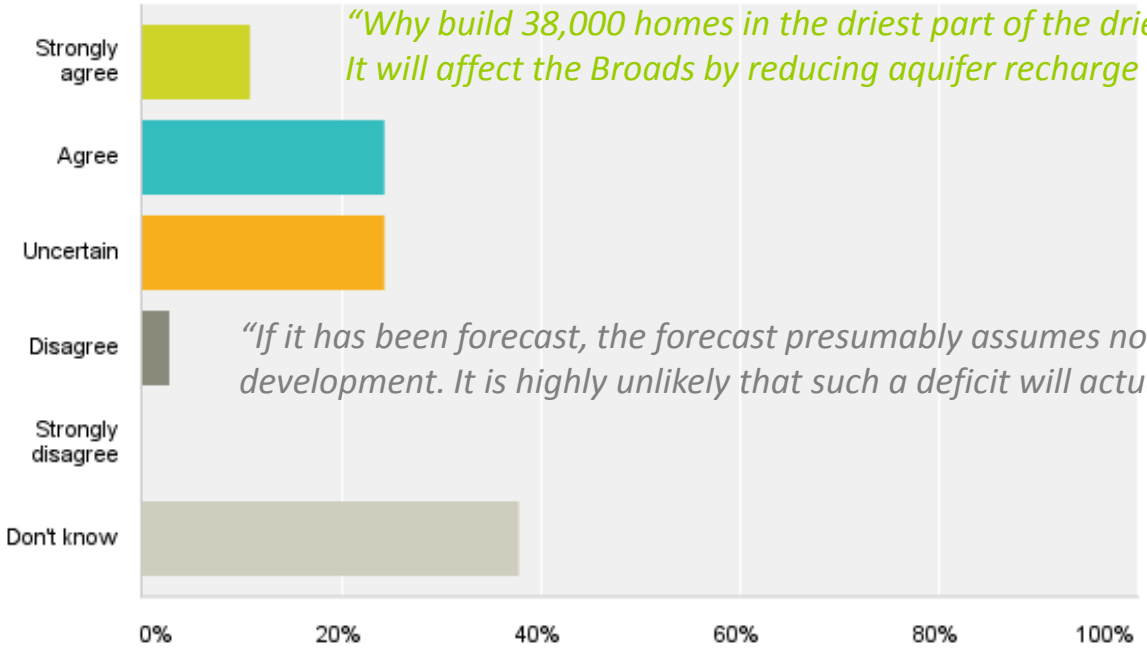

"Why build 38,000 homes in the driest part of the driest county? It will affect the Broads by reducing aquifer recharge

"If it has been forecast, the forecast presumably assumes no further resource development. It is highly unlikely that such a deficit will actually occur."

Q36. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Anglian Water and Environment Agency data on current demand, resource availability and Local Development Framework data on projected household development

How adequate/credible/understood/agreed is this evidence?

- Yes agree.
- Evidence not definitive (re climate change and sustainability).
- Good predicted use/consumption from AWS to forecast use.

Is there additional evidence we should consider using?

- Forecasting for future by better modelling.
- Better planning/building to reduce use such as rainwater harvesting.

What more is needed to build a shared view of the issue?

- Public engagement missing.
- Open transparent conversations and value of water.

Broadland Catchment Partnership

Q37 On a peak summer's day, more water is abstracted for agricultural irrigation than by all the water companies combined, with the demand concentrated in the driest years, in the driest catchments and when resources are most stressed.

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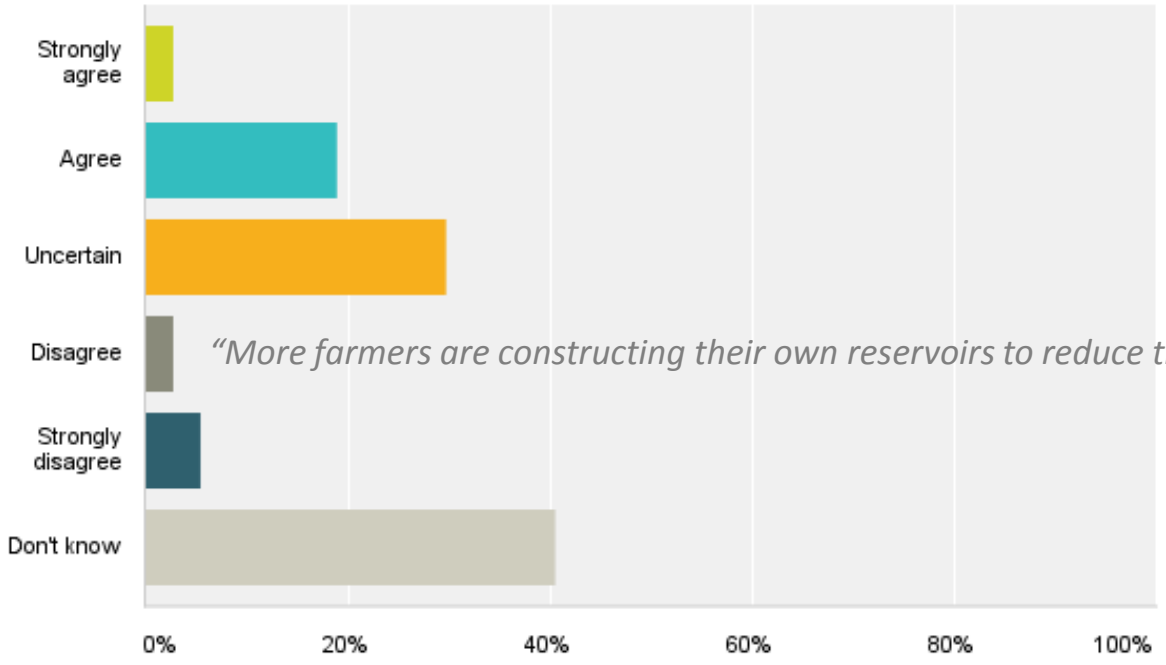

"More farmers are constructing their own reservoirs to reduce this need."

Q37. Comments of participants on this statement and the evidence base

What is the existing evidence base to support this statement?

- Environment Agency licensing data – Catchment Abstraction Management Strategy
- Environment Agency daily river flow monitoring

How adequate/credible/understood/agreed is this evidence?

- Evidence available does support this in some places.
- Actual abstraction vs licensed amount can vary.
- Fundamentally evidence is there i.e. abstraction rates returns/water companies licensed rates.

Is there additional evidence we should consider using?

- Analysis of evidence - what is abstraction for public supply/agricultural irrigation and how do they compare?

What more is needed to build a shared view of the issue?

- Acceptance of and better communication that highest demand from all sources often occurs at times of lowest availability and working together for solutions with multiple benefits to resolve this

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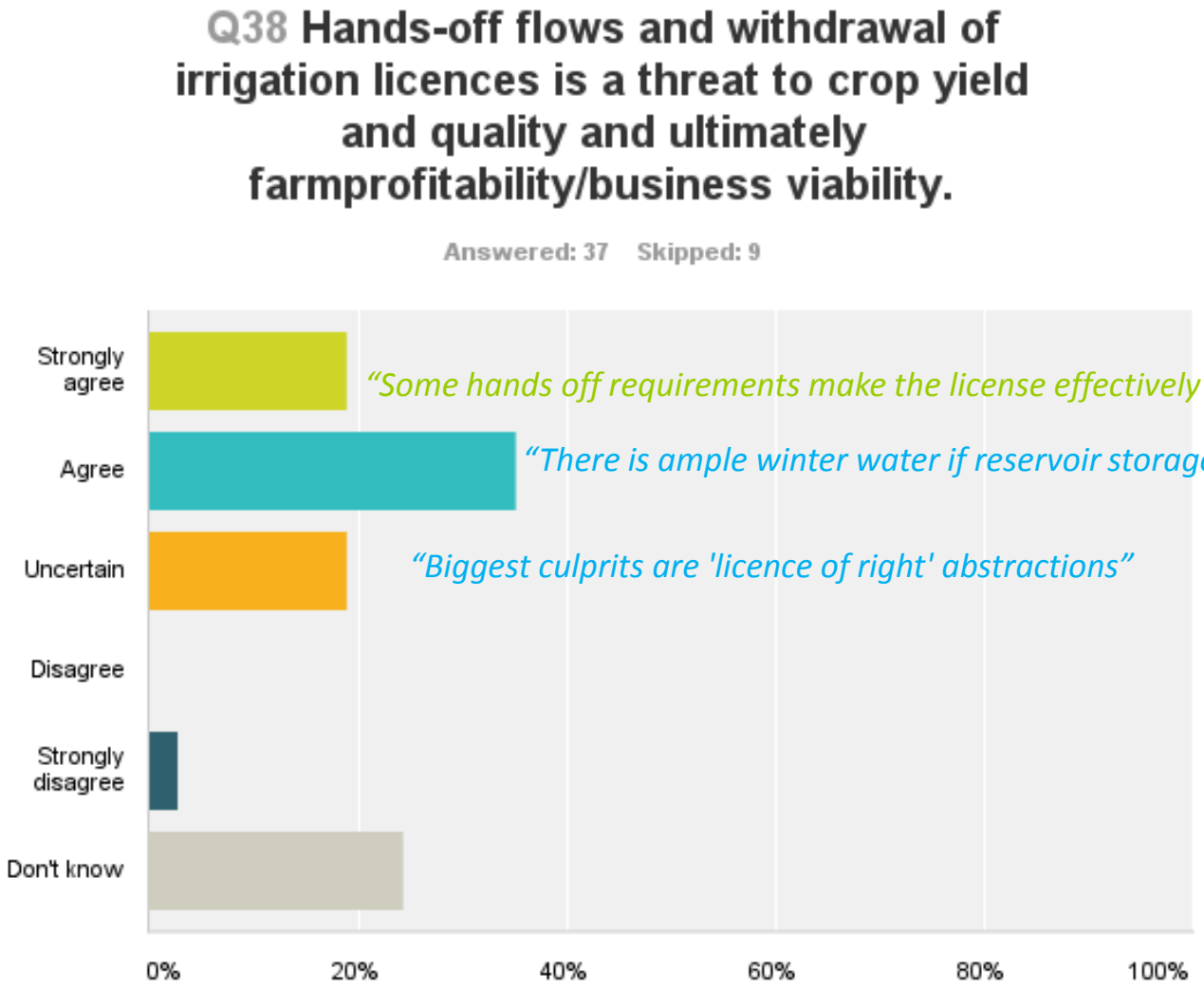


"Some hands off requirements make the license effectively unviable"

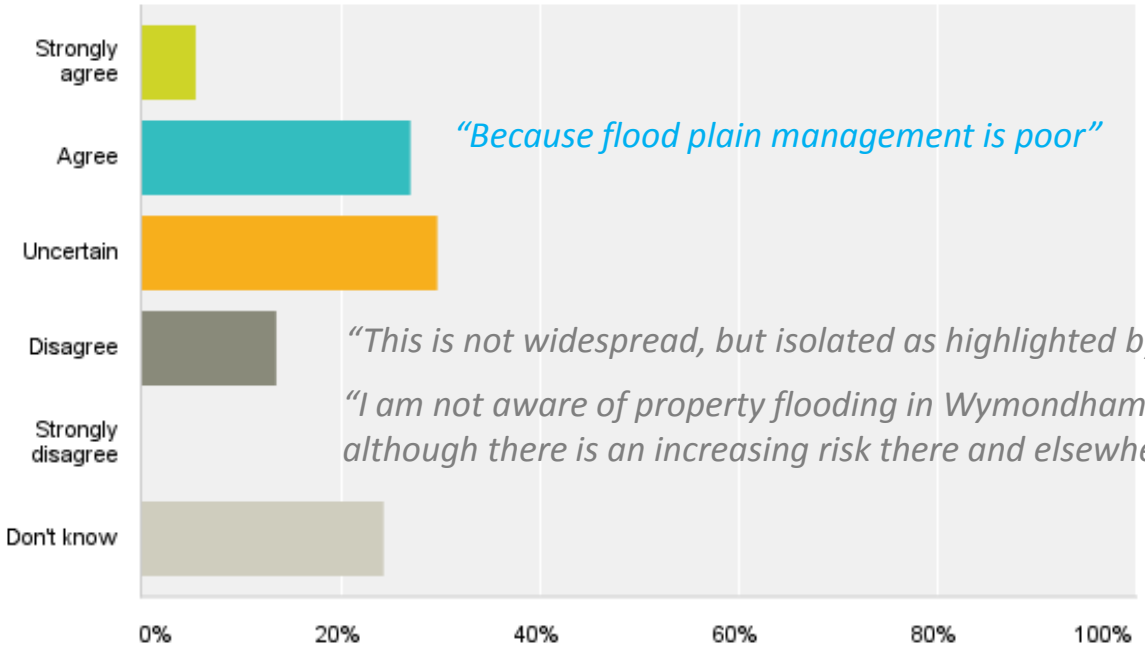
"There is ample winter water if reservoir storage was economically viable"

"Biggest culprits are 'licence of right' abstractions"

Broadland Catchment Partnership

Q39 Surface water and river (fluvial) flooding leads to widespread flooding of agricultural land and to some properties in known 'hotspots' such as Bungay on the Waveney, Wymondham on the Tiffey, Fakenham on the Wensum and Buxton and Horstead on the Bure.

Answered: 37 Skipped: 9



"Because flood plain management is poor"

"This is not widespread, but isolated as highlighted by the term "hotspot"."

"I am not aware of property flooding in Wymondham or Buxton, although there is an increasing risk there and elsewhere."

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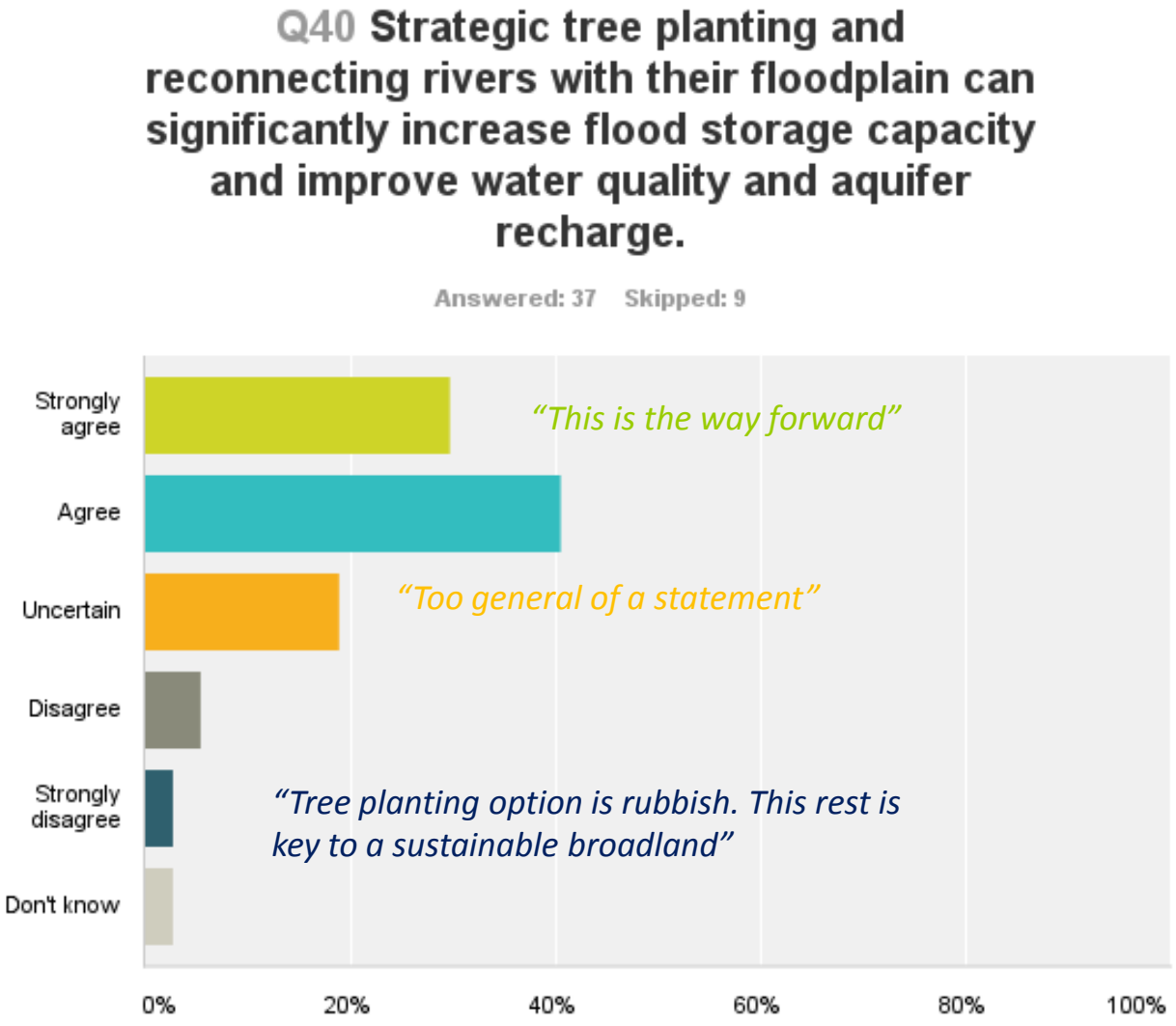

Broadland Catchment Partnership

Q41 Tourism and water-based recreation, such as boating and angling, are vitally important to the Broadland Rivers economy. The tidal rivers form the third largest inland navigation in Britain.

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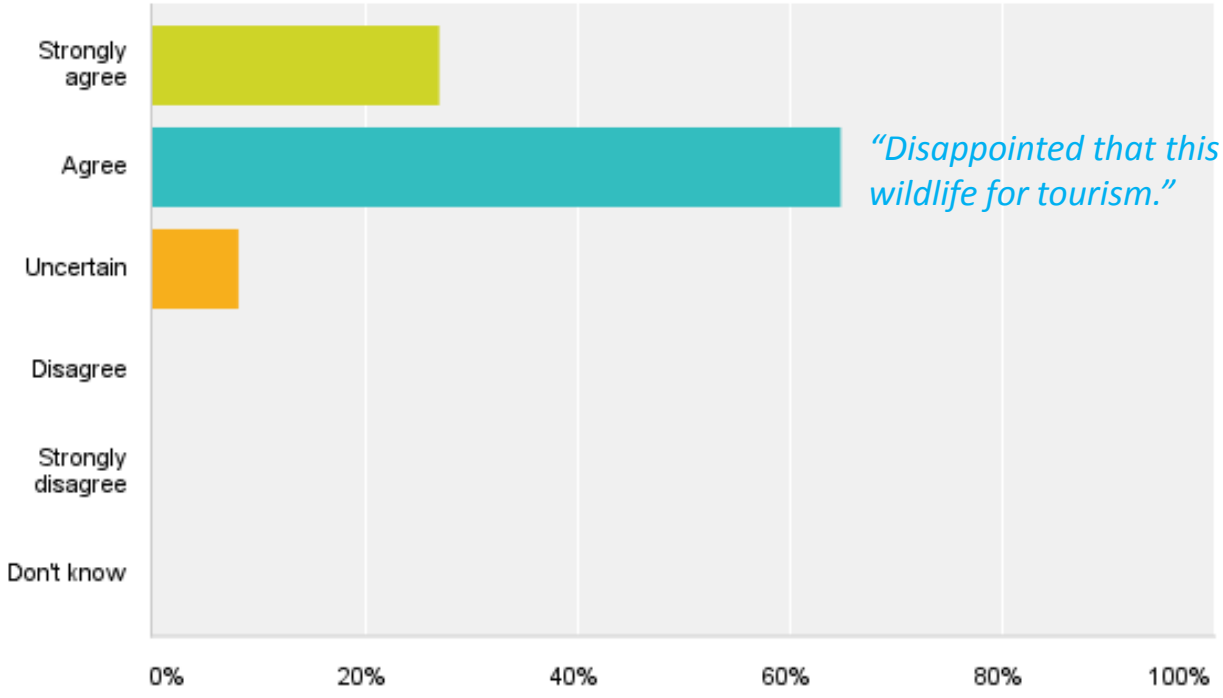

"Disappointed that this does not highlight the benefits of the wildlife for tourism."

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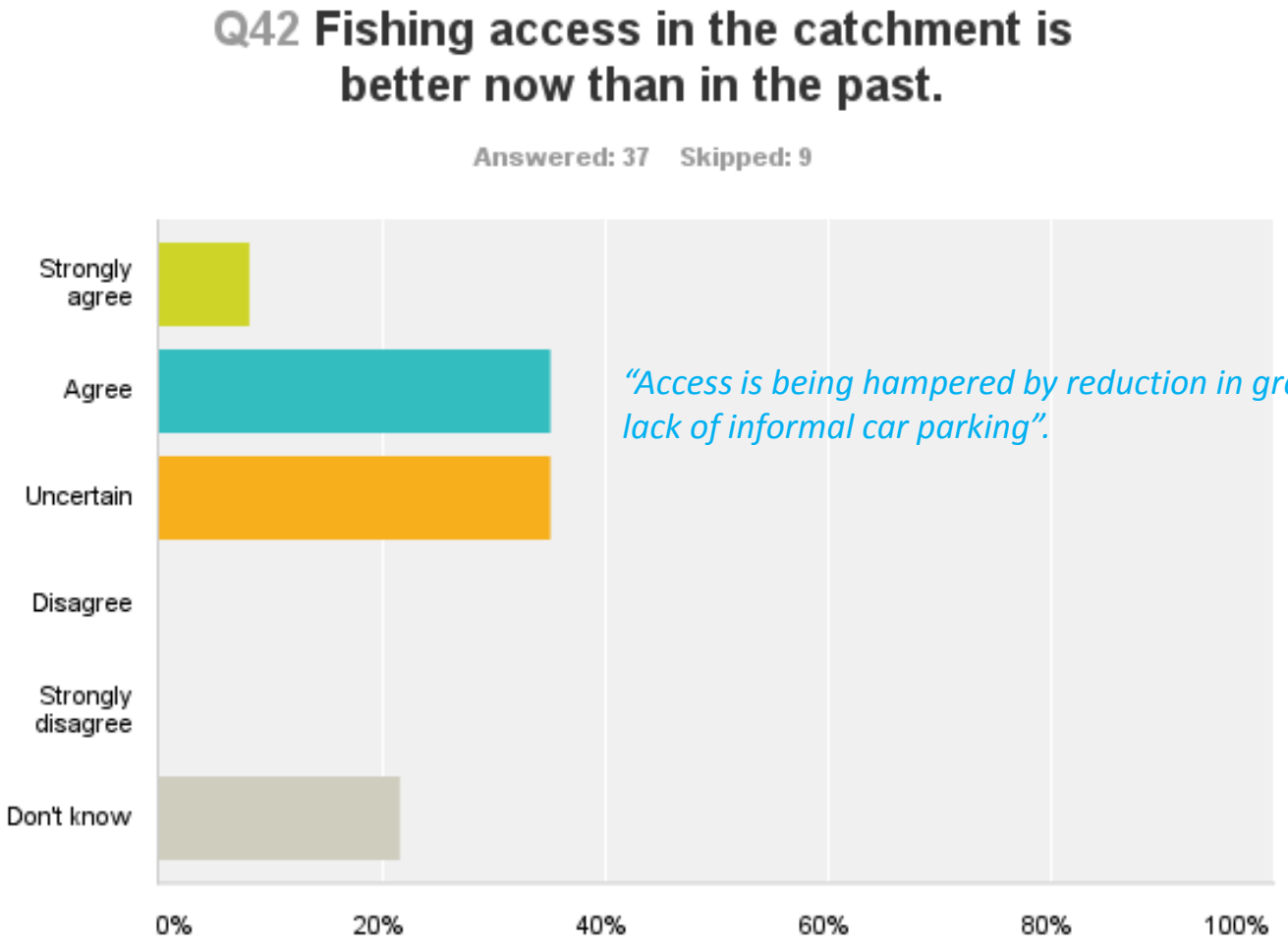
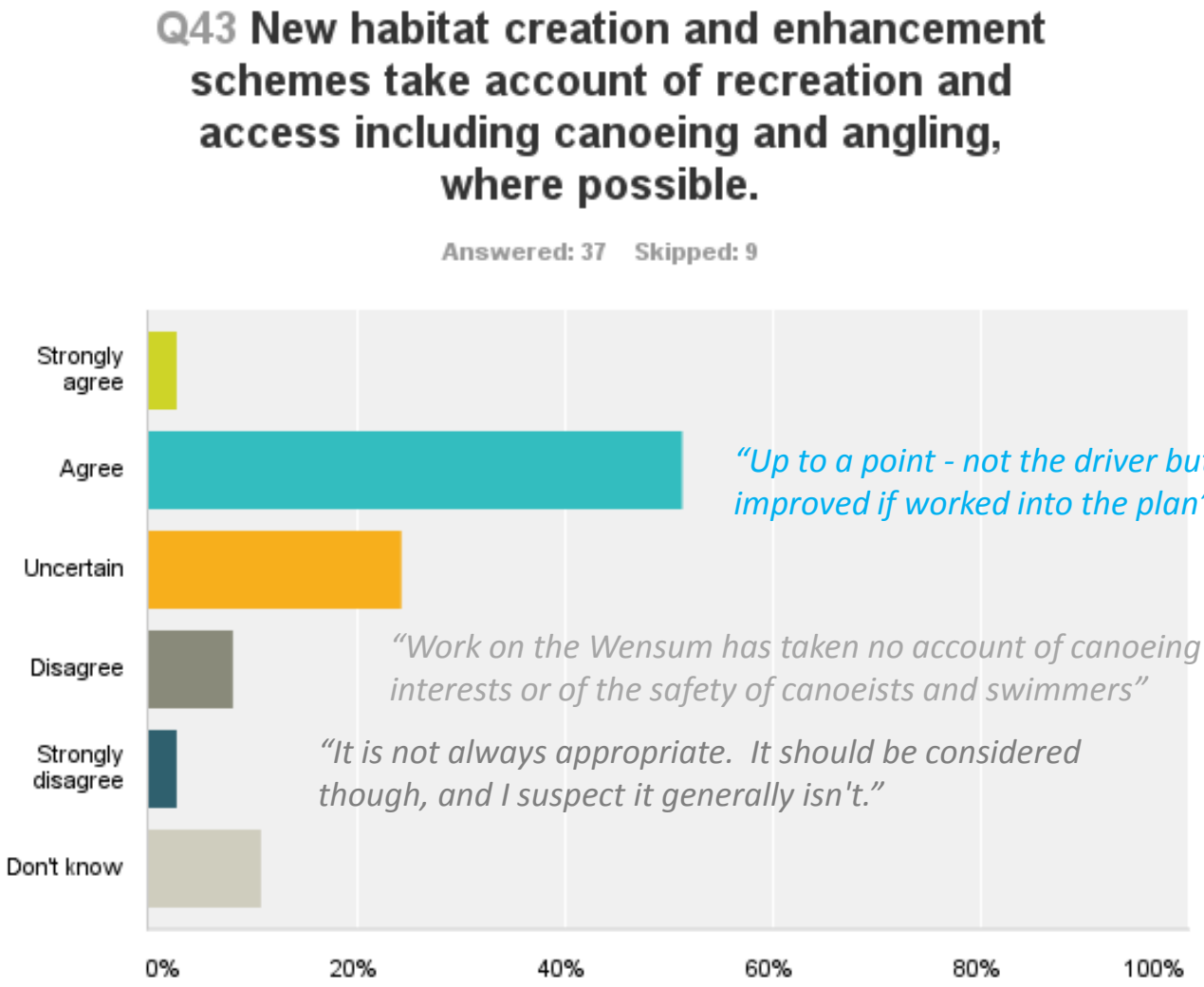


"Access is being hampered by reduction in grass cutting and lack of informal car parking".

Broadland Catchment Partnership

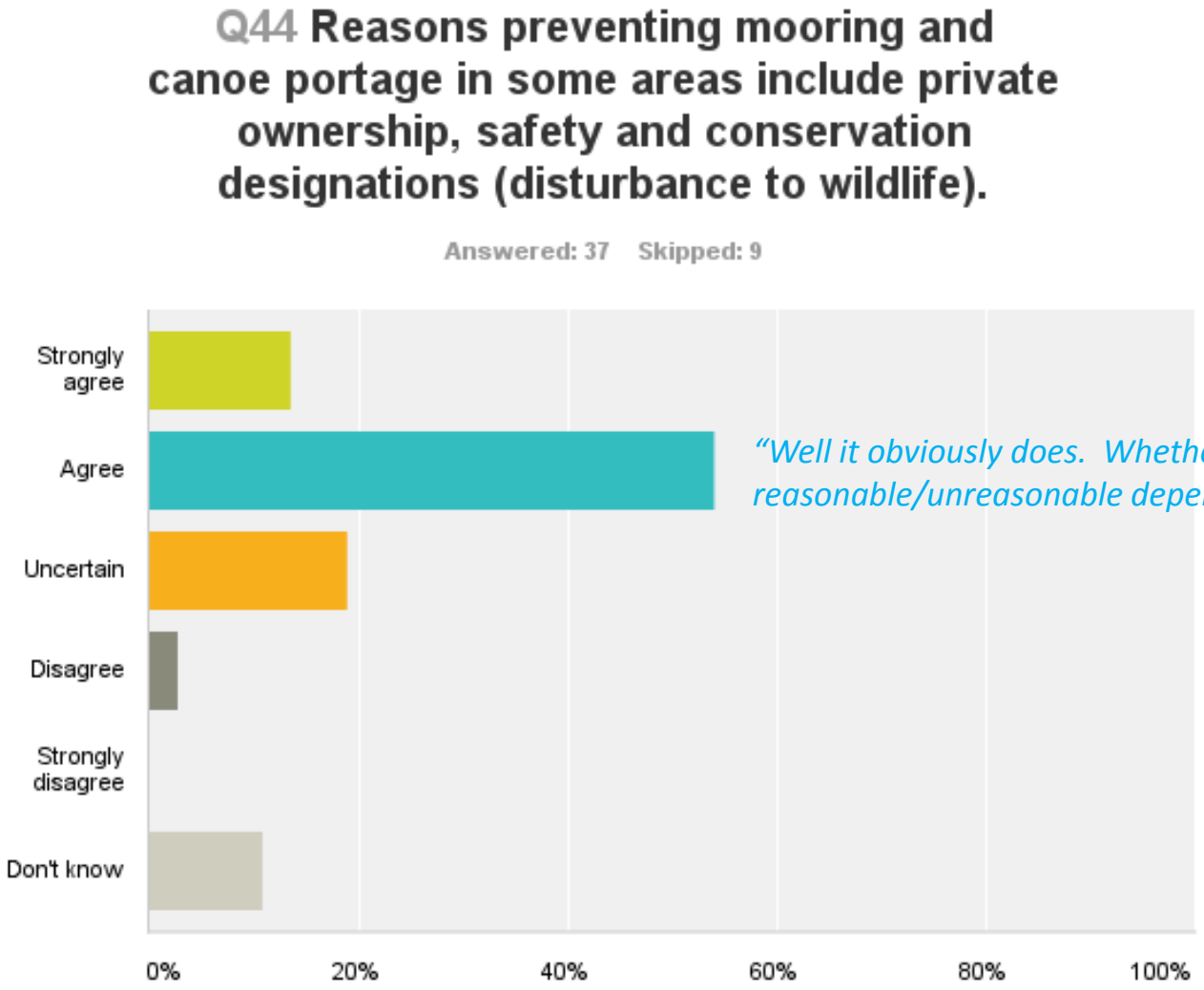


"Up to a point - not the driver but can be improved if worked into the plan"

"Work on the Wensum has taken no account of canoeing interests or of the safety of canoeists and swimmers"

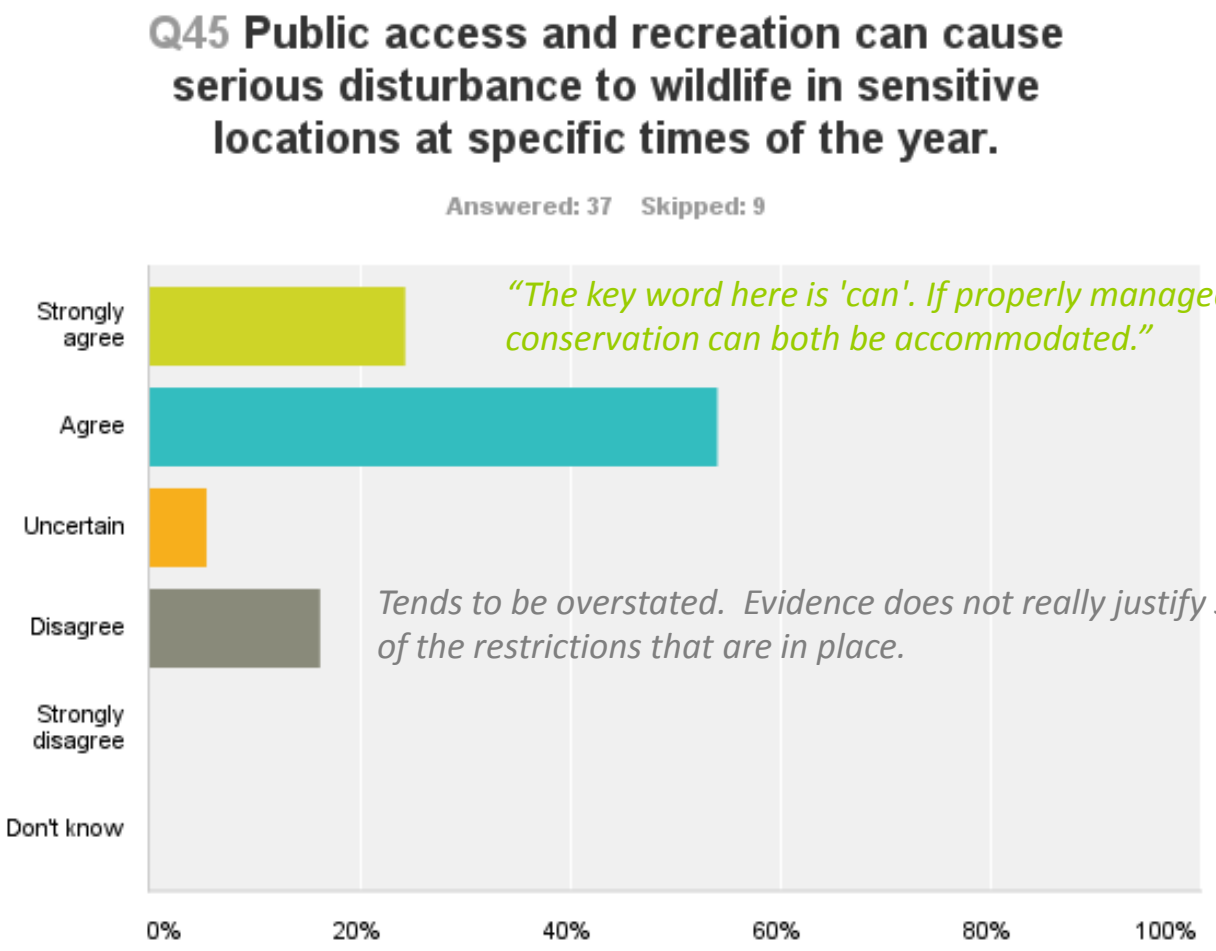
"It is not always appropriate. It should be considered though, and I suspect it generally isn't."

Broadland Catchment Partnership



"Well it obviously does. Whether that is good/bad reasonable/unreasonable depends on the site"

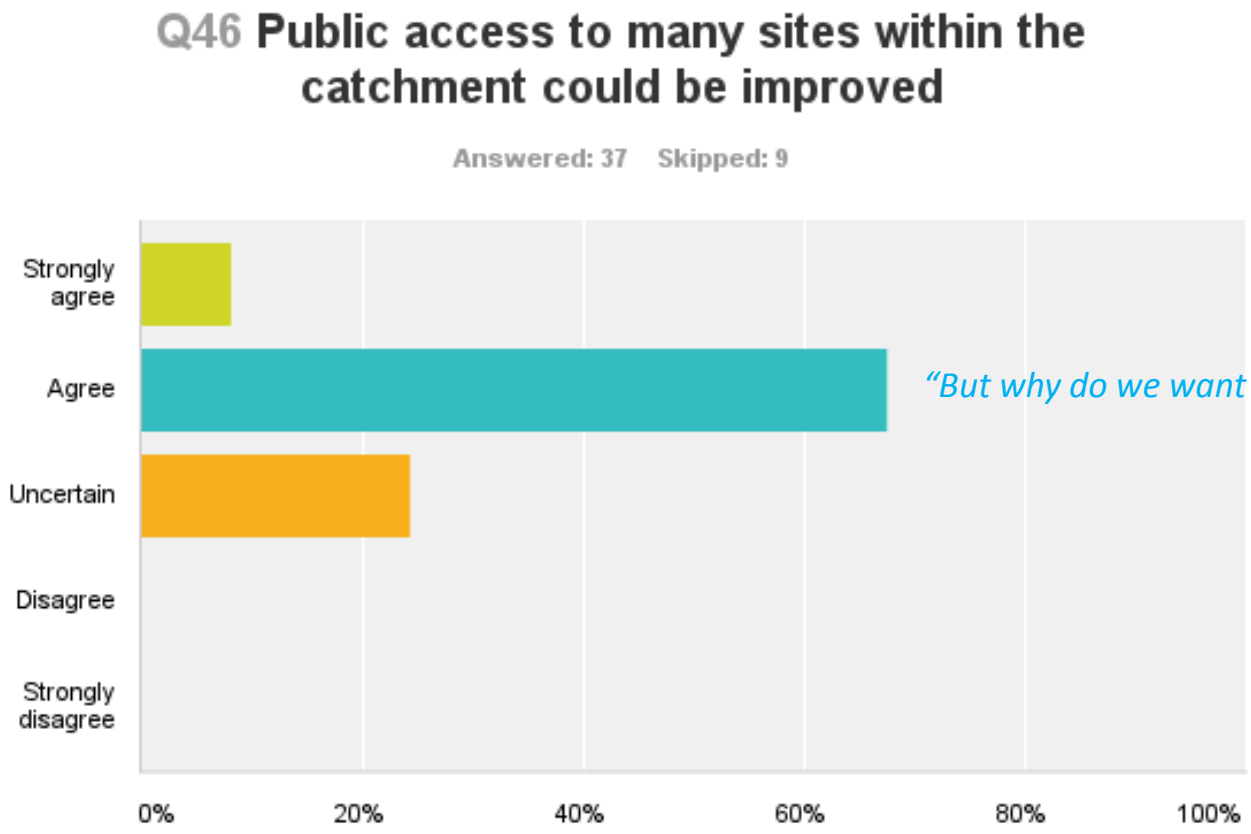
Broadland Catchment Partnership



"The key word here is 'can'. If properly managed, access and conservation can both be accommodated."

Tends to be overstated. Evidence does not really justify some of the restrictions that are in place.

Broadland Catchment Partnership

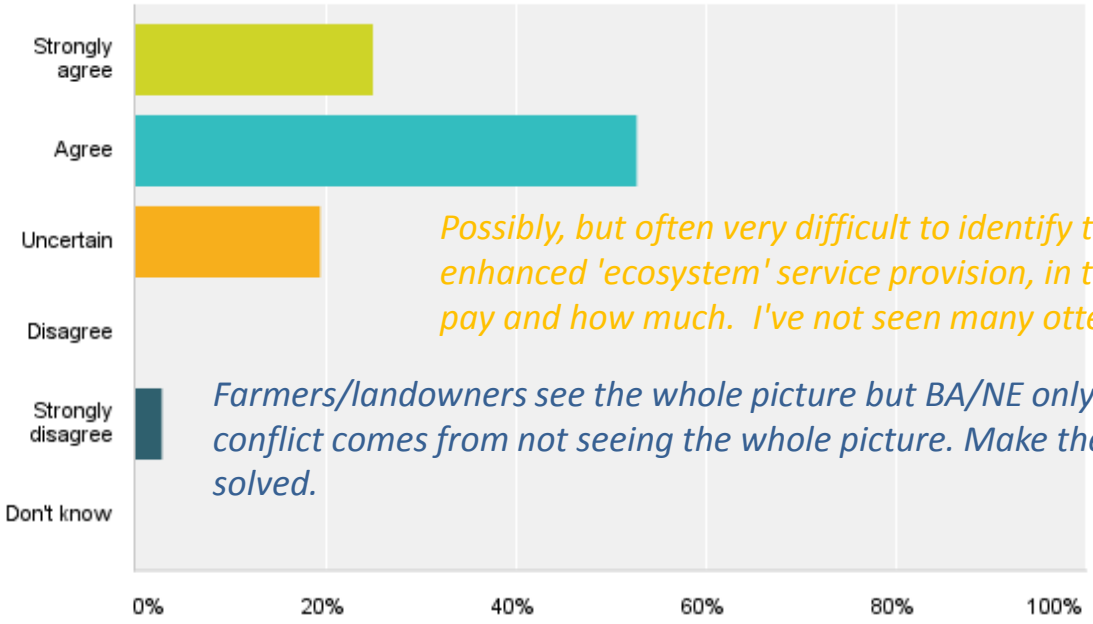


"But why do we want to let public everywhere?"

Broadland Catchment Partnership

Q47 Much of the conflict that exists between farming, wildlife and recreation could be resolved if we followed an approach that recognised the true value of the benefits that the catchment can offer and provided an appropriate payment to those managing the land to provide this.

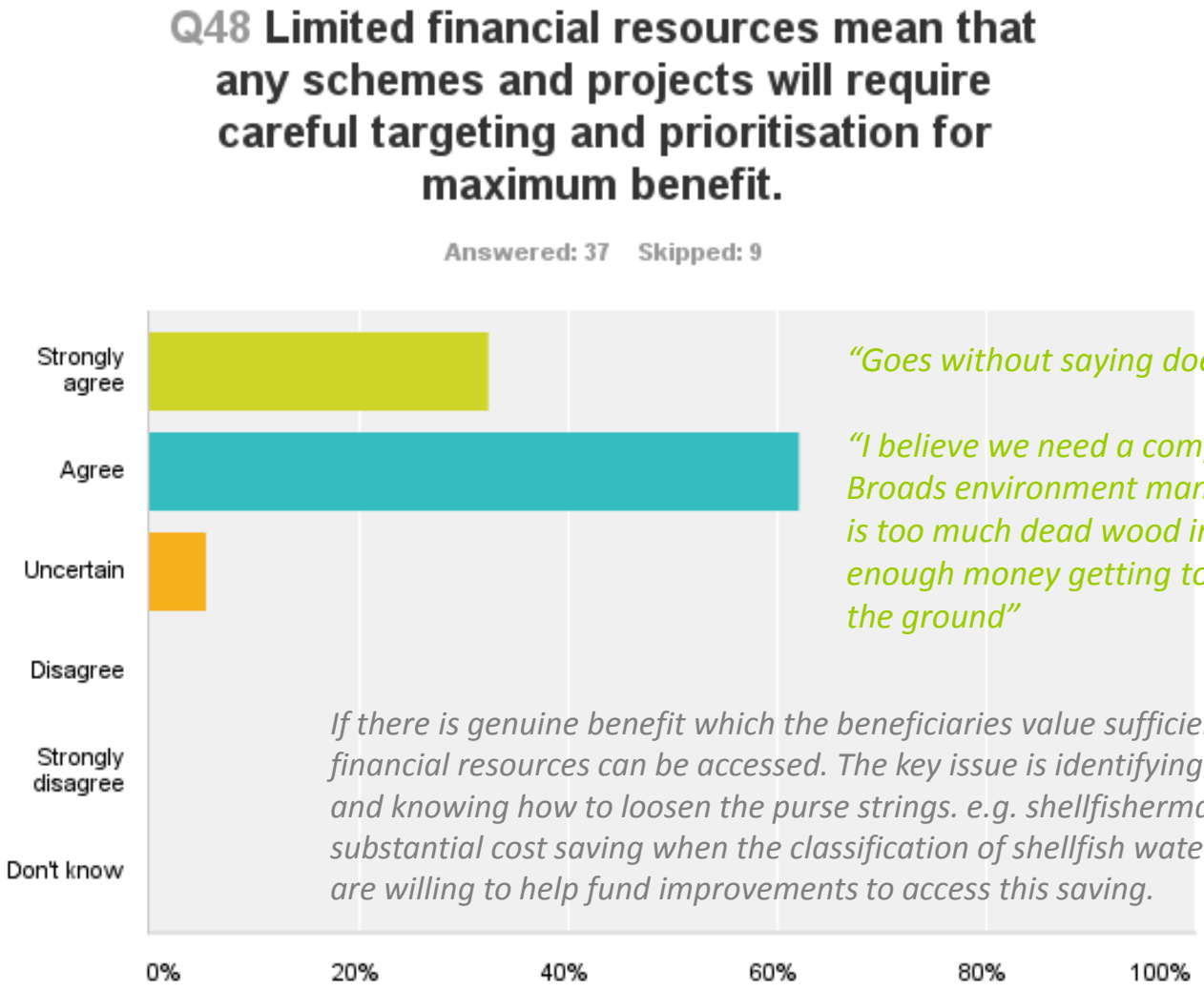
Answered: 36 Skipped: 10



Possibly, but often very difficult to identify the real beneficiaries of any enhanced 'ecosystem' service provision, in terms of who might be prepared to pay and how much. I've not seen many otters with credit cards.....

Farmers/landowners see the whole picture but BA/NE only see the Habitat Directive & WFD. The conflict comes from not seeing the whole picture. Make the environment pay for its self and all will be solved.

Broadland Catchment Partnership



"Goes without saying doesn't it?"

"I believe we need a complete overhaul of how the Broads environment management is funded. There is too much dead wood in the system and not enough money getting to the staff who work on the ground"

If there is genuine benefit which the beneficiaries value sufficiently to fund, the financial resources can be accessed. The key issue is identifying the purse holder and knowing how to loosen the purse strings. e.g. shellfisherman receive a substantial cost saving when the classification of shellfish waters is improved, and are willing to help fund improvements to access this saving.

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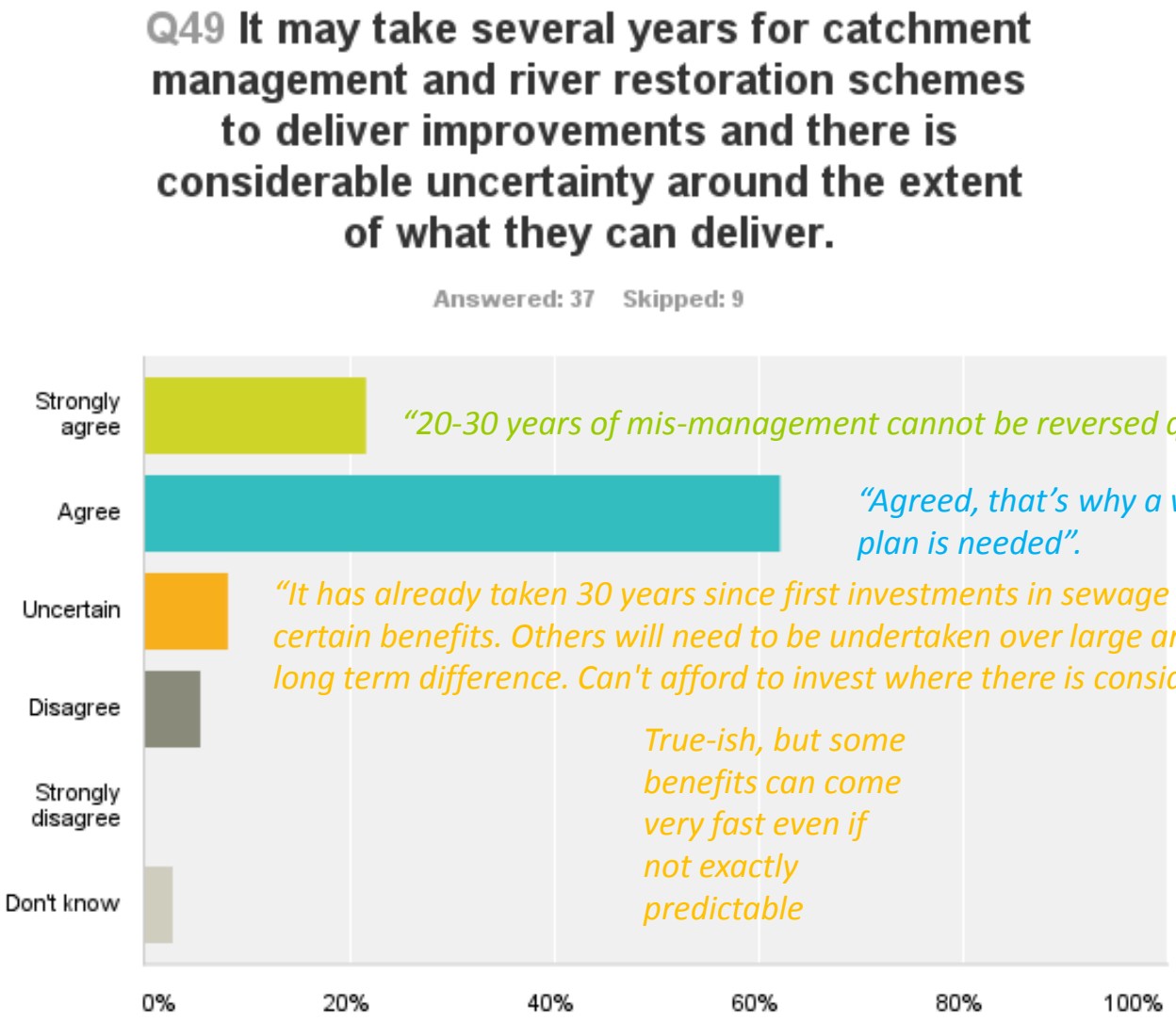


"20-30 years of mis-management cannot be reversed quickly".

"Agreed, that's why a wider stakeholder plan is needed".

"It has already taken 30 years since first investments in sewage works. Some measures will deliver certain benefits. Others will need to be undertaken over large areas with constant effort to make a long term difference. Can't afford to invest where there is considerable uncertainty."

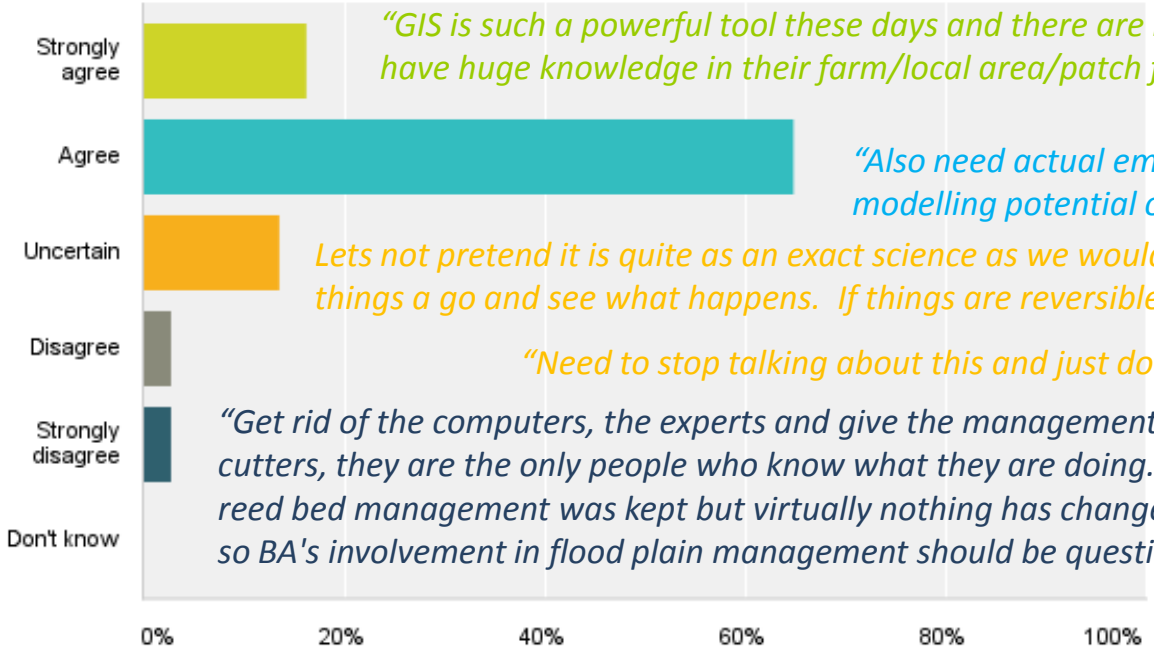
True-ish, but some benefits can come very fast even if not exactly predictable

Broadland Catchment Partnership

"I think the biggest key to all this is changing attitudes - attitudes of local people, attitudes of decision makers, attitudes of politicians and the attitude of the nation to the natural environment. This will give us the best information to help communicate the evidence and target efforts, but we do need to focus funding on actual 'on the ground work' if we want on change that we can measure."

Q50 Learning from other countries, UK catchments and combing the best available technical expertise, computer modelling and local knowledge will give us the best chance of delivering 'on the ground' improvements.

Answered: 37 Skipped: 9



"GIS is such a powerful tool these days and there are lots of people on the ground that have huge knowledge in their farm/local area/patch for work."

"Also need actual empirical data from monitoring as well as modelling potential or possible outcomes."

Lets not pretend it is quite as an exact science as we would like. Sometimes we just have to give things a go and see what happens. If things are reversible, then that can be a better approach."0

"Need to stop talking about this and just do it!"

"Get rid of the computers, the experts and give the management of the flood plains to the reed & sedge cutters, they are the only people who know what they are doing. As part of the Broads Authority review reed bed management was kept but virtually nothing has changed on the ground. Flooding is worse now, so BA's involvement in flood plain management should be questioned"

Broadland Catchment Partnership

Q51. Are there any statements missing that you think need to be discussed regarding the state of the catchment and how best to improve it, and if so, what are they?

- *The survey is inevitably very general - solutions need to be very site and issue specific.*
- *Recognising the long term nature of the task. We are unlikely to see huge improvements for many years.*
- *More supports needs to be available to those who are willing to diversify/change their land use.*
- *The management of the flood-defended marshes on the lower tidal Waveney, Bure & Yare needs to be recognised, that drainage did not cease with the demise of the old drainage mills - it still continues and is absolutely essential if the distinctive marsh features of the Broads is to be maintained.*
- *Yes. NE staff do not appear to have much to do in 2014. Can I suggest that they spend 1 day a week with the reed & sedge cutters learning how a well managed reed bed can help them in the ambitions. I suggest that the reed & sedge cutters are paid to provide this service. This should apply to all levels of NE staff and probably BA staff as well.*
- *Recognise the looming energy crisis and the relationship to food production - there will be no cheap food with dear energy - and the UK may not be able to afford to import as we have done.*
- *Think need to phrase river maintenance Q a little better. We need to stop flood maintenance and river tidying and go towards planned flooding when will not harm floodplain plant communities which is typically the case.*
- *Missing statements that may help the overall plan: 1. loss or gain of aquatic species 2. how climate change may affect the water environment 3. increase/decrease in awareness in the general public about water issues 4. value of properties/business near good quality water.*
- *Something relating to the balance of effort given to working with communities v landowners/farmers*
- *The conflict of 'conservation/restoration of habitats' against 'inevitable global climate change'. Realistically how far can we expect to push water up hill?*
- *Climate change effects on agro-economy and river flows Water quality monitoring Impact of local communities in river restoration*
- *Cost effectiveness and proportionality not addressed. Key concepts for adopting a rational prioritised approach.*

Insights from workshop groups

- No conflict with invasive species issues, compared to competing/incompatible land use issues.
- Local authorities need to set good example in order to promote public/landowners making positive changes based on evidence.
- Underlying geology and why this is important - education/demonstrate evidence.
- Need to incorporate sustainable cost effectiveness with proportionality of benefits.
- Overall agree but sub catchment required.
- Relationship with general rules and specific issues/impacts that will lead to local action.
- Finer grained analysis is required - particularly around the diffuse - detailed studies e.g. DTC will inform other areas/issues.
- Need to understand what is quality evidence 'pedigree'.
- Evidence also needs to consider the evidence behind the projects effectiveness.
- Problem: Ranges - science DONE - good enough science - research questions. Management requirements - better than average management.
- Generalisations need to be Broadland specific.
- Often evidence exists, but needs time and effort to make it available in relevant format.
- Evidence is there but is poorly communicated.
- Evidence analysis/collection is expensive - needs to be targeted where difficult issues/lack of consensus.
- Feeling that lots of information gathered but not easily accessible or freely available.
- Evidence needs to be clear, accessible, simple with clear mitigations. Evidence not necessarily missing but not always at correct resolution/locally relevant.
- Local evidence and knowledge there but needs to be gathered - particularly landscape/history/underlying geology.
- Collation of local data important. How do we engage and collate? Useful sediment pathway information.
- Finding the appropriate level of detail in the evidence.
- Getting hold of evidence we know about is sometimes difficult.
- It is unreasonable to expect perfect science. We cannot monitor everything everywhere.
- Evidence for this example is mainly qualitative. How do we better use this?
- Data licencing is a barrier.
- People often believe something opposite to evidence - need for education?
- What the public wants is sometimes very different to likely funded initiatives WFD e.g.
- Sediment: Lots better off for evidence than we were 15 years ago, but still gaps. Can we scale to catchment level.
- Need for more reactive monitoring to catch events - evidence to scale up.
- Need more frequent and more localised monitoring - involve local communities.

END