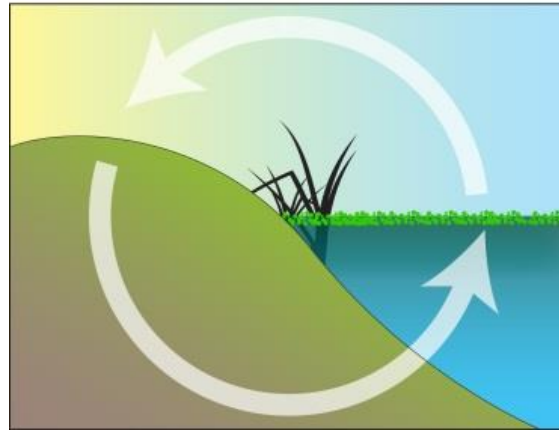


ReBALAN:CE



Comments from absent stakeholders



Anna Simpson, Environment Policy Advisor
Waste Management

- The NFU do not have an official position statement on this topic probably due to the fact that it is a relatively novel technique.
- However it is worth being aware that the farming industry accepts a wide variety of products to spread on their land for added nutritional benefits including manure, compost, digestate and sewage sludge.
- If a product were available to the farming community that had a proven nutritional benefit then they would be likely to be willing to use it on their land.
- However it is worth bearing in mind that this is a competitive market, with many products having a proven track record available.
- For aquatic biomass to be successful it would have to have strong evidence to prove its nutritional benefits, be low cost and available in large enough quantities.

Broads Authority & ReBALAN:CE



- Broads Authority (BA) offer
 - Over 20 years of experience in aquatic plant harvesting and algal biomass management through developing innovative lake restoration techniques
 - Water quality, chlorophyll *a* and water plant data
 - Liaison with lake and river land owners
- ReBALAN:CE valuable outputs for the BA
 - Investigation of the potential use of arisings from our routine cut and collecting operations for sustainable resource recovery in accordance to our priorities in the Broads Plan
 - Investigating the range of harvesting and reuse scenarios available in the Broads, which would be typical of many inland waterways



Sandy Forgan, President of RLDA

- **Why do anglers want to remove aquatic weeds and enjoy water free from algal blooms?**
 - Impacts on fishing/boat navigation
- **What is being done presently?**
 - AP cut & left on shoreline / fraught with difficulties
- **What does the future hold? – ReBALAN:CE?**
 - Welcome the means of effectively controlling AP&AB
 - ‘Double whammy’ of harvesting with wider env benefits?
 - Local farming representatives interested



Department
for Environment

Food & Rural Affairs

Dan McGonigle, Susie Willows & Matthew Hampshire

Initial views on Nutrient Recovery and Reapplication from Flora in Eutrophic Waters

- > We welcome in principle this opportunity to 'close the loop' on nutrient loss from soil to water as potential backstop to effective nutrient management on farms
- > However, it is preferable to prevent or minimise nutrient losses at source in order to maintain sustainable soils, resource efficiency and good farming practice
- > There is a risk of ecological damage to other aquatic flora and fauna from the process of harvesting which should be fully explored in combination with other habitat management activities
- > The potential benefit of these proposals on water quality needs to be thoroughly tested before we might benefit from this 'end of pipe' process to capture any unavoidable nutrient losses to water
- > Given that the process will not be able to recover all nutrient losses, it should not be considered a substitute to good agricultural practice



United States Department of Agriculture
Research, Education, and Economics
Agricultural Research Service

Known & unexplored health-related issues

- ❖ Algae as a human pathogen reservoir
(demonstrated for *Campylobacter*, *Salmonella*, and enterotoxigenic *E. coli*)
- ❖ Algae as the animal pathogen reservoir?
- ❖ Pathogenic algae - humans and plants - demonstrated
- ❖ Extracellular toxins (how affected by processing?)
- ❖ Antibiotic resistance?
- ❖ Water-bound organisms as hosts?
- ❖ Periphyton and other aquatic media - horizontal gene transfer?
- ❖ Occupational safety (harvesting, transportation, processing)



Dr Yakov Pachepsky

REBALAN:CE Approach: Prof Paul Withers

- Recycling biomass - exciting idea as removing a source/problem and helping to solve another by recycling
- More scope with aquatic weeds than algae because more predictable harvest and greater returns to land
- Algae turnover quickly, blooms are erratic and successional communities during the season - health and safety issues re handling the blue-greens.
- Benthic algae are more of a problem than phytoplankton in most rivers in the UK. Only very slow-flowing rivers act like lakes.

- Need justification for the costs of recovery v potential to recycle P but also need to include the externalities of benefits to ecosystem
- Sediments are a ubiquitous source of nutrients (esp P) which also need to be recycled/recovered as now recognised to be causing an issue re delays in ecosystem recovery
- Options are to recycle directly to land or to mine nutrients in them and return to land. Either way, the sediment needs to be removed.

Potential for Sediment P Recycling / Recovery

- Majority of P entering waterbodies is associated with eroding soil particles which becomes sediment when deposited
- Sediments contain more P than the bulk soil because of preferential P adsorption onto clays/Fe oxides
- Sediments also act as a sink for more potent forms of P entering water (e.g. sewage P)
- Sediments act as a long-term source of legacy P that is thwarting recovery of aquatic ecosystems
- P-enriched sediments are therefore not only a source of P that could be recycled/recovered but this would speed up ecosystem recovery because removing a secondary source
- Deposition areas are very widespread and will increase as traps/ponds become more widely adopted as a mitigation measure.
- So potential to recycle/recover is large and on-going
- Metals might be an issue in some circumstances.