



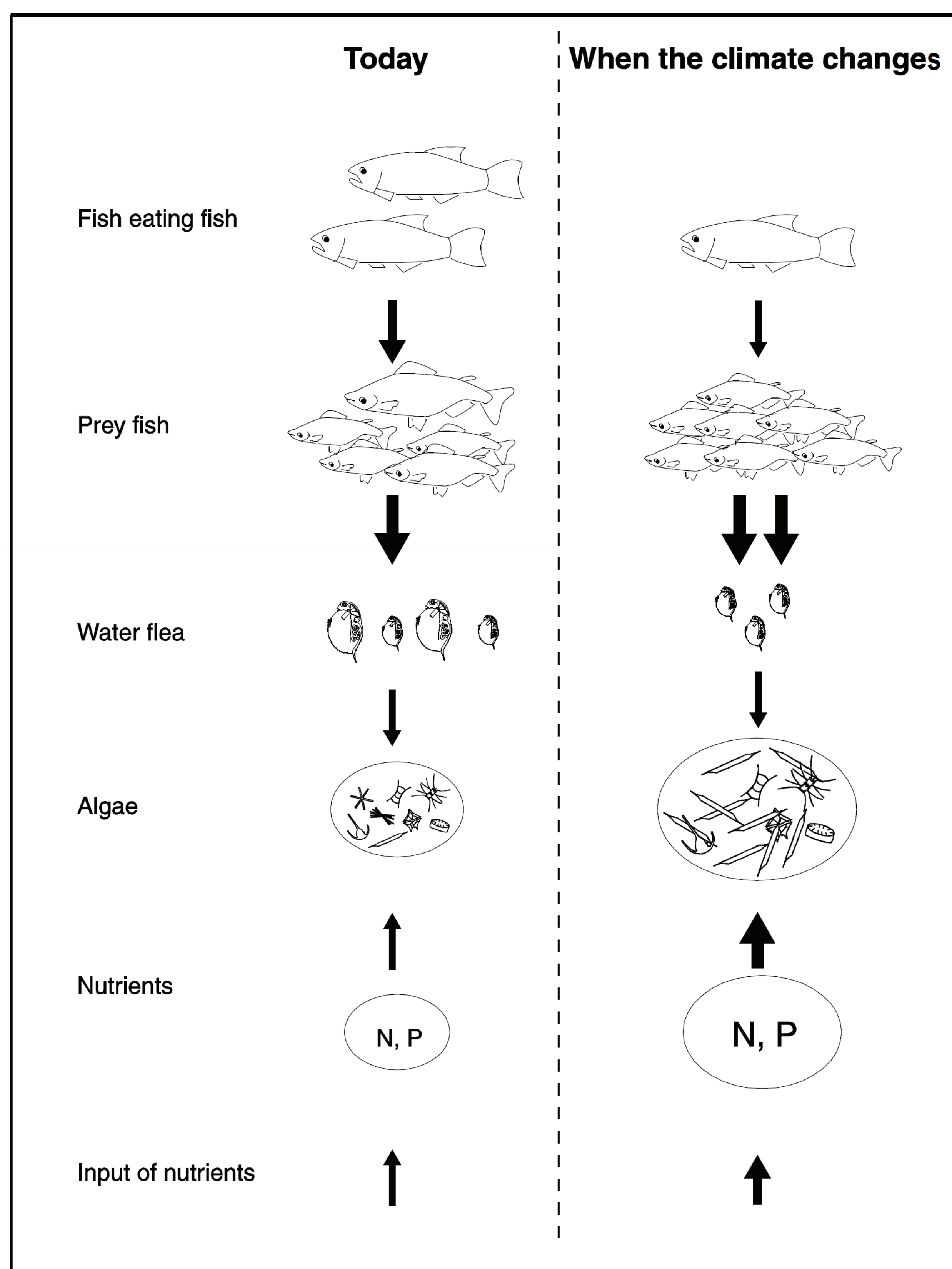
REFRESH – Stricter nutrient loading limits help lake ecosystems to withstand climate change pressures

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Because the impacts of cultural eutrophication and climate change follow the same pathways, stricter nutrient loading limits are needed in a future warmer climate for achieving good ecological status in lakes as required by the Water Framework Directive.

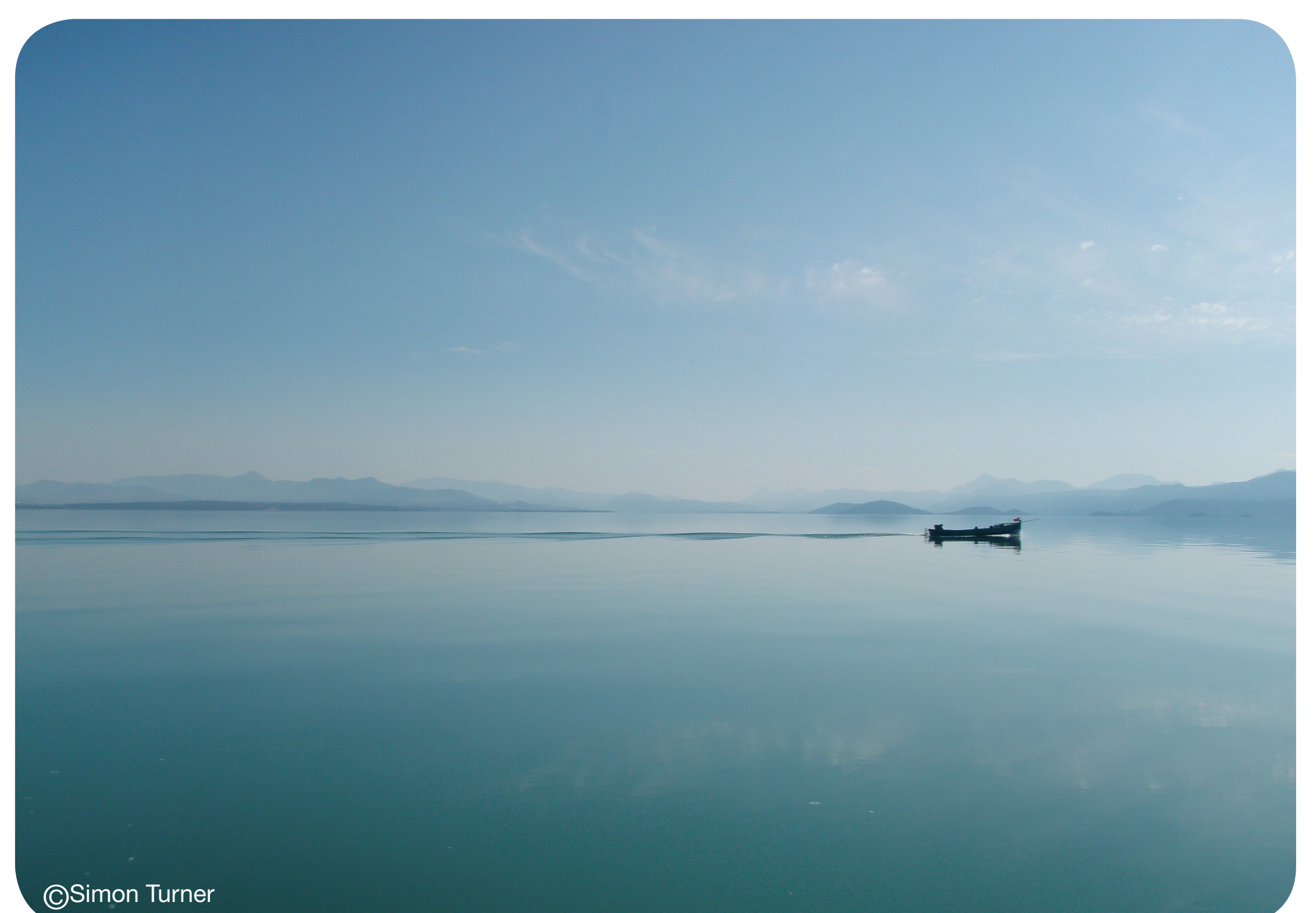
Jeppesen et al., 2011



Trophic structure change in mesotrophic and eutrophic shallow lakes in the north temperate and subtropical lakes and its consequences for sensitivity to nutrient loading and the effects on nitrogen retention (Jeppesen et al., 2011)

Synthesis

- Despite improvements in some regions, **nutrient loading from agriculture remains a major pressure** on Europe's freshwaters, primarily as a result of eutrophication.
- The EU FP-7 Project REFRESH provides new evidence for climate change impacts on lakes, showing that **increased lake temperatures generally have a eutrophication-like effect.**
- As the impact of **eutrophication and climate change follow the same pathways** affecting nutrient availability and cascading effects in the food web, and given the high variability of both pressures, it is **unlikely that their impacts can be disentangled** in each particular case.
- A review of more than 450 climate change adaptation measures related to water carried out by the REFRESH concludes that **all measures leading to reduced nutrient losses from agriculture can be considered win-win measures** as they meet environmental objectives set by the **Water Framework Directive** and will enhance the resilience of lake ecosystems under future climate change.



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Jeppesen E, B.Kronvang, J. E. Olesen, M. Søndergaard, C.C. Hoffmann, J., H.E. Andersen, T.L. Lauridsen, L.Liboriussen, M. Meerhoff, M.Beklioglu, A.Özen, 2011. Climate change effect on nitrogen loading from catchment in Europe: implications for nitrogen retention and ecological state of lakes and adaptations- Hydrobiologia 663:1-21.

REFRESH

Get in touch!

The key objective of REFRESH is to develop a framework that will enable water managers to design cost-effective restoration programmes for freshwater ecosystems.

Visit the REFRESH website: www.refresh.ucl.ac.uk

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