

The uP-Cycle Project

TOWARDS SUSTAINABLE PHOSPHORUS CYCLES IN LAKE CATCHMENTS

Unsustainable phosphorus use has pushed global food security further beyond reach and is leaving a legacy of polluted freshwaters around the world. If phosphorus emissions to our lakes are not reduced in the coming years, then the environmental and socio-economic impacts are predicted to be irreversible. There is currently no global policy on sustainable phosphorus use.

This project will bring together the global lake management and sustainable phosphorus management communities to deliver ecosystem recovery through phosphorus emissions reductions for the benefit of communities living near lakes and other impacted aquatic ecosystems

Globally, biodiversity loss is occurring at a faster rate in freshwaters than in any other environmental domain (83% decline between 1970 and 2014). Phosphorus pollution is a key driver. Excess loading of nutrients to lakes causes harmful algal blooms which threaten human health and drinking water supplies, drive biodiversity loss, fish kills and greenhouse gas emissions at a global scale and degrade coastal ecosystems to which they drain. These effects will be exacerbated by climate change.

During the 20th century, global phosphorus loading to freshwaters has doubled due to anthropogenic emissions from agriculture and wastewater. This is largely driven by national to global scale demands for food and non-food goods, some of which are destined for international trade. These demands are embedded within national economic development plans which fly below the global sustainability policy radar.

This project will aid policymakers and practitioners to deliver phosphorus emissions reductions that enhance the natural environment whilst enabling sustainable and inclusive economic growth; achieved through **Our Net Zero Phosphorus (P) approach**.



Phosphorus pollution can lead to algal blooms which threaten human health and freshwater biodiversity. picture copyright: sunmedia.com

The Net Zero P approach

The approach follows two interrelated steps:

- **Towards Net Zero Phosphorus** halting increasing present-day emissions trajectories to avoid further ecosystem degradation and then reducing levels of future emissions to deliver ecosystem recovery.
- **Beyond Net Zero Phosphorus** accelerating the selection, placement, and implementation of programmes of measures that deliver multiple long-term benefits along the full value chain.



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PROJECT COMPONENTS

1 Setting the global baseline on phosphorus emissions

- Develop 'The Global Phosphorus Emissions Dashboard', an online data tool that maps global phosphorus emissions and their impacts on waters across scales.
- Bring together international stakeholders to identify cross-sectoral and regional drivers of phosphorus emissions to lakes and opportunities to address them.
- Provide a road-map outlining opportunities for sector-specific contributions towards regional and global emissions reduction ambitions to deliver stress-relief on ecosystems (e.g., lake districts, transboundary ecosystems, large marine ecosystems).
- Increase clarity on global phosphorus emissions, drivers and impacts leading to greater integration of national, regional, and global sector-specific emission reduction opportunities.

2 Mobilising the global community of practice

- Establish 'the International Net Zero P for Lakes Network (Zero P 4 Lakes)'; a global network of lake experts bringing together expertise in delivering the world's most challenging phosphorus management programmes.
- Co-develop with the global community of practitioners The Net Zero P Framework and Monitoring and Assessment Approach, designed to enhance existing and emerging emissions reduction programmes.

3 Demonstrating the 'Net Zero P' approach

- Demonstrate the Monitoring and Assessment Approach in the Lake Villarrica Basin (Chile) identifying opportunities to enhance existing emissions reductions plans in each catchment
- Develop and integrate information and data streams to produce Digital Twin virtual environments through which to explore future management scenarios focusing on the Lake Villarrica (Chile) Catchment.
- Identify and enable uptake of emissions reductions opportunities for key sectors, including the implementation of nature-based solutions through stakeholder engagement activities that offer multiple benefits.

4 Influencing the global policy agenda for phosphorus

- Increase awareness and dissemination of project outputs through IW:LEARN and established global initiatives.
- Develop 'The uP-Cycle Innovation Hub' - a web-based information portal to accelerate the development and implementation of sustainable phosphorus initiatives.
- Co-produce a Global Policy Brief to increase awareness across governments on the need for better integration of phosphorus sustainability across the existing policy arena.