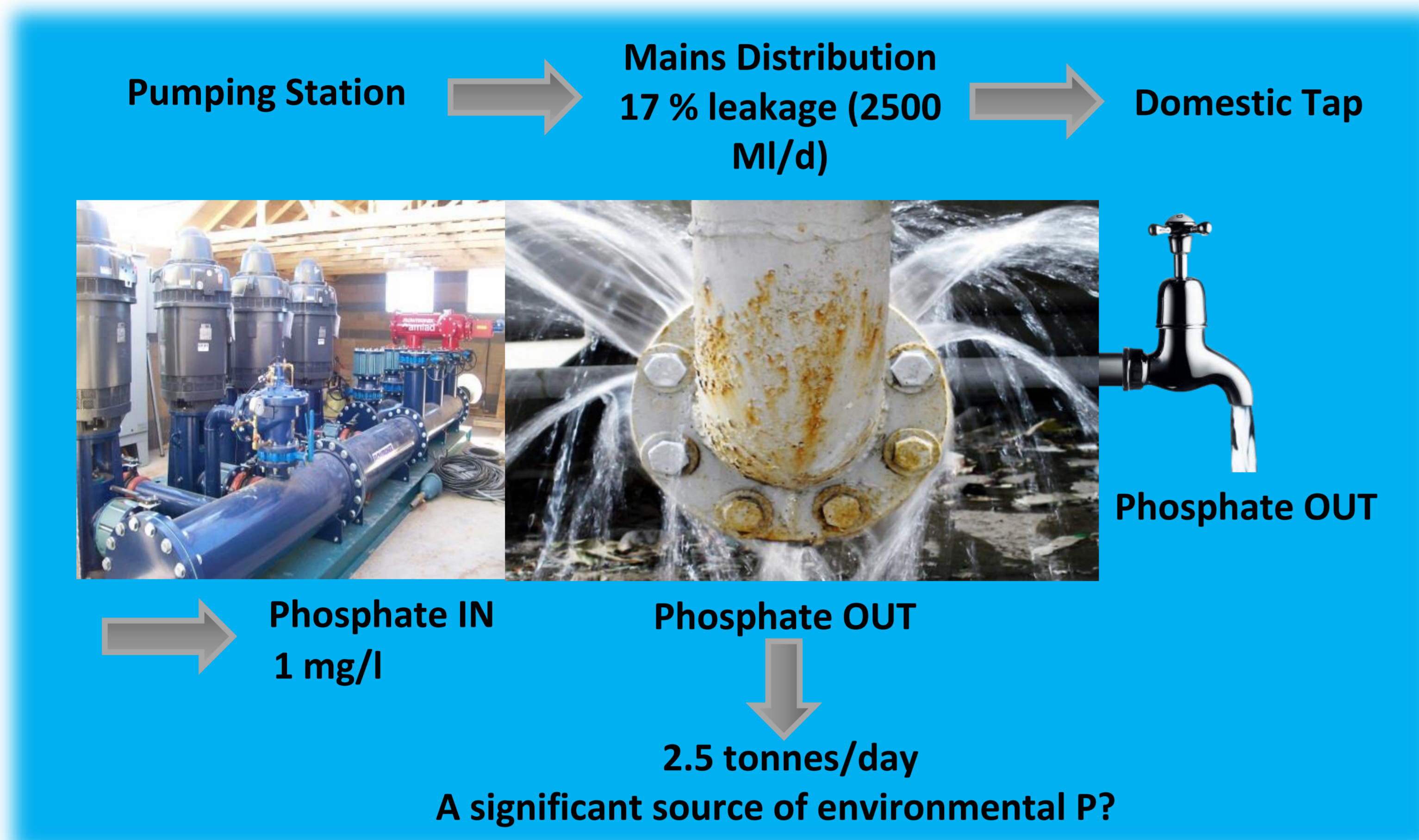


Phosphate isotopes - a tool to fingerprint leakage and environmental P sources?

Introduction

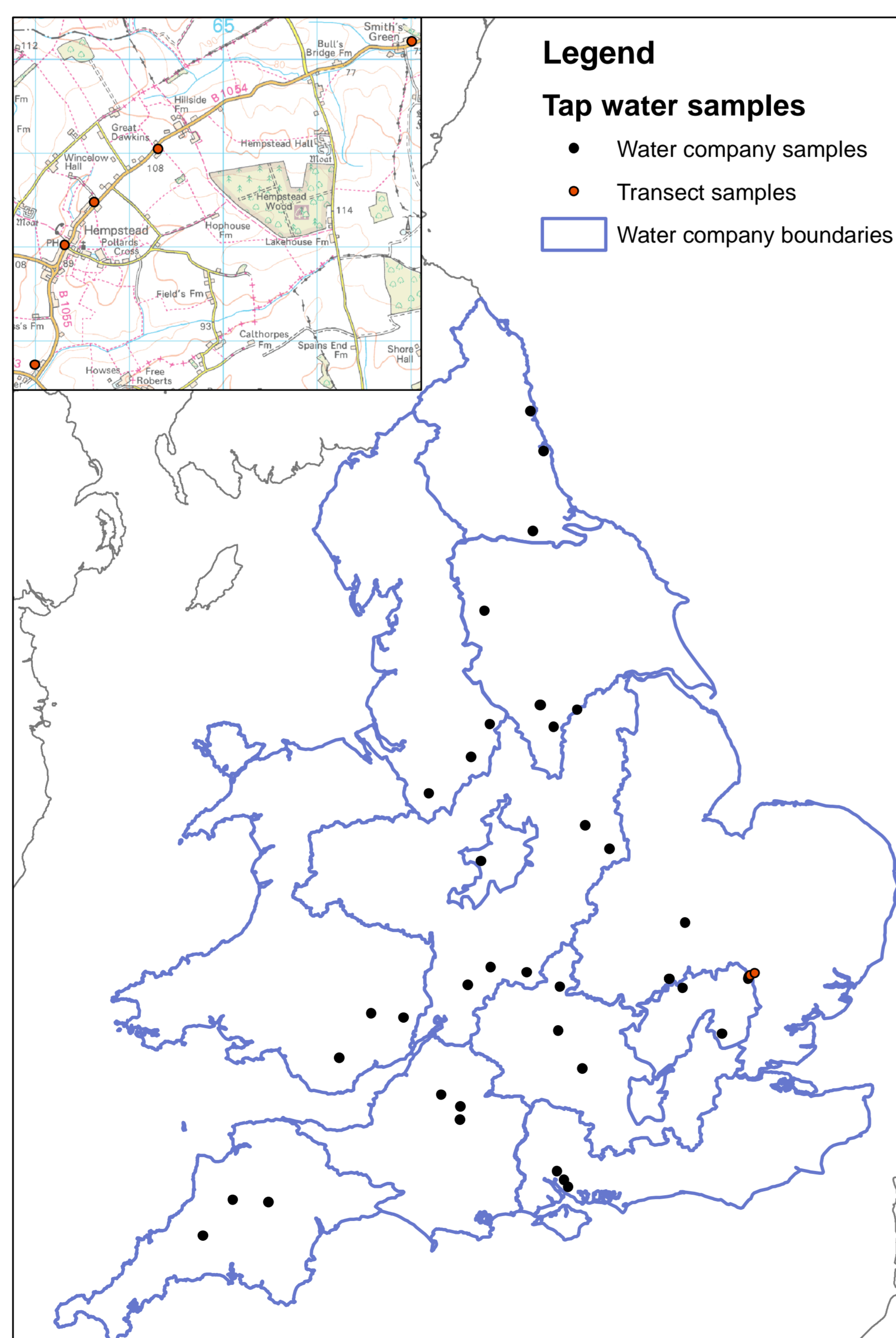
- Up to 25% of mains water can be lost as leakage
- Leakage of phosphate-dosed water may be a significant P source in the environment



- The oxygen isotope of phosphate ($\delta^{18}\text{O}_{\text{PO}_4}$) has been used as a tracer for P sources in ecosystems
- *Could $\delta^{18}\text{O}_{\text{PO}_4}$ of tap water be a useful tool to fingerprint leakage in the environment?*

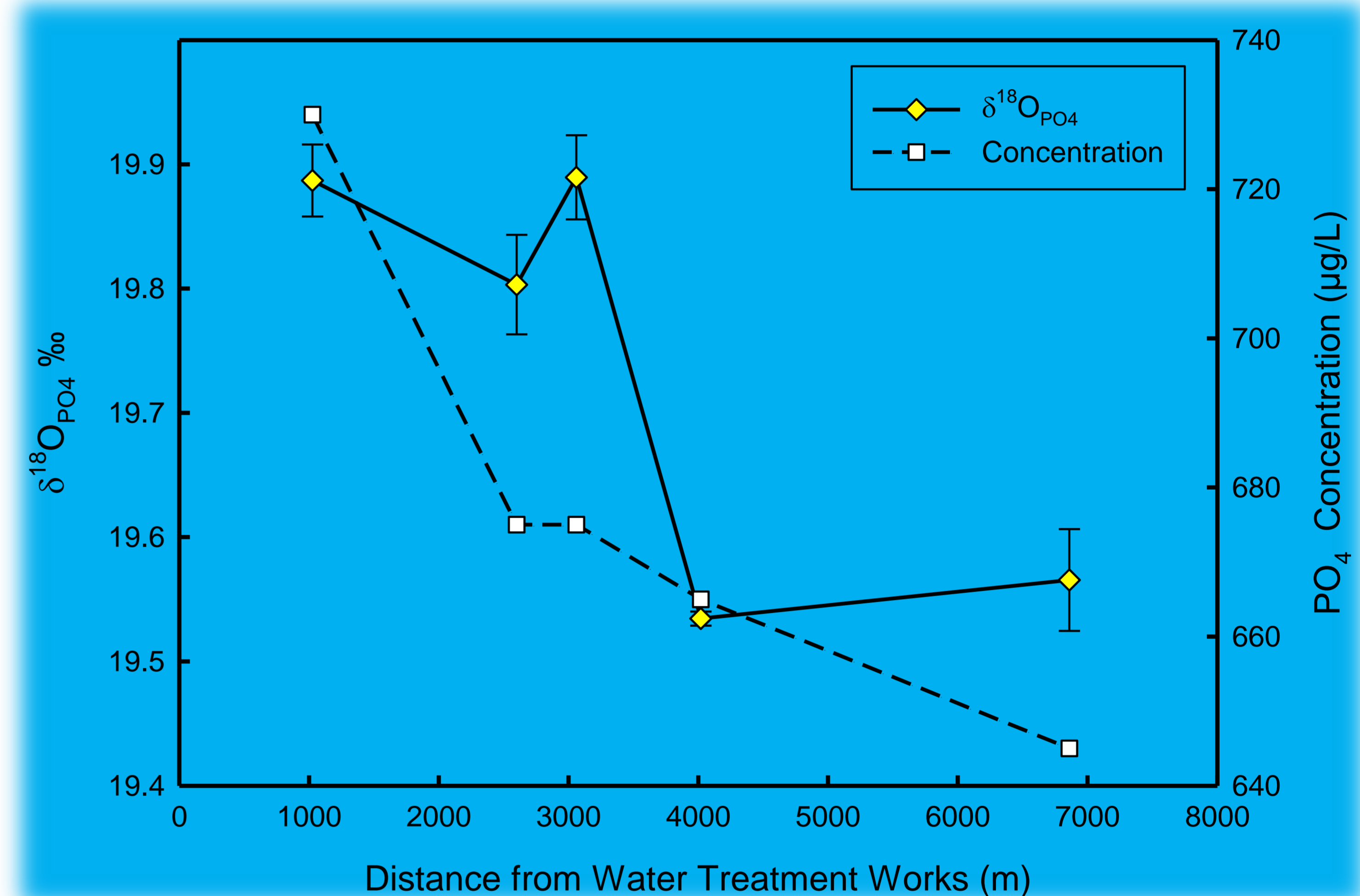
Method

- Sampling of tap waters at 12 water companies across England and Wales
- Sampling along a 8 km main to determine change in $\delta^{18}\text{O}_{\text{PO}_4}$ along the network
- Samples of dosing orthophosphoric acid
- Isotope analysis



Results

- 2 suppliers of orthophosphoric acid with different $\delta^{18}\text{O}_{\text{PO}_4}$
 - 12.4‰ and 19.7‰
- Tap water samples generally within 1-2‰ of dosed values
- Samples along a main show slight decrease in $\delta^{18}\text{O}_{\text{PO}_4}$
 - Long residence time at the end of the network
 - Potential biological cycling of phosphate



Conclusions

- Tap water $\delta^{18}\text{O}_{\text{PO}_4}$ values reflect 2 dosing acids
- Distinct from wastewater treatment discharge
- Potential to use $\delta^{18}\text{O}_{\text{PO}_4}$ to distinguish mains water from STW discharge and environmental sources
- A tool to assess microbial cycling in water mains?

