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| <b>Document title</b>  | BFFE's Proposal for phosphorus (P) equivalent for eutrophication potential |
| <b>Code</b>            | 3  |
| <b>Category</b>        | DEC  |
| <b>Agenda Item</b>     | Matters arising from the subsidiary bodies                                 |
| <b>Submission date</b> | February 11, 2019  |
| <b>Submitted by</b>    | BFFE Secretariat   |
| <b>Reference</b>       | --   |

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## Background

Global warming potential (GWP) is based on the carbon dioxide equivalent (CO<sub>2</sub>-eq) because the impact of different greenhouse gases (CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>) differ. Likewise, eutrophication potential should be based on phosphorus equivalent (P-eq) because potential bioavailability of phosphorus from land-based loads varies between soil-associated particulate-bound phosphorus (PP) and dissolved reactive phosphorus (DRP) (Ekholm 1994, Hydrobiologia 287:179-194, Lehtoranta et al. 2015, Ambio 44:263-273). At first, water soluble ortho-phosphates should be reported along with total phosphorus to further develop the impact indicators for eutrophication.

Currently, HELCOM reports phosphorus (P) only on total P basis without paying attention on different bioavailability of PP and DRP, i.e. on eutrophication potential. The approach overestimates the eutrophication potential of fine-textured eroded soils which have a low share of DRP. Secondly, the eutrophication risk of PP depends on the soil P concentration and soil characteristics, i.e. degree of P saturation of the discharged soil particles. However, the total P is currently the only indicator reported by HELCOM. Water soluble, reactive ortho-phosphates are not reported separately.

## Action requested

The Meeting is invited to consider that HELCOM takes actions to report the P load on P-equivalent basis instead of total P. To estimate phosphorus availability for algae more precisely, there is an urgent need to report P load not only as total P but also as dissolved reactive phosphorus (DRP), i.e. ortho-phosphates. Besides first including DRP or ortho-phosphates into reporting, it is important to develop the P-equivalent to better indicate eutrophication potential of nutrient discharged to waters from land-based sources.

## BFFE's Proposal for phosphorus (P) equivalent for eutrophication potential

Helsinki, February 11, 2019

To: 40<sup>th</sup> Meeting of the Helsinki Commission (HELCOM 40-2019)

*Global warming potential (GWP) is based on the carbon dioxide equivalent (CO<sub>2</sub>-eq) because the impact of different greenhouse gases (CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>) differ. Likewise, eutrophication potential should be based on phosphorus equivalent (P-eq) because potential bioavailability of phosphorus from land-based loads varies between soil-associated particulate-bound phosphorus (PP) and dissolved reactive phosphorus (DRP) (Ekholm 1994, Hydrobiologia 287:179-194, Lehtoranta et al. 2015, Ambio 44:263-273). At first, water soluble ortho-phosphates should be reported along with total phosphorus to further develop the impact indicators for eutrophication.*

Currently, HELCOM reports phosphorus (P) only on total P basis without paying attention on different bioavailability of PP and DRP, i.e. on eutrophication potential. The approach overestimates the eutrophication potential of fine-textured eroded soils which have a low share of DRP. Secondly, the eutrophication risk of PP depends on the soil P concentration and soil characteristics, i.e. degree of P saturation of the discharged soil particles. However, the total P is currently the only indicator reported by HELCOM. Water soluble, reactive ortho-phosphates are not reported separately.

Therefore, the HELCOM observer BFFE (Baltic Farmers' Forum on Environment) representing around 2 million farmers around the Baltic Sea propose the following:

HELCOM should take actions to report the P load on P-equivalent basis instead of total P. To estimate phosphorus availability for algae more precisely, there is an urgent need to report P load not only as total P but also as dissolved reactive phosphorus (DRP). Besides this, it is important to develop the P-equivalent to better indicate eutrophication potential of nutrient discharged to waters from land-based sources.

Sincerely,



Liisa Pietola

On behalf of BFFE, Baltic Farmers' Forum on Environment