Summary of the two phases of DYNATLOSS (2014-2107 (I) and 2018-2021 (II)) within the DynaTrait priority program:

The main objectives/ goals of DYNATLOSS I were:

A1) Ecologically relevant, **dynamic** and **functional traits** affecting plankton dynamics in "wild nature" are e.g. the taxon-specific pigment composition of phytoplankton as a determinant of primary production and the taxon-specific composition of essential lipids (in particular fatty acids) in the phytoplankton community that determine the trophic transfer efficiency to zooplankton.

B1) The taxon and thereby **functional trait diversity of natural phytoplankton** (pigments, fatty acids) is **correlated with the nutritional complementarity** of this community for herbivorous zooplankton. Since the importance of essential fatty acids for zooplankton nutrition has been demonstrated in multiple systems, it is reasonable that a **loss of trait diversity can affect** the supply of essential fatty acids and thereby **zooplankton productivity**.

C1) Different zooplankton groups (e.g. different *Daphnia* genotypes) differ in their susceptibility to limitations by the availability of essential fatty acids. A loss of trait diversity (fatty acids) can thus affect competitive interactions between zooplankton. This can in turn affect the genetic and/or taxonomic composition of the zooplankton community resulting on **dynamic feedback effects on phytoplankton community composition and the corresponding functional traits**.

The main objectives/ goals of DYNATLOSS II were:

A2) **Phytoplankton diversity** manipulations resulting in zooplankton community shifts have the **feedback potential to alter phytoplankton size distribution**. We hypothesize that this will affect **size dependent resource uptake** and thereby growth and quality of phytoplankton.

B2) **Phytoplankton diversity** manipulations resulting in zooplankton community shifts have the **feedback potential to alter nutrient regeneration**: We hypothesize that the **stoichiometry** of the nutrient regeneration differs between relatively **phosphorus rich (cladocera-dominated) and relatively nitrogen rich (copepod-dominated)** zooplankton resulting in different phytoplankton growth dynamics.

C2) **Phytoplankton diversity** manipulations resulting in zooplankton community shifts have the **feedback potential to alter composition of essential PUFAs** in natural phytoplankton by selective feeding and nutrient recycling: We hypothesize that **selective feeders** with chemosensory abilities (such as herbivorous copepods) actively **select for high PUFA algae** in order to meet their PUFA demand (which is impossible for unselective filter-feeding *Daphnia* sp.). The **phytoplankton composition may change further towards a dominance of poor-quality species** with low PUFA content. This may (further) **decrease** the zooplankton community's **trophic transfer efficiency** and limit its ability to control phytoplankton biomass development due to food quality constraints. Additionally, **different recycling of nutrients can also directly affect fatty acid production** of natural phytoplankton