

Abstract LIMNOTIP (Kainz)

The accelerating loss of global biodiversity has affected species in all biomes and ecosystem types. Eutrophication is and continues to be a major and severe environmental threat both within and outside Europe, which causes abrupt regime shifts, i.e. systems that reach “tipping points” and change from clear-water states to turbid conditions with dense algal blooms. Reaching such tipping points generally results in a dramatic decline in biodiversity. Using algae-zooplankton feeding experiments, we will investigate how changes in algal biodiversity along a productivity/temperature gradient affect the amount of essential dietary nutrients (including lipids and their omega-3 fatty acids) available for higher trophic levels. We hypothesize that, a) algal biodiversity increases with increasing phosphorus (P; limiting nutrient) concentrations and temperature, but decreases once P concentrations and temperature keep increasing (identification of P- and temperature-induced tipping points), and, b) increasing algal biodiversity initially increases the amount of omega-3 fatty acids per unit biomass, but levels off with further biodiversity increase. These tests will enable us to assess the 'tipping point' at which the biochemical, dietary quality of algal biodiversity decreases. As a consequence, we predict that reduced algal biodiversity will lead to lower nutritional values of e.g. crustaceans, which constitute major dietary energy for fish. Hence, changes in algal biodiversity due to climate change may affect processes determining the resilience and induce tipping points for biodiversity and social-ecological systems.