

**Supplementary Table 1** Habitat of phytoplankton functional groups

| FG   | Habitat                                                                               | Relevant genera                                                                                                                                                                                                                                                               |
|------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CPMD | Brackish-marine water, mesotrophic                                                    | <i>Guinardia</i> , <i>Leptocylindrus</i> , <i>Bacteriastrum</i> , <i>Biddulphia</i> , <i>Coscinodiscus</i>                                                                                                                                                                    |
| PMD  | Mesotrophic and eutrophic                                                             | <i>Grammatophora</i> , <i>Thalassionema</i> , <i>Climacosphenia</i>                                                                                                                                                                                                           |
| MP   | Inorganically turbid shallow lakes/ponds                                              | <i>Navicula</i> , <i>Thalassiosira</i> , <i>Nitzschia</i> , <i>Pseudo-nitzschia</i> , <i>Pleurosigma</i> , <i>Gyrosigma</i> , <i>Oscillatoria</i> , <i>Arthrospira</i> , <i>Cylindrotheca</i> , <i>Gymnodinium</i> , <i>Achnanthes</i> , <i>Closterium</i> , <i>Surirella</i> |
| Dino | Mesotrophic shallow lakes or high salinity                                            | <i>Alexandrium</i> , <i>Akashiwo</i> , <i>Prorocentrum</i> , <i>Protoperidinium</i> , <i>Peridinium</i>                                                                                                                                                                       |
| H2   | Oligo-mesotrophic deep lakes or mesotrophic shallow lakes, with good light conditions | <i>Nostoc</i> , <i>Anabaena</i> , <i>Calothrix</i> , <i>Spirogyra</i>                                                                                                                                                                                                         |
| Baci | Wide range distribution                                                               | <i>Cocconeis</i> , <i>Amphora</i> , <i>Amphiprora</i>                                                                                                                                                                                                                         |
| MS   | High salinity                                                                         | <i>Dictyocha</i>                                                                                                                                                                                                                                                              |
| SMD  | High salinity and temperature                                                         | <i>Licmophora</i>                                                                                                                                                                                                                                                             |

Functional groups are MP (Inorganically turbid shallow lakes); H2 (mesotrophic shallow lakes); CPMD (Centric planktonic marine diatoms); PMD (Pennate marine diatoms); Dino (Dinoflagellates); Baci (Bacillariophycidae); MS (Marine Silicoflagellates); and SMD (Stalked marine diatoms).