DNAquaIMG represents an interdisciplinary consortium from 11 European countries that nucleates internationally leading expertise in the development and implementation of high-throughput molecular and automated image recognition methods for freshwater biodiversity monitoring. Both approaches hold complementary benefits to biodiversity assessments in the context of ecosystem degradation and restoration: DNA metabarcoding provides high taxonomic resolution and enables detection of yet undescribed biodiversity. In contrast, image-based methods can provide reliable species' abundance, size structure and biomass data, but may only identify specimens to coarser taxonomic resolution. Combined, these complementary approaches offer an opportunity for greatly enriched biodiversity data from environmental samples. Both approaches can be automated to a large extent and produce FAIR biodiversity data. DNAquaIMG proposes to further develop, test and harmonize DNA-based biodiversity monitoring and automated image-based biodiversity assessment and to provide a roadmap on how to implement these two novel monitoring approaches in combination into the existing monitoring context of the European Water Framework Directive (EG/2000/60, WFD). As a key scientific objective DNAquaIMG addresses how biodiversity change from the level of genetic diversity over species communities to functional (trait) diversity correlates with the ecological status class assessed through WFD routine biomonitoring. Targeting the most typically assessed indicator groups in routine biomonitoring, i.e. invertebrates and diatoms, we will build use-cases on samples collected along a gradient of ecological status class through WFD routine biomonitoring in ten countries. We will quantify the corresponding biodiversity change that results from a deterioration from a high to a good, moderate, poor or a bad status class. Concomitantly, we will produce data from stream restoration in to assess if the improvement of ecological quality class is reflected in biodiversity increase. This will be achieved by assessing high-resolution species diversity across all groups, including cryptic diversity in morphologically challenging taxonomic groups using DNA-metabarcoding, but also by assessing quantitative and functional trait data inferred via image-based methods. Through this, the project also aims to identify novel biodiversity targets and respective indicators that may inform ecological status assessments. Based on the project results and stakeholder consultations, DNAquaIMG will develop a strategy for improved transnational monitoring of biodiversity and ecosystem change using molecular and image-based methods. By this, DNAquaIMG will set a basis to generate more inclusive information on biodiversity change, contribute to effective aquatic biodiversity and ecosystem management, and support the implementation of the European Green Deal, the European Biodiversity and the UN post-2020 targets.