Genetic monitoring for biodiversity conservation and environmental sustainability—Examples from the Norwegian Barents Region

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Continued anthropogenic environmental change is wreaking havoc on natural populations, with the stresses and pulses of induced ecological processes affecting a species' local habitat, resulting in inadvertent distribution shifts, hybridization events, and eventual biodiversity loss. It is more critical than ever to monitor the unintended consequences of human activity on not only natural populations, but also community structures and ecosystems. DNA-based (genetic and genomic) monitoring is a critical component of biodiversity monitoring because it allows for the tracking and quantification of temporal changes in population genetic metrics or other population data. Genetic/genomic monitoring enables the estimation of a variety of biological parameters, including demographic parameters (abundance, occupancy, hybridization, and disease status), population genetic parameters (genetic diversity, structure, and effective population size), and responses to anthropogenic selective pressures (exploitation, biological invasions, and climate change). This keynote address will highlight the practical implications of integrating genetic data into management, conservation objectives, and policymaking, as well as capacity building through international partnerships, using case studies from the Norwegian Barents Region.