

# Using generic environmental indicators as part of the alien species assessment tool box under the different EU Directives

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In Europe, nature directives, such as the Water Framework Directive [WFD], the Marine Strategy Framework Directive [MSFD], and the Habitat Directive [HD] were designed to improve the health of the marine ecosystem. Currently, this health is seriously threatened by an increasing amount of human pressures, including the introduction of non-native or alien species. These species negatively affect biological diversity and as a consequence, also affect human and animal health and production in agriculture and fisheries. To counteract the effects of alien species introductions, several EU Member States have formalized their policy in an invasive species strategy. A key component of these strategies is often the establishment and maintenance of a national alien species database. Ideally, those are linked to regional (e.g. NOBANIS, DAISIE) or even global (e.g. GISD) databases. Additionally, the aforementioned EU nature directives include the assessment of alien species in one or another way. Within the MSFD, a descriptor is dedicated to this aspect. For Belgium, this indicator says that the introduction of new alien species of macrofauna or flora should be avoided and the present invasive alien species abundance should not increase significantly. The assessment of these criteria can be supported by the application of generic indicators from other descriptors (e.g. sea floor integrity, biodiversity, commercial fish, food web). For this aspect, some research is already done in the framework of the WFD, whereas alien species are not explicitly accounted for in the directive. The argument for the latter is that no explicit assessment of alien species is required, assuming that significant invasive alien species pressures will affect the environmental status and can hence be detected by the generic status assessments (Vandekerkhove *et al.*, 2013). But is this indeed the case? In this study, we show evidence that generic benthic indicators (BEQI, BPC, m-AMBI, IQI, ...) can indeed be effective in detecting changes in the presence of invasive alien species (e.g. *Ensis directus*, *Crassostrea gigas*) and in the status of the ecosystem. The analyses, however, also indicated that it is difficult to pick up signals on newly arrived alien species, but that patterns in invasive species can be closely followed. As a conclusion, we can state that the monitoring and indicator assessment running for all the generic indicators really helps to assess alien species, as required in descriptor 2 of the MSFD.

## References

Vandekerkhove J., Cardoso A.C., Boon P.J.. 2013. Is there a need for a more explicit accounting of invasive alien species under the Water Framework Directive? Management of Biological Invasions 4(1): 25–36.