



**MASTER THESIS PROJECT**

# **THE USE OF PASSIVE SAMPLERS AS ALTERNATIVE FOR THE IMPACT ASSESSMENT OF DREDGING ACTIVITIES IN PORT WATERS**

**HUGO CARVALHAL SILVA**

**AZTI Foundation,  
Pasajes, Spain**

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## Summary

Several human activities have the potential to impact the marine environment, such as dredging, which may cause the resuspension of sediments and the remobilization of contaminants to the water column (i.e., metals). Regarding the monitoring of metals listed as priority substances, the Water Framework Directive (WFD) establishes their concentration should be evaluated based on spot sampling. This might not be the best sampling strategy, considering that it represents the dissolved concentration of metals (with a questionable ecological relevance) at the exact time of sampling, while missing metals temporal fluctuations. For dynamic aquatic environments, other sampling methodologies may be more representative of metal concentrations and their potential environmental impacts, such as Diffusive Gradient in Thin Films (DGTs) passive samplers, which allow the calculation of metals time-weighted average labile concentrations. In this sense, this study aimed to assess the impacts of dredging in Bilbao Port, focusing on measurement of metal (Cu, Ni, Zn, Fe, Mn, Cd, Co, Cr and Pb) concentrations in water before, during and after the dredging activities by means of spot and passive sampling (using DGTs). As a result, it was possible to observe that the major part of spot sampling results were below the limit of quantification (LOQ), and thus, it would not have been possible to determine if dredging had any effect on the distribution of metals in the water column based only on this technique. On the other hand, quantifiable concentrations were measured with DGTs at all the stations and in all the studied periods, making possible to discriminate the metals that were affected by the dredging. Passive sampling is a promising alternative and complementary to spot sampling, providing reliable information that will help to make more correct decisions for the management of dredging impacts on harbours' water quality.