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Impact of dredged-material disposal on soft-bottom communities in a recurrent marine dumping area near to Guadalquivir estuary, Spain.

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9 **ABSTRACT**

10 This study assesses the effects of dredged material disposal in a recurrent
11 marine dump near the Guadalquivir Estuary (south-western Spain). We compared the
12 changes observed with two reference areas combining a classical ecological approach
13 with new stable isotope techniques to analyse trophic structure. We detected
14 permanent changes in the macrofaunal community structure as well as in the diversity
15 and biotic indices applied, which showed higher values in the disposal area. The
16 community in the marine dump had lost the natural temporal variations observed in the
17 reference areas. These effects could be due to the last disposal event carried out in the
18 summer of 2015 or to the recurrent disposals since 2010. Despite the structural
19 changes shown by the benthic community, these impacts were not reflected in the food
20 web structure of the marine dump. Our results confirm the high variability of disposal
21 disturbances. Hence, we recommend performing studies in every disposal event,
22 merging different functional and structural approaches.

23 **KEYWORDS:** disposal, macrobenthic community, stable isotopes, food web, Gulf of
24 Cadiz

25 **1. INTRODUCTION**

26 Both dredging and the dumping of dredged material are common practices
27 around the world and are one of the most serious environmental concerns for coastal
28 management (Marmin et al., 2016; Moog et al., 2015; Van Dolah et al., 1984). These
29 practices are particularly developed in estuaries where sedimentation patterns are high
30 and may be accelerated by human activities (Cesar et al., 2014). However, dredging is
31 essential to maintain security in navigation and to support trade and economic
32 sustainability (OSPAR, 2008; Bates et al., 2015). Although relocation of dredged
33 material is one of the most important concerns in those activities, much of the material
34 dredged is still disposed at sea for economic reasons (Harvey et al., 1998; Katsiaras et

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