Outdoor recreation in Kosterhavet
effects of leisure boats

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KOSTERHAVETS NATIONALPARK

Introduction

Kosterhavet is a marine national park, formed in 2009 and home to a wide variety of species, both in the water and on land. With 500000 visitors per year it is a very popular area for recreational activities. Most visits however occur during the summer season, which creates a high pressure on the environment.
Leisure boats can affect its surrounding both chemically, e.g. through emisson of fuel and leakage from antifouling paints , and physically; in the form of litter and anchor damage.
Anchors can cause abrasions on the bottom substrates ; scrape macro-algae from rocky bottoms and tear rhizomes of eel-grass on sandy substrates. They also displace sediment, and can therefor re-introduce compounds buried by sedimentation.

Study

Sediment cores were sampled at 10 different locations in the Kosterhavet area(Fig. 1), and samples were extracted from the surface layer and 10 cm depth to investigate if potentially toxic compounds from antifouling paints were present.
The sampled sediments were freeze-dryed and analysed for organic tin content by standardized methods.
Sampled sites consist of 4 well visited natural harbours, 4 areas with low boat traffic and anchoring(reference sites), and 2 small marinas/guest harbours to test if levels of organic tin in natural harbours are comparable to those in marinas or if they do not differ from the reference sites which are assumed to have low or non-detectable levels.

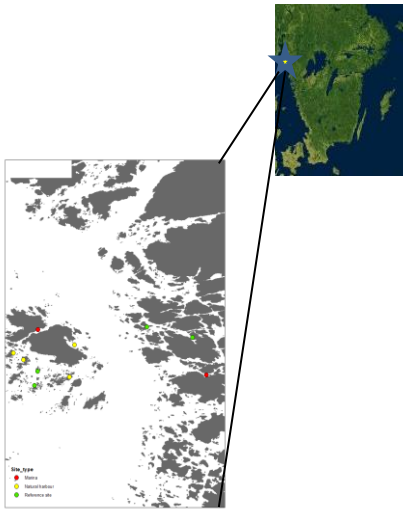

Figure 1. Sample sites in Kosterhavet.

Besides organic tin, samples will also be analysed for metal content and Irgarol.
The metal content will be determined both chemically and by use of X-ray flourescence(XRF), to test the accuracy of a handheld XRF device (Fig. 2) as a method to monitor metals in marine sediments.

Figure 2. Handheld XRF-device.

Anti-fouling paints

TBT(Tri-Butyl-Tin) in antifouling paints are banned by swedish law, but leisure boats still remain a source of contamination. Organic tin compounds such as TBT and its degradation products(Di-Butyl-Tin, Mono-Butyl-Tin) as well as other toxic substances used in antifouling paints(copper, Irgarol) are still found in marinas and guest harbours.

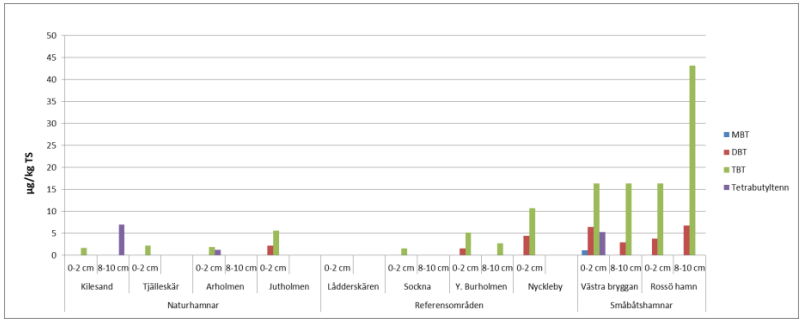

Figure 3. Organic tin compounds in sediments from Kosterhavet.

Preliminary findings

The results suggest TBT is still being introduced to the Koster area(Fig. 3), albeit in small doses. The lack of degradation products in most of the natural harbours as well as the absence of both TBT and degradation products in the deeper samples imply that the TBT present in surface samples are not re-introduced through anchoring.