Webbinarium, Effektiva och hållbara sätt att hålla båtbotten ren!

Petter Andreassen
Chief chemist, R&D Fouling Protection
Jotun

Västkusten	Havstulpaner, mossdjur, blåmusslor, sjöpung etc	Grönalger och tarmtång	Förhindrar transport av invasiva arter	Angrepp av skeppsmask på träbåtar
Biocidfria färger på båtskrov under vattenlinjen				
Biocidbaserade färger på båtskrov under vattenlinjen	NonStop VK Racing VK	NonStop VK Racing VK	NonStop VK Racing VK	NonStop VK Racing VK
Biocidfria färger på propeller och drev				
Biocidbaserade färger på propeller och drev	Aqualine VK	Aqualine VK	Aqualine VK	Aqualine VK

JOTUN

Östersjön	Havstulpaner, mossdjur, blåmusslor, etc	Grönalger och tarmtång	Förhindrar transport av invasiva arter	Angrepp av skeppsmask på träbåtar i södra Östersjön
Biocidfria färger på båtskrov under vattenlinjen				
Biocidbaserade färger på båtskrov under vattenlinjen	NonStop EC Racing EC	NonStop EC Racing EC	NonStop EC Racing EC	NonStop EC Racing EC
Biocidfria färger på propeller och drev				
Biocidbaserade färger på propeller och drev	Aqualine VK	Aqualine VK	Aqualine VK	Aqualine VK

Sötvatten	Grönalger	Förhindrar transport av invasiva arter
Biocidfria färger på båtskrov under vattenlinjen	WaterShield (må rengjøres)	
Biocidfria färger på propeller och drev	W	

Jotun fikk ikke BPR-godkjennelse i Sverige,

så alle produktene er nå under utfasing!

JOTUN

Antibes

Hvor mye kobber lekker ut mens båten ligger i marinaen?

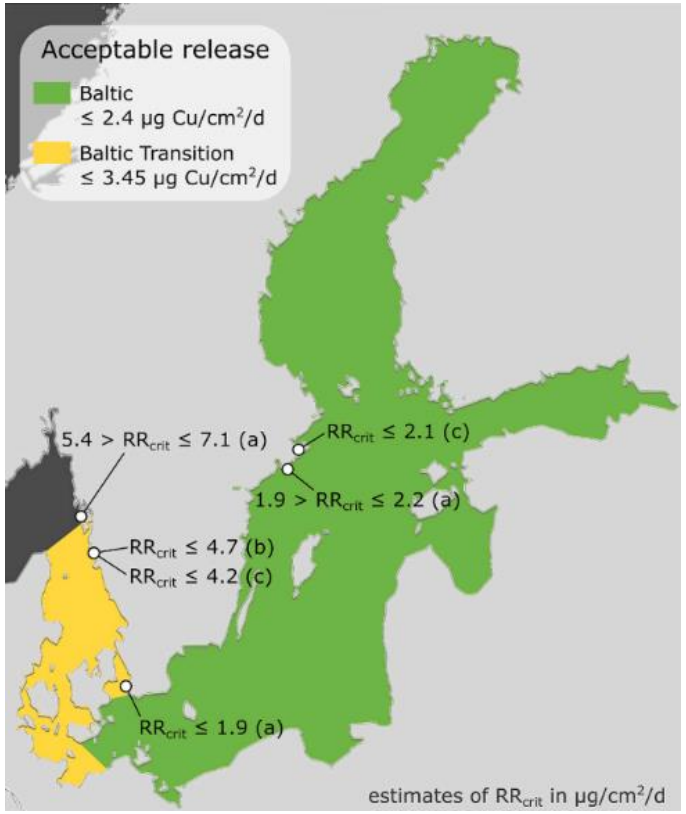
Environmental risk assessment of using antifouling paints on pleasure crafts in European Union waters

Erik Ytreberg [a,*], Maria Lagerström [a], Sofia Nöu [a], Ann-Kristin E. Wiklund [b]

NonStop VK
2,7 µg Cu/cm²/d

Racing VK
2,7 µg Cu/cm²/d

Aqualine VK
2,5 µg Cu/cm²/d



NonStop EC
0,7 µg Cu/cm²/d

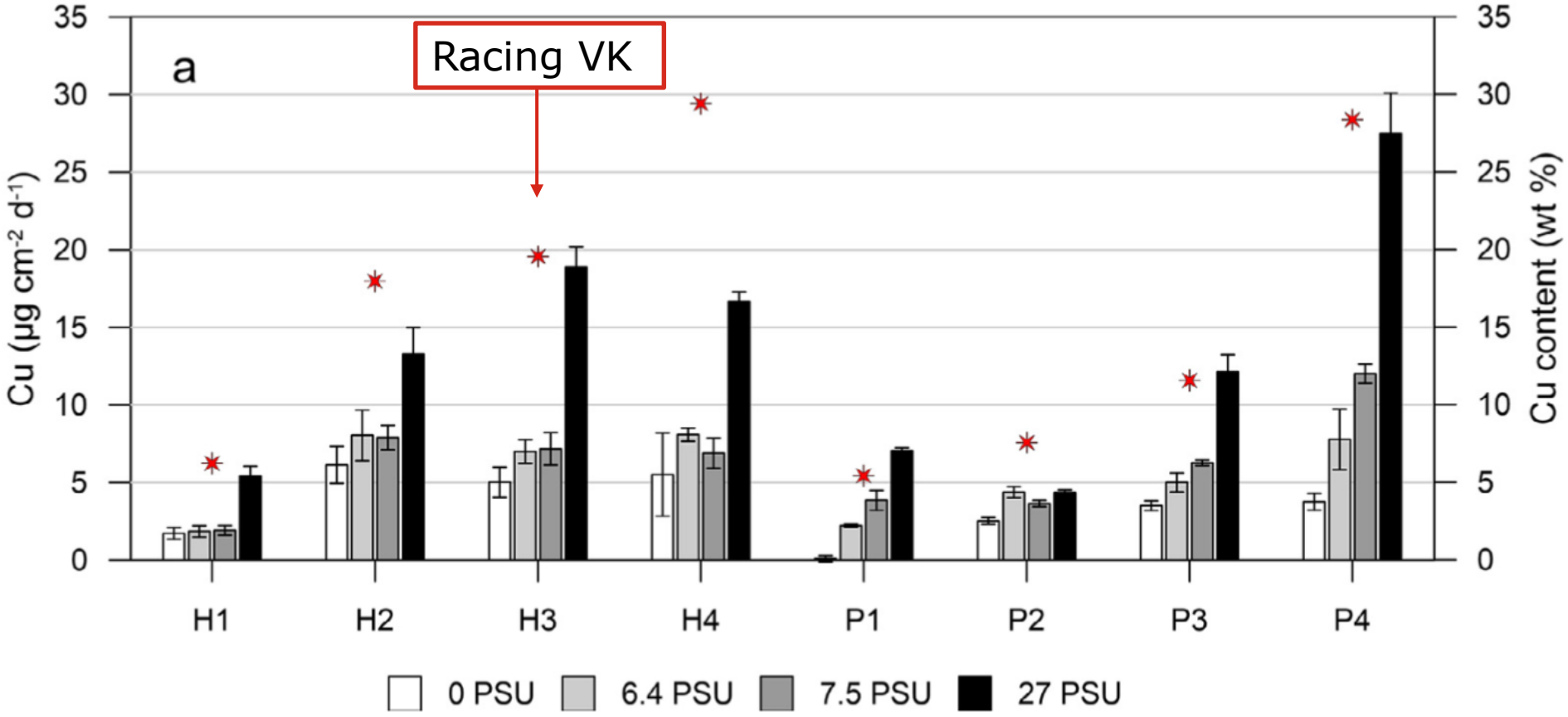
Racing EC
0,4 µg Cu/cm²/d

WaterShield
0,0 µg Cu/cm²/d

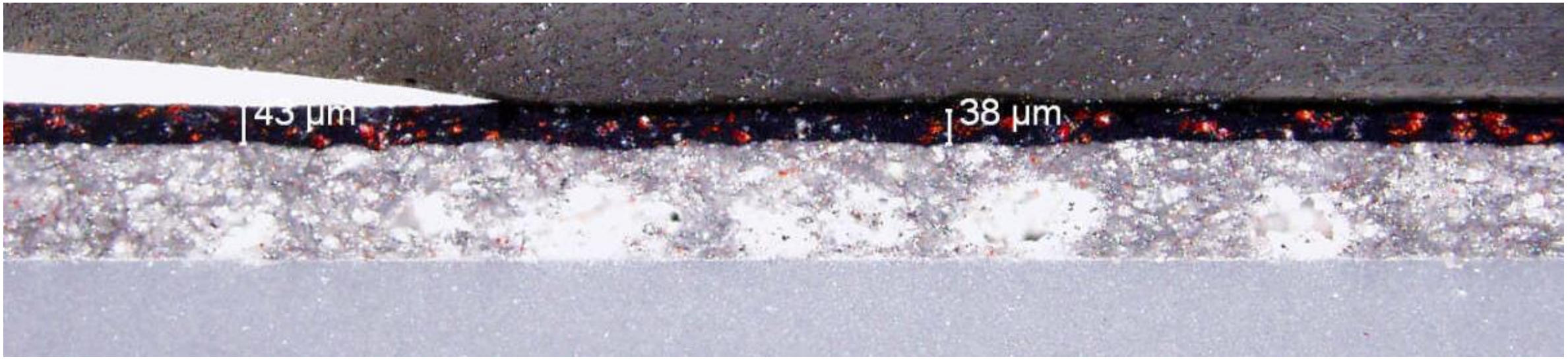
Med denne utlekkings-hastigheten, så ville Racing VK vært tom for kobber etter 140 dager!

Antifouling paints leach copper in excess – study of metal release rates and efficacy along a salinity gradient

Maria Lagerström[a,*], Erik Ytreberg[a], Ann-Kristin E. Wiklund[b], Lena Granhag[a]



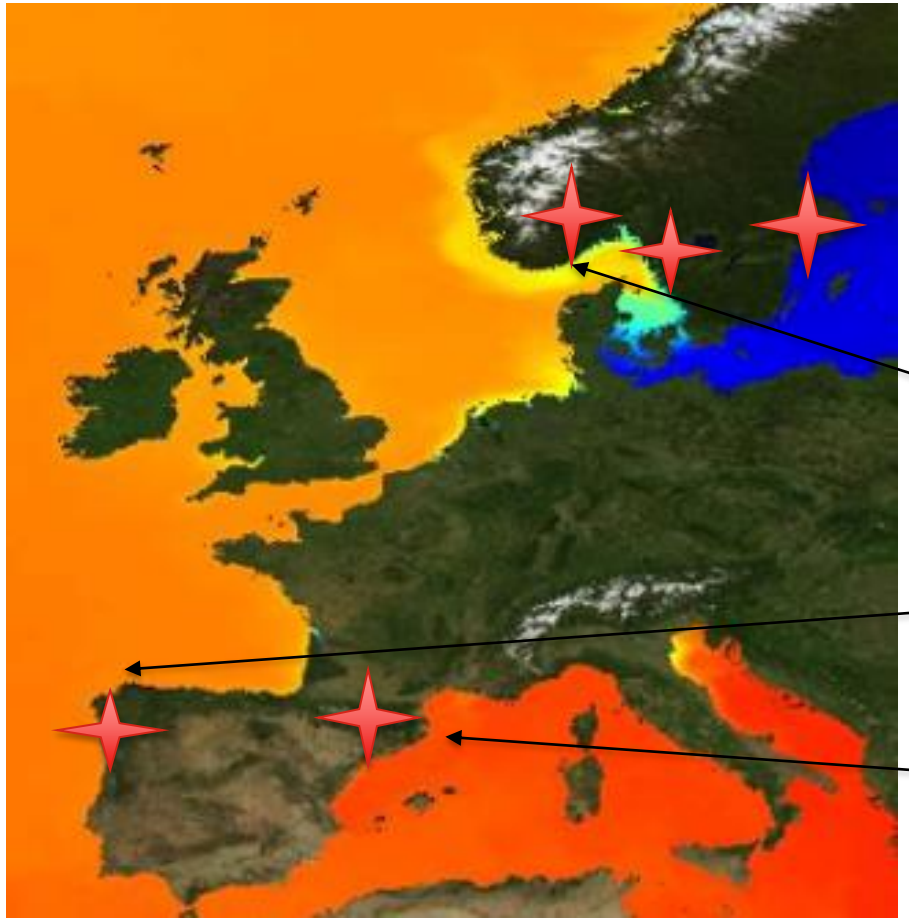
Racing VK Black etter 6 måneder i Göteborg



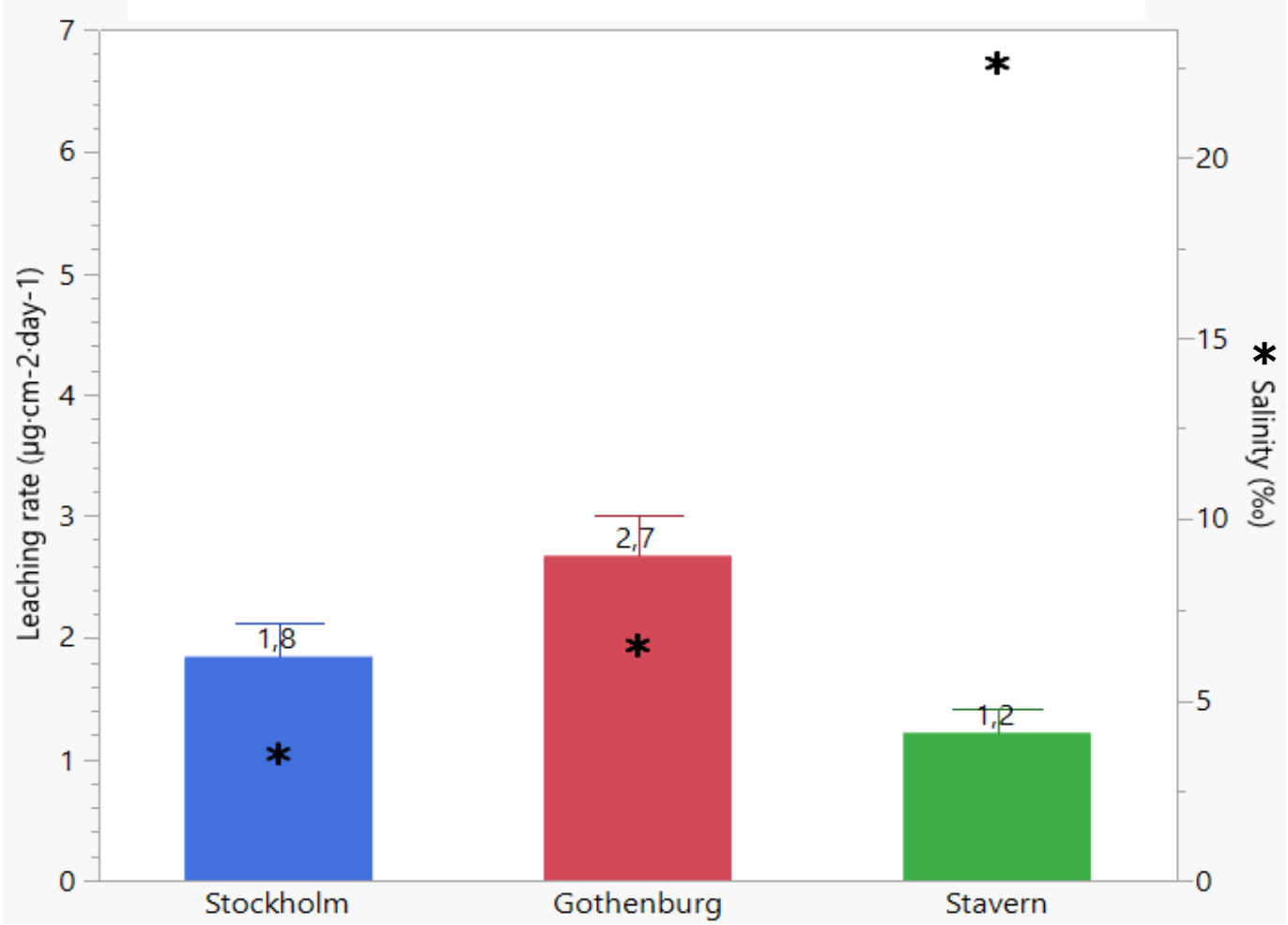
Malingsfilmen er ikke tom for kobber!

Jotun feltstudie i Europa

- 5 marinaer (4 to 38‰)
- 9 produkter
- 6 måneder
- Fra april til oktober



Racing VK



Marinaen med den høyeste saliniteten har den laveste utlekkingen!

Det må være andre parametere som har påvirket Chalmers resultater.

UNIVERSITY OF GOTHENBURG

DEPARTMENT OF MARINE SCIENCES

MSc-student analyserte Jotun's malinger med XRF

RELEASE OF COPPER FROM ANTIFOULING PAINTS EXPOSED IN EUROPEAN WATERS

Author: Emma Rova

JOTUN

Kun 4 av 9 produkter var mulig å måle med XRF

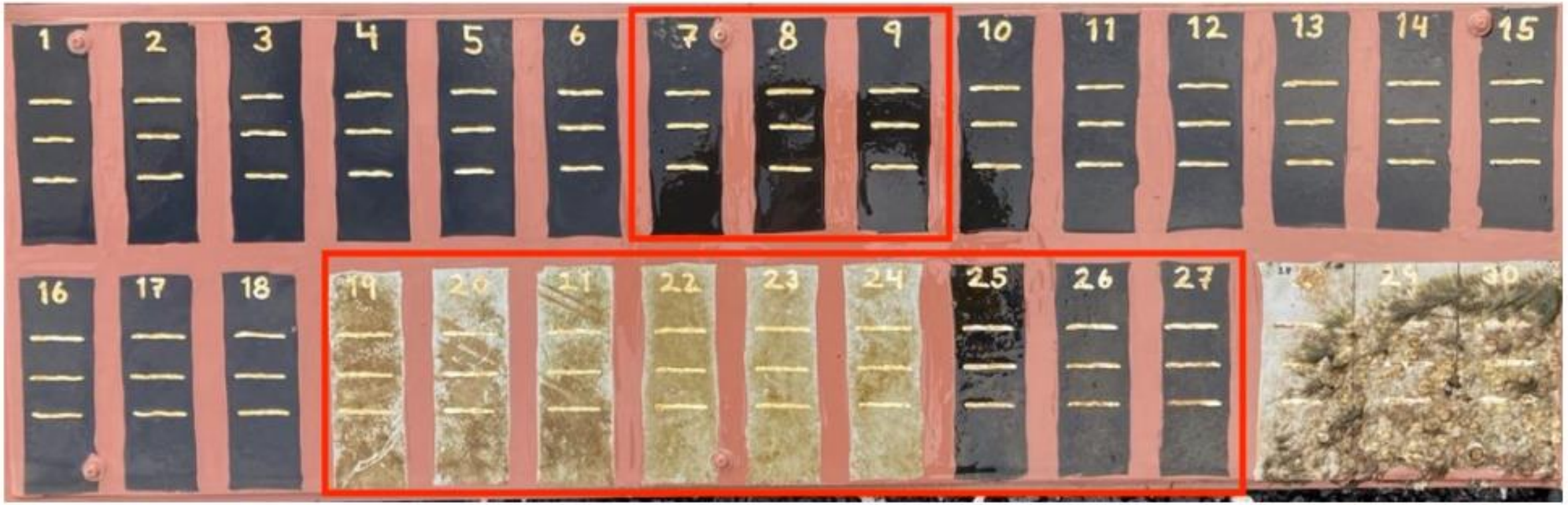
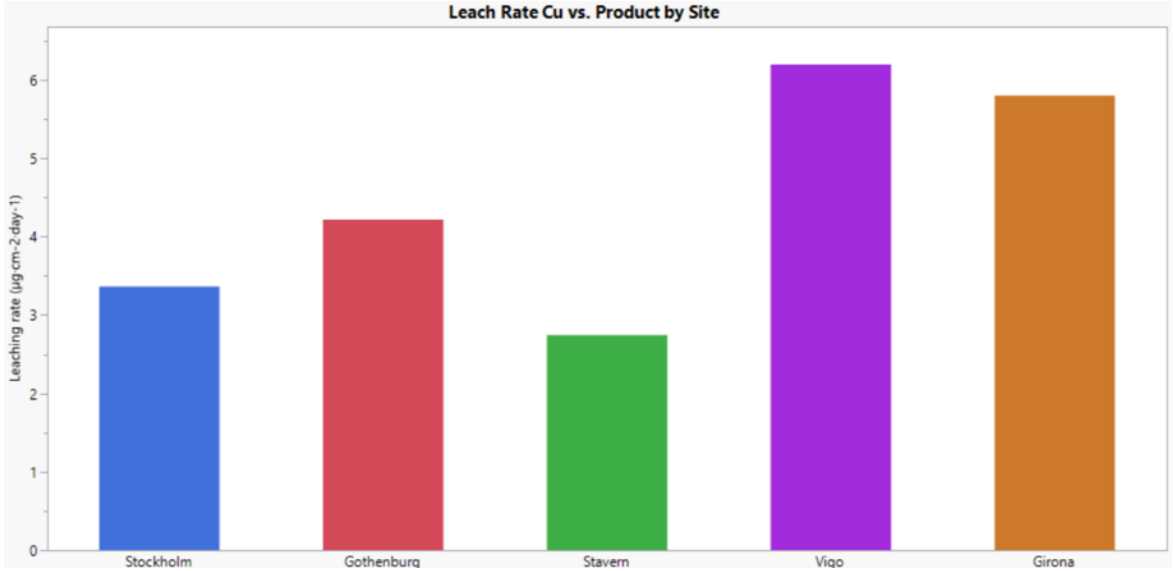


Figure 12: Full picture of panel retrieved from Stockholm site. Red boxes indicate the analysed paints in this study.

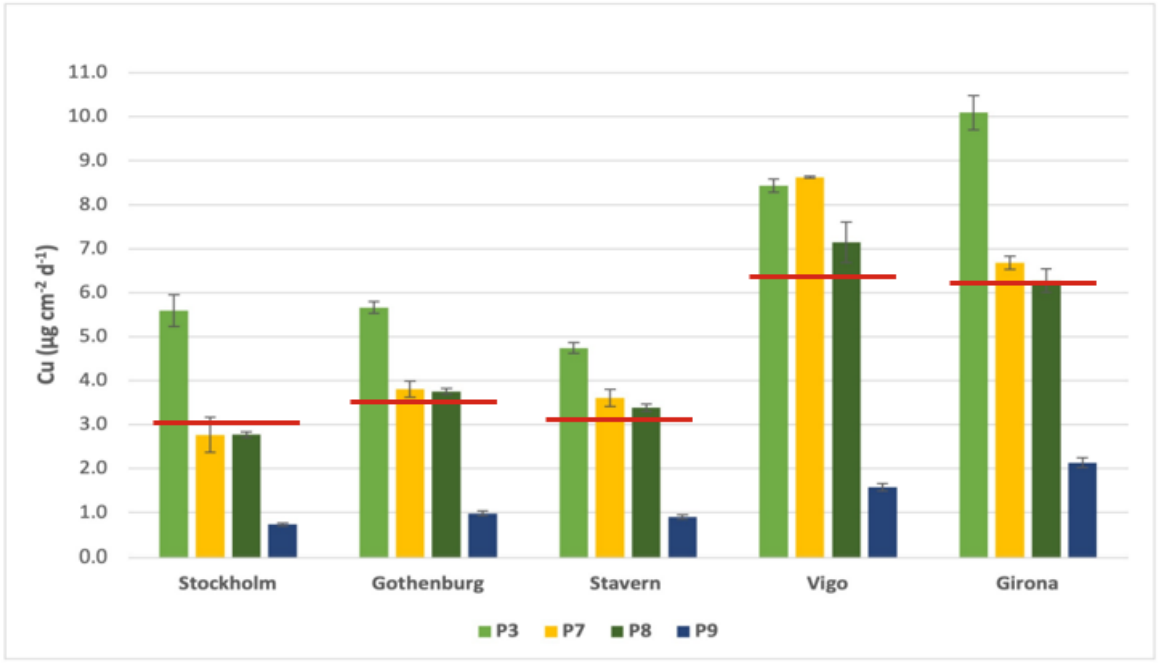
…men hun fikk like resultater som Jotun

Mikroskop



P1-P9

XRF



HALVA FÖRBRUKNINGEN MED REN BOTTEN!

TESTADE AV

Mellan en ren och beväxt båtbotten skiller oceaner vad gäller bränsleförbrukning, fart, ac
Vi släpper ut massor av skit i natu
det kostar både pengar och njutni

Utslipp til luft kontra sjø

Luft

Drivhusgasser

Ikke regulert

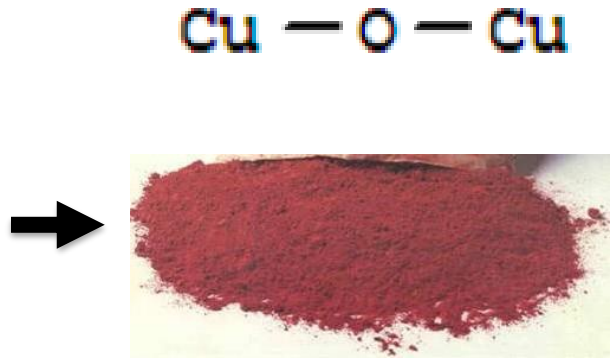
Sjø

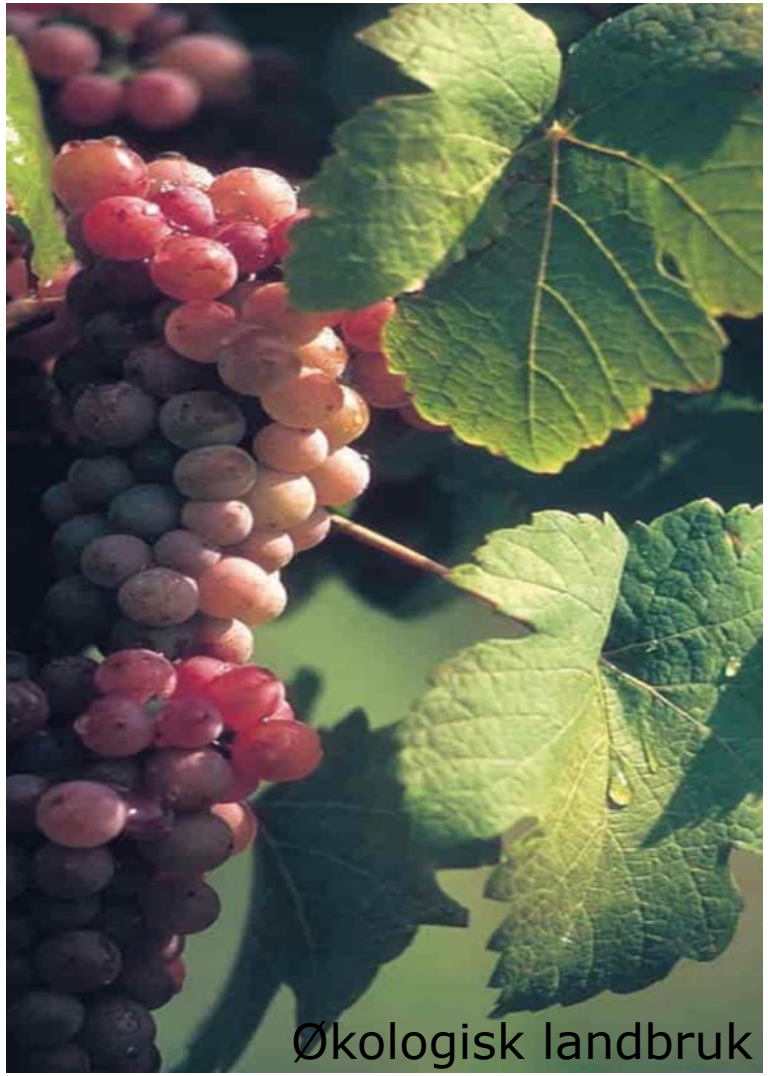
Biocider

Strengt regulert

Kobberoksid finns i naturen

Vi bruker kun re-sirkulert kobber





Kobber blir oppfattet som helt naturlig i andre markeder

”Det finns stor risk att arten kan komma till svenska hav som påväxt på båtar”
SLU Artdatabanken

Filtsjöpung ”Havsspya”
Didemnum vexillum

HAVFORSKNINGSINSTITUTTET

Testplater til feltstudie i Karmsundet
2022

JOTUN

HAVFORSKNINGSINSTITUTTET

Hold båten ren

Arten bryr seg dessverre ikke om verken forurensing, grus, stein eller støv. Næringssalter og overflod av planteplankton er heller ingen trussel, da havnespyet lever av å spise blant annet plankton. En trøst kan være at havnespy ikke så lett fester seg på godt vedlikeholdte båter.

– Vi testet fire ulike typer bunnstoff i nærheten av havnespy, og alle beskyttet godt, sier Husa.

Bildet viser test-platene etter en sesong i Karmsundet. Alle de **kobber**-baserte produktene var effektive, mens de ubehandlede platene, som den nærmest på bildet, var begrodd av sekkedyr (sjöpung, tunicates).

JOTUN

Hvordan kan fritidsbåter unngå å bidra til spredning!

Rengjøring av skrog på land

Rengjøring av skrog under vann

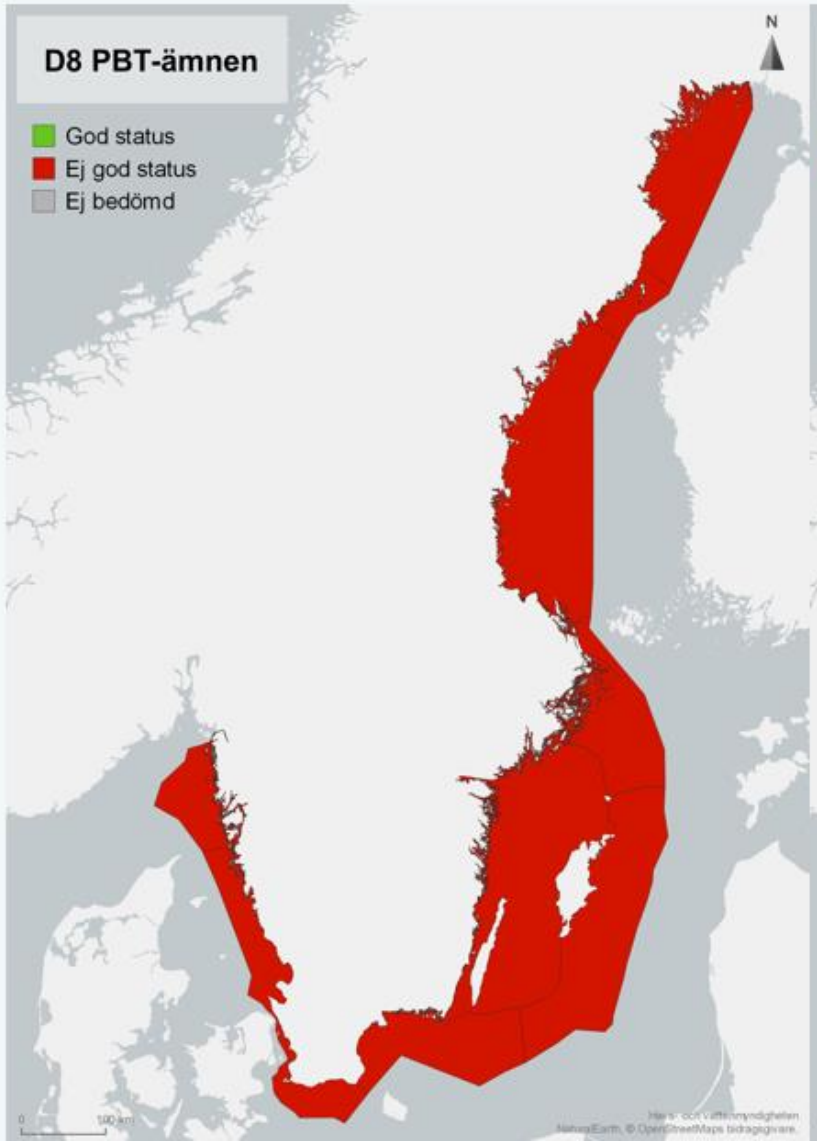
Opptak av båt som er behandlet med biocidfritt bunnstoff og vasket i løpet av sesongen. Begroing med sekkedyr (sjöpung) kan sees på drev og lettmetalldeler hvor det er vanskelig å komme til med rulle og pensel. Aqualine Spray er anbefalt.

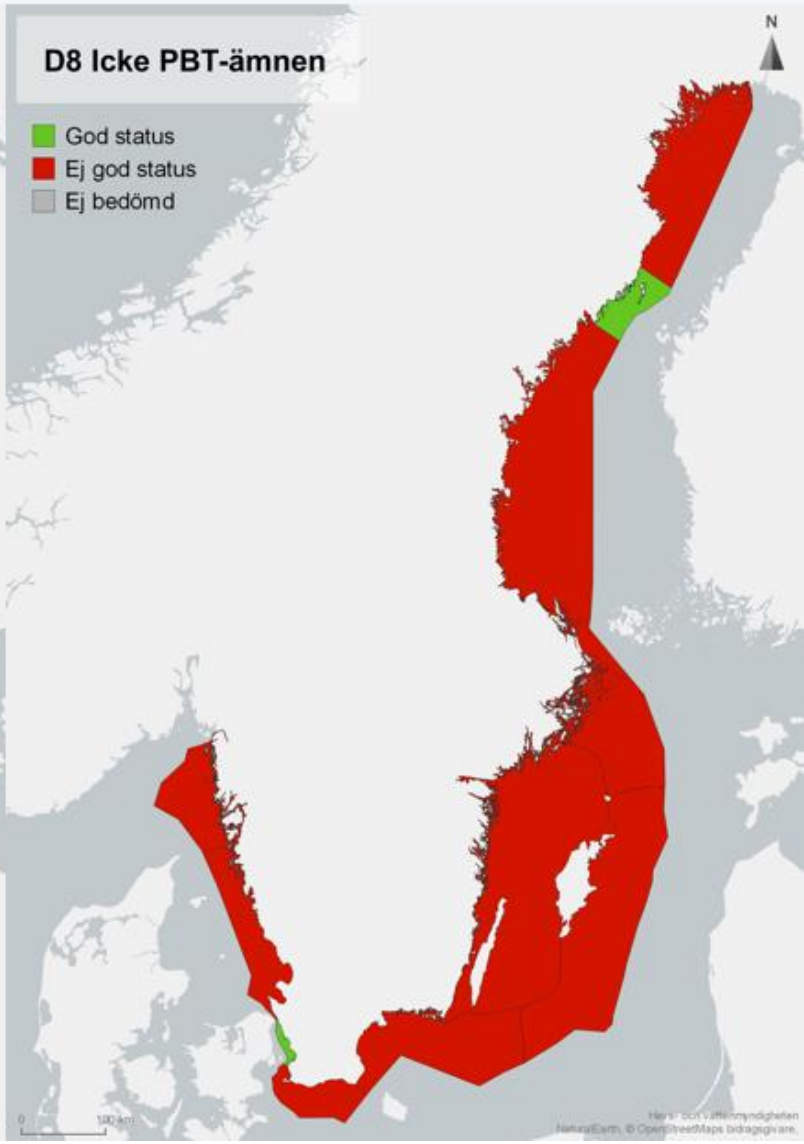

FOR SOME FORMS OF LIFE,
IT'S BEST NOT TO TRAVEL
JOTUN
A sector group of Cefic

Current situation- Swedish marine environment

Havs och Vatten myndigheten

- PBT-substances: Good environmental status is not reached in any area
- Non-PBT substances: Good environmental status is reached only in areas where there is a lack of measurements





Background concentrations and extent of Cu, As, Co, and U contamination in Baltic Sea sediments

Sina Shahabi-Ghahfarokhi [a,*], Mats Åström [a], Sarah Josefsson [b], Anna Apler [b], Marcelo Ketzer [a]

[a] Linnaeus University, Faculty of Health and Life Sciences, Department of Biology and Environmental Science, Sweden
[b] Geological Survey of Sweden, Uppsala, Sweden

This study established background (pre-industrial) values of copper (Cu), arsenic (As), cobalt (Co), and uranium (U) in Baltic Sea sediments. The indicated background values could help identifying the spatial and temporal anthropogenic loads of these elements (metals and metalloids) in the Baltic Sea. In this study, 137 sediment samples were collected from cores obtained from 13 monitoring stations in the Gulf of Bothnia (Bothnian Bay and Sea) and the entire Baltic Proper. To understand the extent of contamination, we used direct and combined methods to define the geochemical background values as inputs for the geochemical index (I_{geo}) calculation. The obtained values were then compared with the background values established by the Swedish Environmental Protection Agency. From the direct method, Cu, Co, As, and U had background values of 39, 21.5, 12.4, and 6.3 mg kg^{-1} DW. Copper and U exhibited concentrations above the background values in surface sediment in the western and eastern Baltic Proper (maximum I_{geo} indicates moderate contamination). Arsenic was above background concentrations in the Baltic Sea and highest in the Gulf of Bothnia (maximum I_{geo} indicates strong contamination). Cobalt concentrations were within the range of background values (no contamination).

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Det naturlige bakgrundsnivået var høyere enn forventet

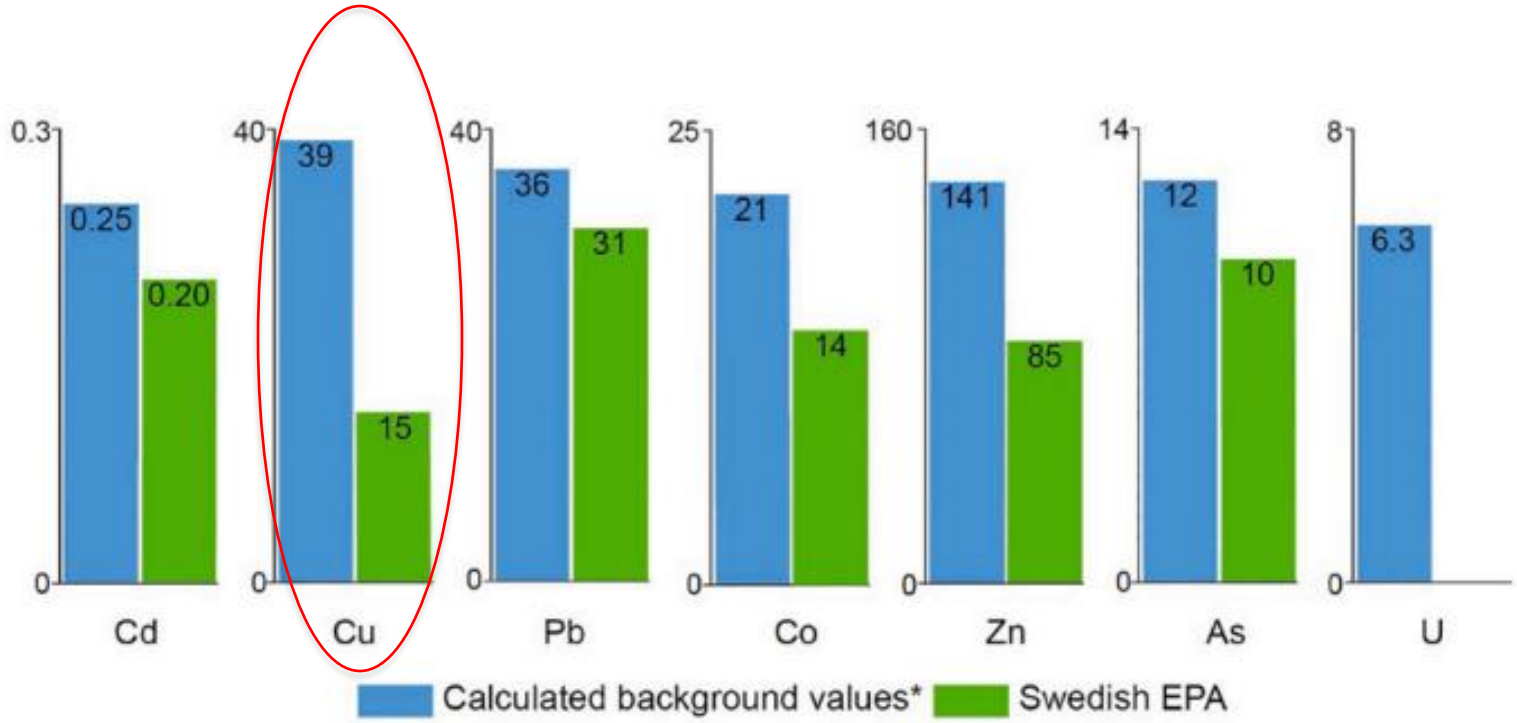
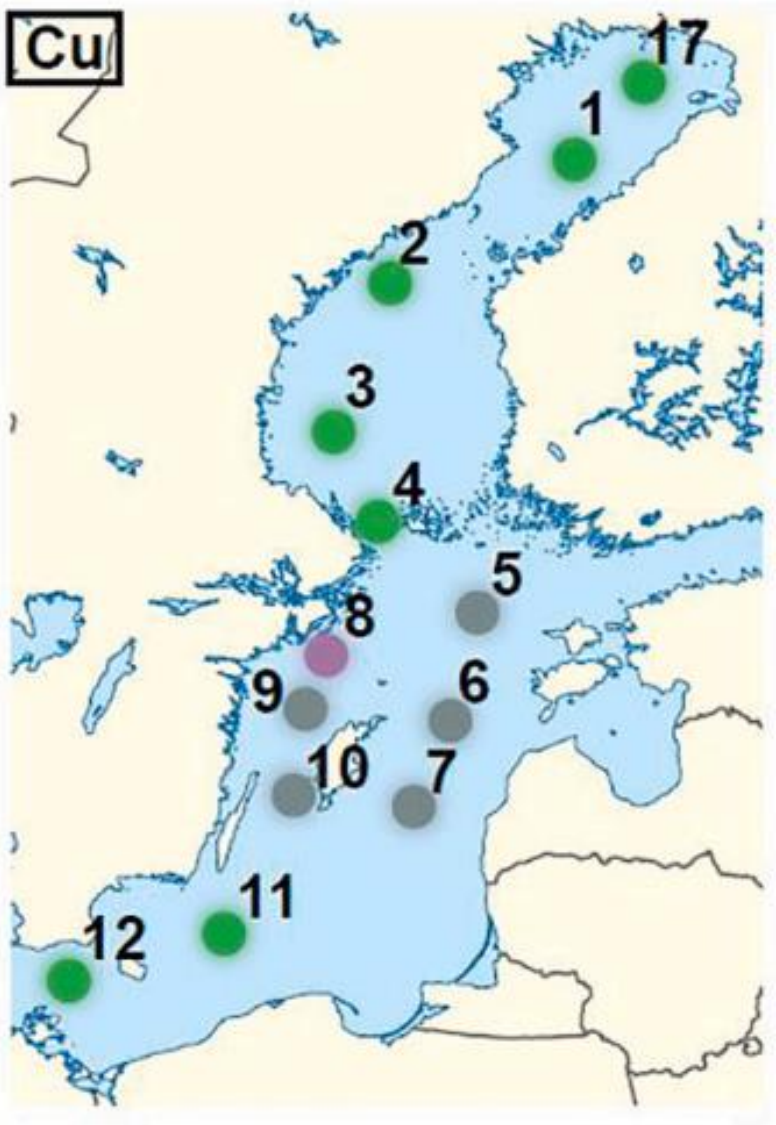


Fig. 8. Calculated background values from the Baltic Sea in comparison to the Swedish EPA values. *Values of Cd, Zn, and Pb were obtained from Shahabi-Ghahfarokhi et al., (2021).



- De før-industrielle nivåene av Cu i sedimentene er høye
- Mye høyere enn det Havs och Vatten myndigheten legger til grunn
- Nordre og Søndre del av Østersjøen er ikke forurenset (0)
- Vestre del er ikke- (0) til moderat forurenset (I)
- Utenfor Stockholm er sedimentene moderat forurenset (II)

(0) uncontaminated, (I) uncontaminated to moderately contaminated, (II) moderately contaminated, (III) moderately to strongly contaminated, (IV) strongly contaminated, (V) strongly to extremely strongly contaminated, and (VI) extremely contaminated

Draft Antifouling Paints in Washington State: Third Report to the Legislature

During our review of biocidal ingredients, we found non-copper antifouling biocides registered for use in the Washington State have remained essentially unchanged since our last review in 2019. Based on the new scientific information reviewed, Ecology concluded that Tralopyril/Econea and zinc pyrithione are not safer replacements to copper. DCOIT is a safer chemical to copper based on our current knowledge, but we lack sufficient data to conclude the effectiveness.

We reviewed research and studies related to non-biocidal paints, which are still in early development. Non-biocidal paints are emerging products designed for commercial vessels. Very limited products are available for recreational boats now. Currently available information suggests that non-biocidal paints primarily use silicone polymers or fluorinated chemicals, which may pose their own hazards. Most of the needed scientific information on environmental impacts is still not yet available.

At this time, Ecology is not able to determine "that safer and effective alternatives to copper-based antifouling paints are feasible, reasonable, and readily available" pursuant to RCW 70A.445.020. As a result, the potential restrictions on copper-based paints in RCW

Publication 23-04-057
Page 1

Antifouling Paints in Washington State
November 2023

For fluoropolymer based FRCs, a 2021 California study found three out of four non-biocidal coatings contain high levels of PFAS ranging from 400 ng/L to 50,000 ng/L (Anghera et al., 2022). Another study by Nordic Council of Ministers identified that PFAS is used to make Intersleek 1100SR Part C (50%–75%) (Wang et al., 2020a). Commonly referred to as **forever chemicals**, these fluorinated chemicals are concerning pollutants in the marine environment. Washington State restricts intentionally added PFAS in several consumer products due to concerns in persistence, bioaccumulation, and adverse human health impact (Ecology, 2021b; Ecology, 2022). Ecology cannot support the use of PFAS as a substitute for copper in antifouling paints.

For silicone-based FRCs, literature has mentioned that hydrophilic-modified silicone oils are leaching from foul-release coatings. The leaching of persistent silicone oils could lead to the build-up of oil film on the sediments, and entrapment and suffocation of organisms that live in those environments.

In addition to PFAS or silicone oils, the substances leaching from foul release coating are unknown. Substances that are being released to the environment may include catalysts, unreacted components that migrate to the surface of the polymer, solvents, or low levels of toxic compounds in pigments and other additives. The antifouling paint particles that contain these substances can contribute to marine contamination as microplastics. We lack sufficient information to conclude the toxicity and environmental impact of foul-release coatings.

Jotun frykter at et forbud mot kobber i Sverige vil føre til:

- Økt forbruk av fossilt drivstoff (fossilt bränsle)
- Økt utslipp av drivhusgasser (växthusgas)
- Økt spredning av fremmede arter (invasiva arter)
- Økt bruk av evighetsskjemikalier (evighetsskemikalier)

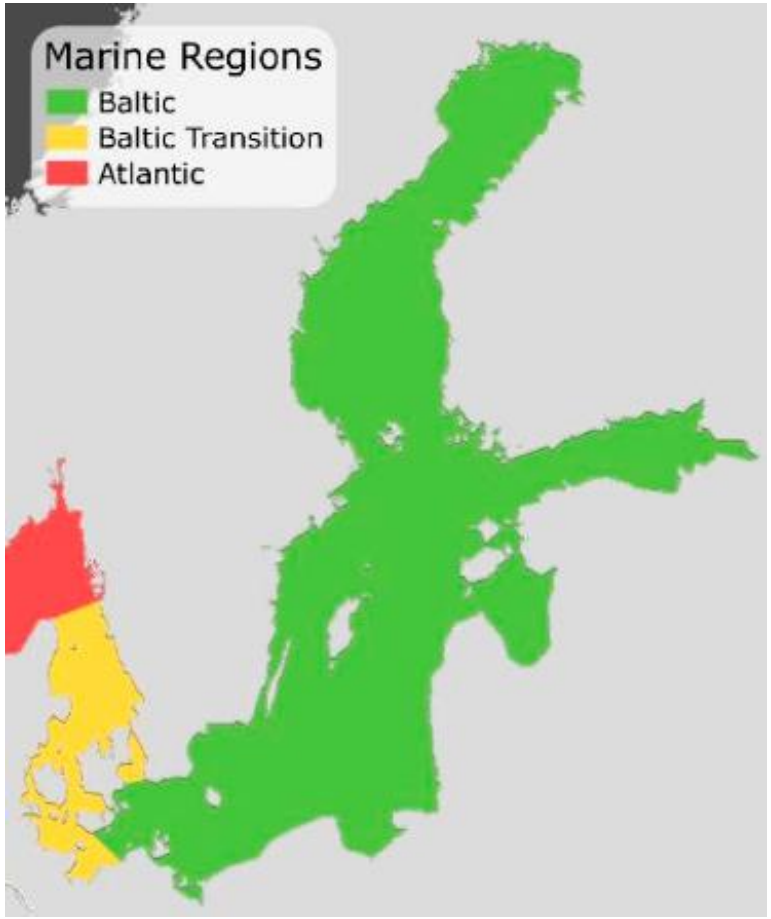
Om forurensningen av kobber i sedimentene langs Sveriges kyst er på nivå II istedenfor nivå VI som man tidligere har trodd –
er det da nødvendig å forby kobber i antifouling?

Jotun’s framtidige sortiment i Sverige?

NonStop VK

Racing VK

Aqualine VK



NonStop EC

Racing EC

WaterShield

Jotun Protects Property