



**HELCOM Maritime
EMSA, Lisbon**

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CLIA

Cruise Lines International Association (CLIA) is the unified global organization helping the cruise industry succeed by advocating, educating and promoting the common interests of the cruise community.

CLIA Community

50+ CRUISE LINES



Ocean, river and specialty cruise lines, representing more than 95 percent of global cruise capacity

340+ EXECUTIVE PARTNERS



Key suppliers and cruise line partners, including ports & destinations and ship development, suppliers and business services

15,000 TRAVEL AGENCIES



Includes the largest agencies, hosts, franchises and consortia

25,000

TRAVEL AGENT MEMBERS WORLDWIDE



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Some relevant facts cruise sector

- Representing approx. 300 of more than 50.000 internationally trading ships (<<1%)
- B2C market, maritime sector in tourism and travel
- Even in most visited places, cruise guests represent max. 6% of all tourism
- Highly predictable sector
- Highly visible and preference to berth close to city centers
- Close cooperation ports, cities and cruise required
- Have showed a steady growth over the past years

Agenda item 5

Airborne emissions from ships and related
measures

EGCS Washwater study update

EGCS Washwater study

- Background
- Goals

EGCS Washwater study- Samples

- Chemical water analyses of washwater were supplied for 291 samples mainly from cruise ships, some from bulk carriers, and ferries.
- Samples were taken from:
 - Seawater inlet;
 - Outlet of scrubber tower; i.e. before any on-board treatment system.
- Any sample not containing sufficient data to calculate emission rate, featuring a negative net concentration as well as outliers were discarded. As a result 253 samples were used and 38 discarded.
- On the basis of the empirical samples, average emissions per tonne of fuel were calculated

EGCS Washwater study- Compounds

Metals

Arsenic

Cadmium

Chromium

Copper

Lead

Mercury

Nickel

Vanadium

Zinc

PAHs

Acenaphthene

Acenaphthylene

Anthracene

Benzo(a)anthracene

Benzo(a)pyrene

Benzo(b)fluoranthene

Benzo(g,h,i)perylene

Benzo(k)fluoranthene

Chrysene

Dibenz(a,h)anthracene

Fluoranthene

Fluorene

Indeno(1,2,3-cd)pyrene

Naphthalene

Phenanthrene

Pyrene

EGCS Washwater study- Emission Rates

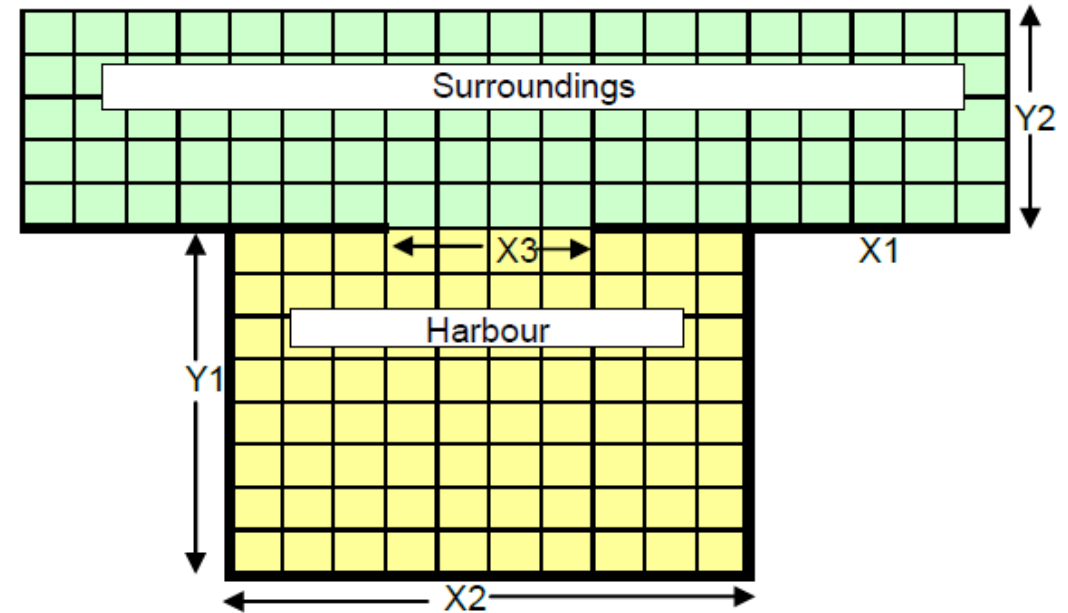
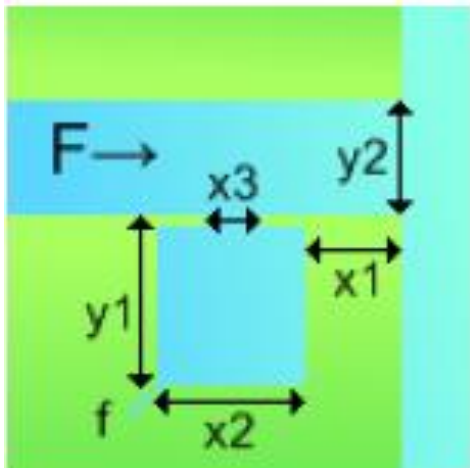
- A reference situation was defined in which
 - a hotel energy consumption of 192 MWh/day
 - translating into 40 tons of fuel consumed per daywas applied for 365 days per year.
- This could represent a number of scenarios, like e.g. three cruise ships with 8 MW hotel load each at berth for 8 hours a day.
- Resulting emission rates (emissions per day) were used as input in the MAMPEC model to calculate the accumulated equilibrium concentrations.

EGCS Washwater study- MAMPEC Model

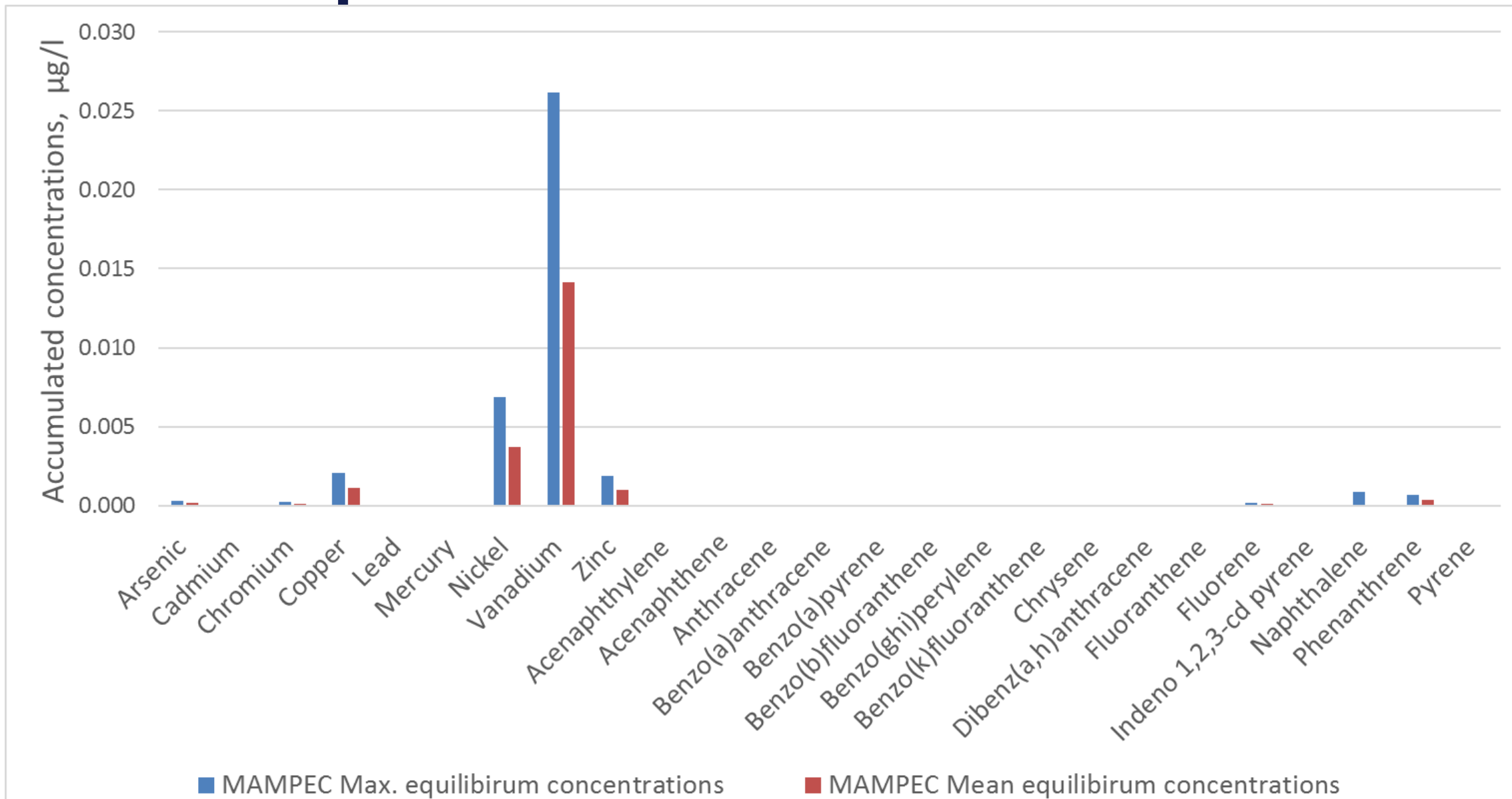
- **Well established, open source** model.
- Developed to **predict environmental concentrations** (PECs) for the exposure assessment of antifoulants in harbours, rivers, estuaries and open water.
- Special version for ballast water (MAMPEC-BW) was developed for IMO;
- MAMPEC BW 3.1.0.3 has been used in project.
- **Suggested (MEPC 74/14/1) to be used for a generalised marine environmental risk assessment.**
- Model features:
- **Steady-state model: calculates equilibrium concentrations for a given set of inputs.**
- Uses series of diffusion coefficients to transfer emissions from cell to cell of a spatial grid.
- Initial port water is assumed to contain **no background concentrations.**

EGCS Washwater study- MAMPEC Model

- Model outcome: Maximum, mean and minimum accumulated equilibrium concentrations for harbour and surroundings.
- OECD-EU Commercial Harbour module has been used so far.
- Module applies specific standards for:
 - Water characteristics;
 - Specific hydrodynamic exchanges;
 - Harbour geometry/spatial dimensions.



Groundwater study- Initial Results – Equilibrium Concentrations



EQS Washwater study- Initial Results

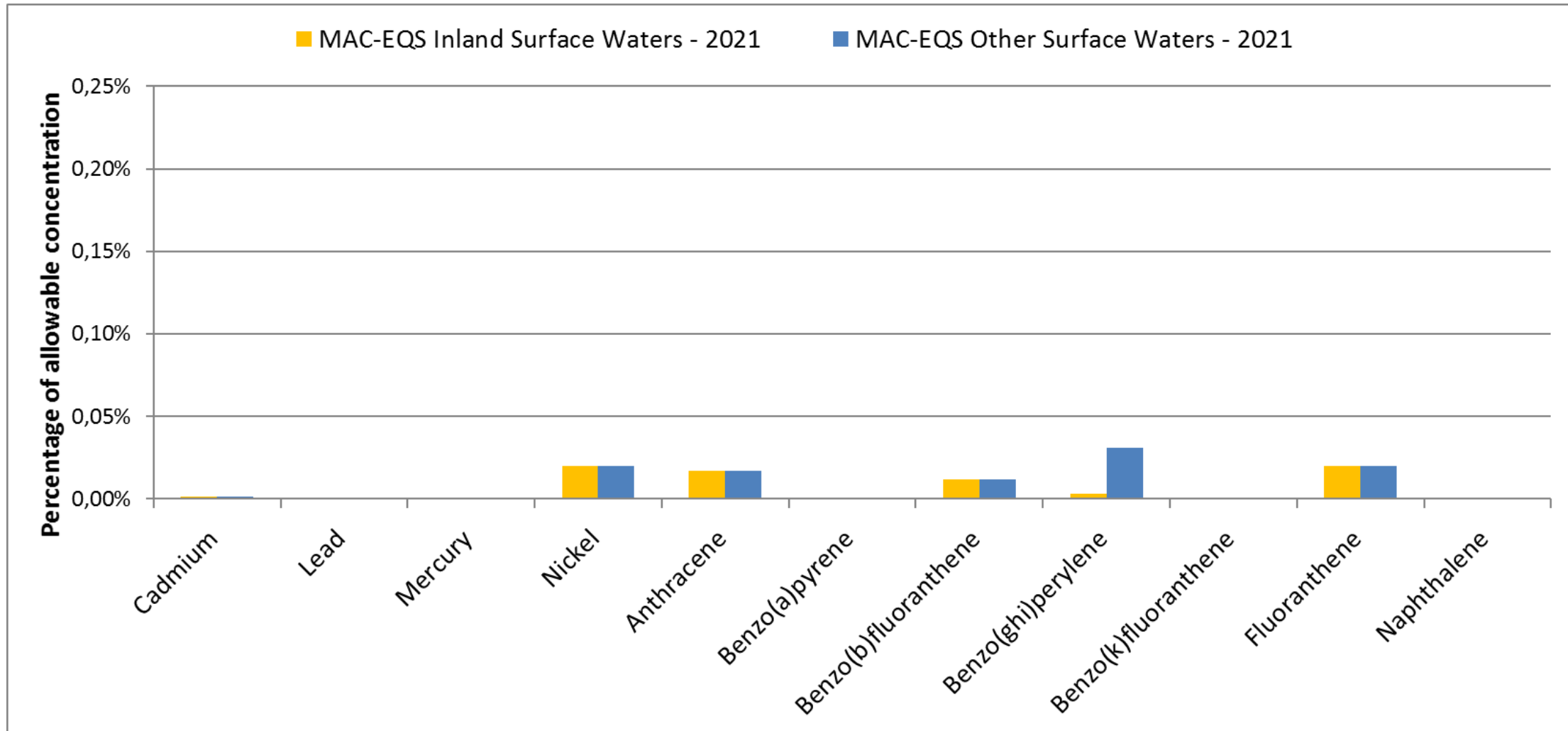
EU Environmental Quality Standards (EQS) 2021

EQS to **be met from 2021 onwards** as laid down in Directive 2013/39/EU for Inland surface waters and Other surface waters for the compounds analysed in this initial assessment.

[µg/l]	Max. Allowable Concentration (MAC)		Annual Average (AA)	
	MAC-EQS Inland surface waters	MAC-EQS Other surface waters	AA-EQS Inland surface waters	AA-EQS Other surface waters
[Total concentrations; for metals dissolved concentrations]				
Cadmium	0.45	0.45	0.08	0.2
Lead	14	14	1.2	1.3
Mercury	0.07	0.07		
Nickel	34	34	4	8.6
Anthracene	0.1	0.1	0.1	0.1
Benzo(a)pyrene	0.27	0.027	0.00017	0.00017
Benzo(b)fluoranthene	0.017	0.017		
Benzo(k)fluoranthene	0.017	0.017		
Benzo(ghi)perylene	0.0082	0.00082		
Indeno(1,2,3-cd)-pyrene	na	na		
Fluoranthene	0.12	0.12	0.0063	0.0063
Naphthalene	130	130	2	2

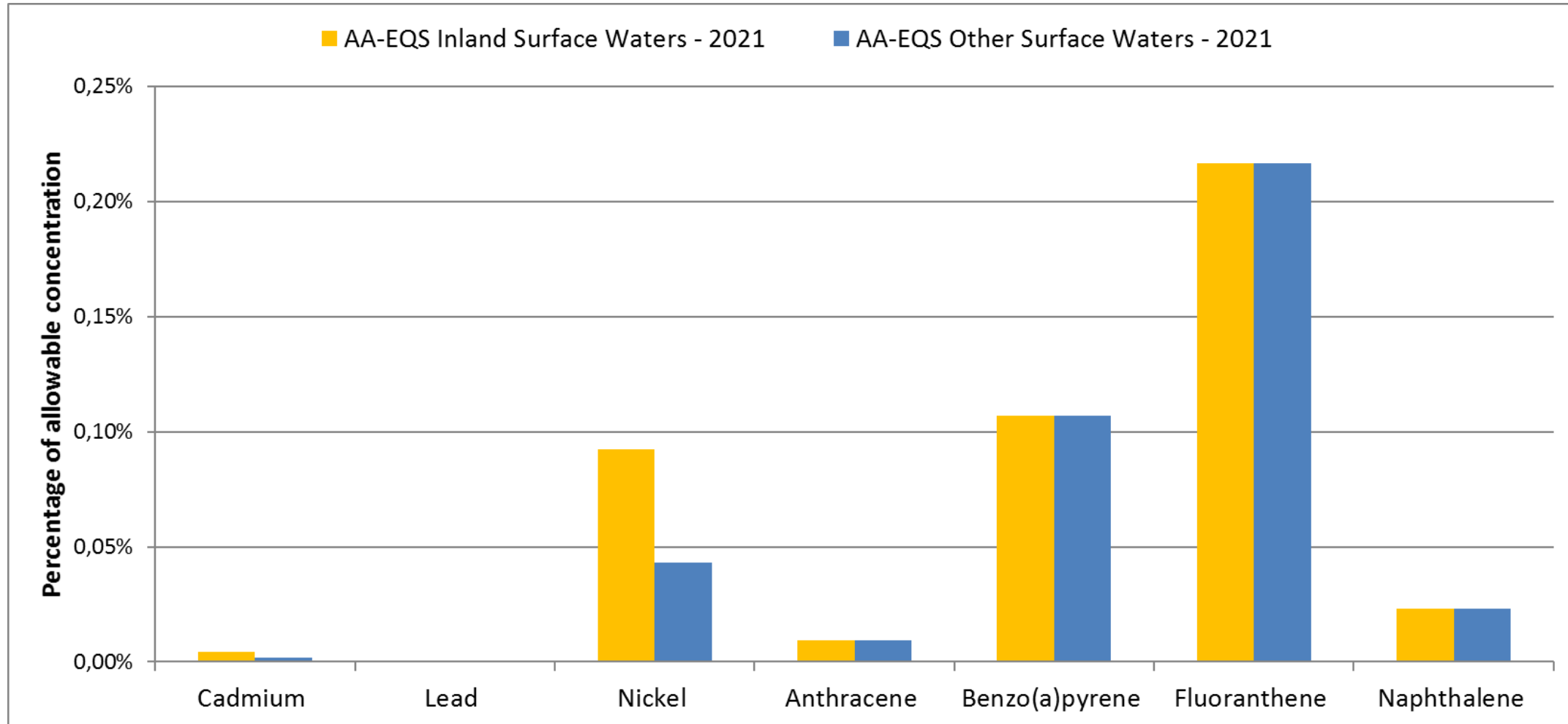
EQS Washwater study- Initial Results

Maximum Harbour Accumulated Concentrations as a percentage of the future (2021) maximum allowable concentration as laid down in Directive 2013/39/EU for Inland surface waters and Other surface waters.



EQS Washwater study- Initial Results

Annual Average Harbour Accumulated Concentrations as a percentage of the future (2021) average allowable concentration as laid down in Directive 2013/39/EU for Inland surface waters and Other surface waters.



EGCS Washwater study- Conclusions

For most of the compounds considered in the specified reference scenario and not considering washwater after-treatment, using open-loop EGCSs increase the equilibrium concentration in the port by 0% - 0.01% of the annual average environmental quality standard in the EU in 2021

For four compounds, Naphthalene, Nickel, Benzo(a)pyrene, and Fluoranthene, open-loop EGCSs increase the equilibrium concentration in the port by 0.02% - 0.2% of the annual average environmental quality standard in the EU in 2021.

Note that the results are dependent on the reference scenario (the number of ships in a port and their fuel consumption), and the port.

EGCS Washwater study- planning

- MEPC 74: Preliminary results presented
- Based on feedback; more focus on sediments
- End September 2019: Draft full report issued to sponsors for review and comment
- Early October 2019: Deadline for sponsors to submit comments and hopefully confirm endorsement of the report
- End October 2019: Final draft of full report issued

Thank you for your attention

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