

Testing water injection dredging for regular port maintenance

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#### Introduction

#### From Kirichek et al (2018), Sediment management in PoR







### WID pilot in 2018

- 1) How WID can be applied for port maintenance?
- 2) What factors should be taken into account during WID?
- 3) What are CO<sub>2</sub> and cost benefits for applying WID for port maintenance?
- 4) Is it feasible to apply WID as a regular port maintenance concept?







# How WID can be applied for port maintenance?





# What factors should be taken into account during WID?

- 1) Hydrodynamic conditions in the WID area: direction and velocity of tidal currents, existing density currents and salinity gradients
- 2) Sediment properties: grain size distribution, shear strength, density, oxygen consumption potential and sediment quality
- **3)** Boundary conditions of the maintained area: bathymetry, slope angle, embankments
- **4)** WID operational parameters: diameter of nozzles, flow velocity from the nozzle, stand-off distance of the jet, trailing speed of the WID vessel



# What are the costs and CO2 benefits for applying WID for port maintenance?



From Kirichek and Rutgers (2020), Terra et Aqua, 160

# Is it feasible to apply WID as a regular port maintenance concept?







### WID pilots in 2020-2021

- 1) Does WID influence UKC?
- 2) What are the environmental impacts of WID?
- 3) What is the frequency of WID?
- 4) How the WID actions can be optimized?











#### What are environmental impacts of WID?





### What is the frequency of WID?







#### How the WID actions can be optimized?





From Kirichek et al (2021), Advances in maintenance of ports and waterways: WID



### Conclusions

- The WID pilots showed substantial costs and CO2 benefits compared to the regular TSHD maintenance
- First results of the WID environmental monitoring campaigns suggest that WID actions don't have a significant impact on the turbidity in the water column
- A number of analytical, numerical and measuring tools are available for optimizing the WID efficiency for port maintenance
- Adapting WID for a regular port maintenance is feasible



## **Questions?**



