

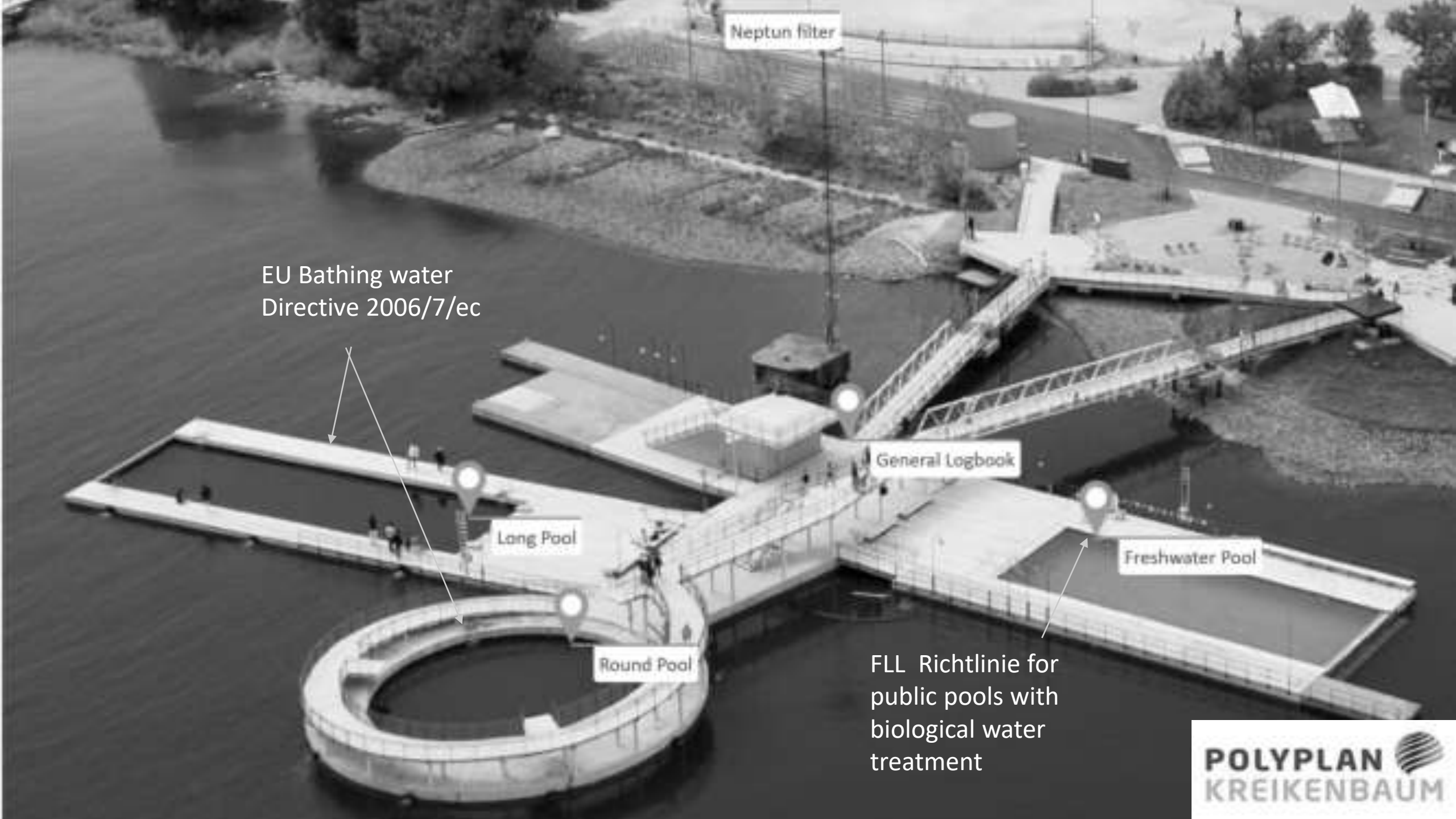
IOB Conference 2023 Mechelen

NSP Millennium Pool Gothenburg  
Stefan Bruns

raumlaborberlin

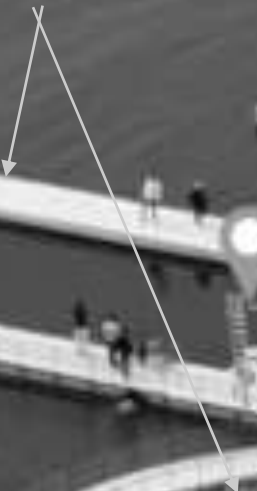


**POLYPLAN**   
KREIKENBAUM



Neptun filter

EU Bathing water  
Directive 2006/7/ec



Long Pool

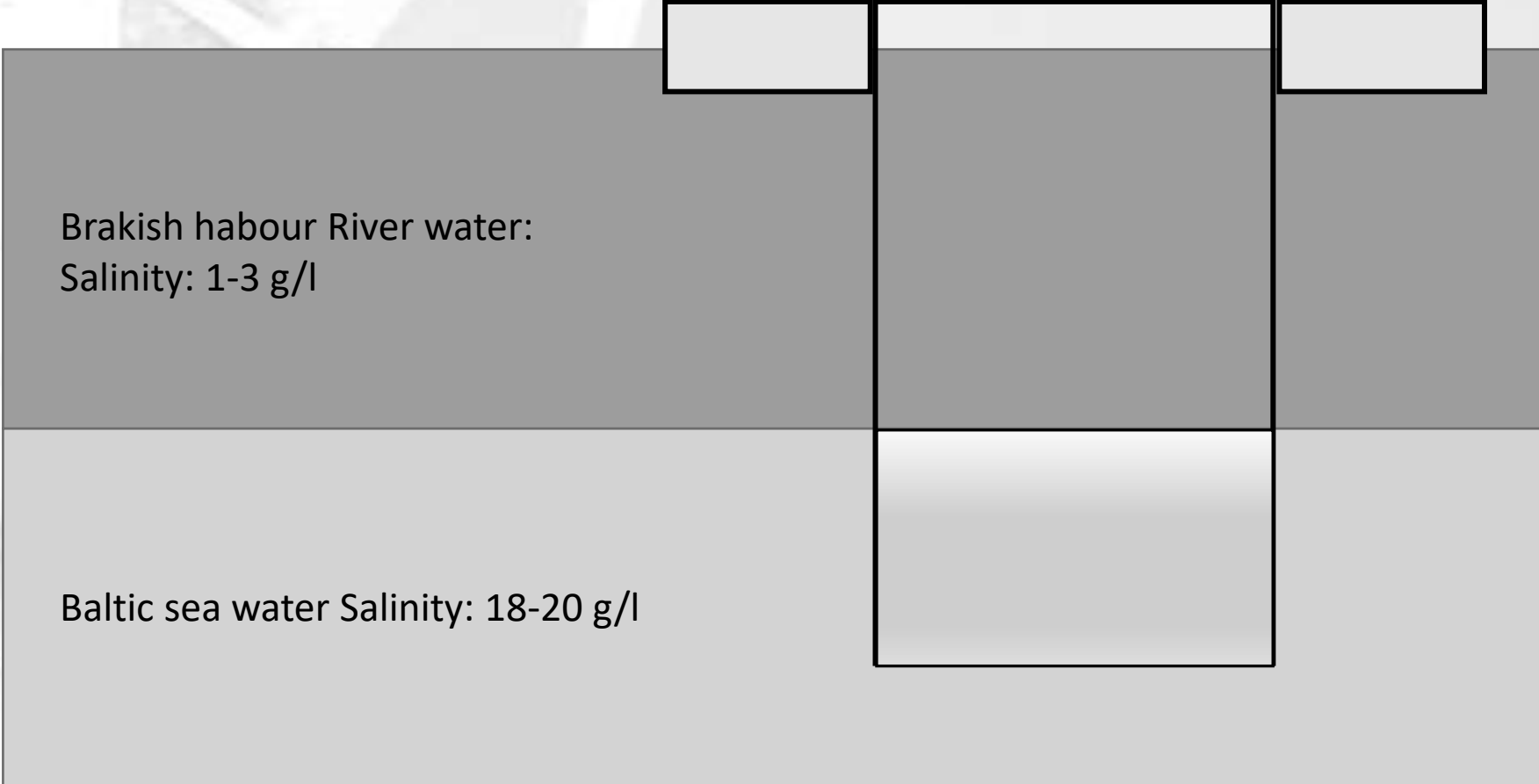
Round Pool

General logbook

Freshwater Pool

FLL Richtlinie for  
public pools with  
biological water  
treatment

# Salt water pool (Function)

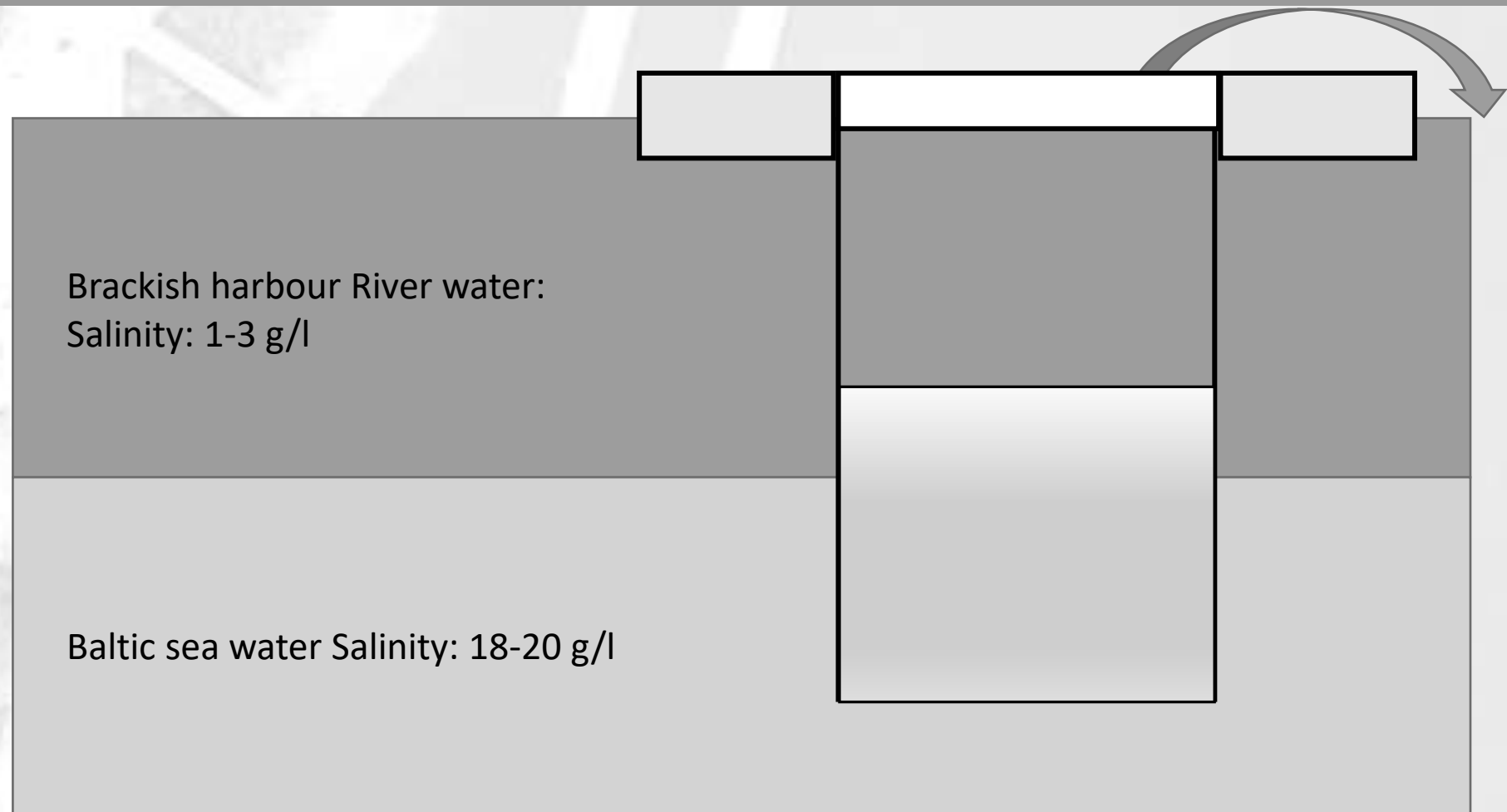


Brakish harbour River water:  
Salinity: 1-3 g/l

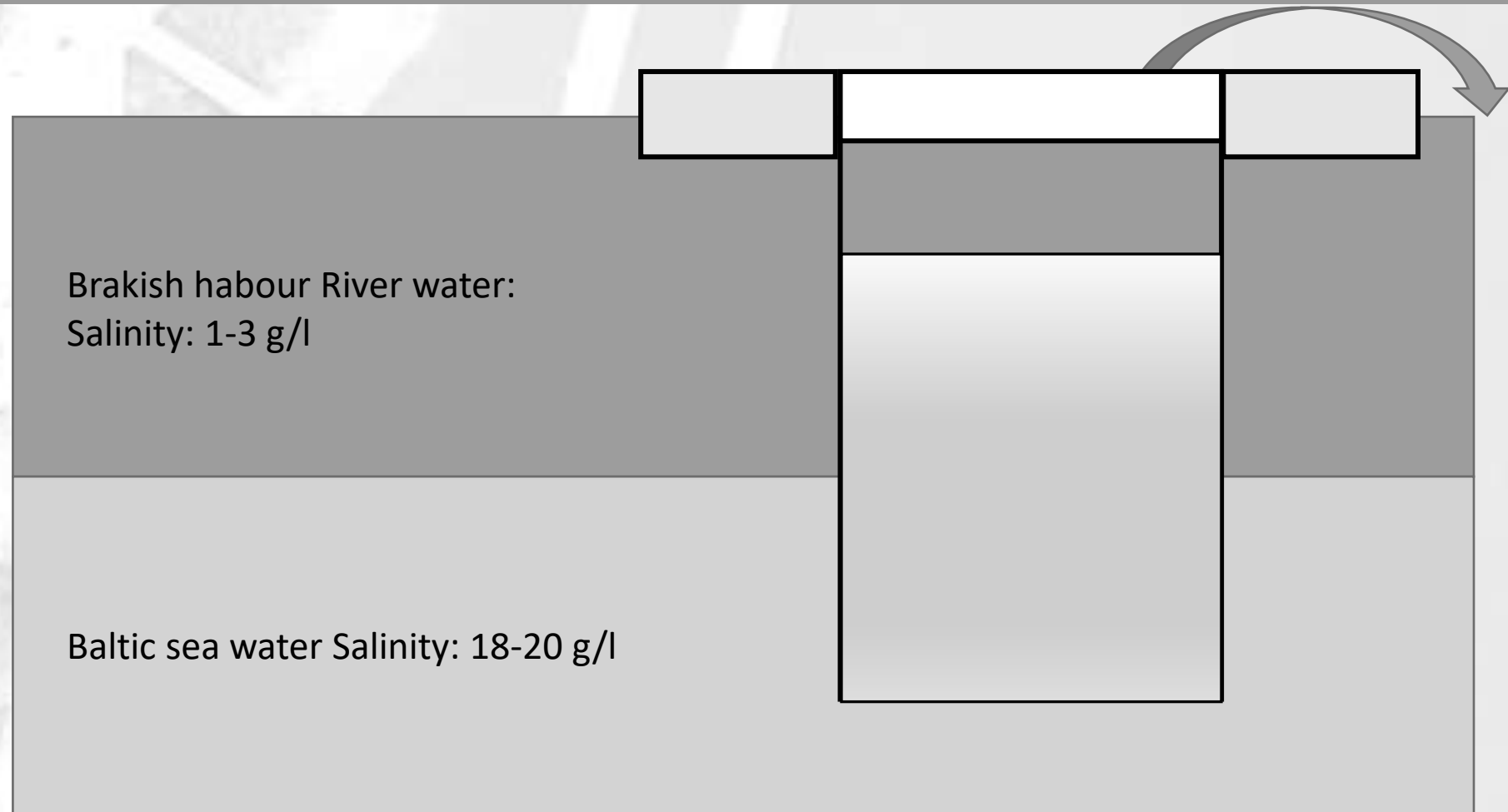
The diagram shows a cross-section of a pool with a central barrier. The barrier is a vertical wall with a flat top. On the left side of the barrier, there is a layer of water labeled 'Brakish harbour River water' with a salinity of 1-3 g/l. On the right side, there is a layer of water labeled 'Baltic sea water' with a salinity of 18-20 g/l. The barrier is positioned such that the water levels on both sides are equal, and the barrier itself is taller than the water level. The barrier is shown as a solid grey block with a black outline. The water layers are also shown as solid grey blocks with black outlines. The background of the diagram is a light grey color.

Baltic sea water Salinity: 18-20 g/l

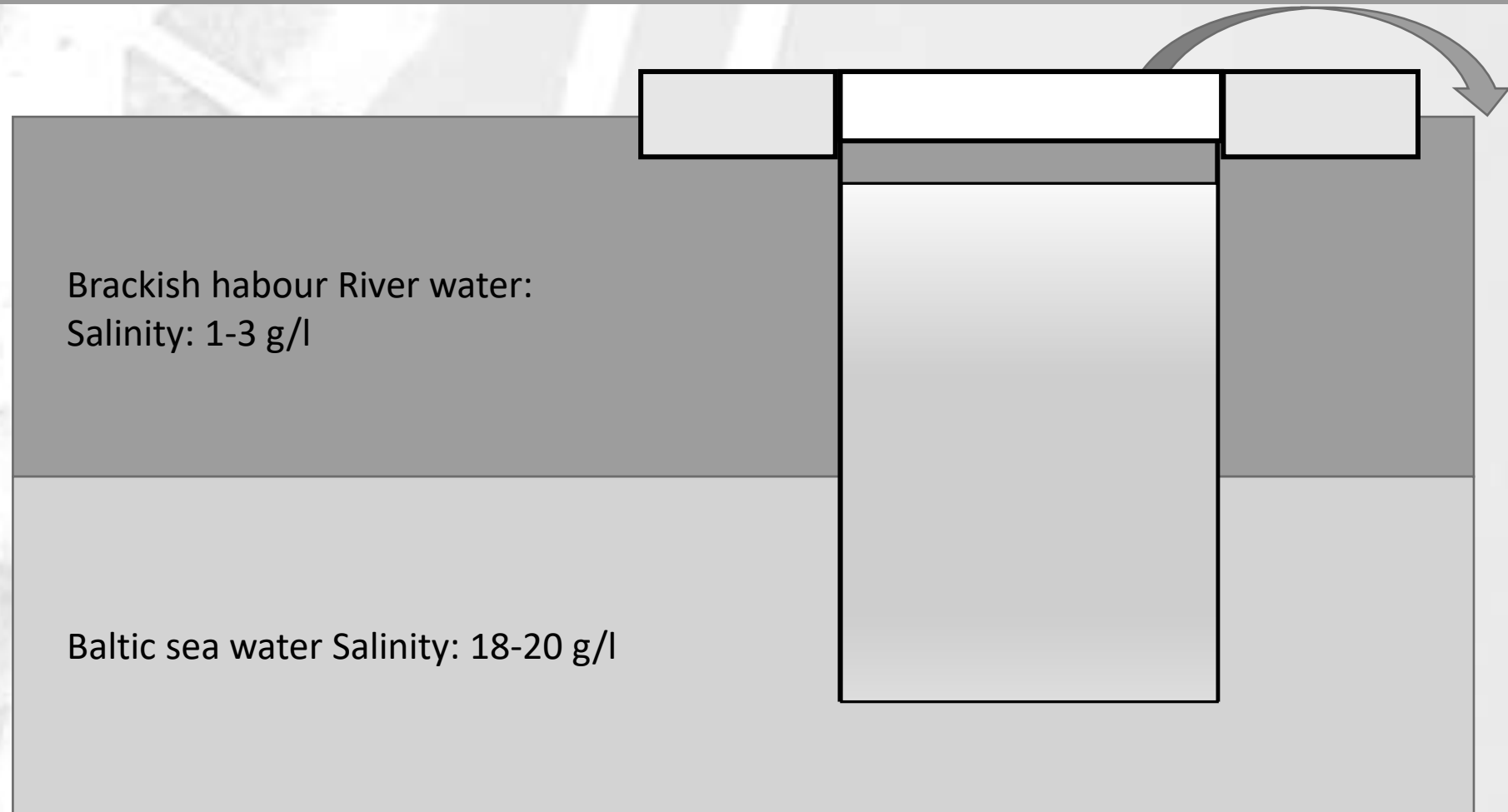
# Salt water pool (Function)



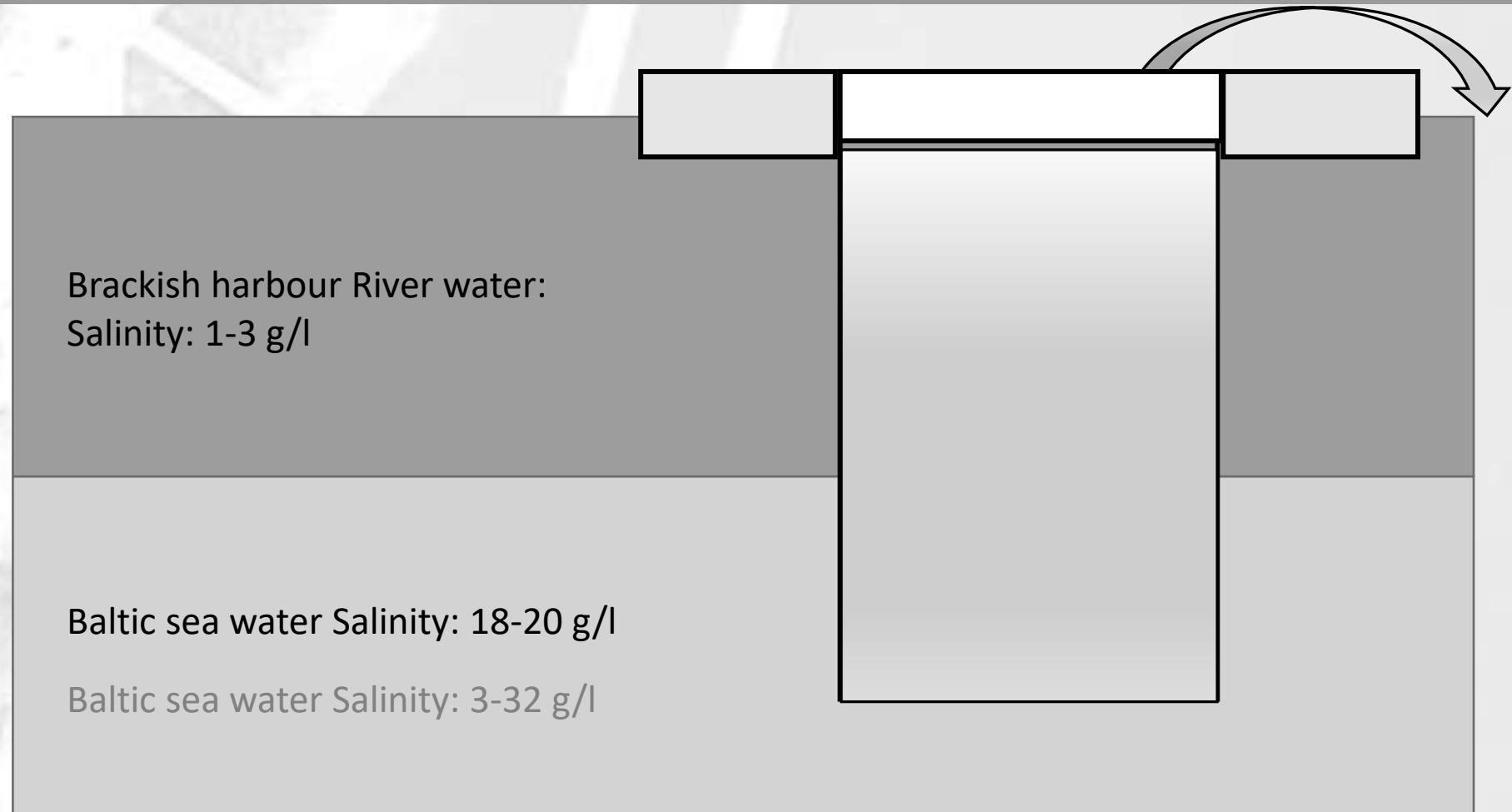
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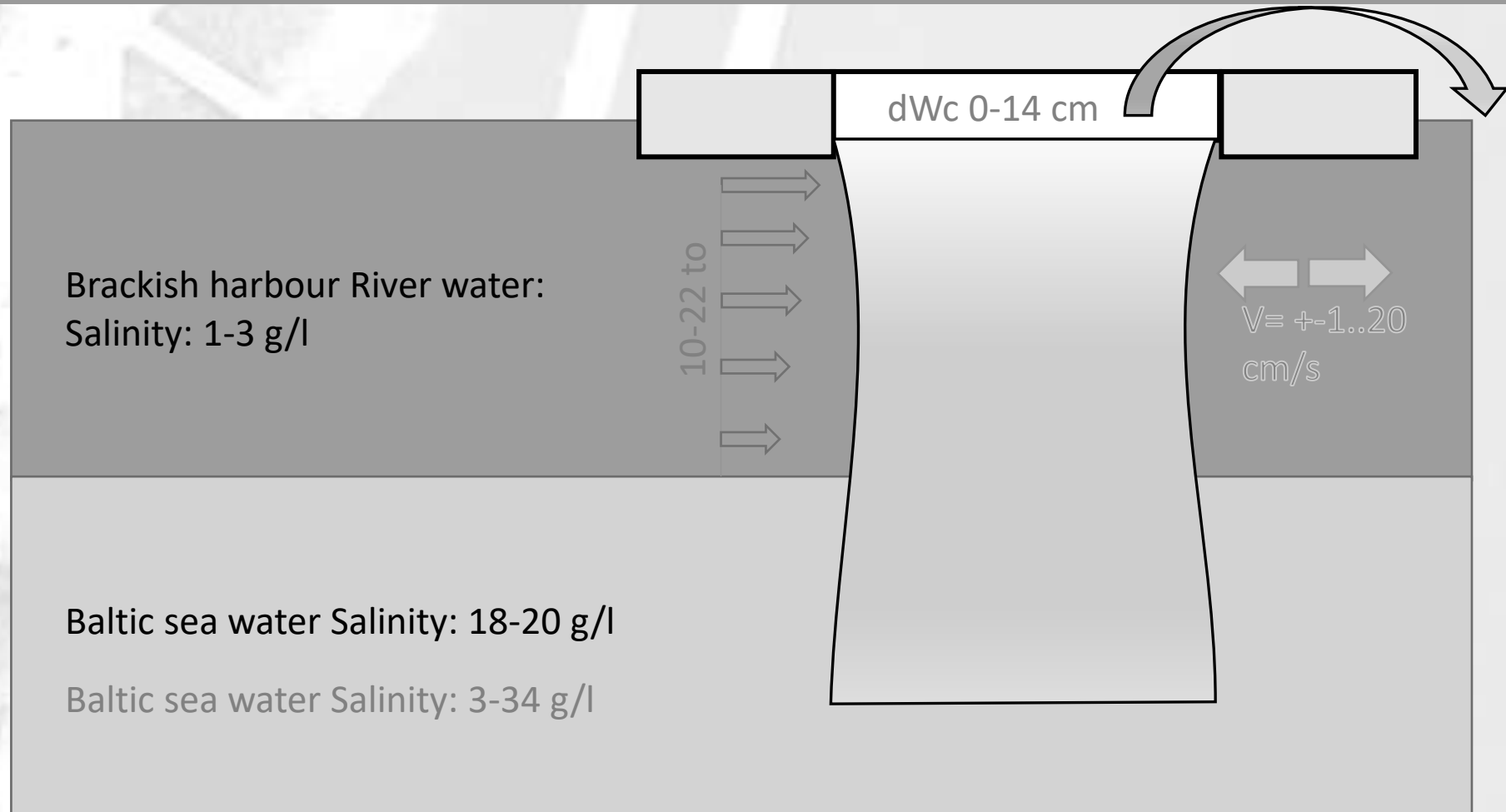
# Salt water pool (Function)



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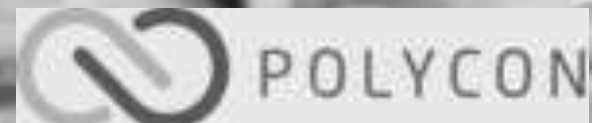


# Salt water pool (stress situation)





As build



# Salt water pool (construction)



# Salt water pool (construction - round pool floaters)



# Salt water pool (shipping – Mega pontoons (500 to)



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**POLYCON**

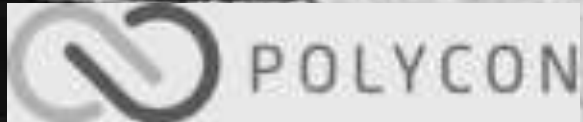
# Salt water pool (shipping and pre-stretching – wall segments with locks)



# Salt water pool (installation of wall segments)



Salt water pool (winter comming back all frequently +5.. – 15 °C)



# Salt water pool (prepartion static spider element round pool)





# Salt water pool (preparation static spider element round pool)



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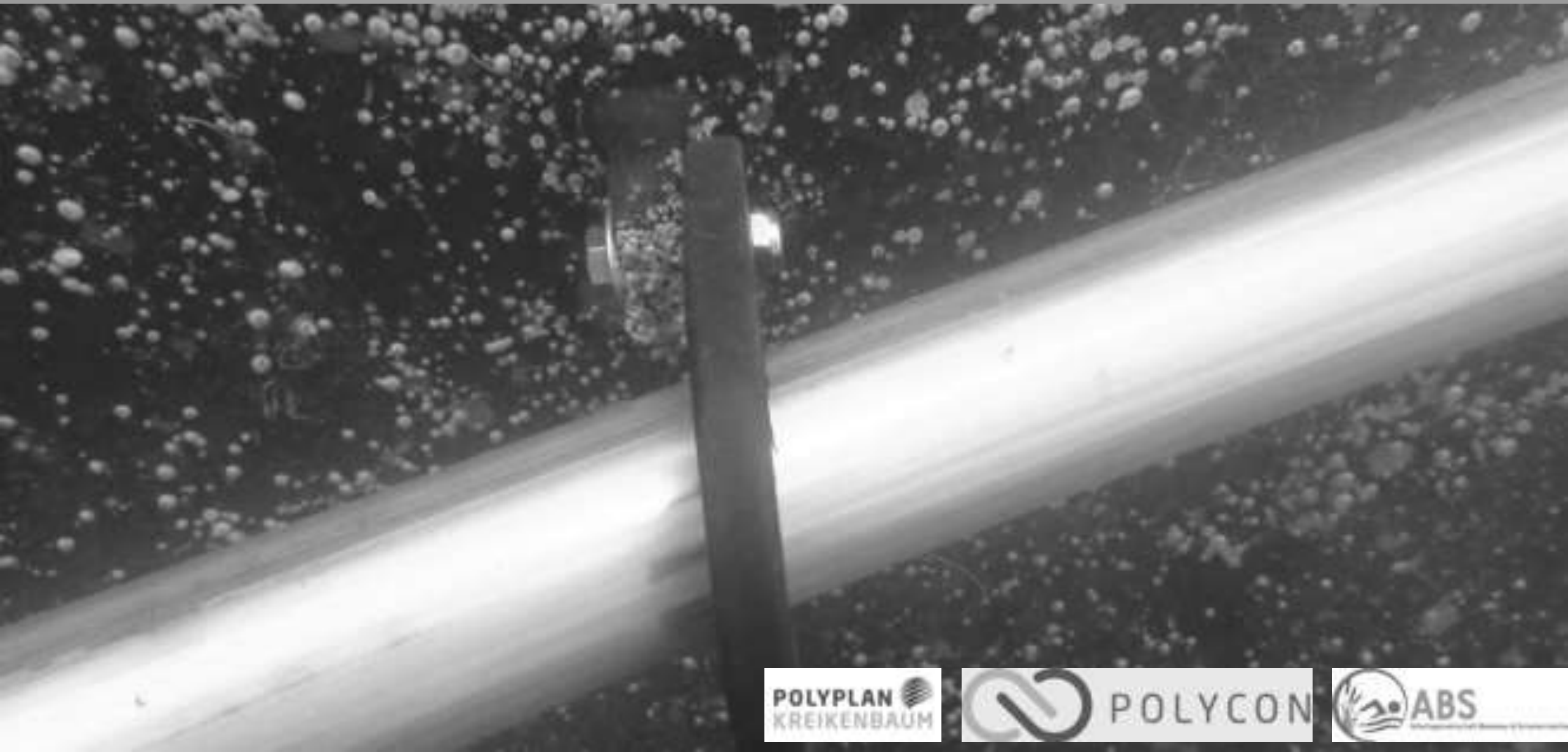
# Salt water pool (prepartion static spider element round pool)



# Salt water pool (under water connections)



# Salt water pool (under water connections)



# Salt water pool (under water connections)



Dress code for 4 month




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 **POLYCON**

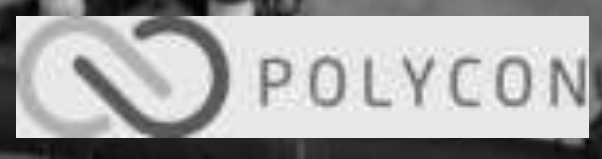
Relaxing time



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 **POLYCON**

# Fresh water pool (technical room)

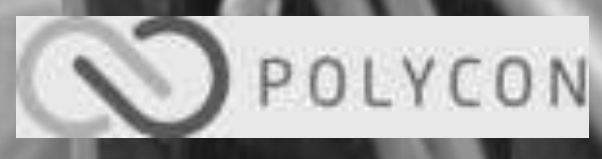
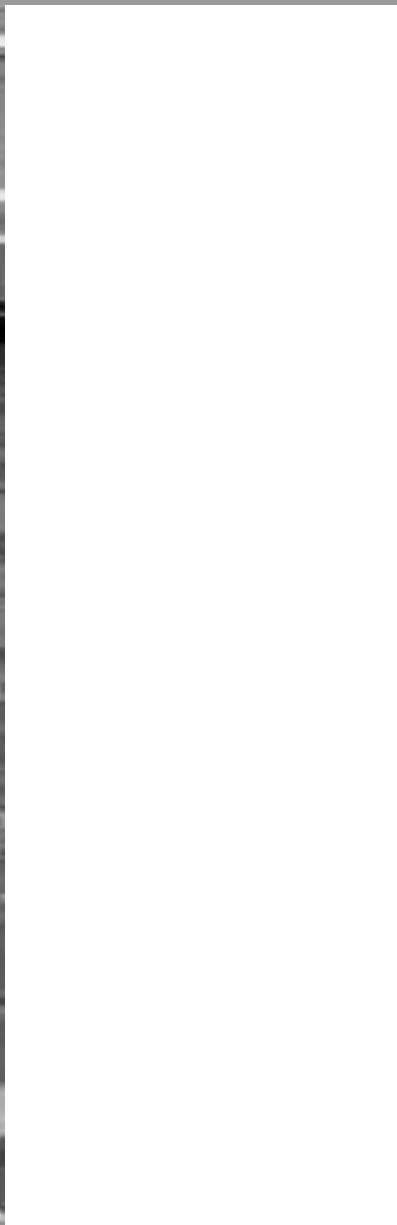




# Fresh water pool (Neptun filter)



# Salt water pool (opening)



# Fresh water pool (opening)



# Fresh water pool (opening)



POLYPLAN  
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POLYCON



# Salt water pool (opening)



Salinity is rising up from  
bottom side 5 hours after starting

Salt water pool (opening)

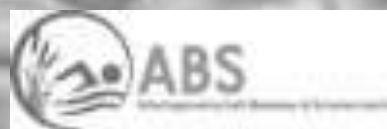
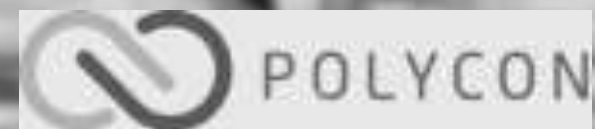


barnacles

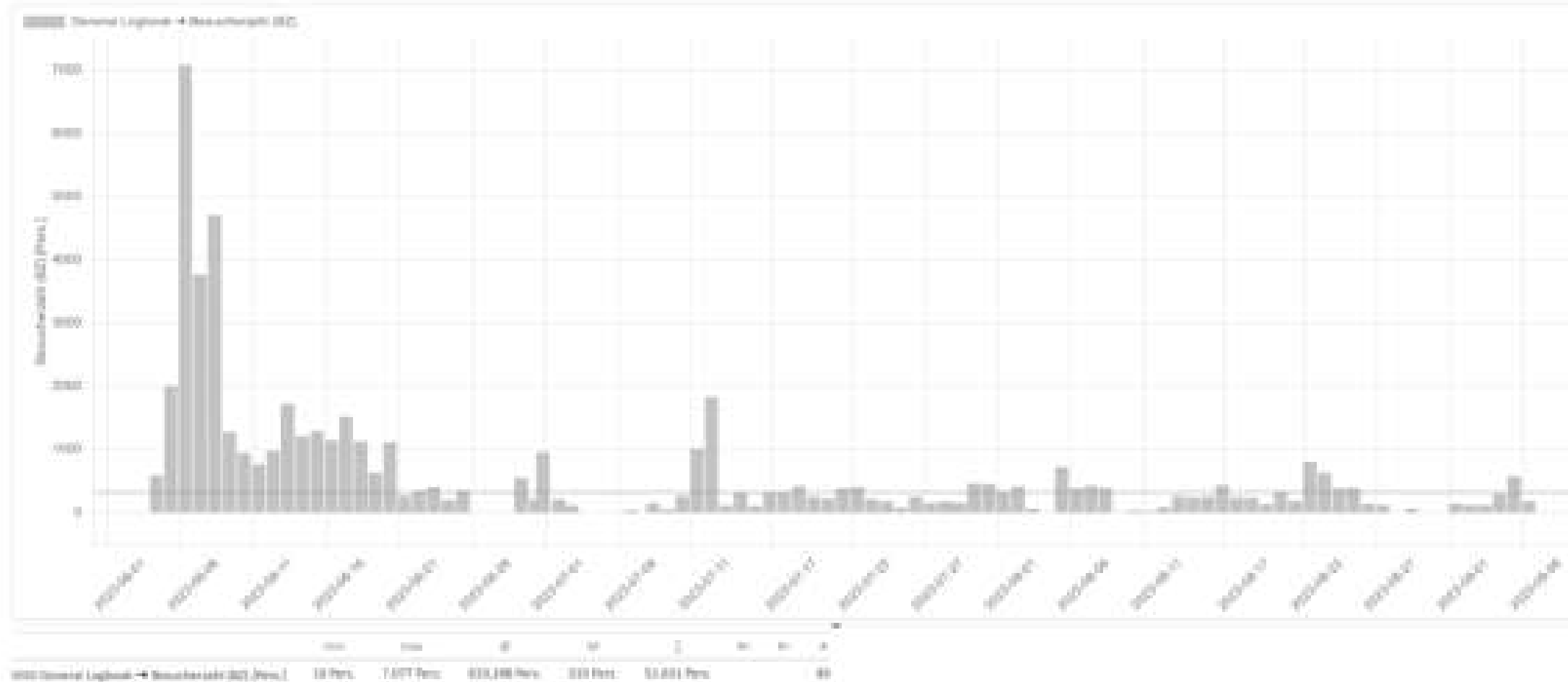
Inspection during  
stress situations



# Hygienic Situation in NSP



# Salinity



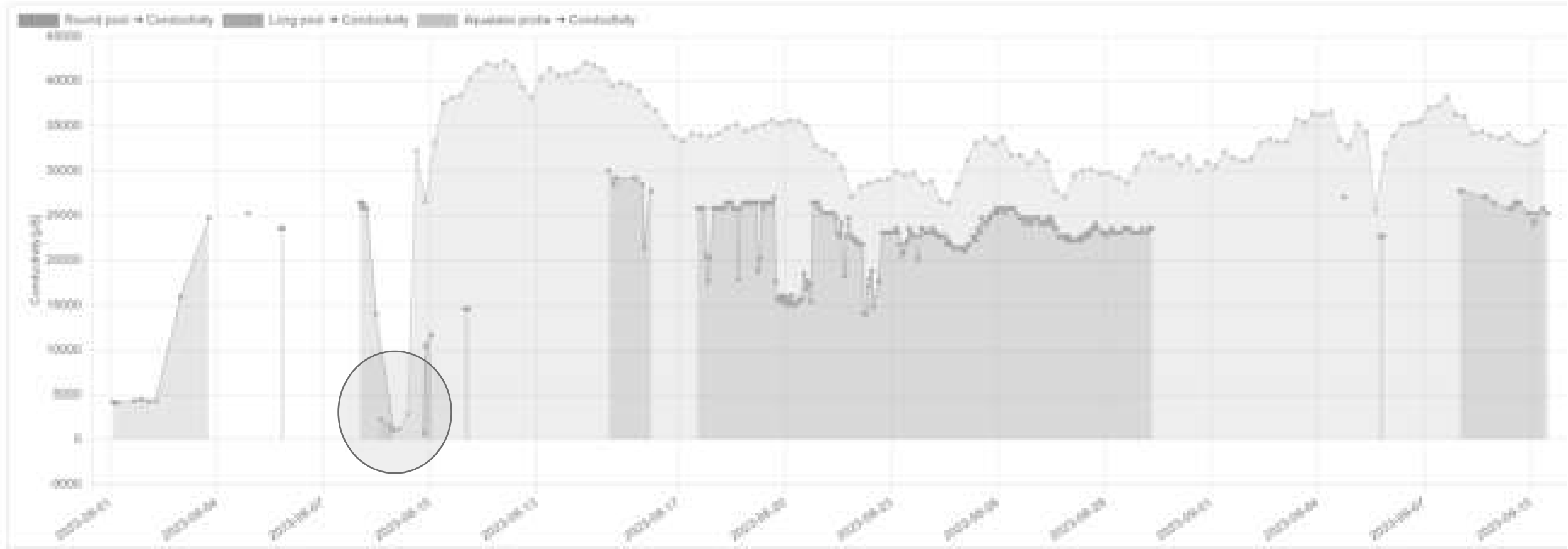


# Salinity



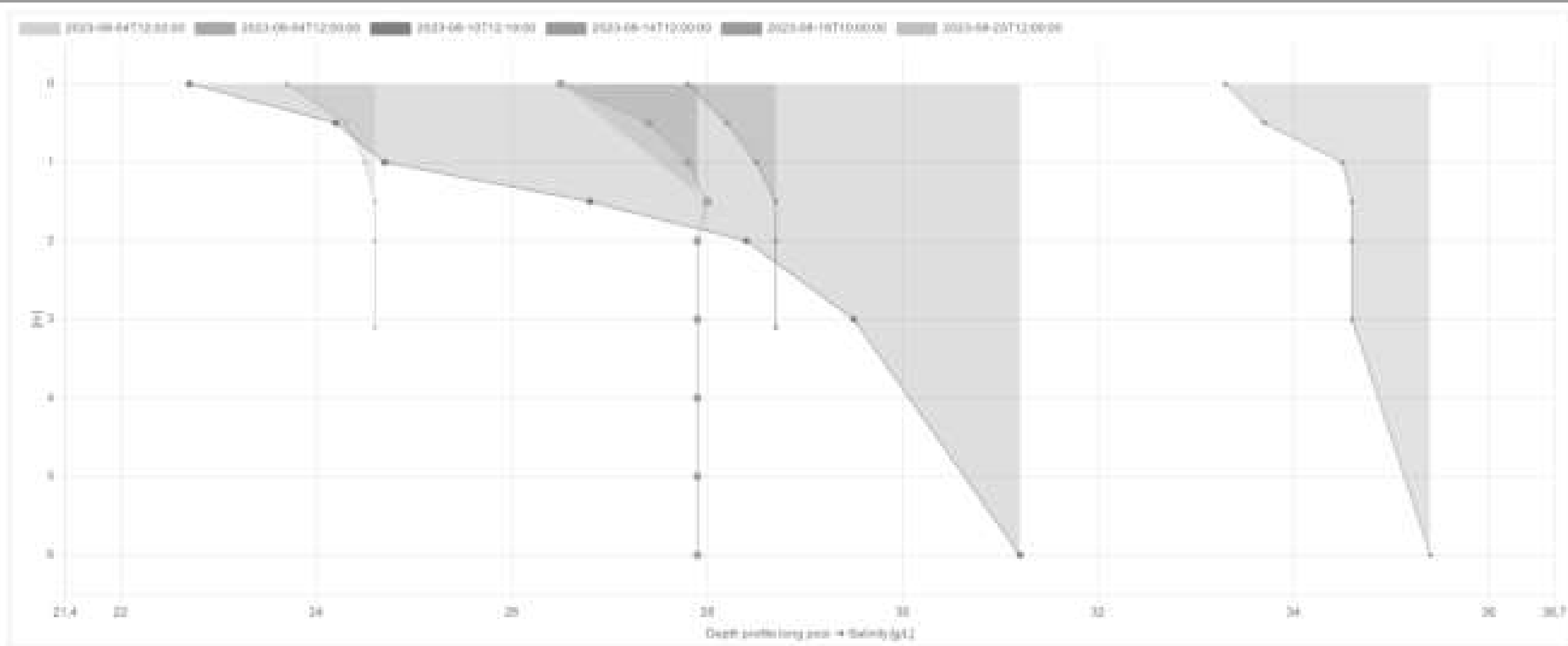
	min	max	Ø	St	St.021	St
General Logbook -> Bewässerzahl (SD) (Perc.)	20 Perc.	1.077 Perc.	605.188 Perc.	118 Perc.	12.821 Perc.	88
01 Messpunkte -> Wassertemperatur pool (°C)	17°C	20,776 °C	20,040 °C	20,776 °C		
Long Pool -> Wassertemperatur (°C)	16,7 °C	21,2 °C	20,094 °C	16,8 °C		78
Round Pool -> Wassertemperatur (°C)	15,4 °C	21,9 °C	17,228 °C	17 °C		14

# Salinity

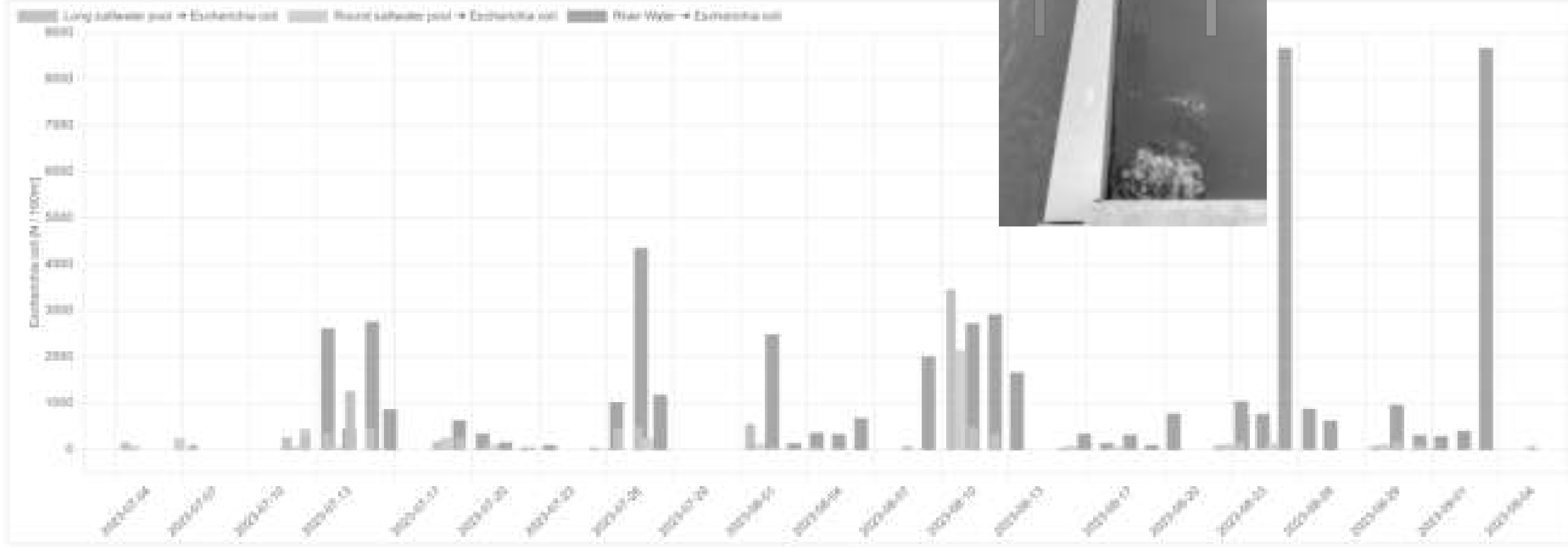


	min	max	Ø	St	St <sub>90</sub>	St <sub>5</sub>
Round pool → Conductivity [µS]	478 µS	60.000 µS	22.176.415 µS	21.333 µS		100
Long pool → Conductivity [µS]	0 µS	43.873 µS	22.935.367 µS	23.456.321 µS		

# Salinity

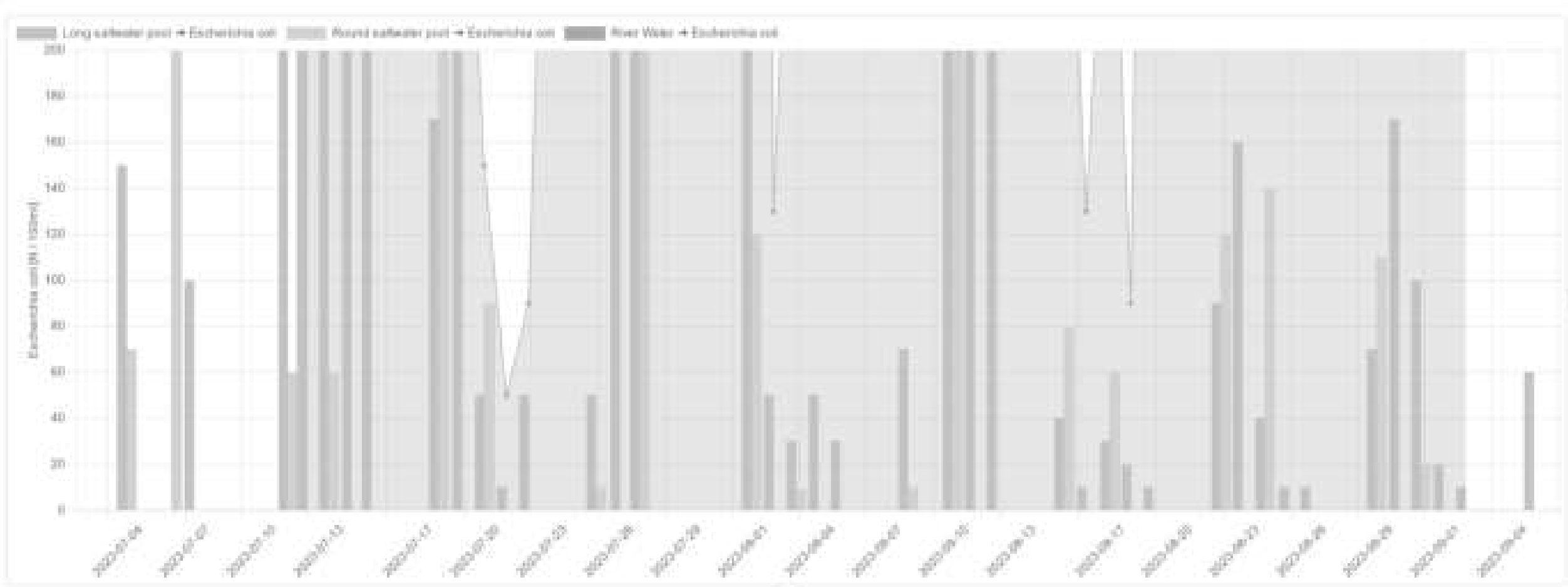


# e.Coli



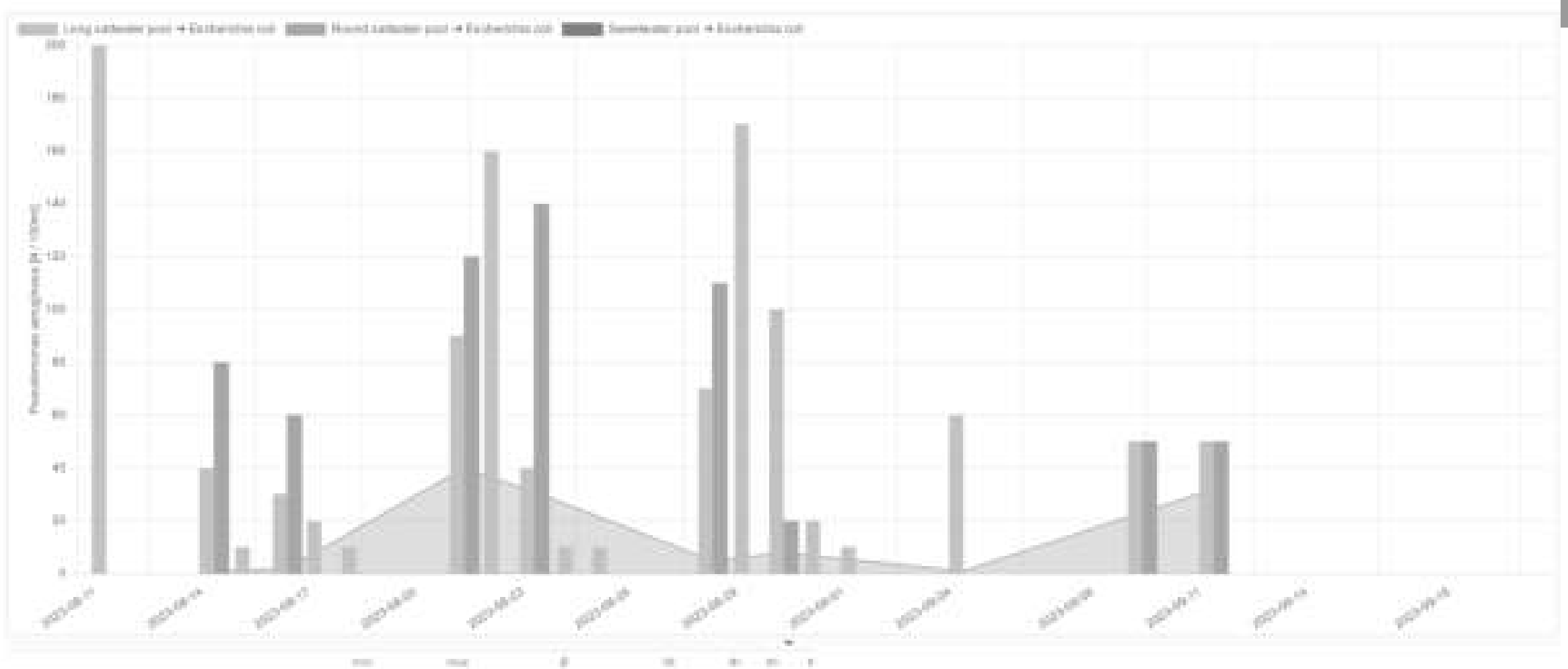
	min	max	Ø	90	95	98
Long surface pool → E. coli (N / 100ml)	10 N / 100ml	6.450 N / 100ml	756 N / 100ml	70 N / 100ml	14	40
Beach surface pool → E. coli (N / 100ml)	6 N / 100ml	1.280 N / 100ml	1.291.767 N / 100ml	80 N / 100ml	9	18
River Water → E. coli (N / 100ml)	10 N / 100ml	8.660 N / 100ml	1.421.055 N / 100ml	765 N / 100ml	10	58

# E.Coli



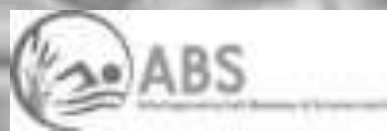
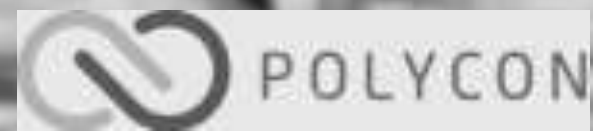
	min	max	Ø	St	St <sub>u</sub>	St <sub>l</sub>
Long saltwater pool → Escherichia coli (N / 100ml)	17 N / 100ml	3.450 N / 100ml	154 N / 100ml	79 N / 100ml	11	47
Round saltwater pool → Escherichia coli (N / 100ml)	8 N / 100ml	2.340 N / 100ml	221,717 N / 100ml	88 N / 100ml	0	19
River Water → Escherichia coli (N / 100ml)	50 N / 100ml	8.460 N / 100ml	1.421,263 N / 100ml	745 N / 100ml	10	58

# E.Coli

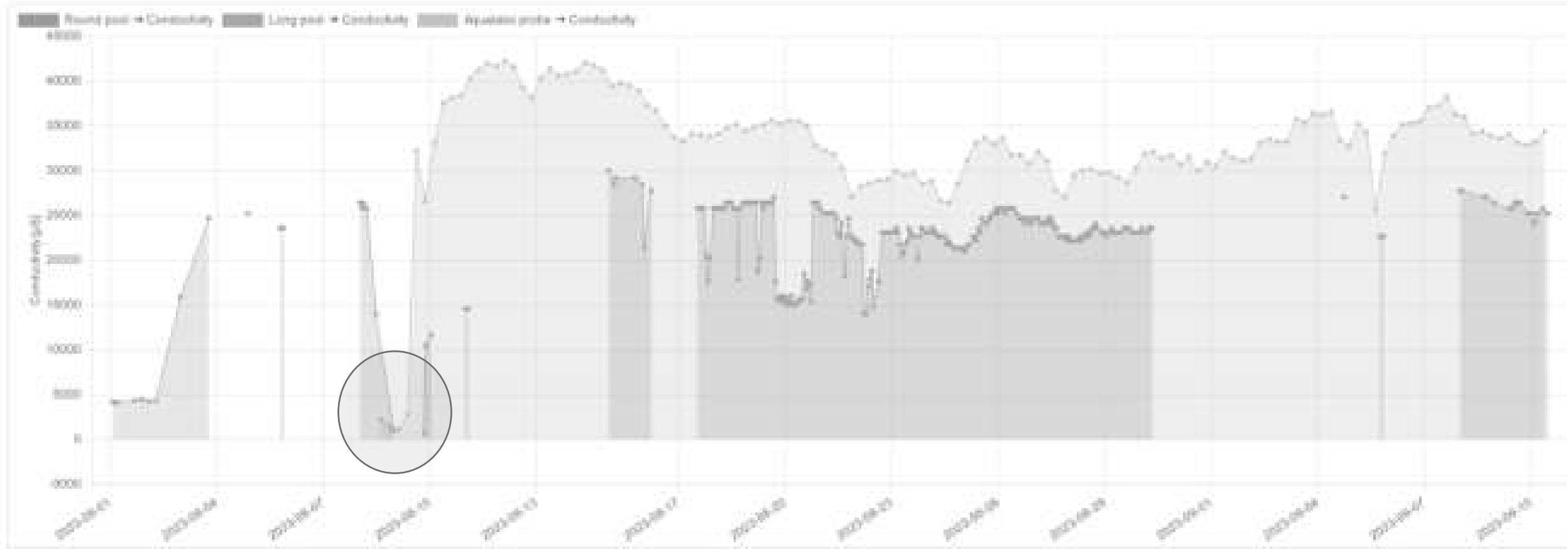


	2012	2013	2014	2015	2016
Long poolwater pool → Escherichia coli (CFU / 100ml)	100	500	27.268	40	0
Hand poolwater pool → Escherichia coli (CFU / 100ml)	20	140	18,75	10	0
Swimming pool → Escherichia coli (CFU / 100ml)	1	40	15	6,8	0

High dynamic



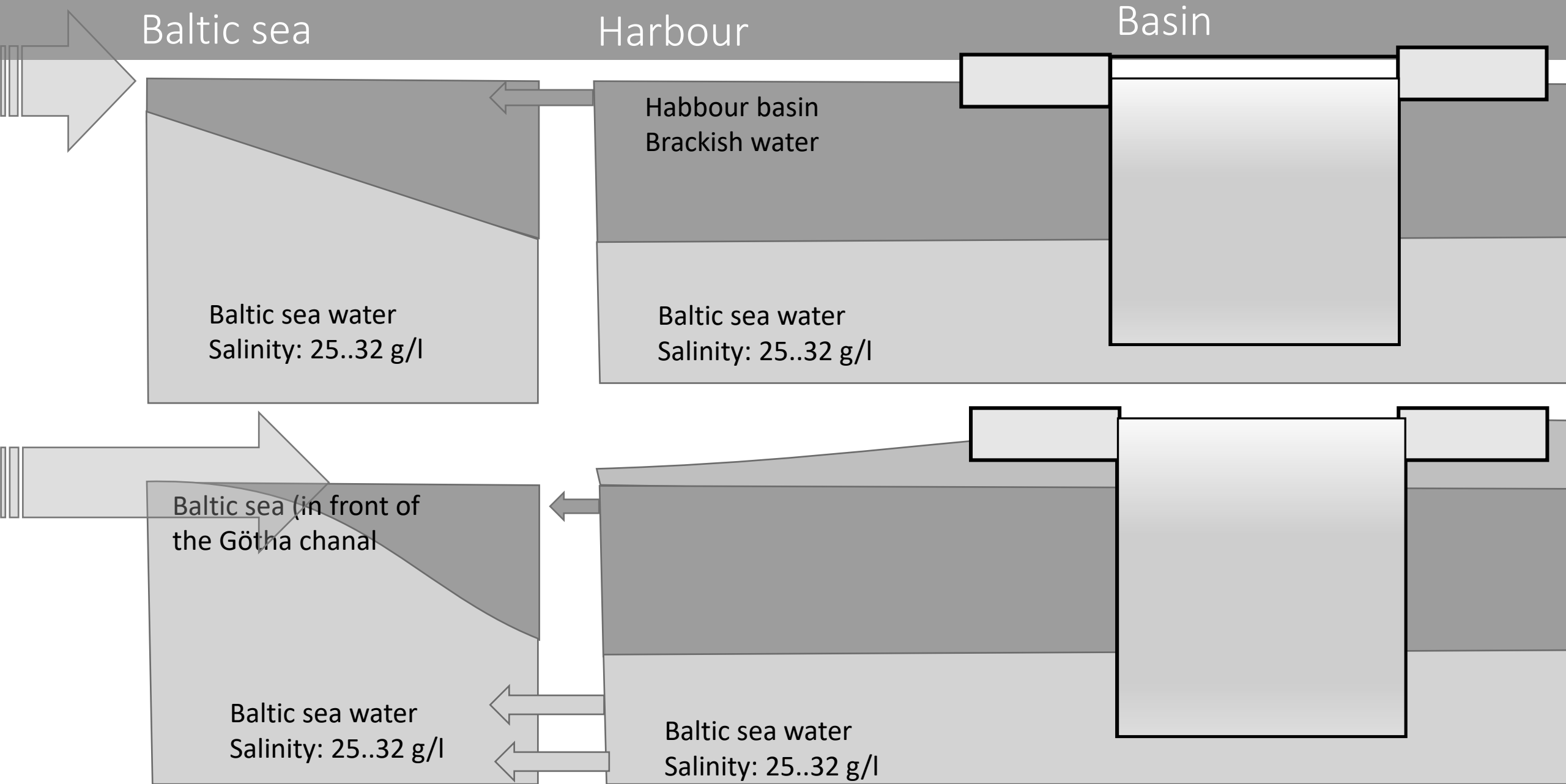
# Salinity



	min	max	Ø	St	St <sub>90</sub>	St <sub>5</sub>
Round pool → Conductivity [µS]	478 µS	88.000 µS	22.176.415 µS	21.333 µS		100
Long pool → Conductivity [µS]	0 µS	43.873 µS	22.938.367 µS	23.456.321 µS		
Aquatic probe → Conductivity [µS]						



# Estuaries dynamics



# Estuaries dynamics

## Basin

Baltic sea

Harbour

Baltic sea (in front of the Götha canal)

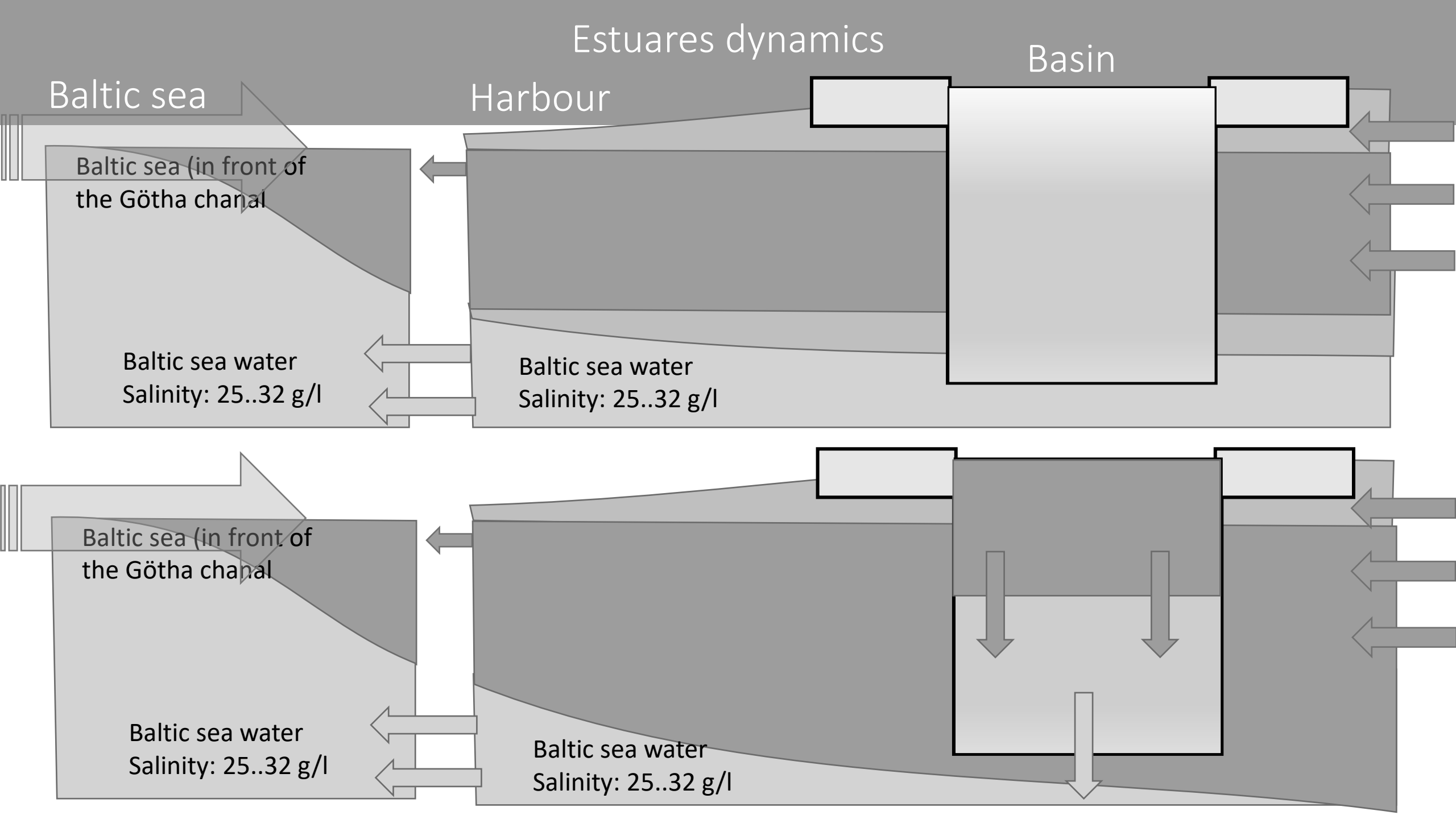
Baltic sea water  
Salinity: 25..32 g/l

Baltic sea water  
Salinity: 25..32 g/l

Baltic sea (in front of the Götha canal)

Baltic sea water  
Salinity: 25..32 g/l

Baltic sea water  
Salinity: 25..32 g/l



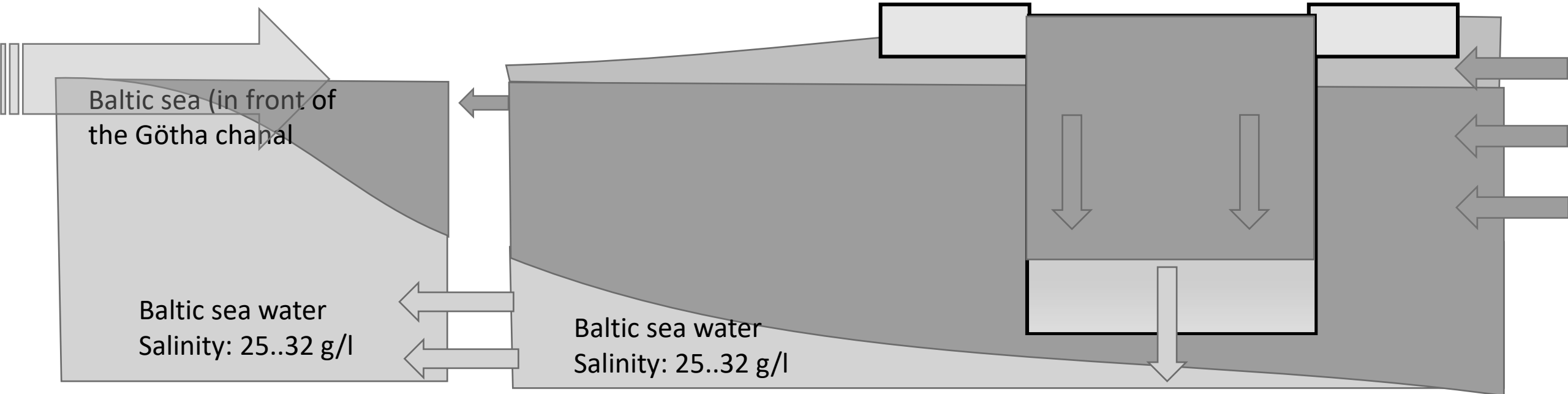
# Estuaries dynamics

## Basin

### Baltic sea



### Harbour



# Initial waves

## Baltic Sea

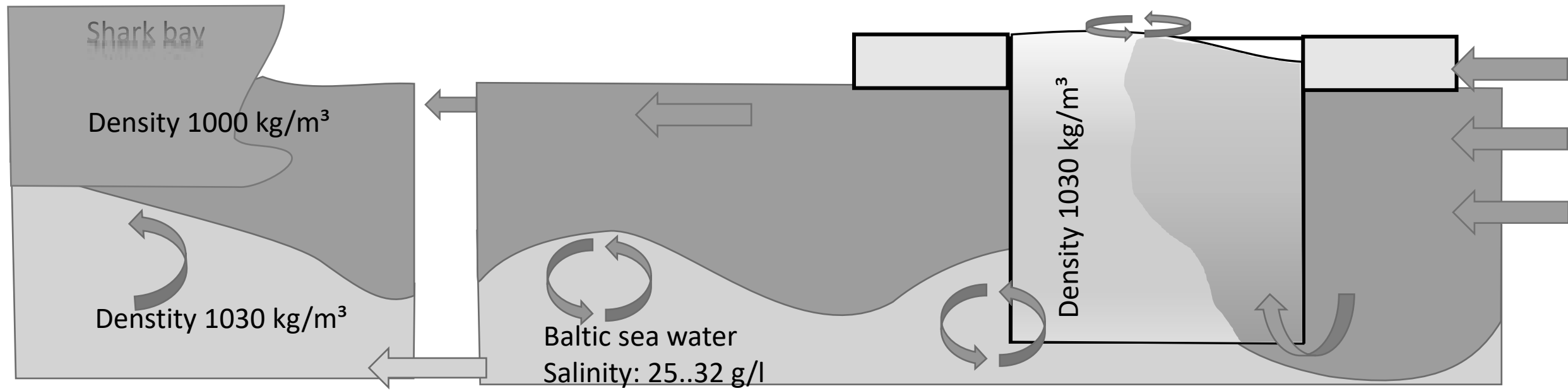


## Ship traffic



## Basin

Density 1,29 kg/m<sup>3</sup>



Welcome to a new pool vision



(Göteborg 2023)

Welcome to a new pool vision



**(Göteborg 2023)**

Welcome to a new pool vision



(Gothenburg 2023)

# Wale insprction



(Gotenborg 2023)



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[Bruns@polyplan-kreikenbaum.eu](mailto:Bruns@polyplan-kreikenbaum.eu)

