LIFE-FRESHMAN: increasing freshwater availability in the coastal zone of The Netherlands and Flanders

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3rd ADAPTtoCLIMATE Conference, 19-20 April, 2021

dunea DUIN & WATER

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- Our drinking water production process (featuring the coastal dunes)
- Brackish water as additional source – why?
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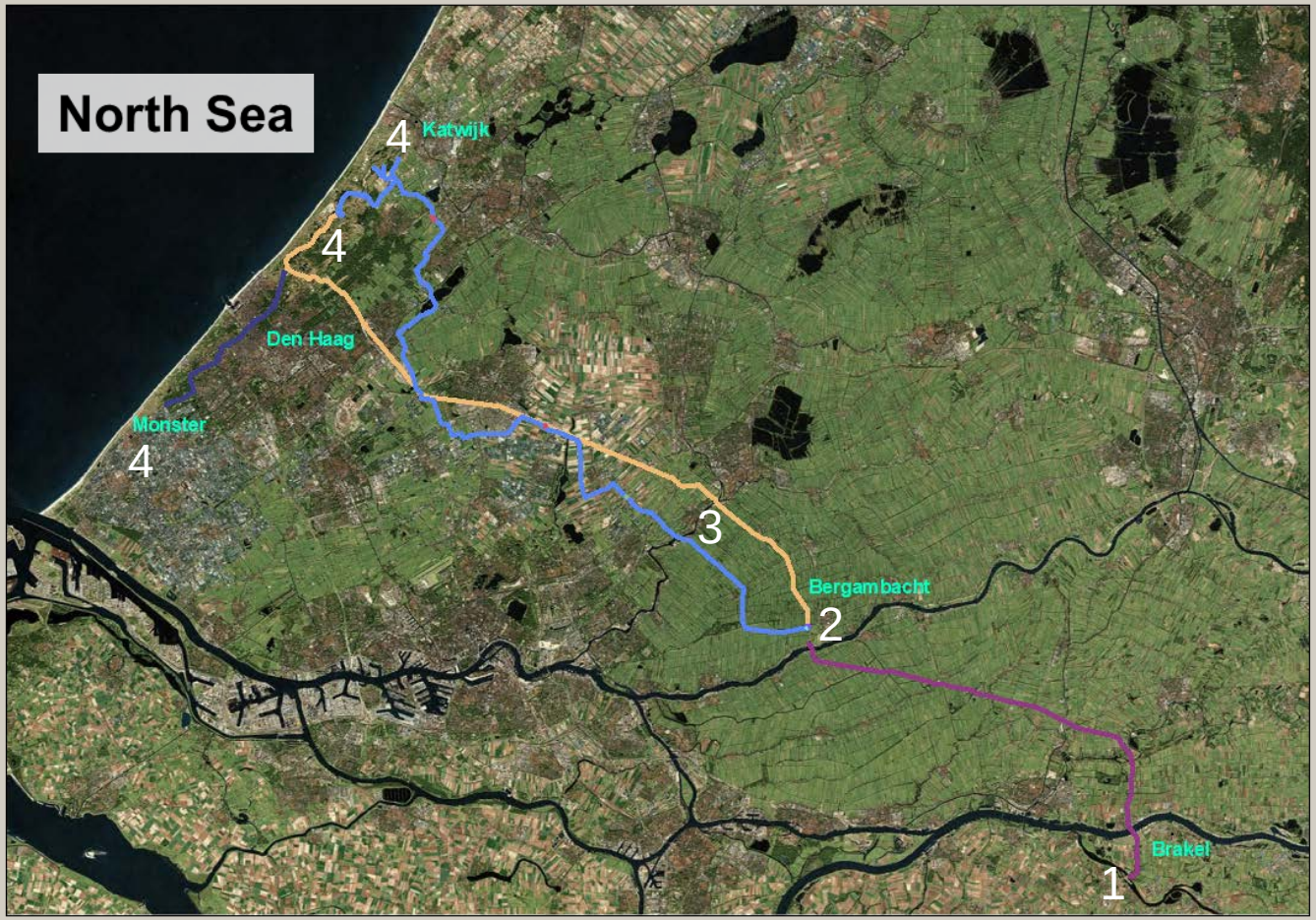
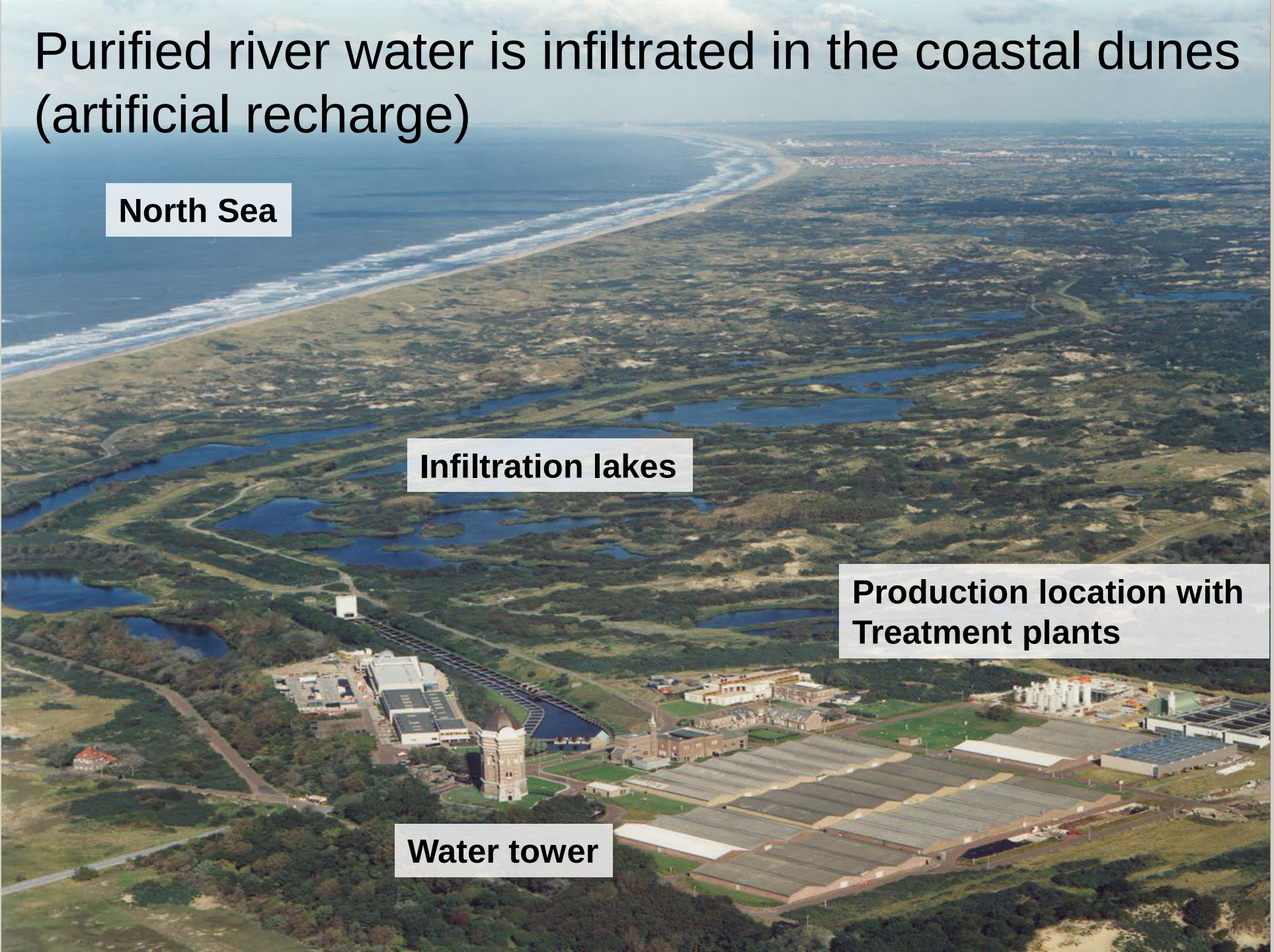
- Preliminary results (exploratory drilling)

About Dunea

- Drinking water utility
  - 1.3 million customers
  - 80 Million m^3/year (9000 m^3/hr)
  - Major cities: The Hague, Leiden
- Raw water sources
  - Major intake: Meuse River (1)
  - Alternative intake: Rhine River (2)
- Water treatment in five steps
  - Step 1: intake river water / microsieves
  - Step 2: rapid sand filtration
  - Step 3: transportation to the dunes
  - Step 4: infiltration into the coastal dunes
  - Step 5: post-treatment → drinking water



Purified river water is infiltrated in the coastal dunes (artificial recharge)



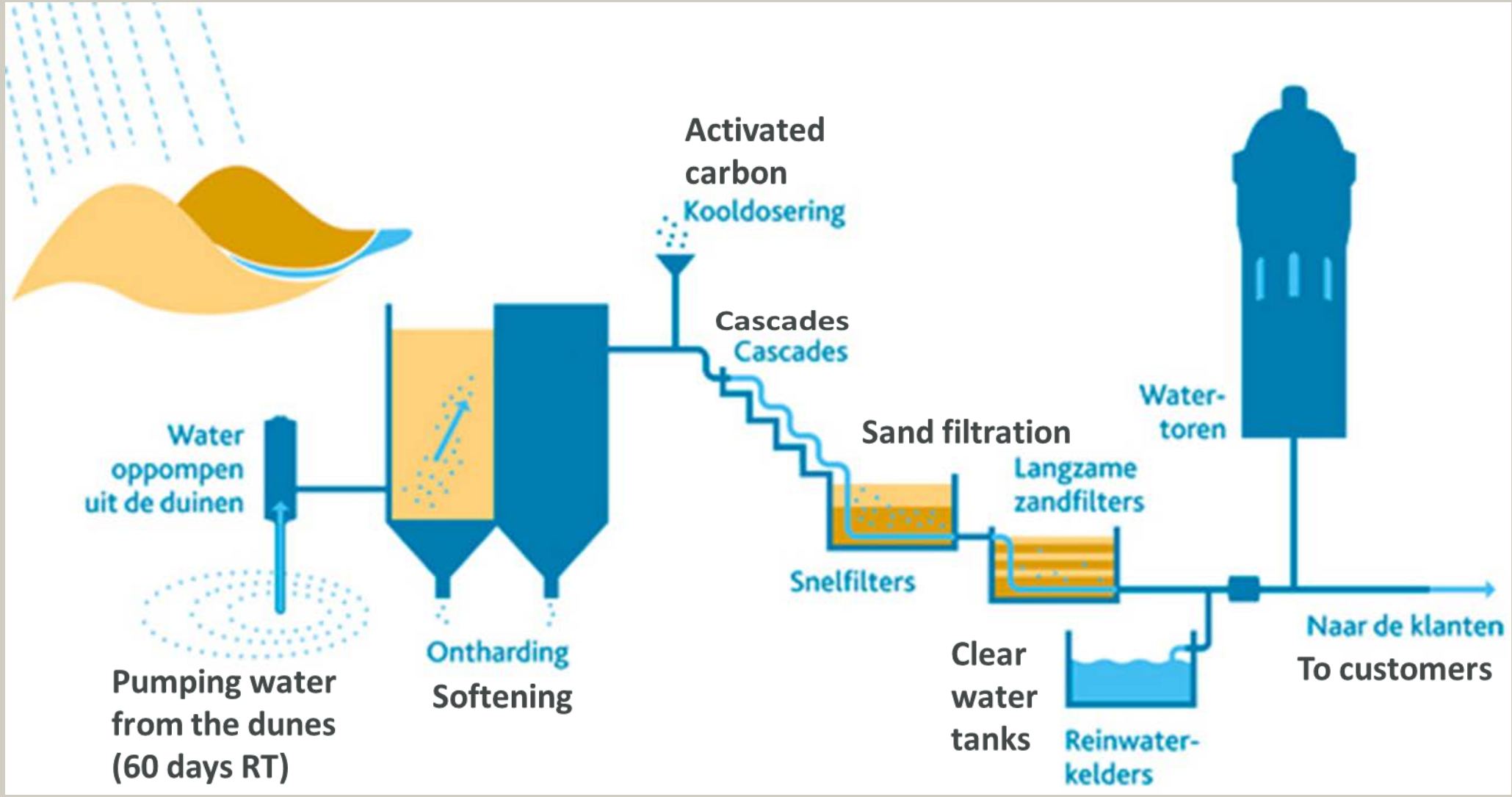
dunea DUIN & WATER

Coastal dune area
“Meijendel”
10 km long
2 km wide
0-25 m above MSL

Natura 2000 reserve

Life

Post-treatment of dune water to drinking water



Why exploring brackish water as new source of drinking water?

River water quality is under increasing pressure due to:

- Chemical spills (4 major spills in 2012-2019)

- Climate change
  - More and longer periods of low river flow → Less dilution of waste water discharges
  - More heat waves: higer water temperature, algae blooms → purification more difficult
  - Salinization of our second intake location

→ New sources of drinking water are needed
→ E.g. brackish groundwater

Project title « Freshman »

PROJECT LOCATION: see map

BUDGET INFO:

Total amount: 6.3 million euro

% EC Co-funding: 49%

DURATION: 01/07/20 - 31/12/25

PROJECT'S IMPLEMENTORS:

Coordinating Beneficiary: Dunea

Associated Beneficiary(ies):
KWR, De Watergroep, IWVA, Allied Waters

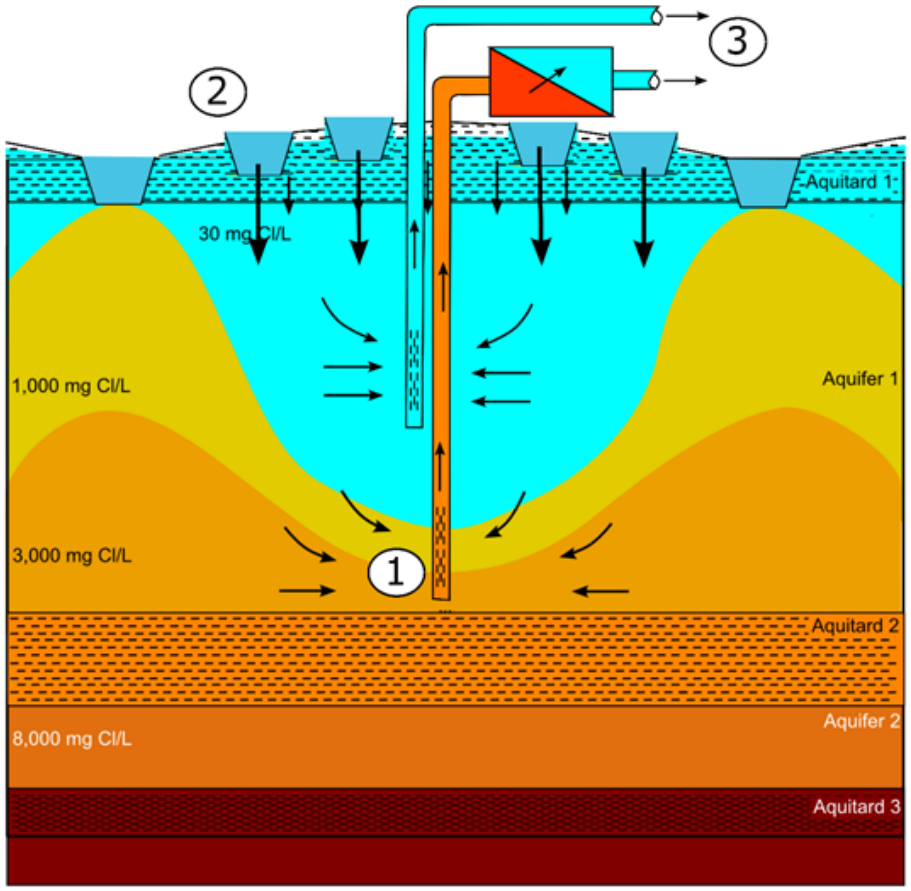
Technical outline of the Freshman project

Abstraction and purification of brackish water in the coastal dunes, leading to:

- *New source of drinking water*
- *Growth of the freshwater lens on top*
- *Preventing salinization of the deep freshwater wells*

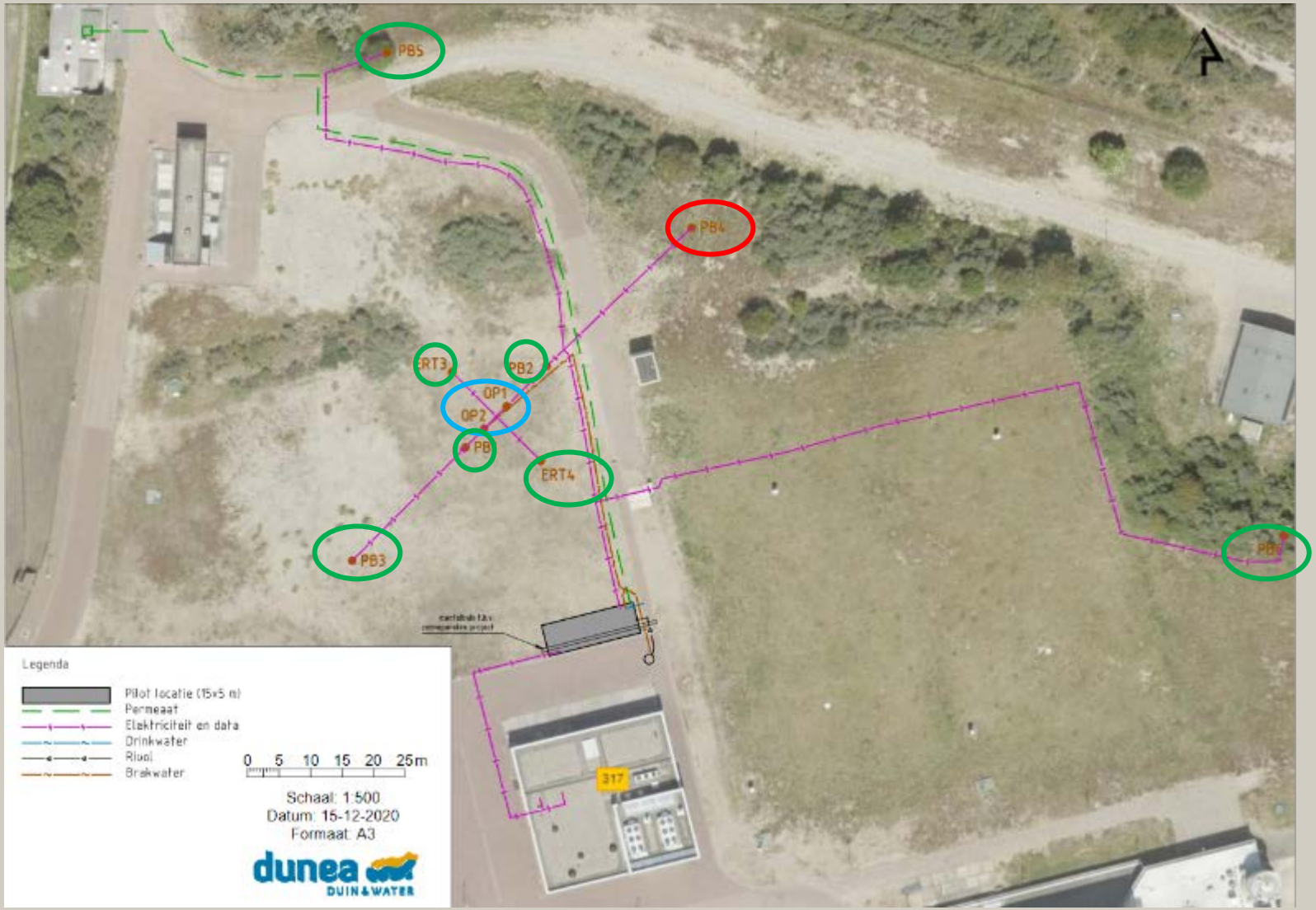
Supporting the current practice of river water infiltration and abstraction in the coastal dunes

1. Brackish water abstraction
2. River water infiltration and groundwater abstraction
3. Purification of the fresh and brackish groundwater streams



Demonstration pilot on production location of Dunea in the coastal dunes (100 x 100 m)

Aerial view of the proposed well field



2 Extraction wells (5 filters)

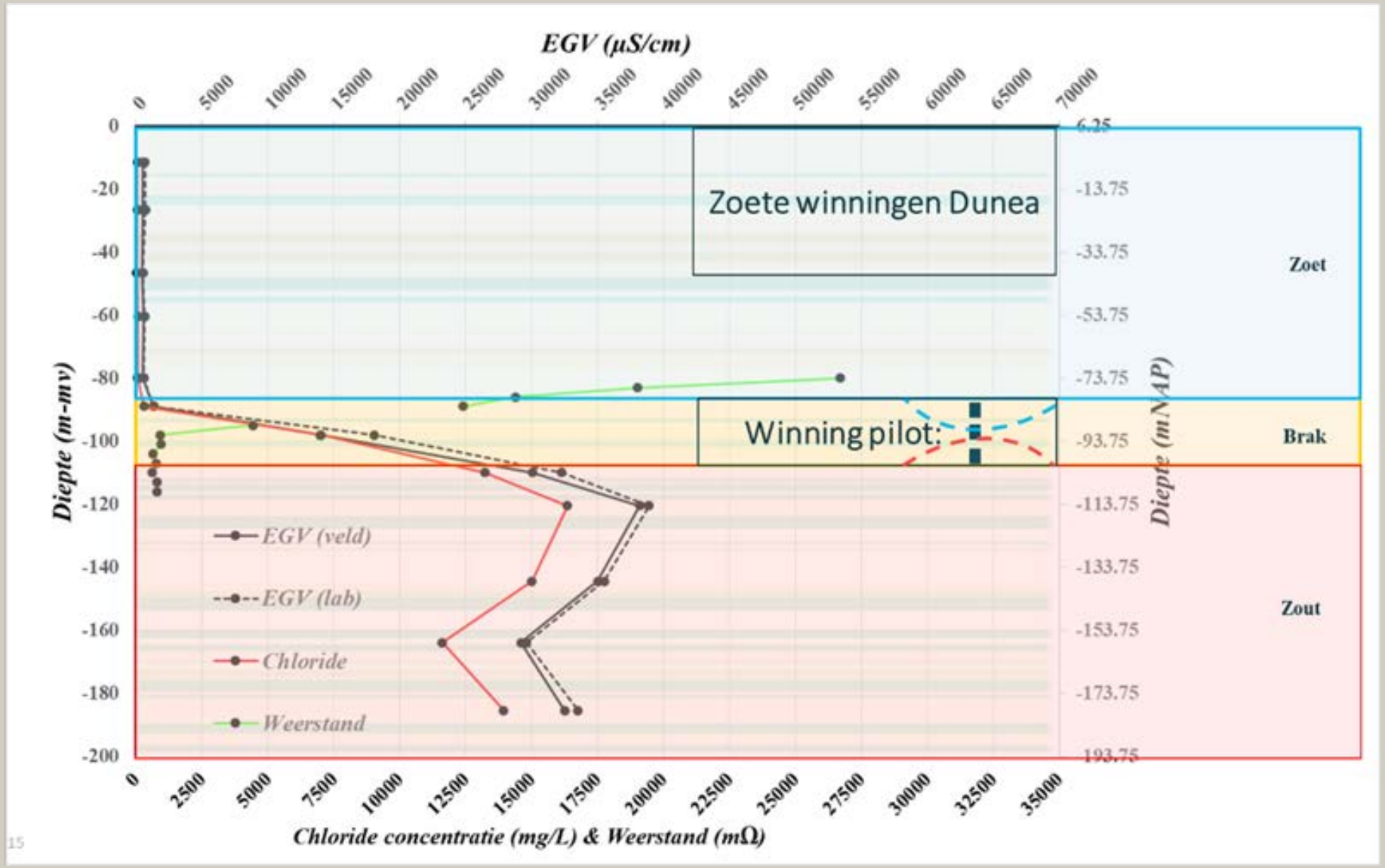
7 Observation wells (6-10 filters)

1 Exploration well (18 filters)

Drilling the exploration well (March 2020)

Measurement of conductivity profile

EC and chloride profiles (Exploration well)



0-85 m: Freshwater

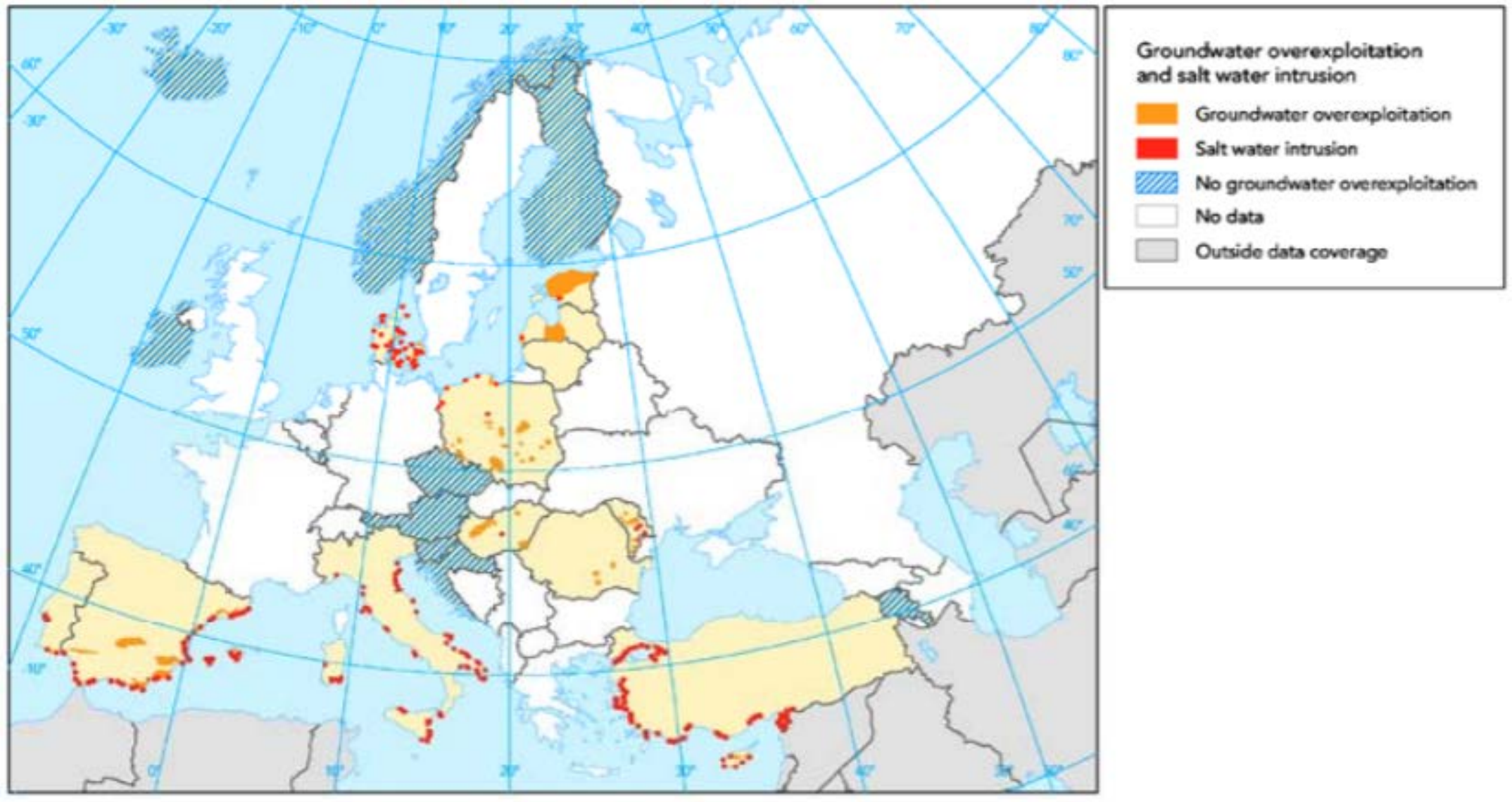
85-105 m: Brackish

> 105 m: Salt water

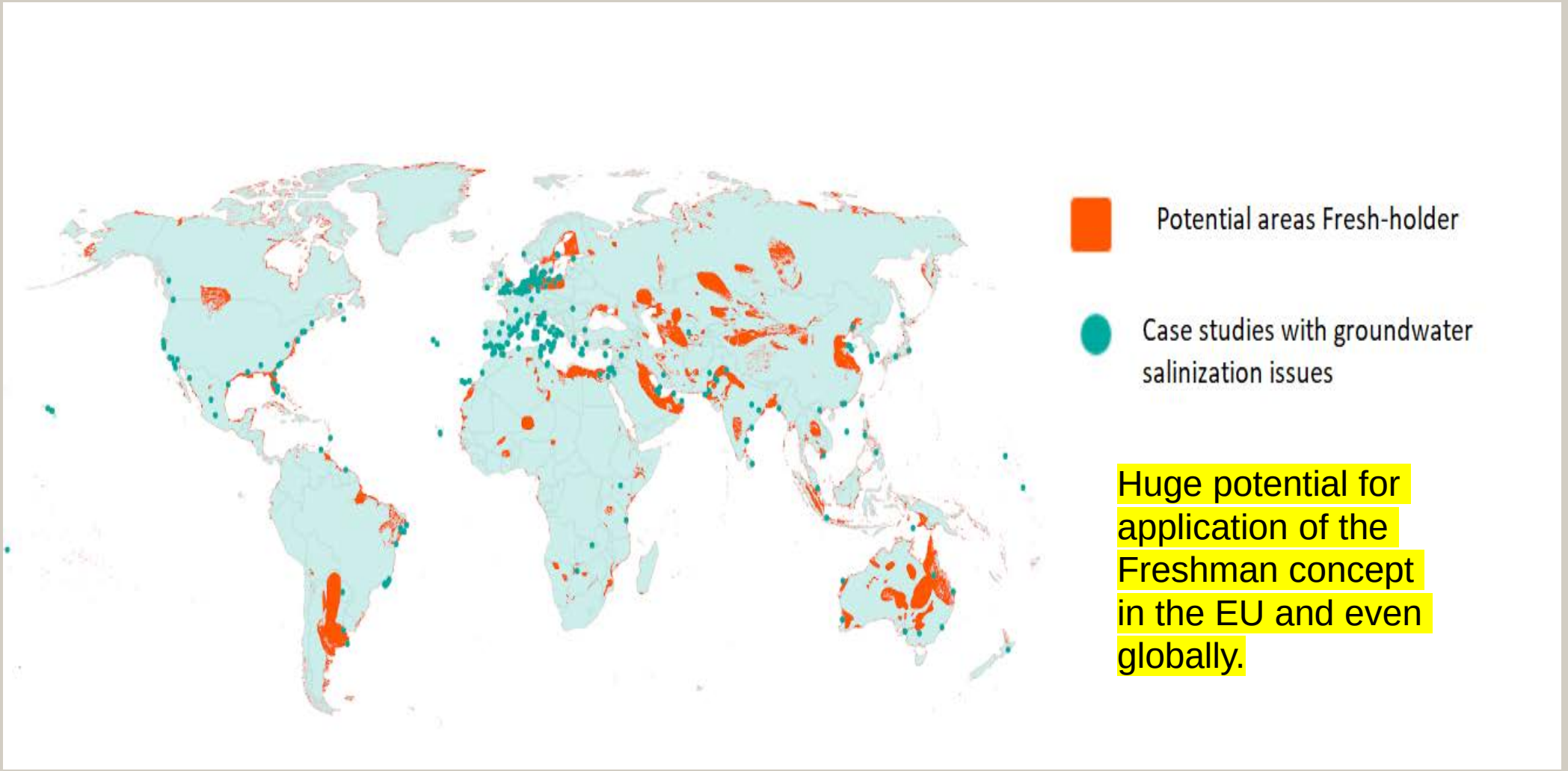
Key actions of the project

- **2020:** Drilling exploratory well; obtaining environmental permits
- **2021:** Realisation of well field and purification system (Reversed Osmosis)
- **2022-2024:** Operational phase
  - Abstraction and purification of brackish groundwater
  - Monitoring the growth of the freshwater lens
  - Monitoring environmental impacts of the abstraction
- **2025:** project completed; decision for upscaling (6 Mm^3/year); international application of the concept

Seawater intrusion in coastal aquifers (red) and groundwater overexploitation (orange)



Worldwide salinization of coastal aquifers



Huge potential for application of the Freshman concept in the EU and even globally.

Thank you for listening!

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https://dunea.nl/algemeen/life-freshman