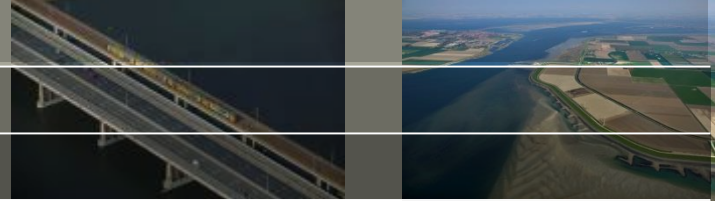




Mogelijkheden voor grootschalige ondergrondse opslag van zoetwater in het gebied Braakman-Zuid.

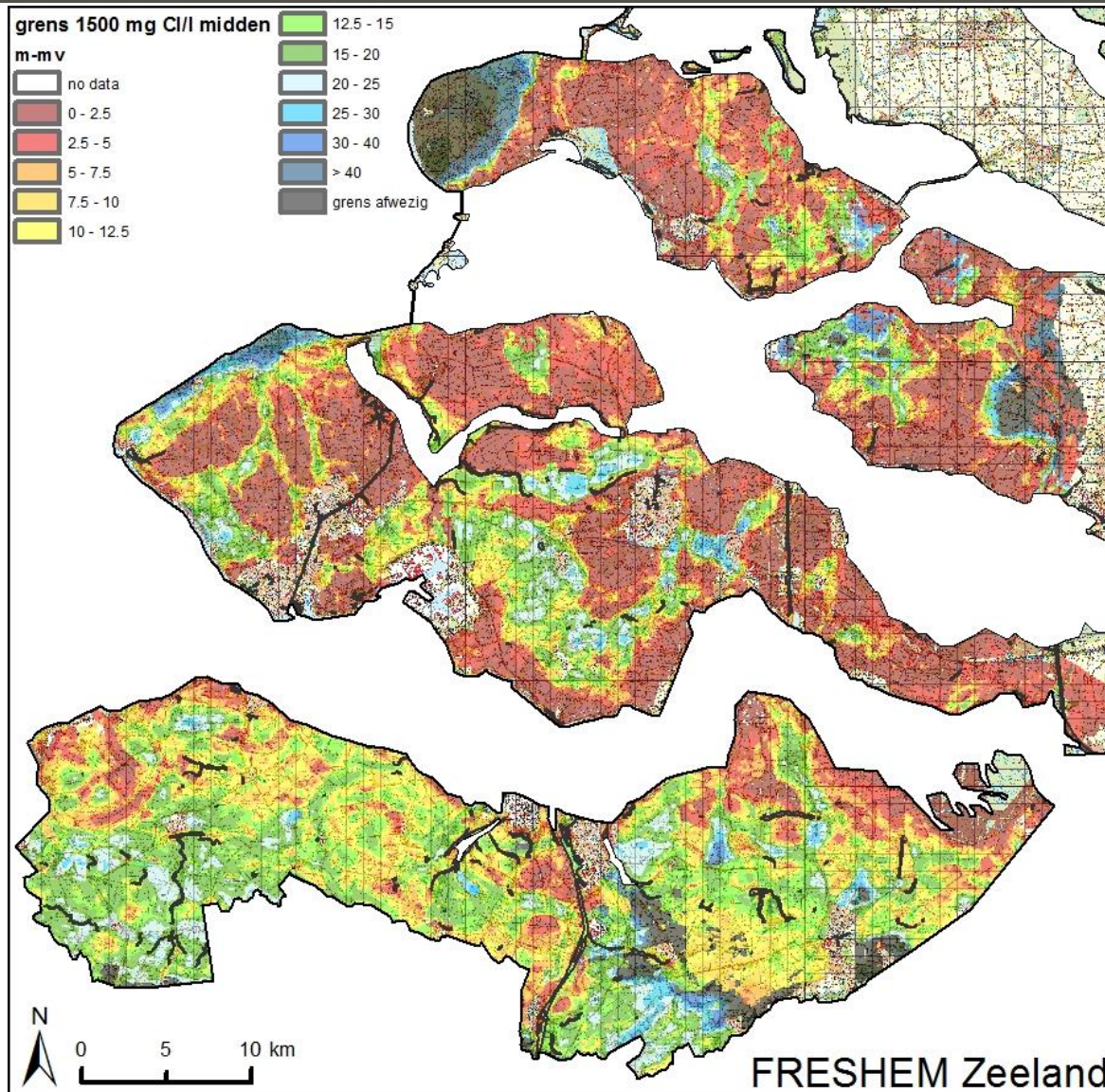
*Perry de Louw
Tobias Mulder
Esther van Baaren
Sandra Galvis
Gualbert Oude Essink*

Inhoud presentatie

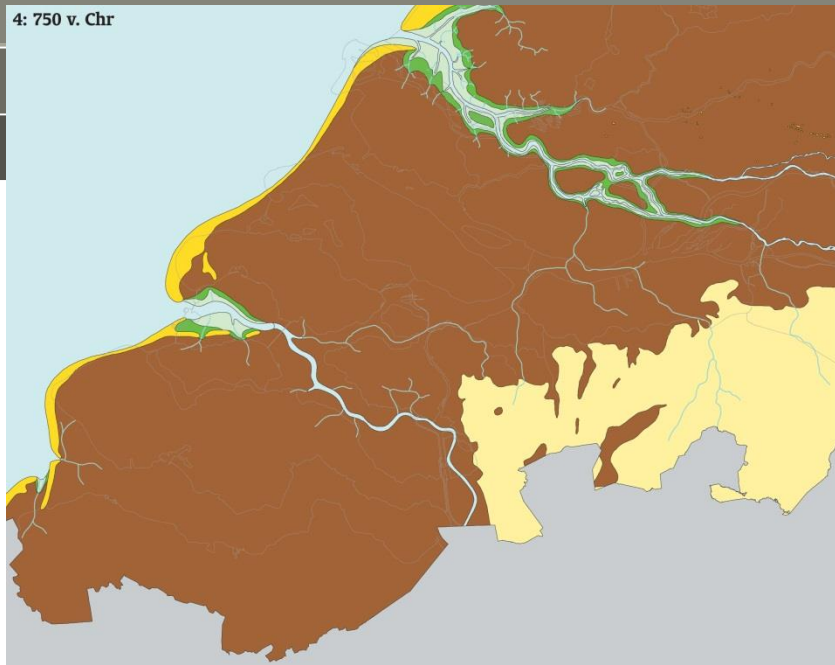


- Zoet-zout grondwatersysteem Zeeland
- Mogelijkheden voor zoetwateropslag: kreekruginfiltratie
- Gebiedsbeschrijving Braakman-zuid
- Modelberekeningen potenties voor zoetwateropslag
- Conclusies

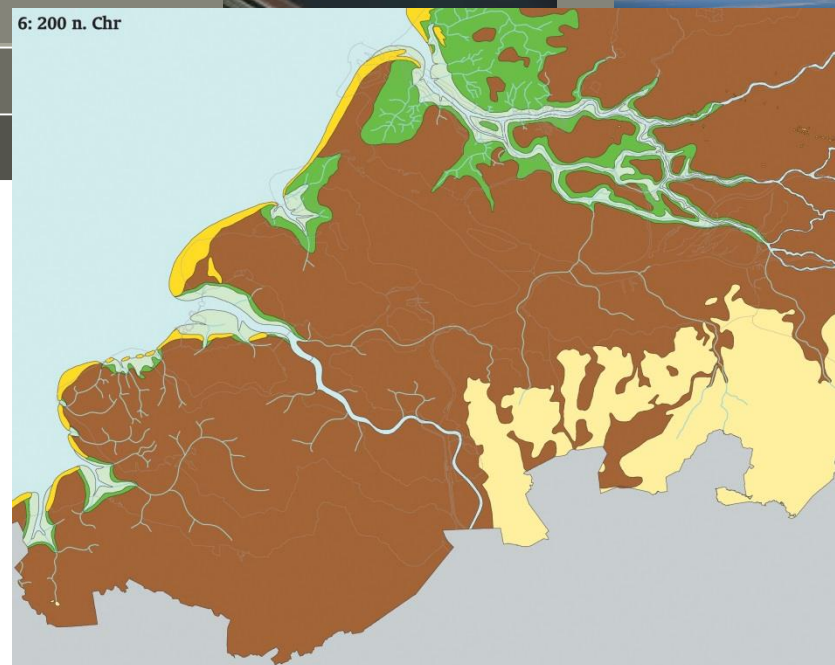
Diepte grens zoet –zout grondwater: FRESHEM



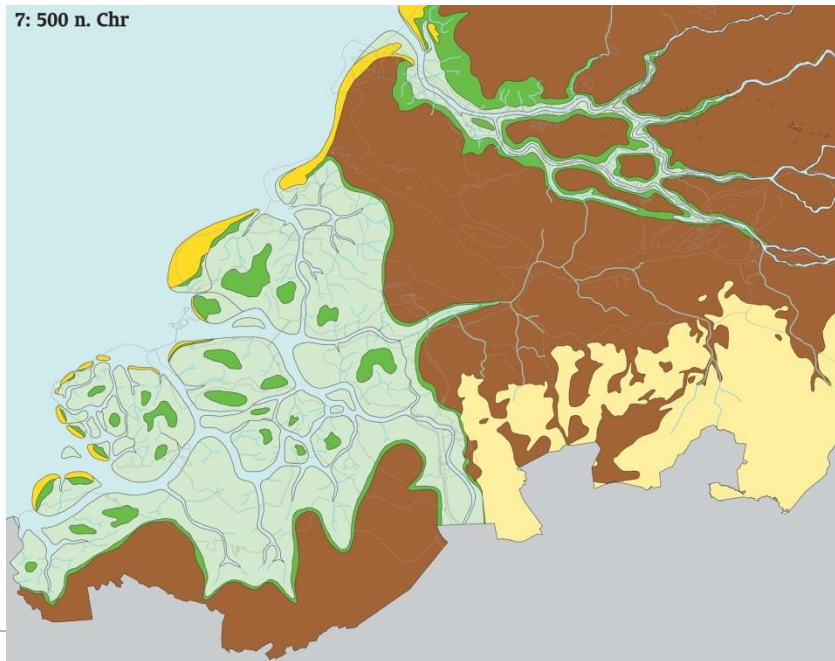
4: 750 v. Chr



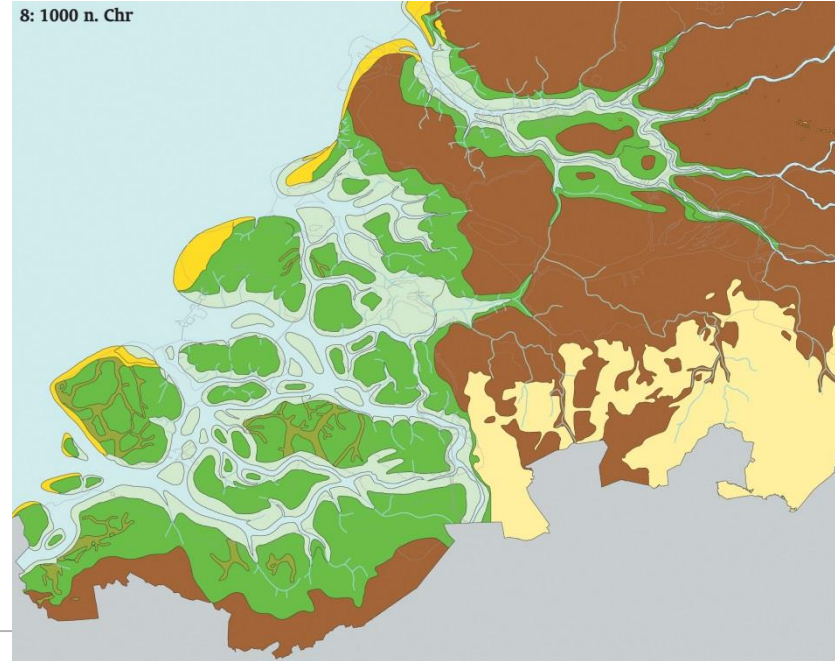
6: 200 n. Chr



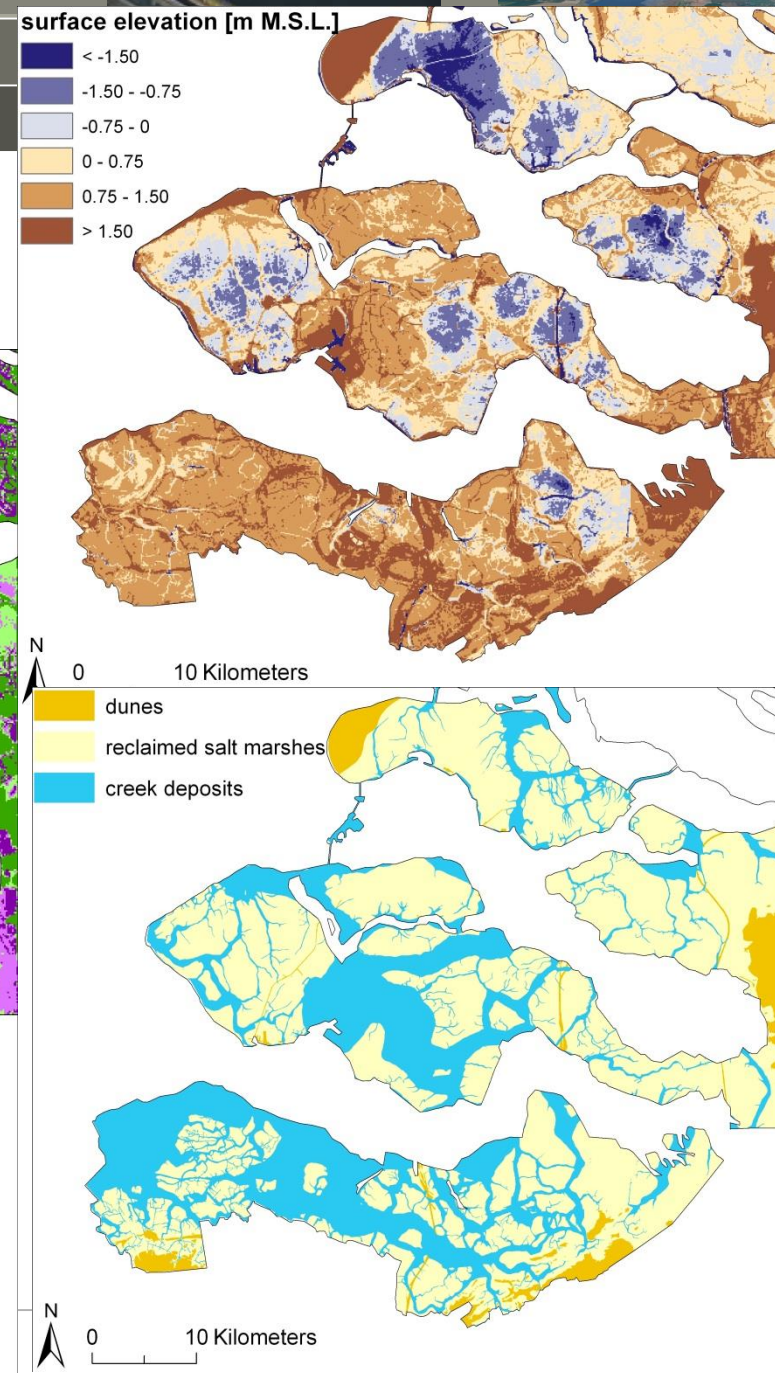
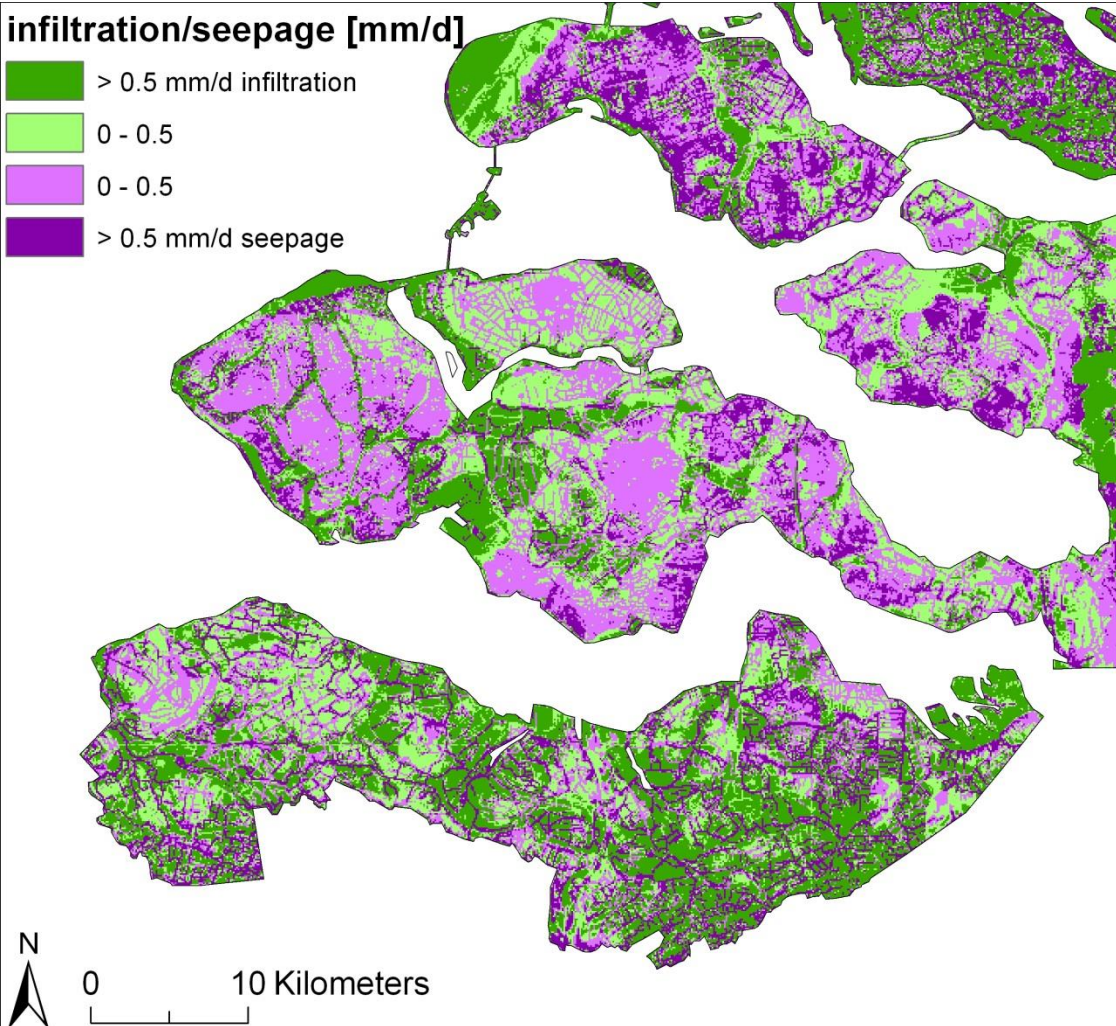
7: 500 n. Chr



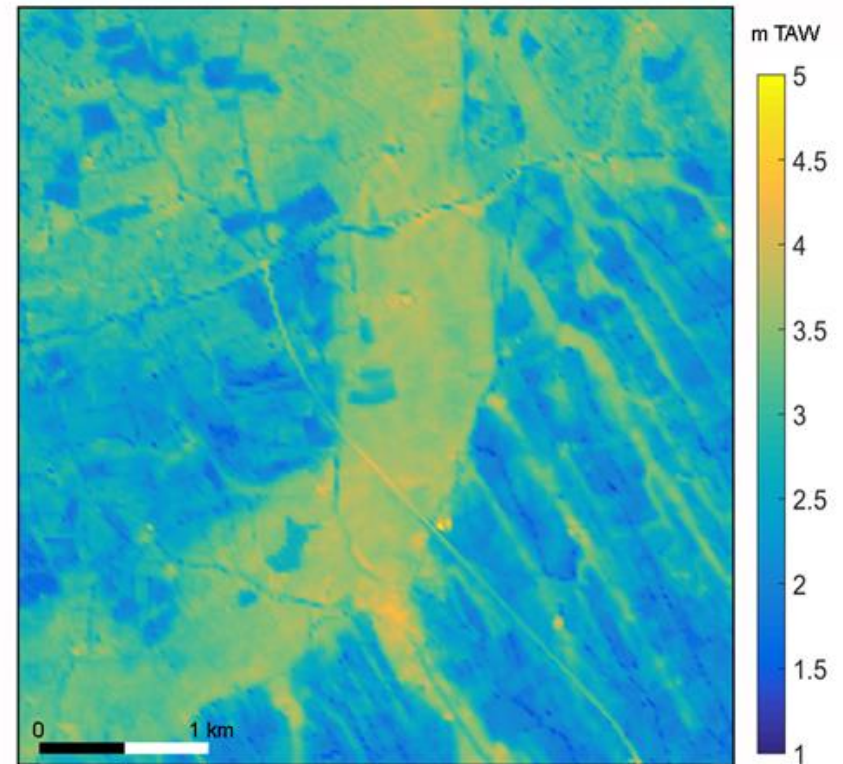
8: 1000 n. Chr



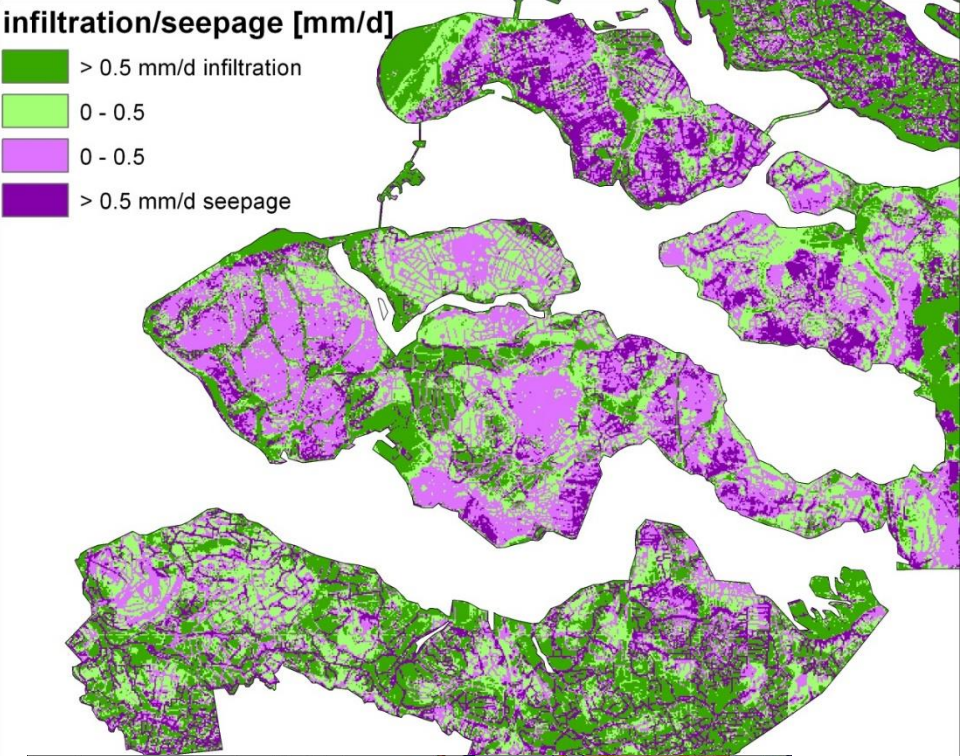
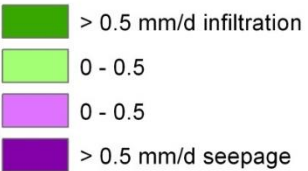
Kwel en infiltratie in Zeeland



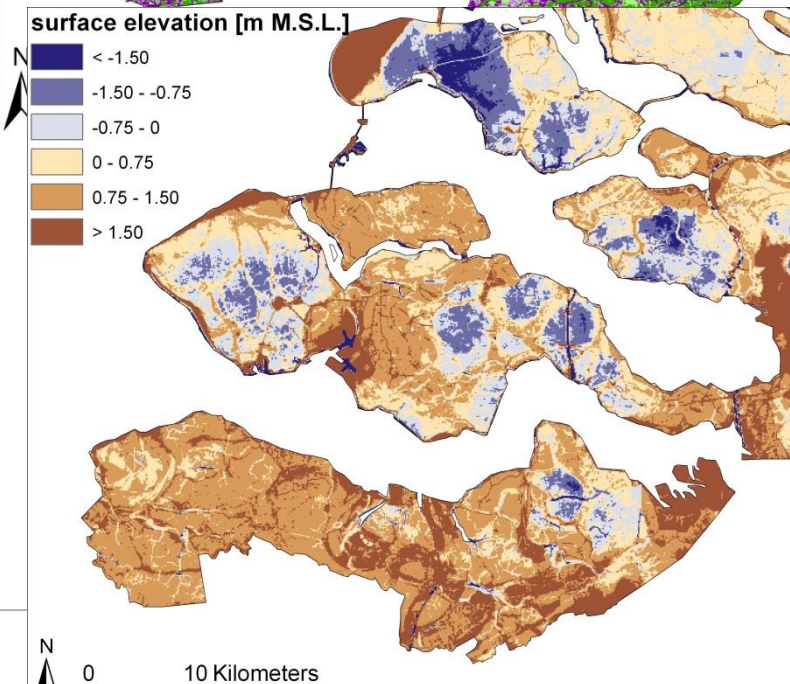
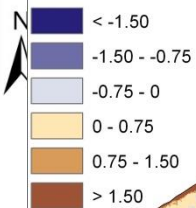
Kreekruggen liggen hoger in het land



infiltration/seepage [mm/d]



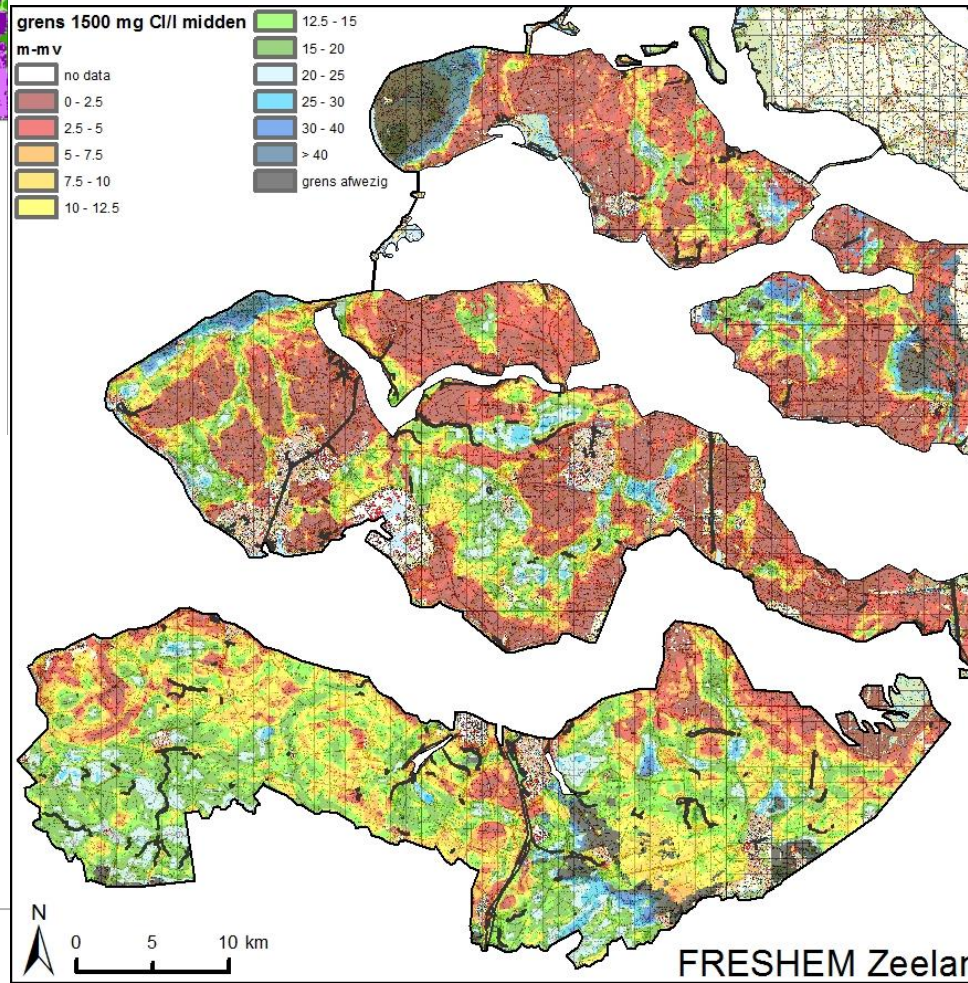
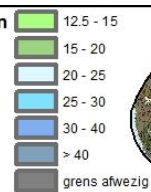
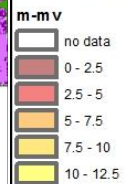
surface elevation [m M.S.L.]



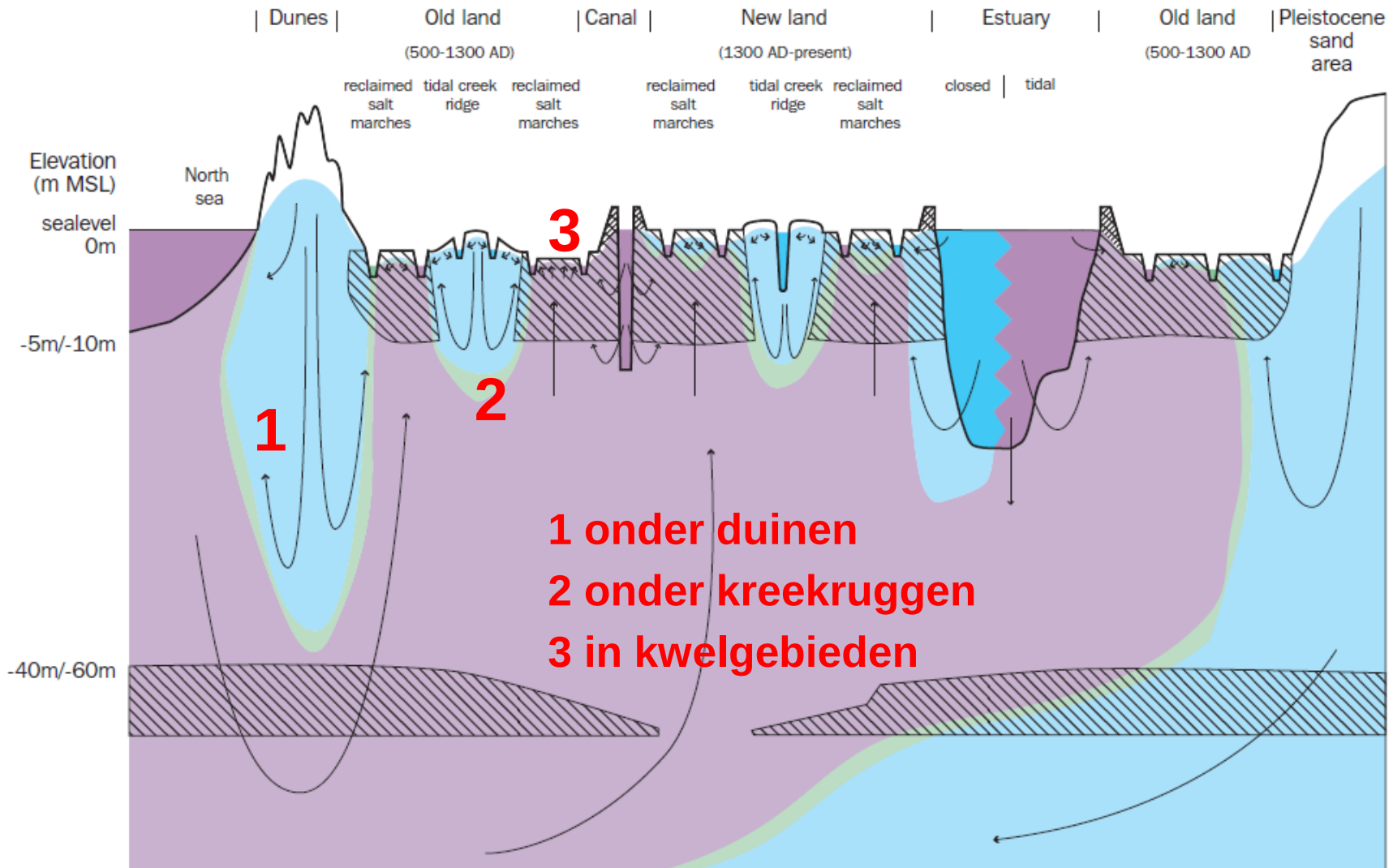
and



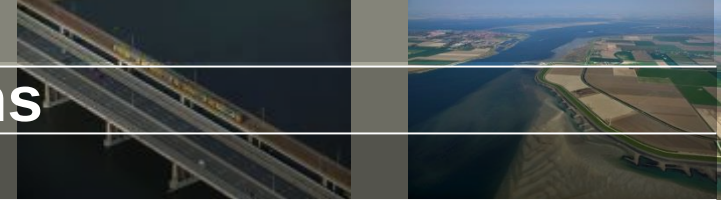
grens 1500 mg Cl/l midden



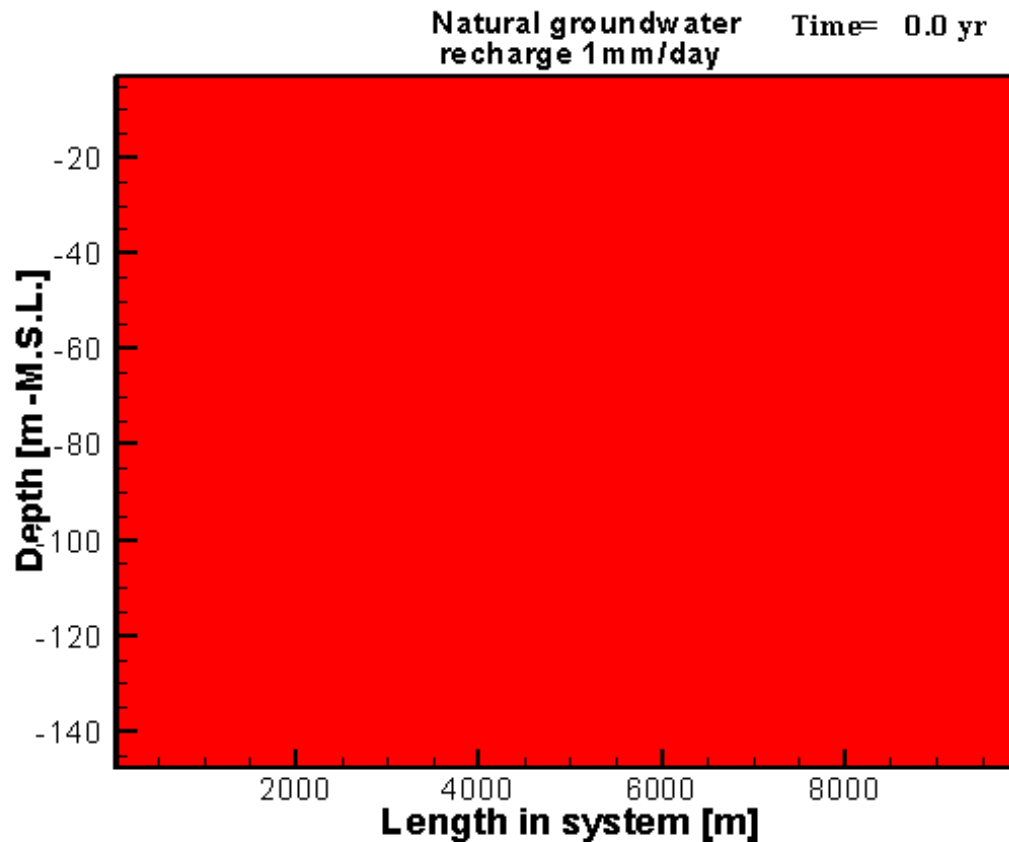
Drie typen zoetwaterlenzen in Zeeland



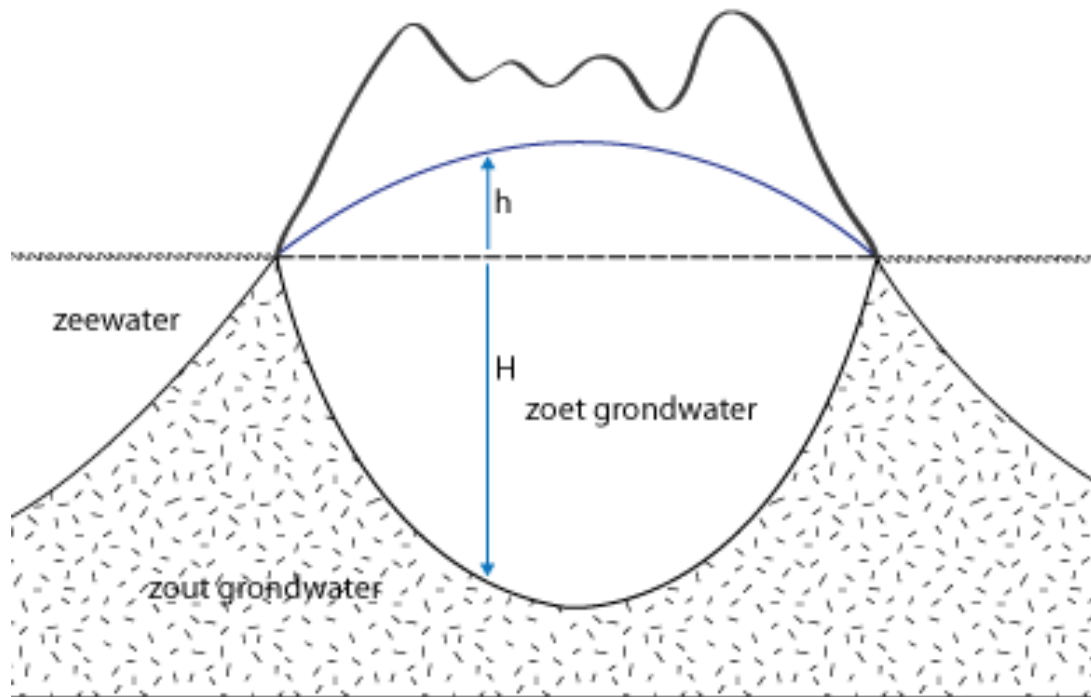
Ontwikkeling van een zoetwaterlens



Evolution of a freshwater lens



Badon Ghyben - Herzberg (1888): BGH-lenzen



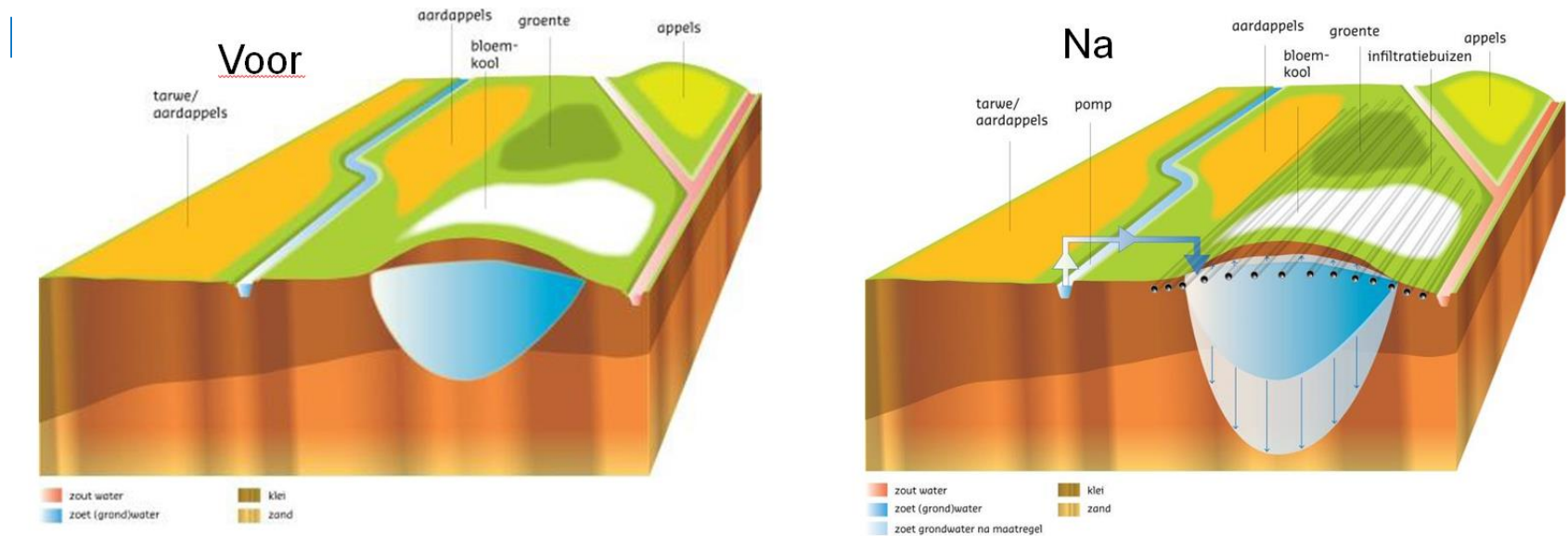
Dichtheid:

Zeewater = 1025 kg/m³

Zoetwater = 1000 kg/m³

$$H(x) = 40 \cdot h(x)$$

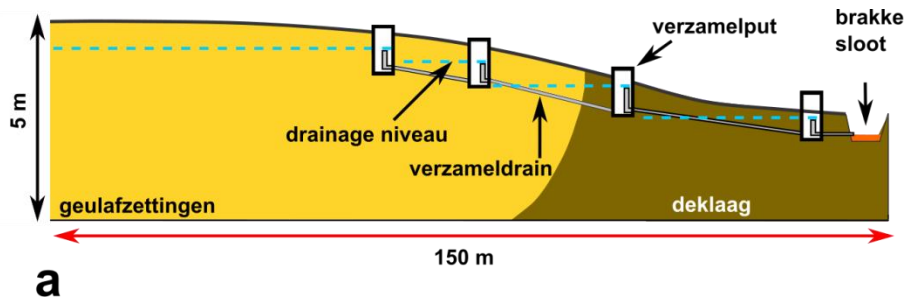
Ondergrondse opslag zoetwater: Kreekrug-infiltratie



Belangrijkste fysische factoren die de kansrijkdom bepalen:

- Relatief hogergelegen gebieden
- Bestaande zoetwaterlens (> 5m) - infiltratiesituatie
- Ruimte nodig voor structurele verhoging grondwaterstand (dm's)
- Zand in ondergrond, dikke storende lagen in ondergrond afwezig (klei, veen)
- Aanwezigheid zoetwaterbron voor infiltratie in bodem

Go-Fresh - proef op Walcheren



legenda

- peilgestuurde drainage
- locatie van de dwarsdoorsnede (a)
- zoet water sloot
- brakke / zoute sloot



- 30.000 m³ per jaar infiltratie van winterwater op 10 ha
- Groei lens na 6 jaar ongeveer 4-5 meter
- Duurzaam onttrekken, ongeveer 16.000 m³ per jaar met 4 diepdraains en
- 40.000 m³ met 10 diepdraains

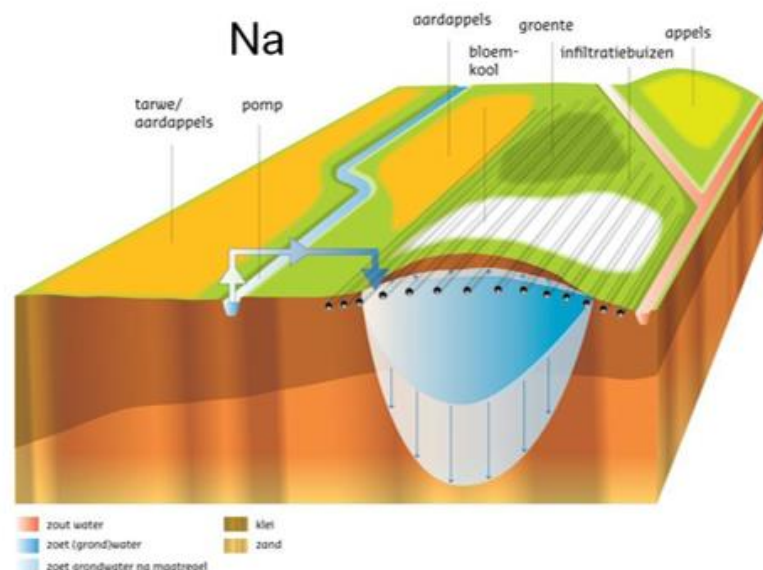
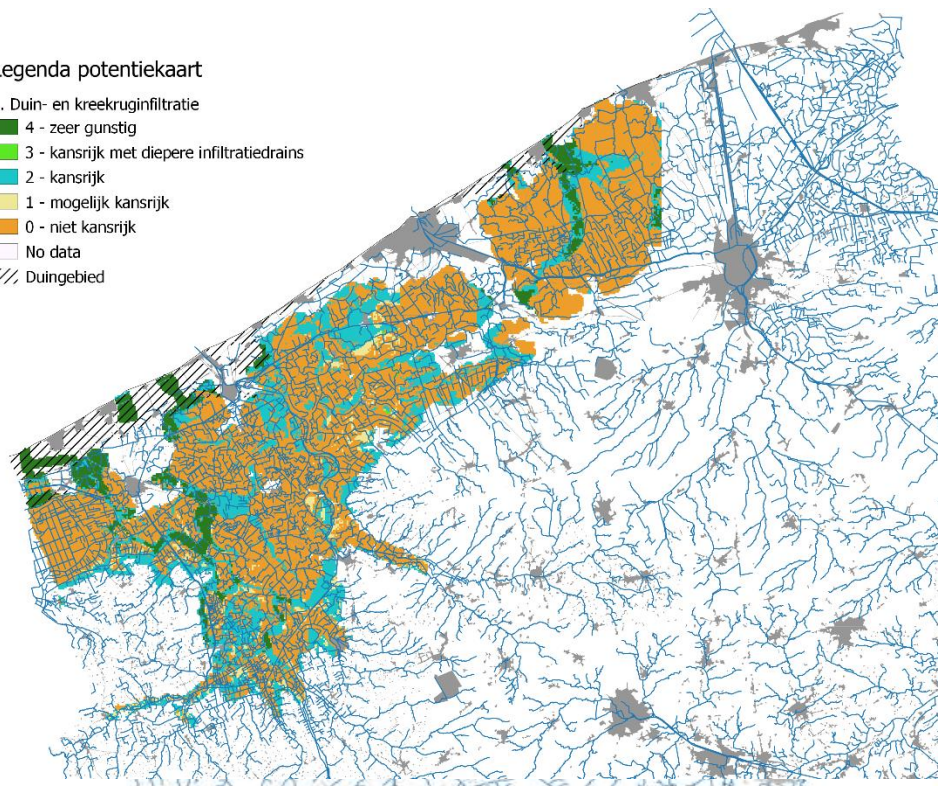
Go-Fresh – Vlaanderen

Twee pilootprojecten op basis van de projectresultaten:

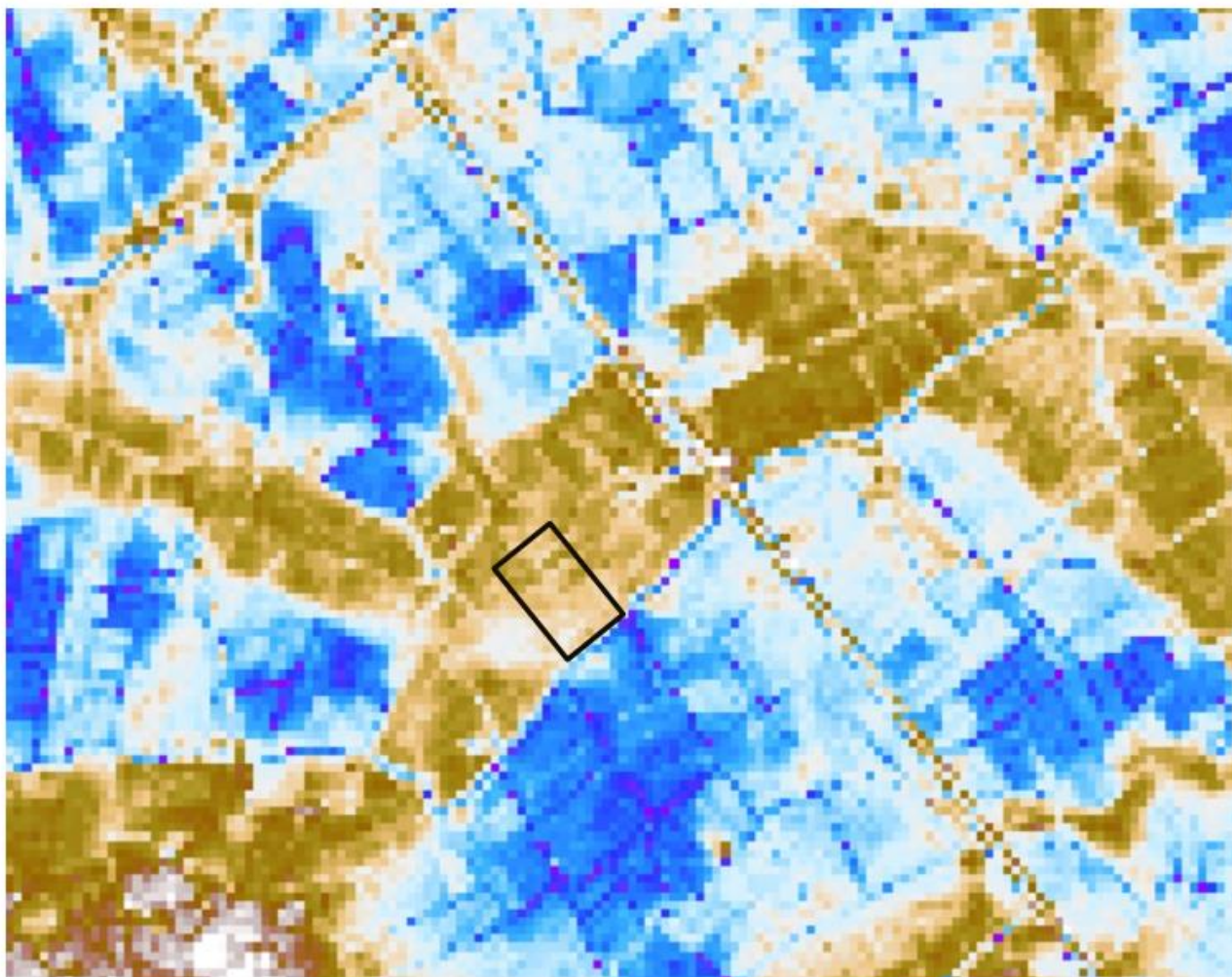
Kan ondergrondse wateropslag dienen als nieuwe waterbron?

Legenda potentiekaart

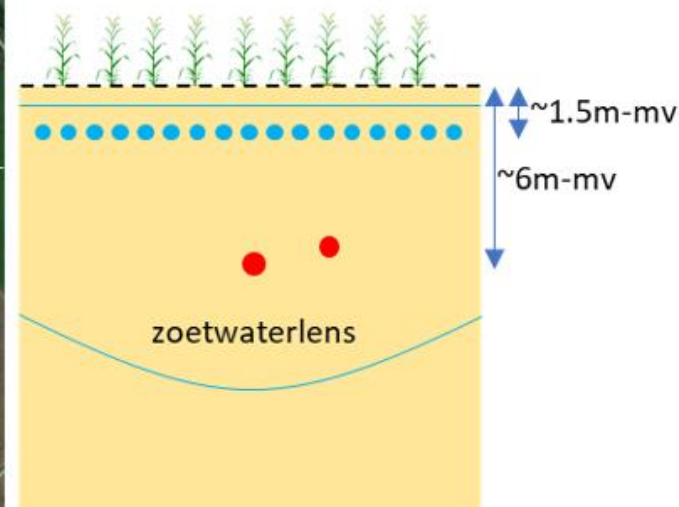
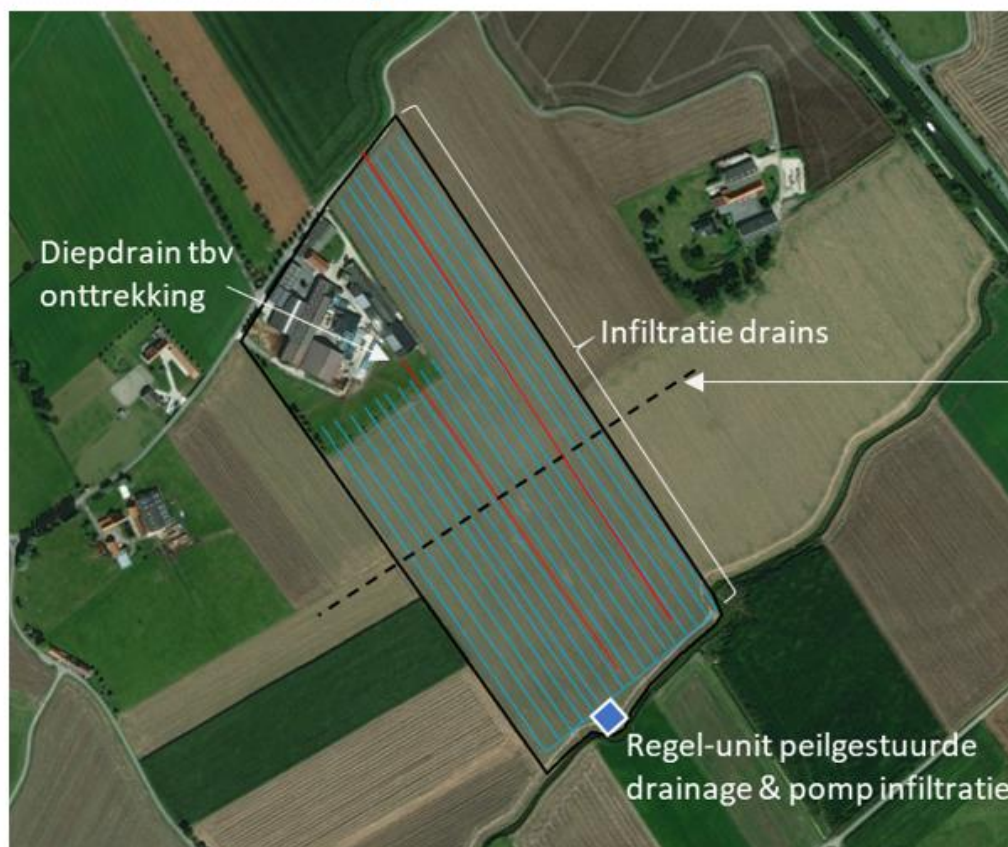
- 1. Duin- en kreekruuginfiltratie
- 4 - zeer gunstig
- 3 - kansrijk met diepere infiltratiedrains
- 2 - kansrijk
- 1 - mogelijk kansrijk
- 0 - niet kansrijk
- No data
- /// Duingebied



Hoogteligging



Advies ontwerp



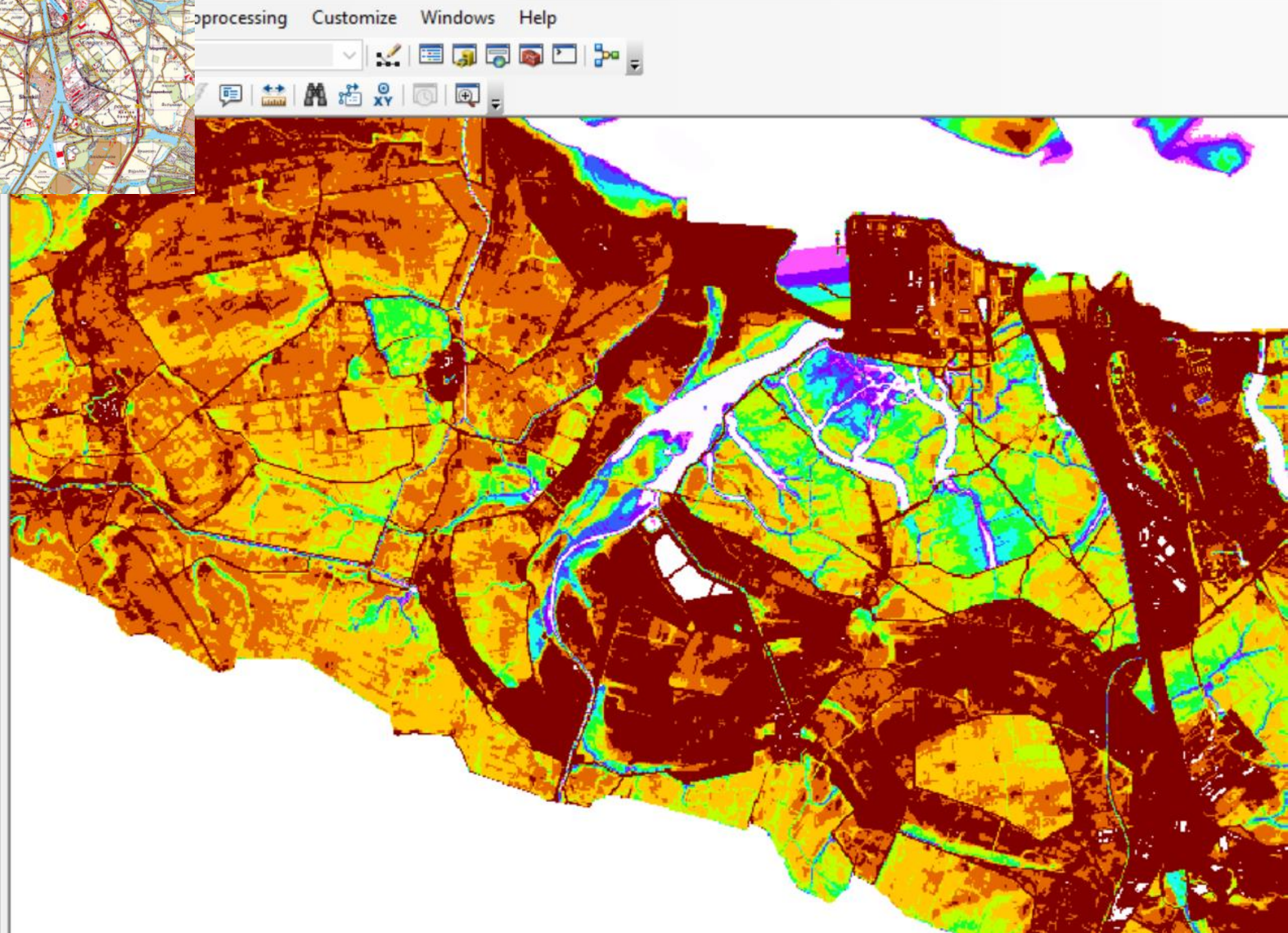
1^e concept ontwerp. Definitief plan afhankelijk van metingen en advies drainage specialist



2019

es

Maaiveldhoogte (m NAP)



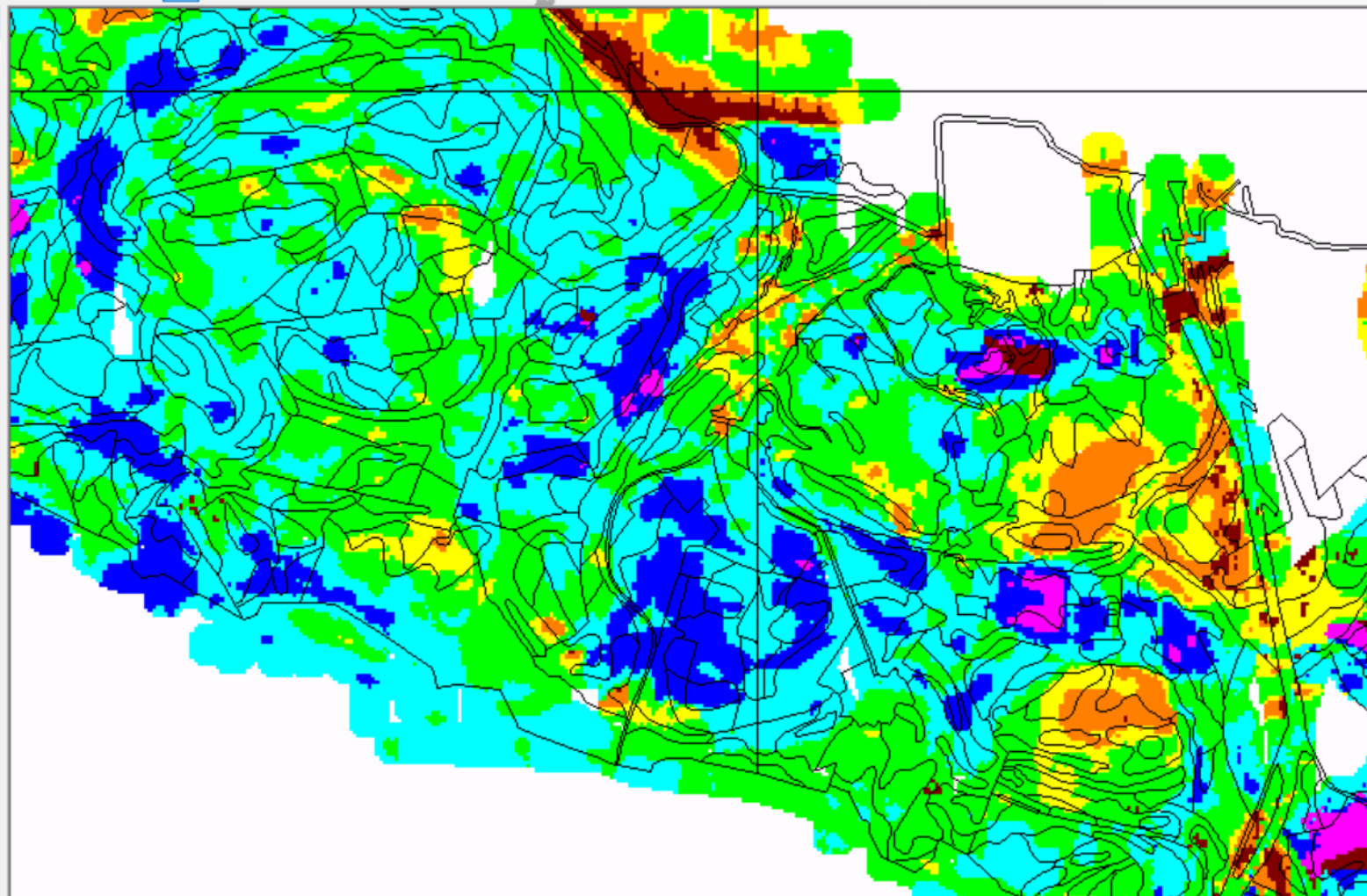
- ☐ head_1ewvp_d2_Ssdin
- ☐ head_fal_d2_Ssdiv4_a
- Value
High : 3
Low : -3
- ☐ head_fal_d2_Ssdiv4_a
- Value
High : 8,66
Low : -4,15
- ☒ **ahn25**
- VALUE
- ☐ -1.107 - -50
- ☐ -49,99999999 - -25
- ☐ -24,99999999 - 0
- ☐ 0 - 25
- ☐ 25,00000001 - 50
- ☐ 50,00000001 - 75
- ☐ 75,00000001 - 100
- ☐ 100,0000001 - 125
- ☐ 125,0000001 - 150
- ☐ 150,0000001 - 33.7
- ☐ New Group Layer
- ☒ New Group Layer

Dikte zoetwaterlens (m)

Table Of Contents



- ☐ -0,89 - -0,35
 - ☐ -0,34 - 99,00
 - ☐ nl_provincies_poly
 - ☐ krekens_poel
 - ☒ **NATUUR_Bodemkaart**
 - ☒ Zeeland_NAP_1500_midde
 - ☐ Zeeland_NAP_1500_midde
 - ☐ head_1ewvp_d2_Ssdiv4_au
 - ☐ head_fa1_d2_Ssdiv4_auton
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 - ☐ -998,99999999 - -20
 - ☐ -19,99999999 - -15
 - ☐ -14,99999999 - -10
 - ☐ -9,99999999 - -4
 - ☐ -3,99999999 - -2
 - ☐ -1,99999999 - 0
 - ☐ 0 - 99
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Low : -999
- Value
High : 3

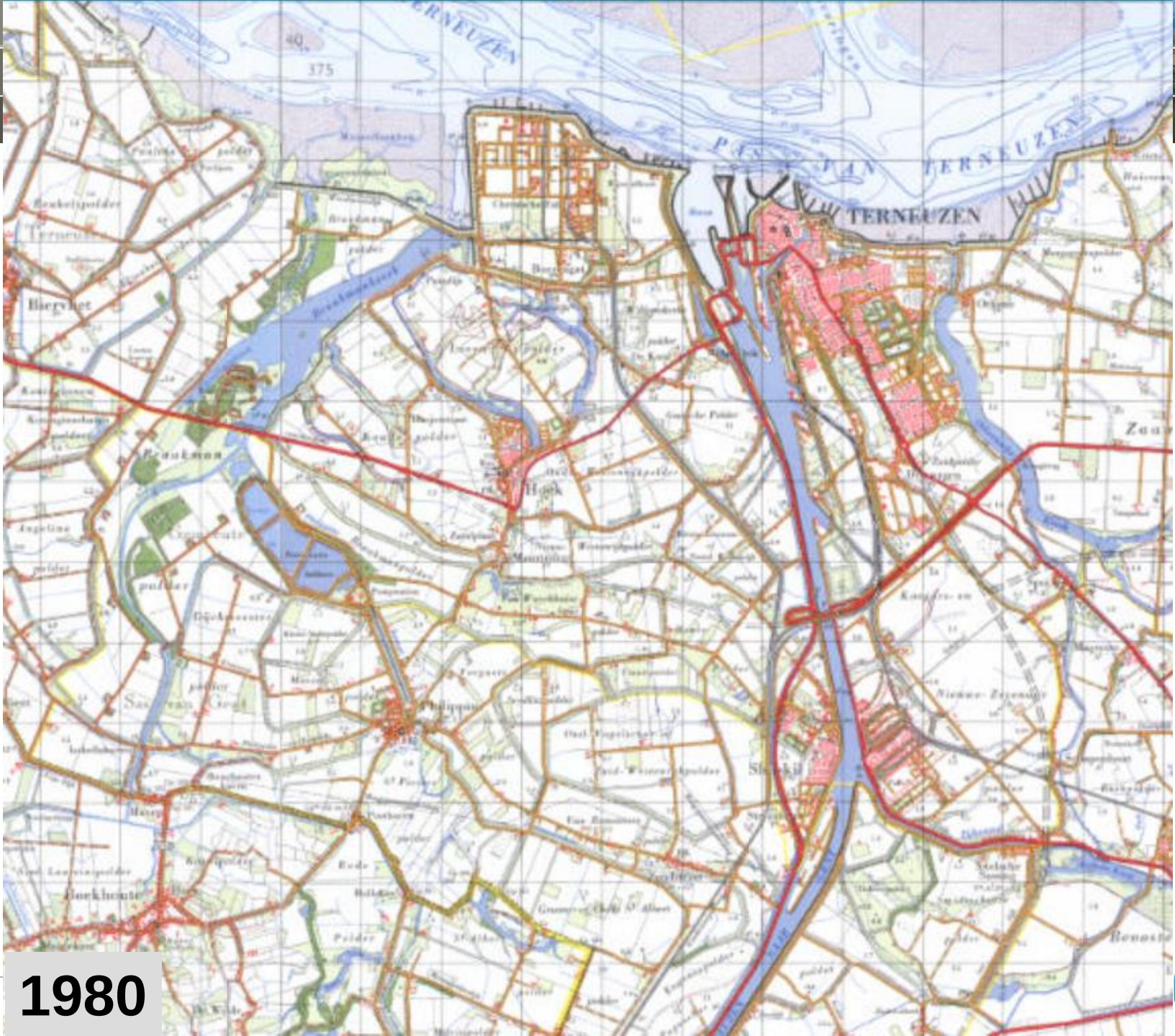


Deltares

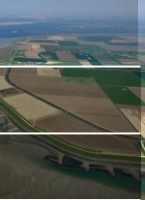


2019

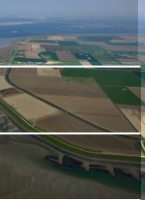
es



1980



res



1970

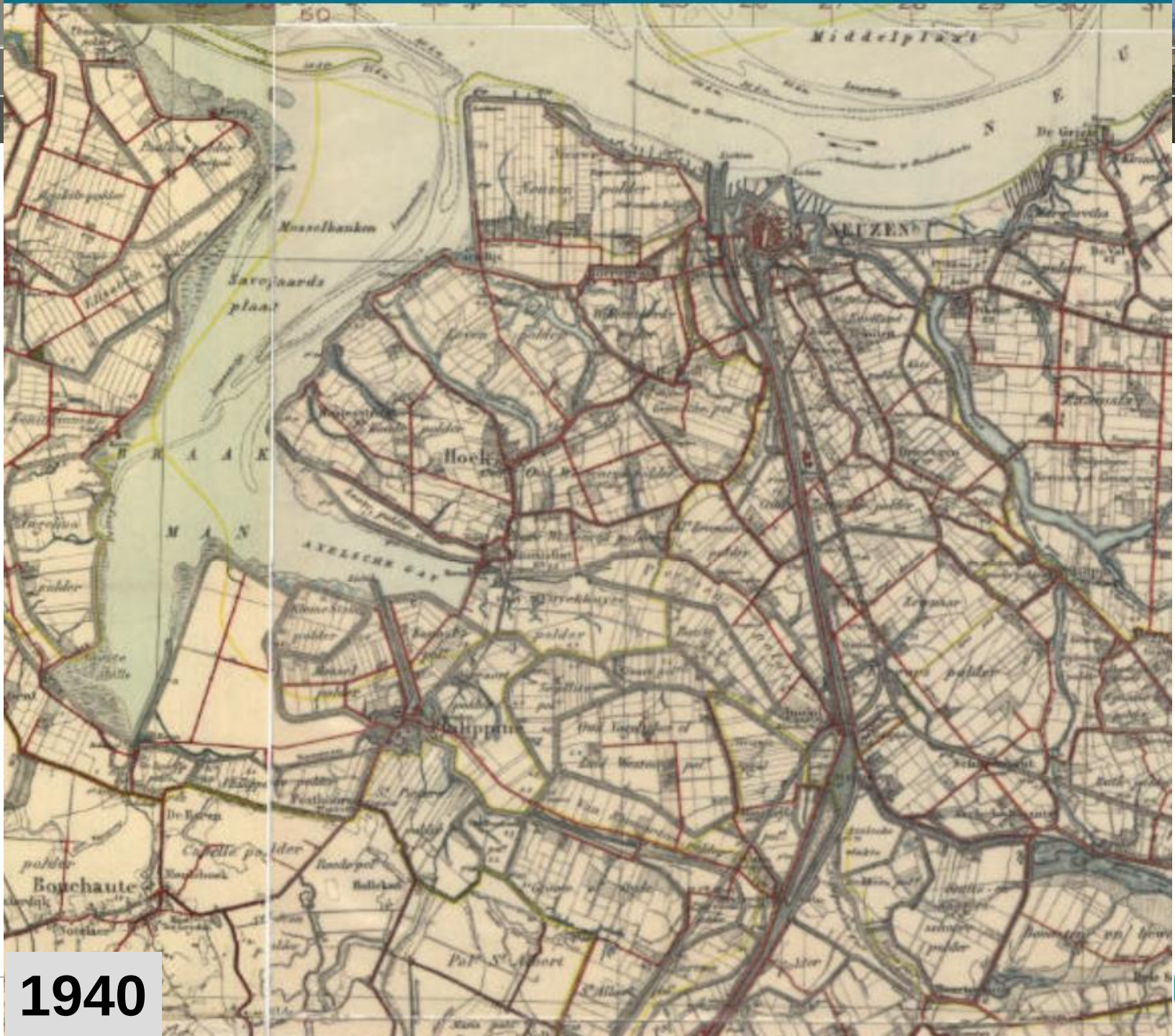
res



1950

16 juli 1952 werd de Braakman afgesloten

res



1940

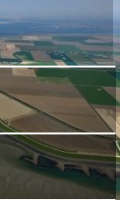
res



res



1900



es

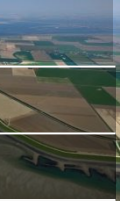


1850

es



1815



es

