

# Hoogveenherstelmaatregelen Fochteloerveen

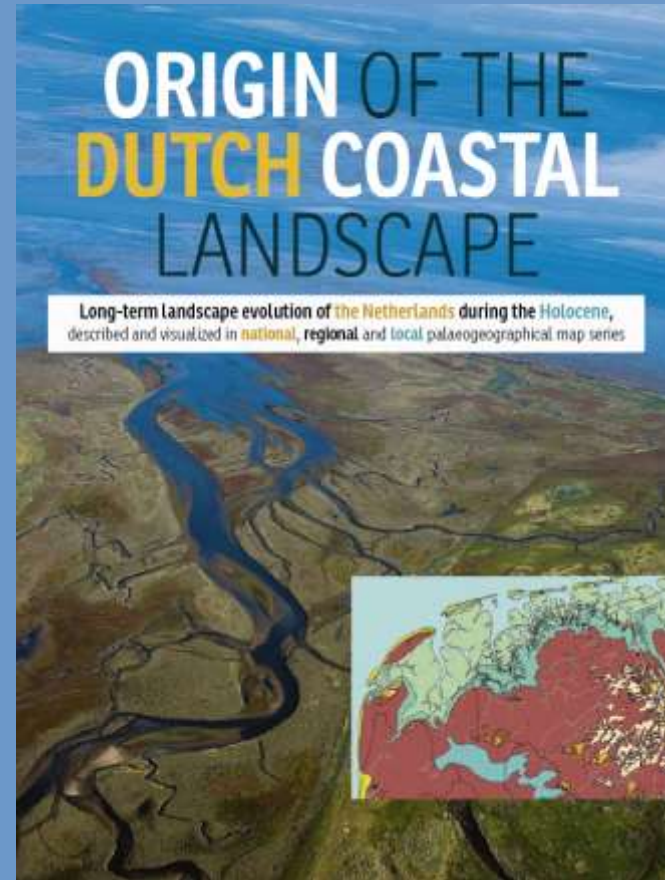
Nicko Straathof, Natuurmonumenten, februari 2015



Natuurmonumenten

# Hoe het veen in Nederland verscheen en weer verdween.

Proefschrift Peter Vos





8000 voor Chr.



**Holocene landschap**

- |   |  |  |
|---|--|--|
|  Hoge duinen             |  Zee- en rivierklei             |  Veer                     |
|  Strandwallen en duinen |  Ingedijkte zee- en rivierklei |  Stedelijk gebied        |
|  Duinvalleien          |  Droogmakerij                 |  Buiten- en binnenwater |
|   |  |  Waterlopen             |

5500 voor Chr.



**Pleistocene landschap**

- |  |  |   |
|--|--|---|
|  Beek- en rivierdalen             |  Pleistoceen zand > 0 m NAP |  Löss              |
|  Pleistoceen zand < 15 m -NAP    |  Rivierduinen              |  Tertiar en ouder |
|  Pleistoceen zand 15 - 0 m -NAP |  Stuwwallen en drumlins   |   |

5500 voor Chr.



**Holocene landschap**

- |                        |                               |                        |
|------------------------|-------------------------------|------------------------|
| Hoge duinen            | Zee- en rivierklei            | Veem                   |
| Strandwallen en duinen | Ingedijkte zee- en rivierklei | Stedelijk gebied       |
| Duinvalleien           | Droogmakerij                  | Buiten- en binnenwater |
|                        |                               | Waterlopen             |

3850 voor Chr.



**Pleistoecene landschap**

- |                                |                            |                   |
|--------------------------------|----------------------------|-------------------|
| Beek- en rivierdalen           | Pleistoecen zand > 0 m NAP | Löss              |
| Pleistoecen zand < 16 m -NAP   | Rivierduinen               | Tertiair en ouder |
| Pleistoecen zand 16 - 0 m -NAP | Stuwwallen en drumlins     |                   |



3850 voor Chr.



**Holocene landschap**

- |                        |                               |                        |
|------------------------|-------------------------------|------------------------|
| Hoge duinen            | Zee- en rivierklei            | Veën                   |
| Strandwallen en duinen | Ingedijkte zee- en rivierklei | Stedelijk gebied       |
| Duinvalleien           | Droogmakerij                  | Buiten- en binnenwater |
|                        |                               | Waterlopen             |

2750 voor Chr.



**Pleistocene landschap**

- |                                |                            |                   |
|--------------------------------|----------------------------|-------------------|
| Beek- en rivierdalen           | Pleistoceen zand > 0 m NAP | Löss              |
| Pleistoceen zand < 16 m -NAP   | Rivierduinen               | Tertiair en ouder |
| Pleistoceen zand 16 - 0 m -NAP | Stuwwallen en drumlins     |                   |

2750 voor Chr.



**Holocene landschap**

- |   |  |  |
|---|--|--|
|  Hoge duinen             |  Zee- en rivierklei             |  Veer                     |
|  Strandwallen en duinen |  Ingedijkte zee- en rivierklei |  Stedelijk gebied        |
|  Duinvalleien          |  Droogmakerij                 |  Buiten- en binnenwater |
|   |  |  Waterlopen             |

1500 voor Chr.



**Pleistocene landschap**

- |  |  |  |
|--|--|--|
|  Beek- en rivierdalen             |  Pleistoceen zand > 0 m NAP |  Löss               |
|  Pleistoceen zand < 16 m -NAP    |  Rivierduinen              |  Tertiair en ouder |
|  Pleistoceen zand 16 - 0 m -NAP |  Stuwwallen en drumlins   |  |



1500 voor Chr.



**Holocene landschap**

- Hoge duinen
- Strandwallen en duinen
- Duinvalleien
- Zee- en rivierklei
- Ingedijkte zee- en rivierklei
- Droogmakerij
- Veen
- Stedelijk gebied
- Buiten- en binnenwater
- Waterlopen

500 voor Chr.



**Pleistocene landschap**

- Beek- en rivierdalen
- Pleistoceen zand < 16 m -NAP
- Pleistoceen zand 16 - 0 m -NAP
- Pleistoceen zand > 0 m NAP
- Rivierduinen
- Stuwwallen en drumlins
- Löss
- Tertiair en ouder

500 voor Chr.



**Holocene landschap**

- Hoge duinen
- Strandwallen en duinen
- Duinvalleien
- Zee- en rivierklei
- Ingedijkte zee- en rivierklei
- Droogmakerij
- Veen
- Stedelijk gebied
- Buiten- en binnenwater
- Waterlopen

100 na Chr.



**Pleistoecene landschap**

- Beek- en rivierdalen
- Pleistoecen zand < 16 m -NAP
- Pleistoecen zand 16 - 0 m -NAP
- Pleistoecen zand > 0 m NAP
- Rivierduinen
- Stuwwallen en drumlins
- Löss
- Tertiair en ouder





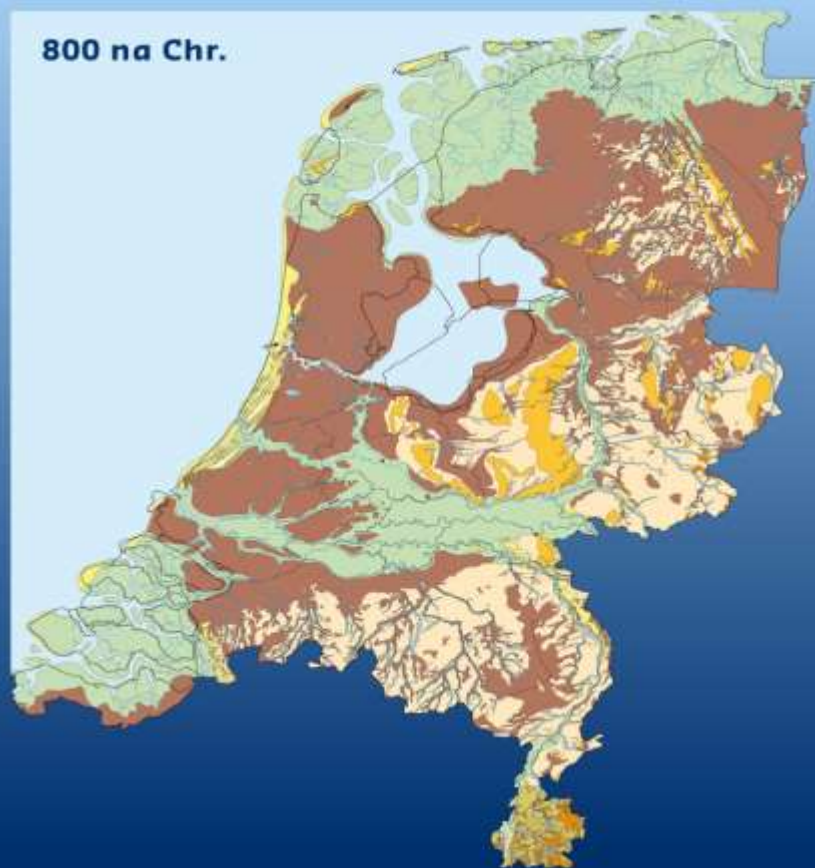
100 na Chr.



#### Holocene landschap



800 na Chr.



#### Pleistocene landschap



800 na Chr.



#### Holocene landschap



1500 na Chr.



#### Pleistocene landschap





1500 na Chr.



#### Holocene landschap



1850 na Chr.



#### Pleistocene landschap



1850 na Chr.



#### Holocene landschap



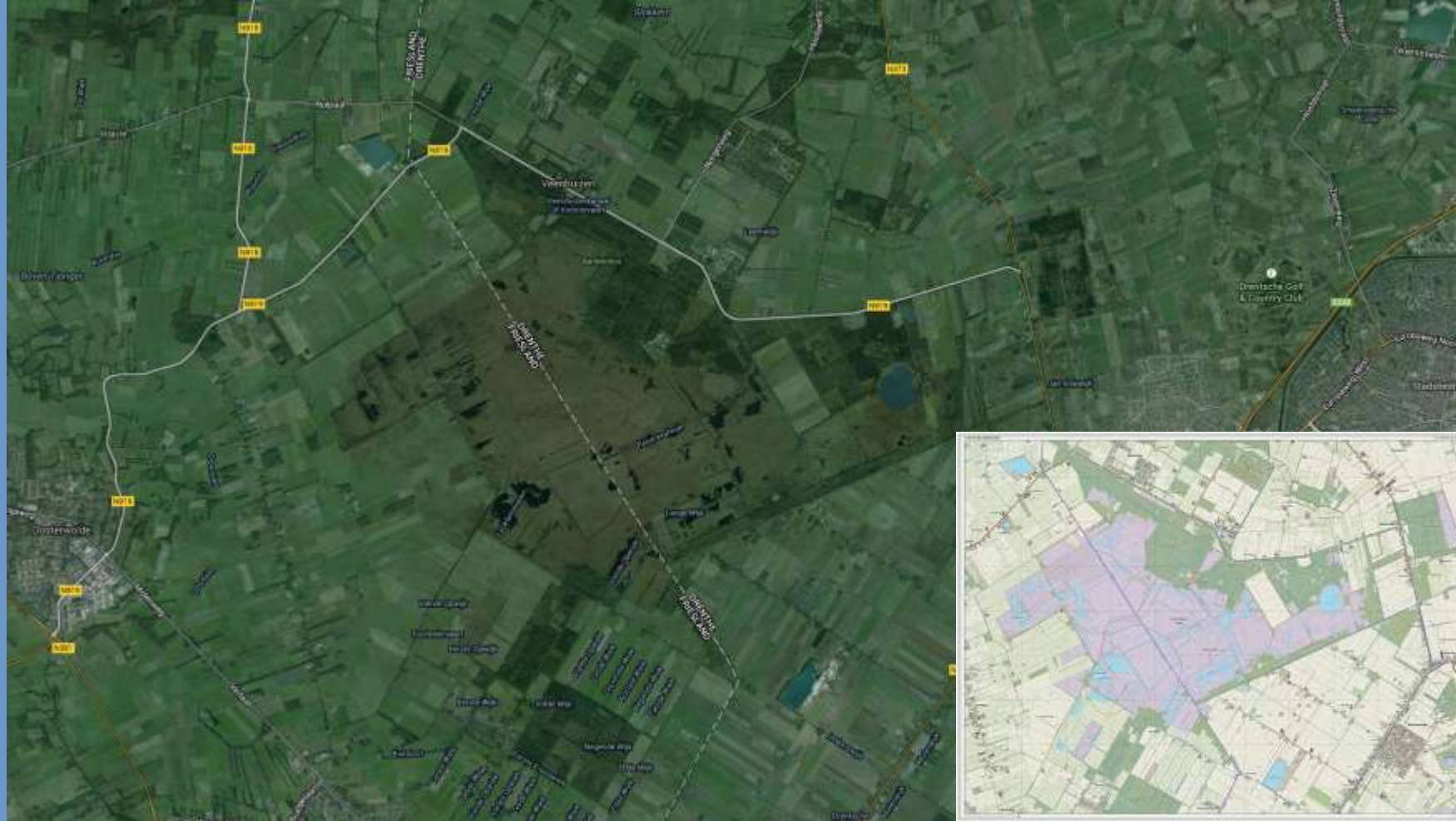
2000 na Chr.



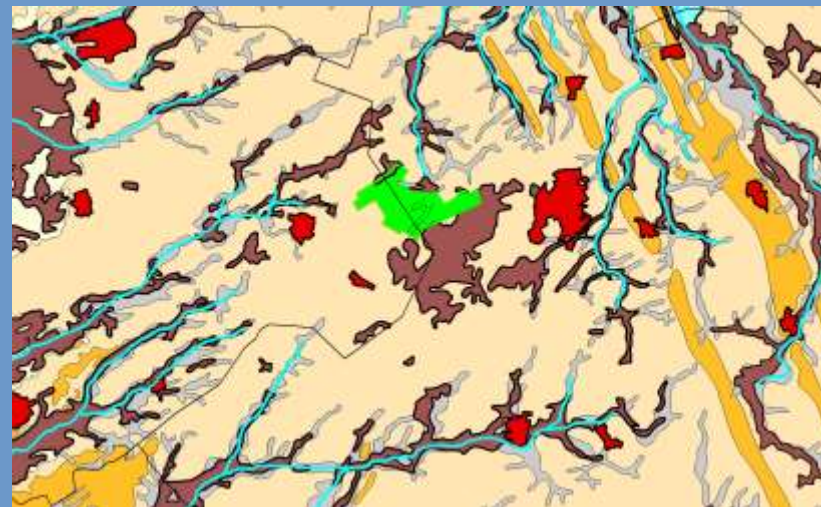
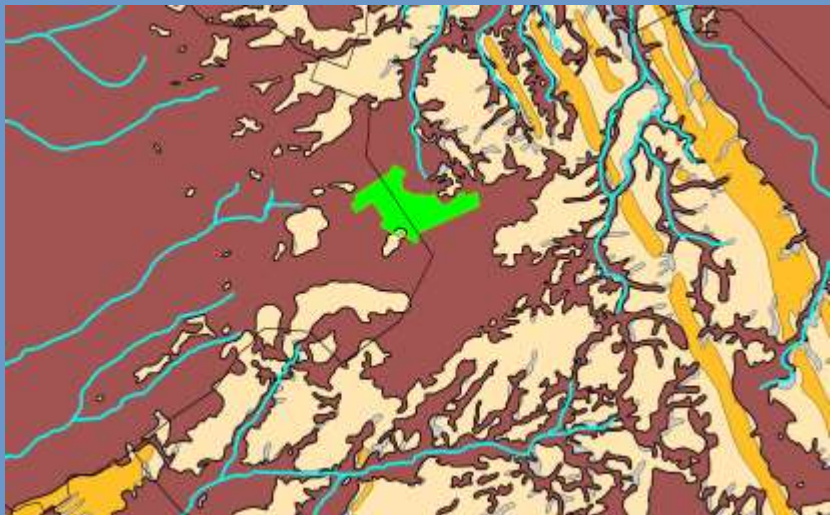
#### Pleistocene landschap







## .Omgeving Fochteloerveen 500 BC en nu





## Vervening mbv veenwijken



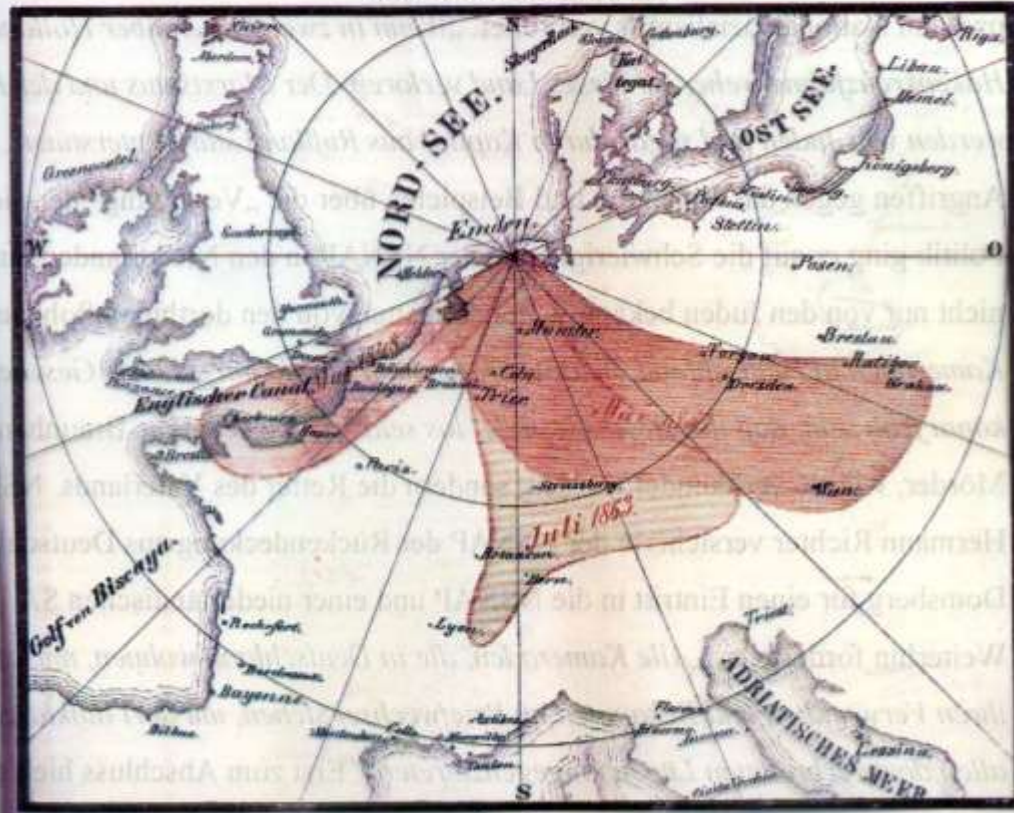
Boekweitbrandcultuur,  
volgens D. lit. een  
Nederlandse vinding !





# Verbreitung des Moorrauchs 1848, 1857, 1863.

von Dr. M. A. F. Prestel.

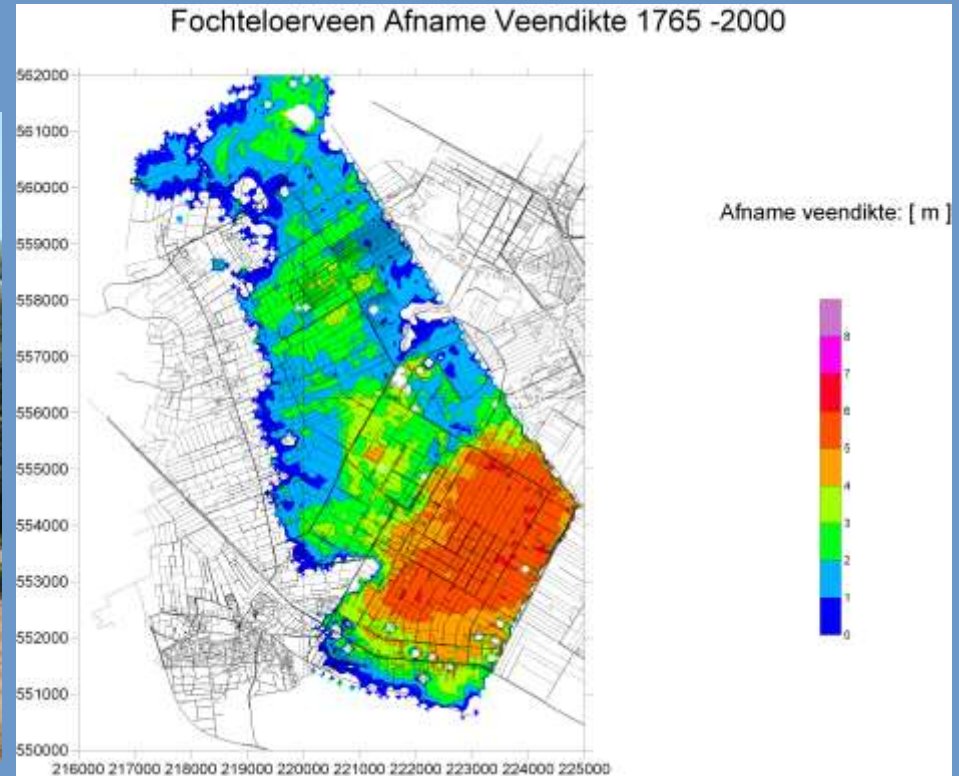


Machinale vervening  
tot in de 80-er jaren





Maaiveld daling sinds 1765  
Boekweit-brandcultuur : 1-2 m.  
Vervening: tot 7 m.  
Oxidatie: ?







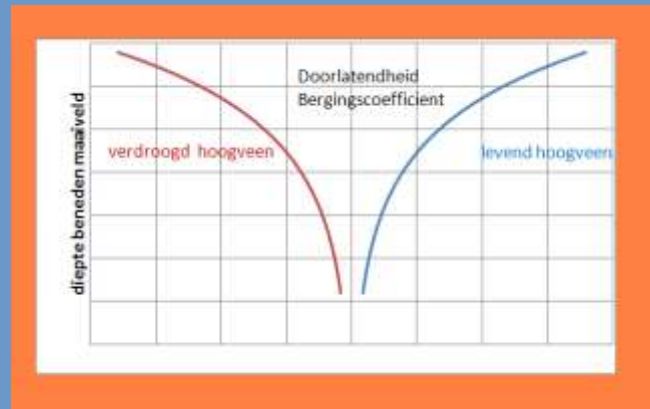
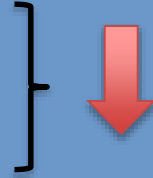
Sphagnum groei op veraarde compacte toplaag ?

Porositeit

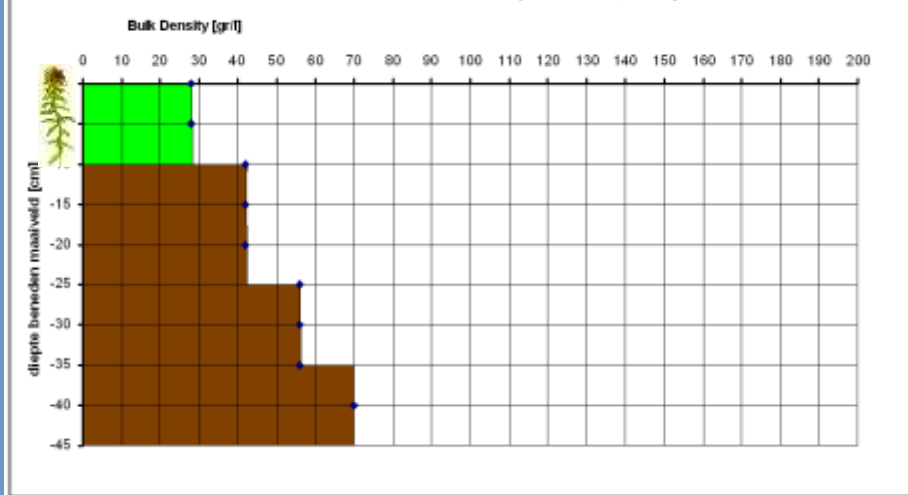
“Mooratmung”

Doorlatendheid

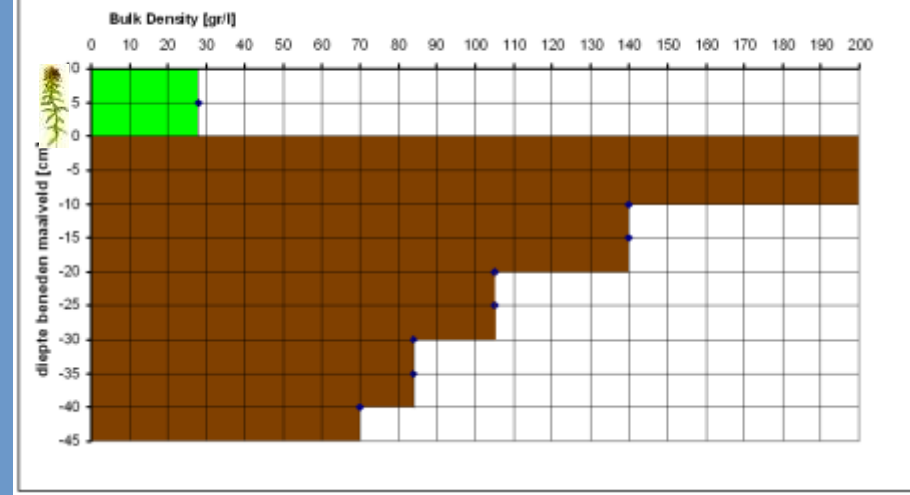
Kip -- Ei probleem !



Bodemdichtheid Acrotelm (Romanov, 1968)



Bodemdichtheid Fochteloerveen

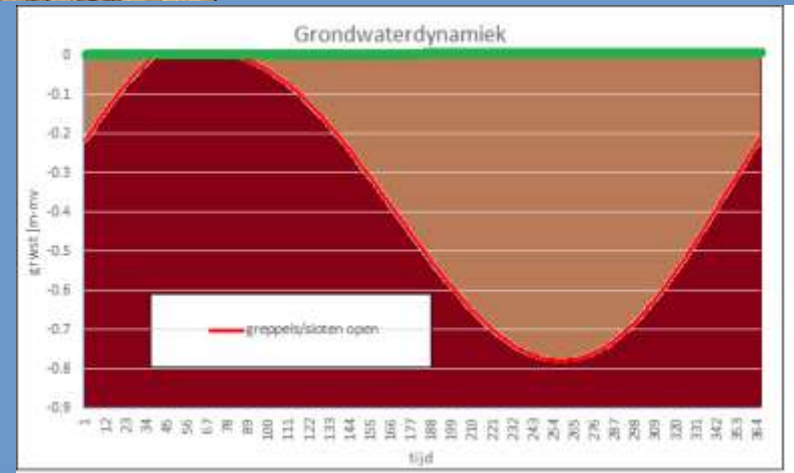
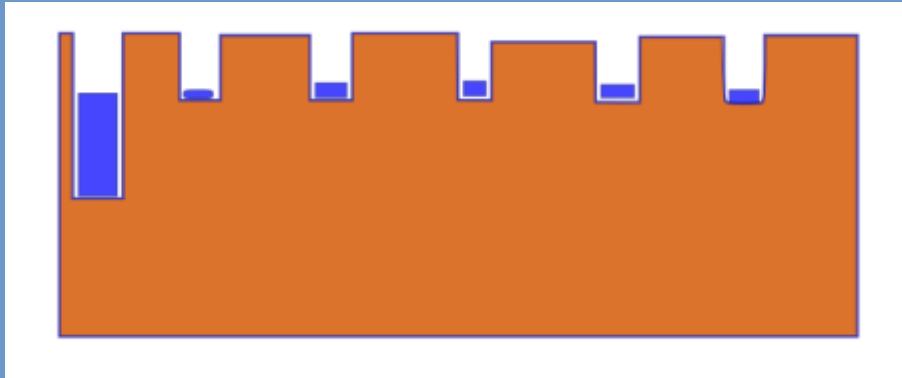






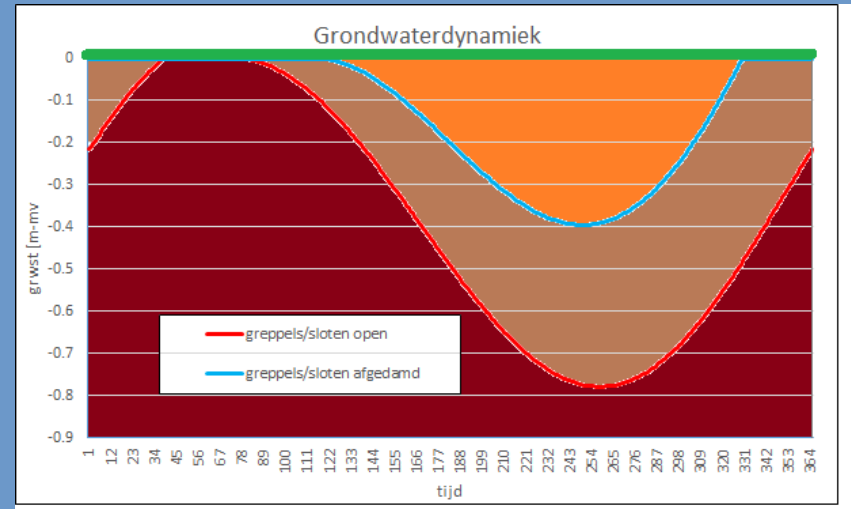
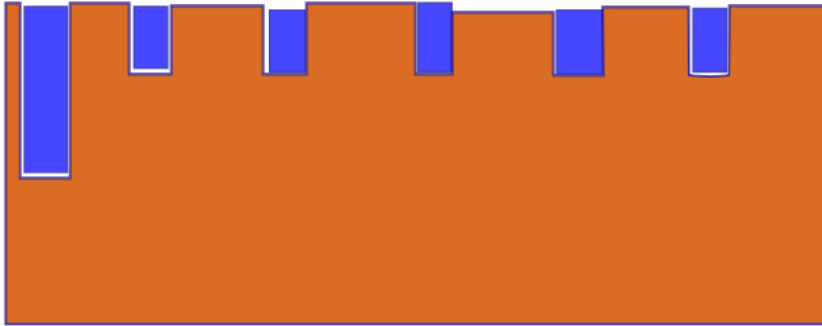


Grondwaterdynamiek  
Ontwatering door  
greppels/sloten



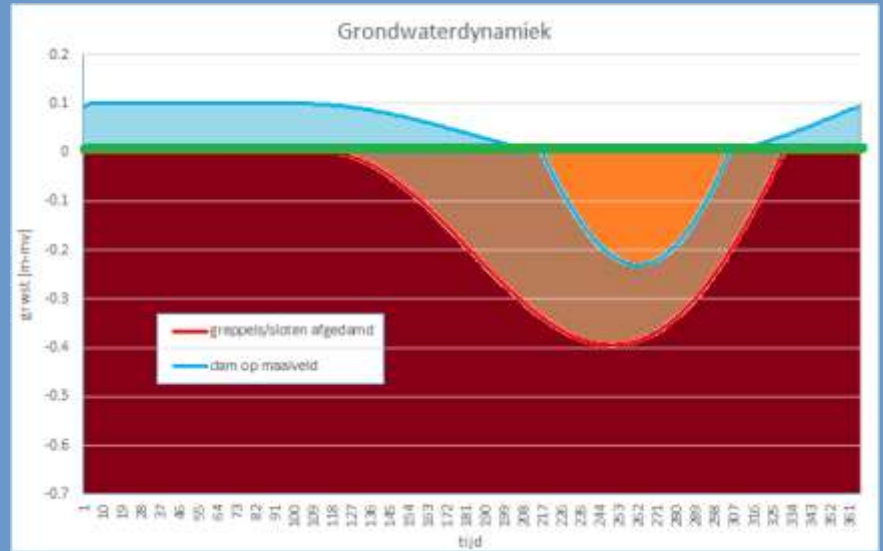
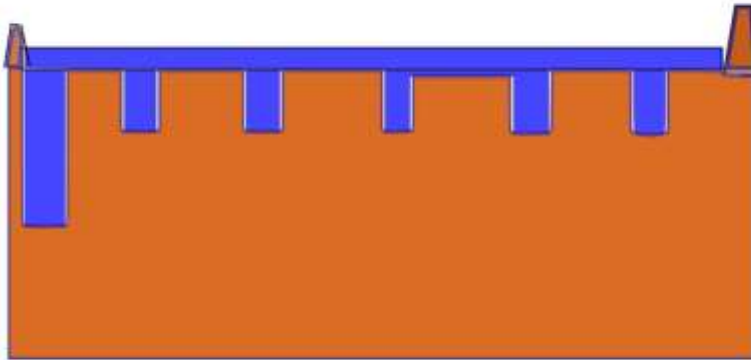
# Grondwaterdynamiek

## Afdammen sloten en greppels





# Grondwaterdynamiek Dammen op maaiveld

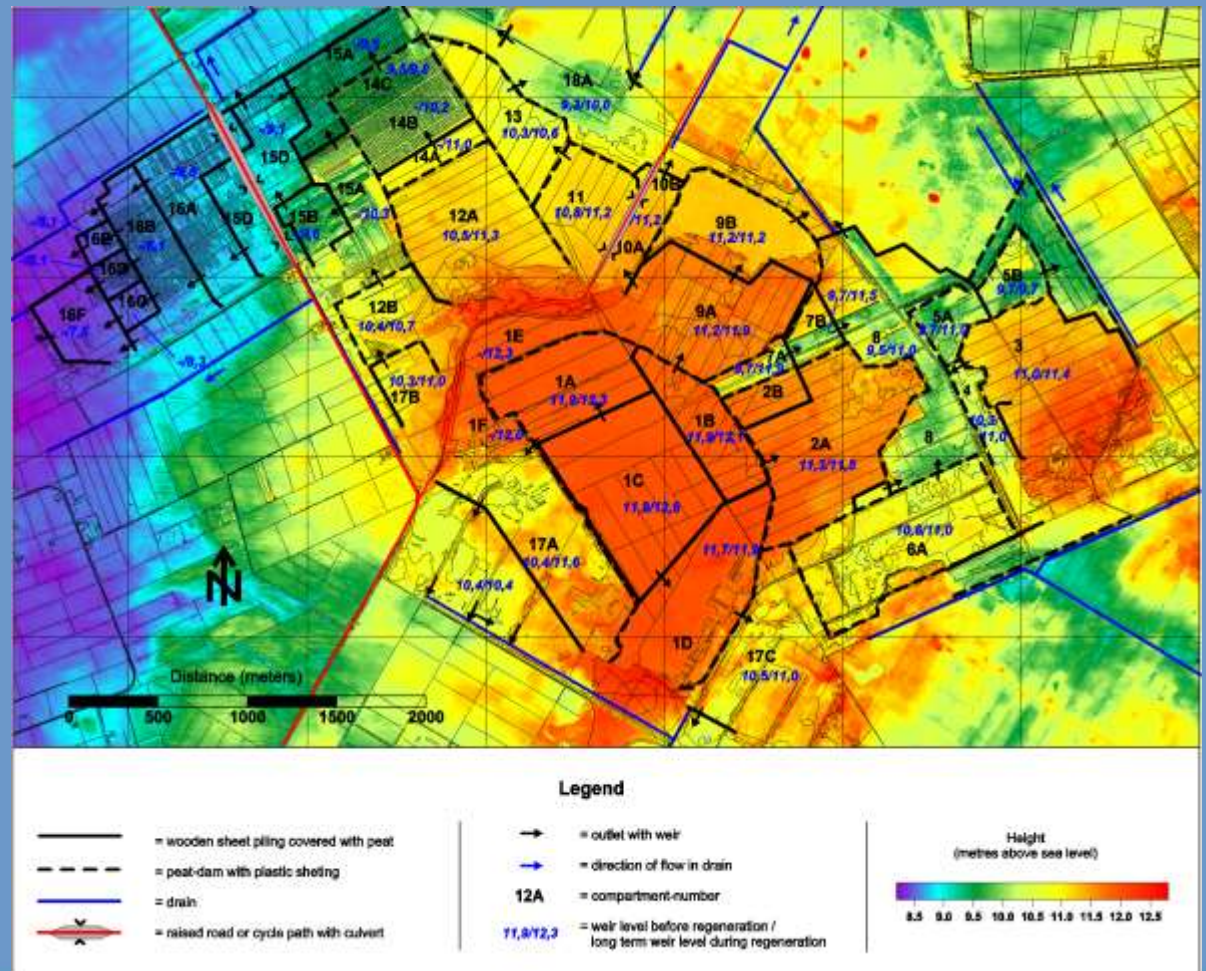


1<sup>e</sup> Dammenplan 1983  
DTM : 1punt/ha.

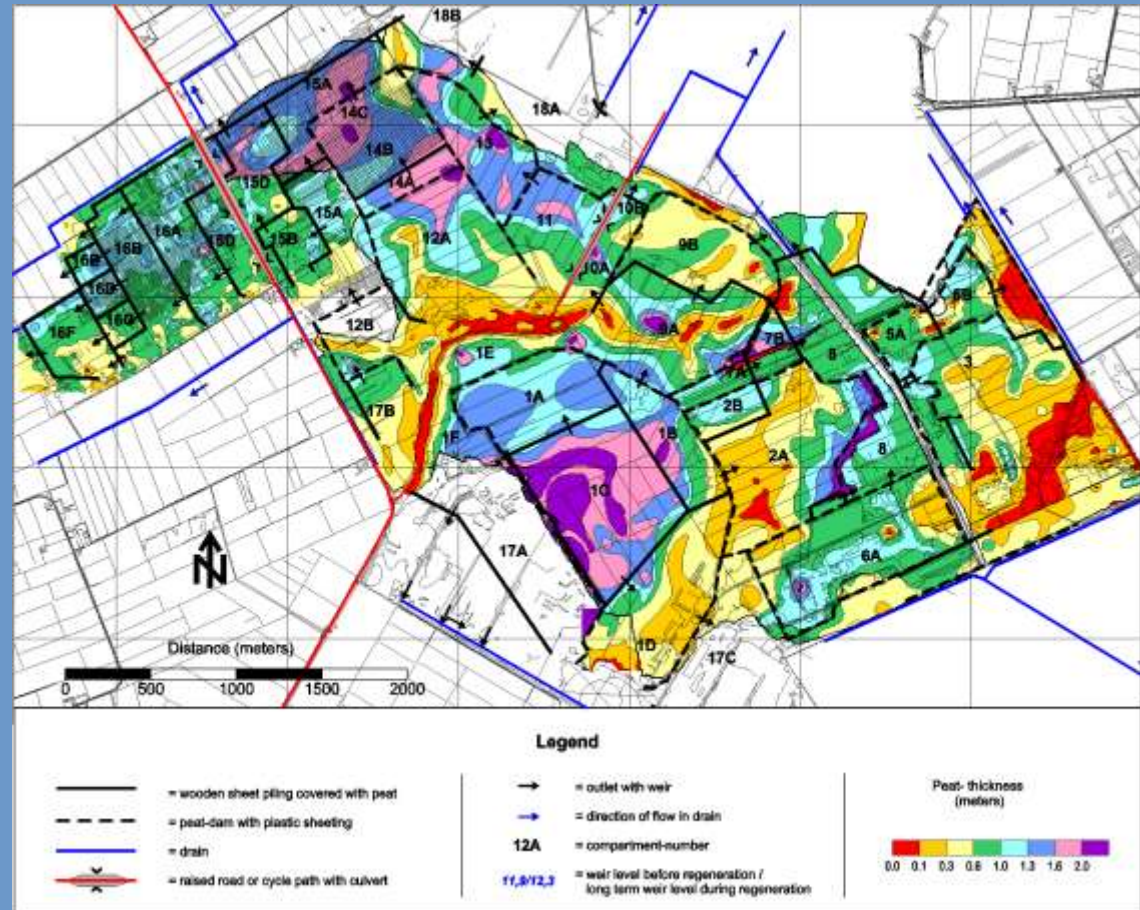




2<sup>o</sup> Dammenplan 1999  
 AHN-1: 1p./5x5m



# Dikte restveenlaag als hulpinformatie





# Damwanden van hout



## Legend

- = dam
- - - = catchment boundary
- = drain
- = outlet with weir
- = direction of flow in drain
- ⊙ = compartment-number

**Bell Hullebaar**

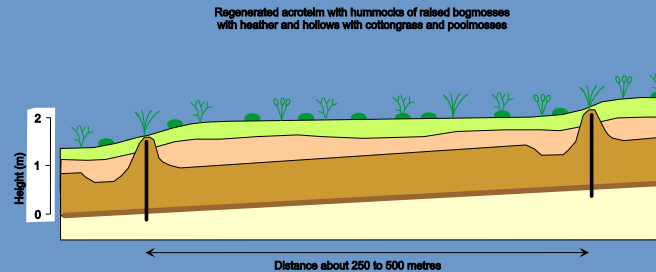
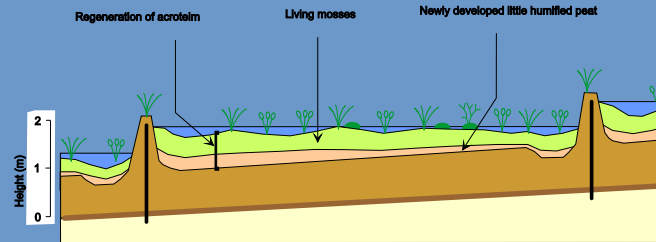
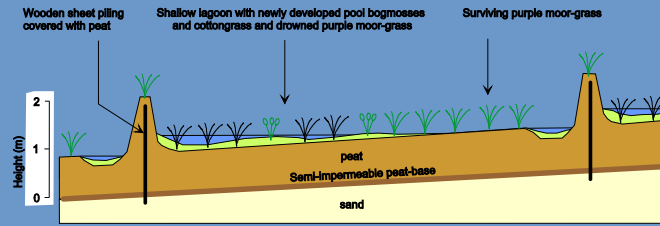
Ecophysiological  
Consultancy

Schiedamsedijk 113, 2012 WC, Zuidwijk (NL)  
Tel: +31 36 474598 E-mail: hullebaar@box.nl



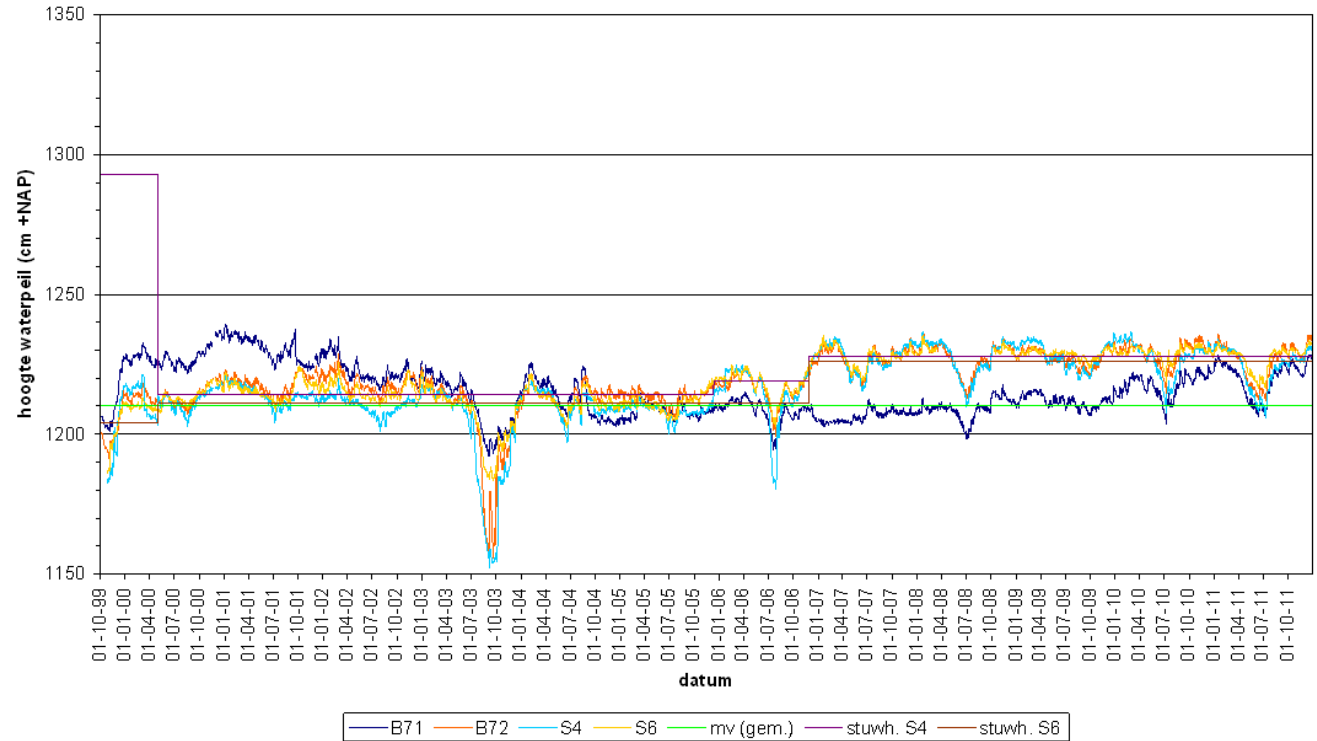
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# Acrotelmvorming dmv verlanding



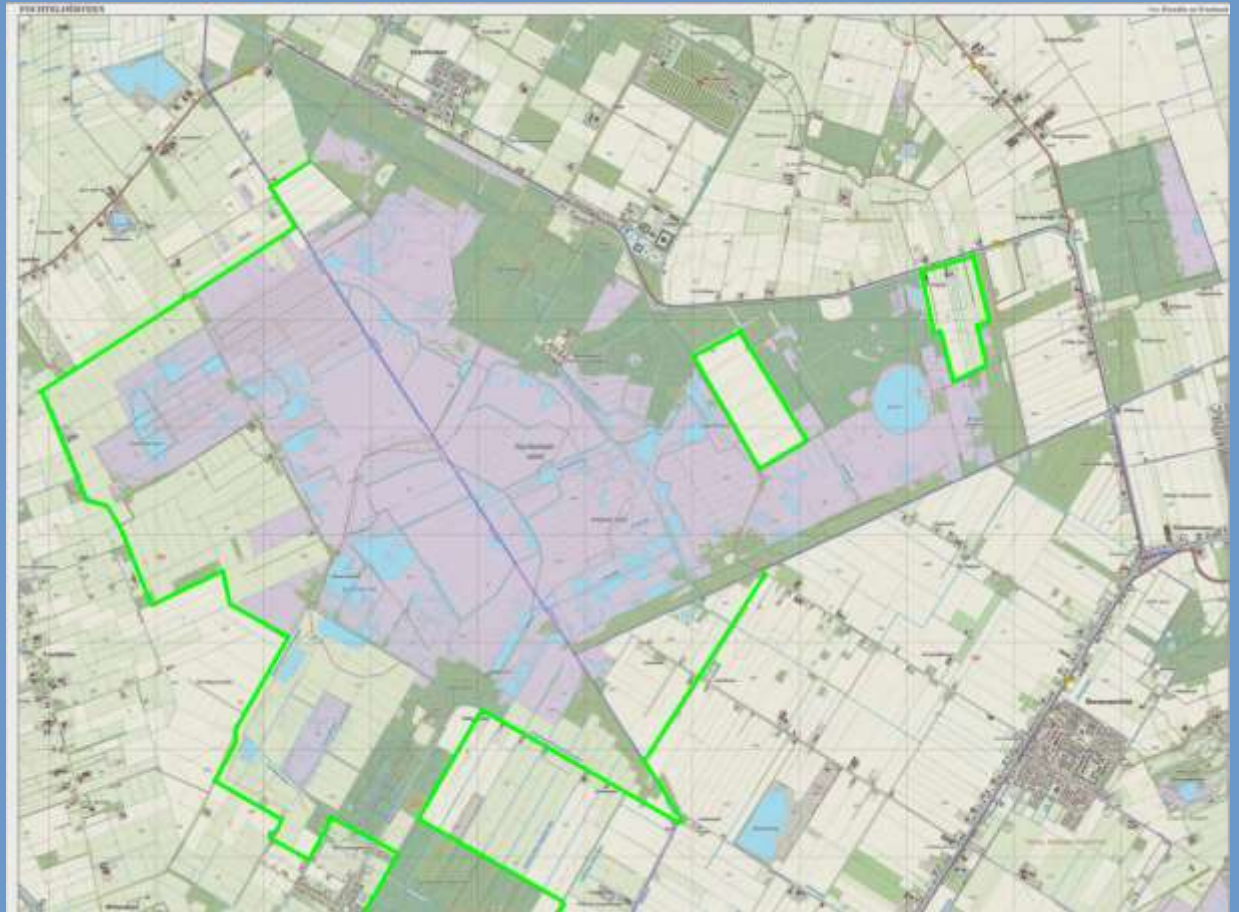
# Grondwaterdynamiek Reactie op stuwpeilverhoging

fig. a: Fochteloërveen Compartment 1C - Verloop waterstanden t/m 2011





# Inrichting landbouwgebieden Friese Randzone



# Bufferzone tegen Ontwatering

N-Emissie

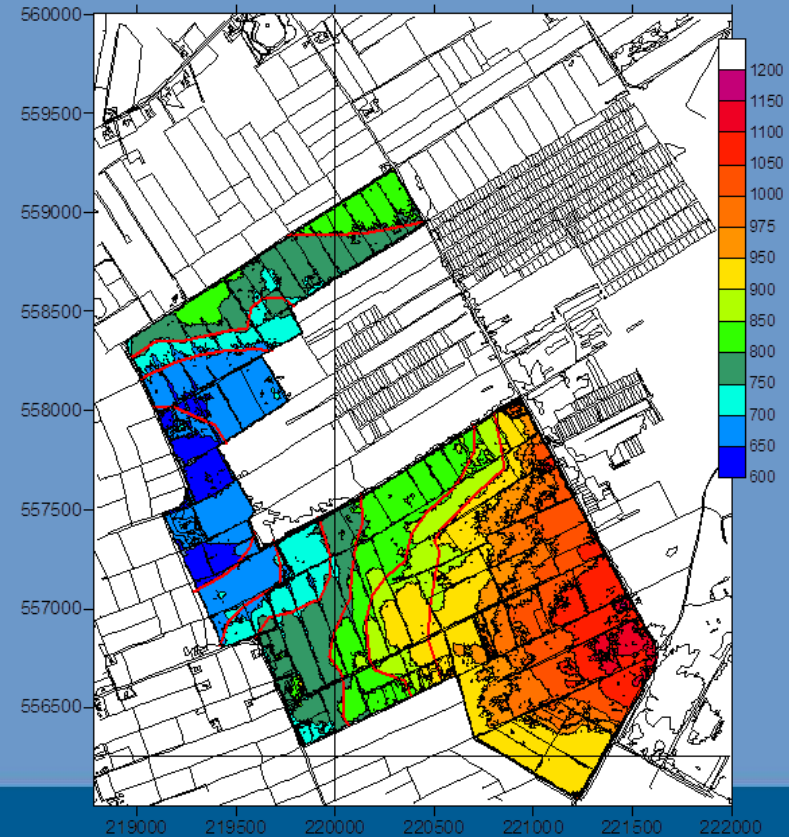
Droge lucht

voor Ganzenopvang



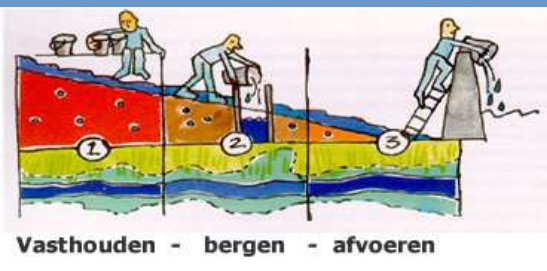
## Randzone Fochtelooveen 2e Module

maaiveldshoogte [cm+NAP] en ligging kaden (50 cm interval )





# Waterberging bij extreme neerslag

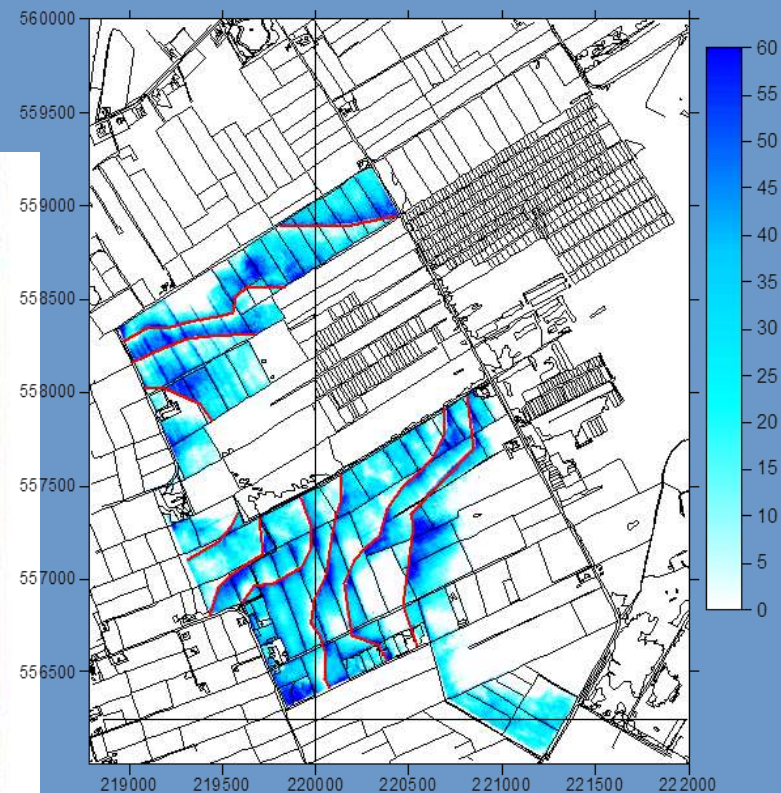


Vasthouden - bergen - afvoeren



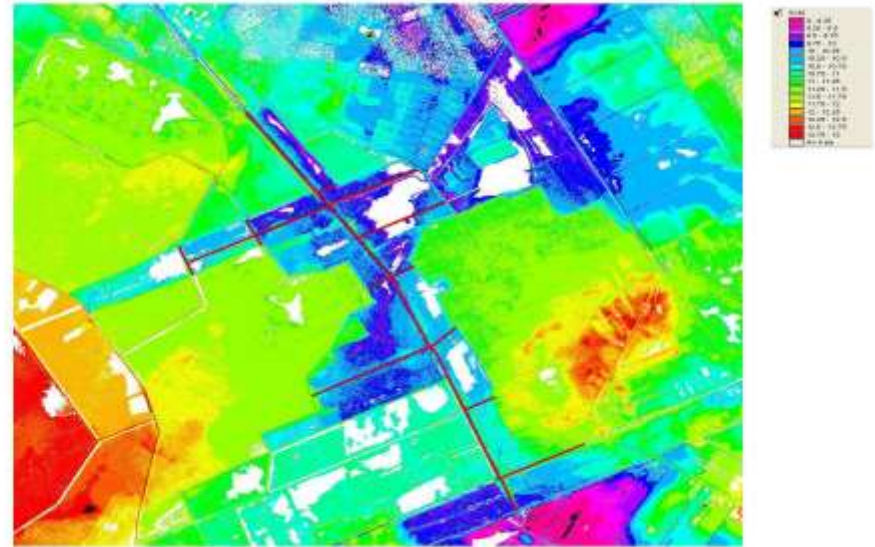
## Randzone Fochtelooerveen 2e module

waterdiepte [cm+mv] bij waterstand op kaderand

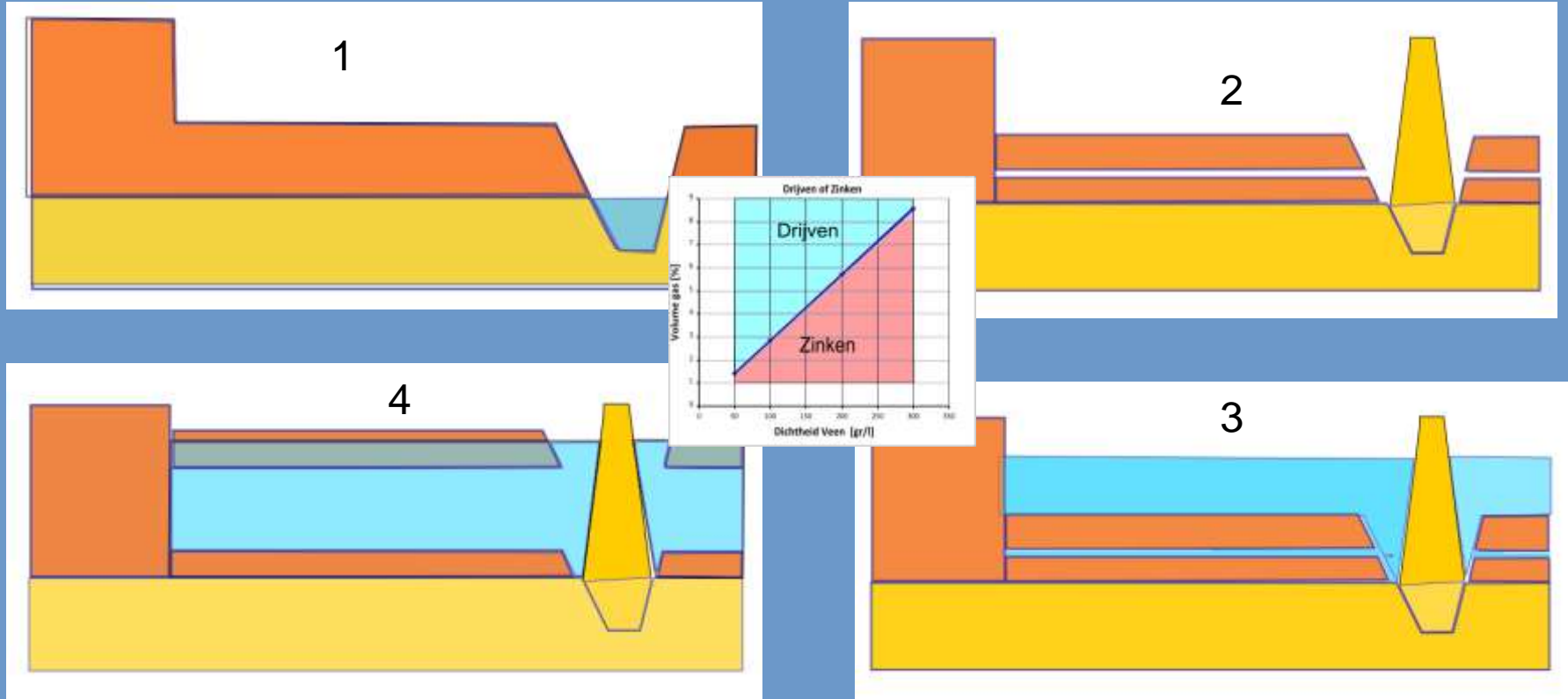




# Inrichting Slenk Schaaphokswijk



# Trilveen ontwikkeling over 60 ha.

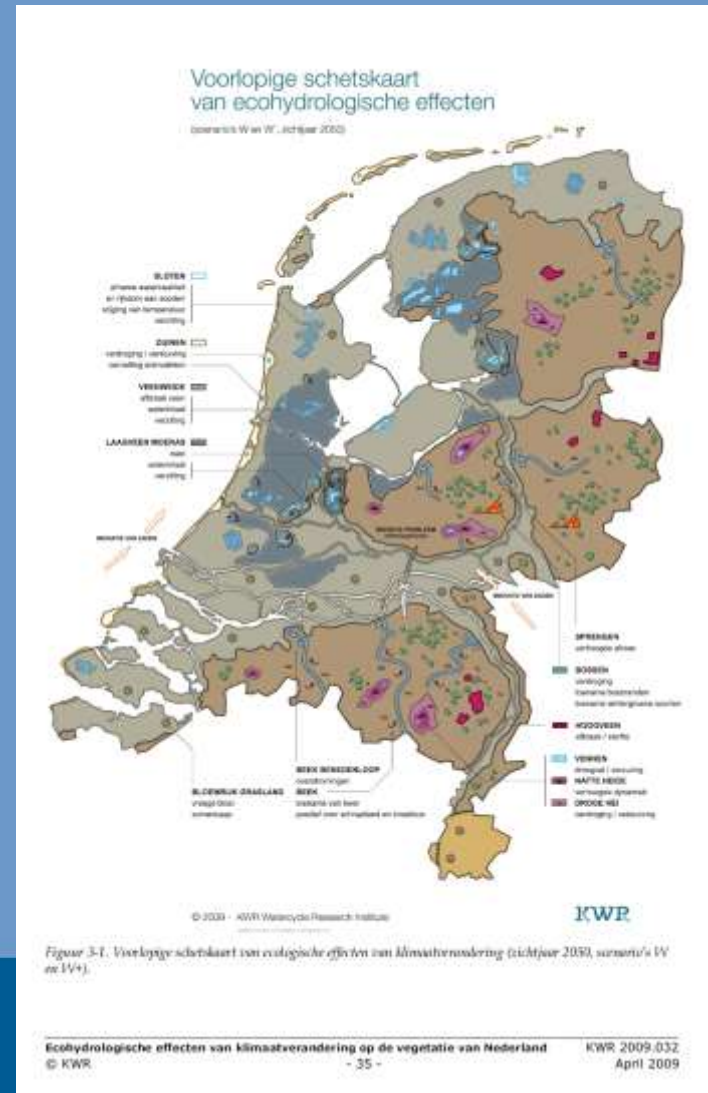
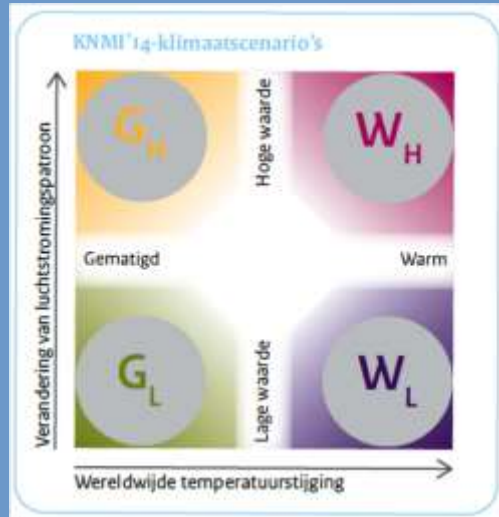








# Knelpunt :Klimaatsverandering



## Knelpunt :Stikstof / Pijpenstrootje

„... . Erst bei hohen anthropogenen Stickstoffeinträgen ... überschreitet der Eintrag die Aufnahmekapazität der Torfmoose und stimuliert das Wachstum von Birken und Pfeifengras. Diese Arten verschlechtern aber durch erhöhte Interzeption und Verdunstung den Wasserhaushalt und können auch durch Lichtkonkurrenz negative Auswirkungen auf das Torfmooswachstum haben. Zudem transportieren ihre Wurzeln Sauerstoff in den Torf, was zu beschleunigter Torfoxidation führt. Diese positiven Rückkopplungen lassen sich nur durch eine weitgehende Verbesserung des Wasserhaushaltes und durch Zurückdrängung dieser Arten (z.B. mittels Mahd) unterbrechen. ...“

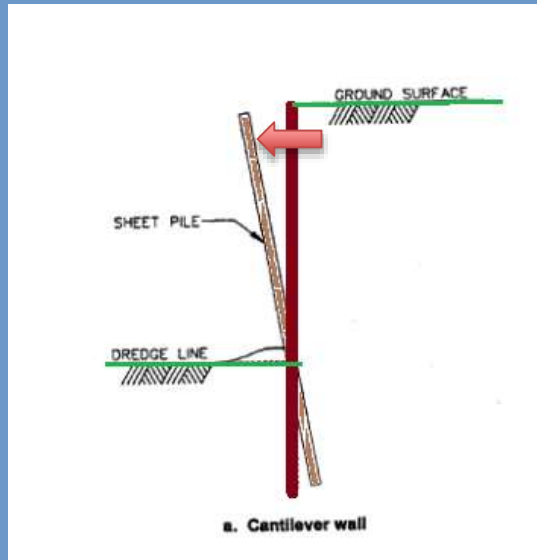




# Knelpunt: Stabiliteit Damwand

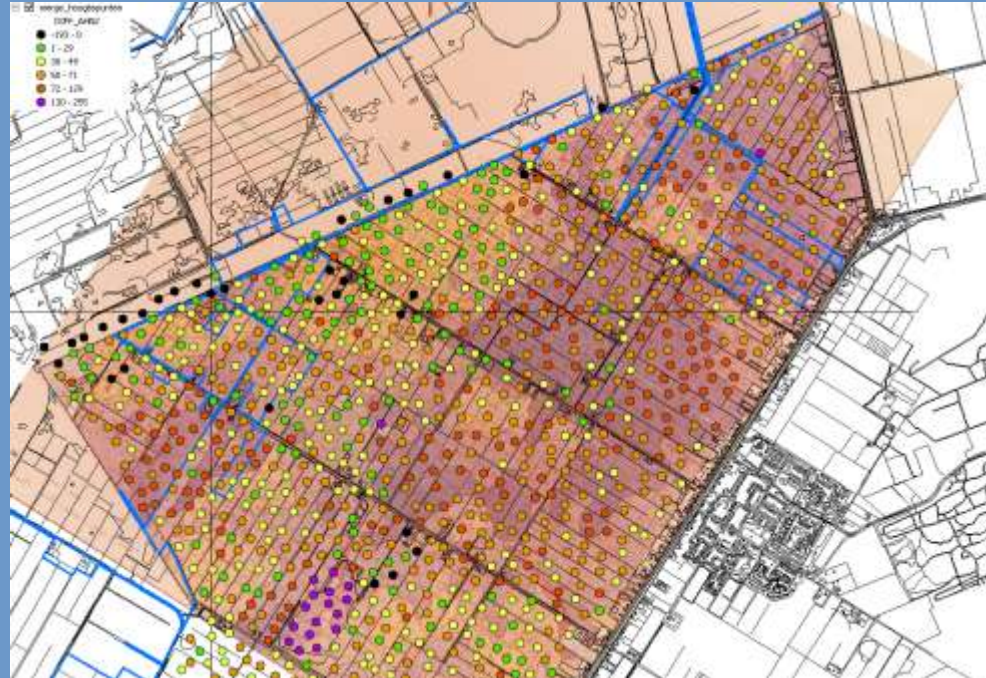
Veendikte > 2 m.

Sprong in waterpeil > 50 cm.



# Knelpunt: extra wegzijging door toename peilverschil

Maaiveld  
1950 - 2000



Knelpunt: Geen verlanding van diep openwater







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### About IMCG

The International Mire Conservation Group (IMCG) is an international network of specialists who

- internationally promote, encourage and, where appropriate, co-ordinate the conservation of mires and related ecosystems; and
- internationally enhance the exchange of information and experience relating to mires and factors affecting them.


The network encompasses a wide spectrum of expertise and interests, from research scientists to consultants, government agency specialists to peatland site managers. The network currently has over 250 contacts in almost 60 countries.

The **International Mire Conservation Group** was established 1984, in Klagenfurt, Austria to promote the conservation of mires and their complete range of natural diversity throughout the world. Its organisational structure was formalized in 2000 by adopting a constitution and electing a Main Board and an Executive Committee. On July 7th 2001 the IMCG was officially registered in France as an association under the law of 1901.

### Newsletter



The IMCG Bulletin is published monthly and informs about recent developments in mire and peatland conservation and restoration. The Bulletin has in 2013 succeeded the IMCG Newsletter, which was published 3-4 per year but since appears irregularly to cover strategic topics more extensively than the Bulletin can do. If you are interested in contributing an article to Bulletin or Newsletter, contact the IMCG secretariat ([info@imcg.net](mailto:info@imcg.net)).



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*Mires and Peat* is indexed by Thomson Reuters Web of Science (**2014 Impact Factor = 0.896**), Elsevier Scopus, EBSCO Environment Complete, CABI Abstracts, CSA Proquest (including their Aquatic Science and Fisheries Abstracts ASFA, Ecology, Entomology, Animal Behavior, Aquatic and Pollution databases) and Directory of Open Access Journals (DOAJ). *Mires and Peat* also participates in the CABI Full Text Repository.

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