Historical Geography of the Waasland polders

Landscape evolution and interactions between social and ecological processes

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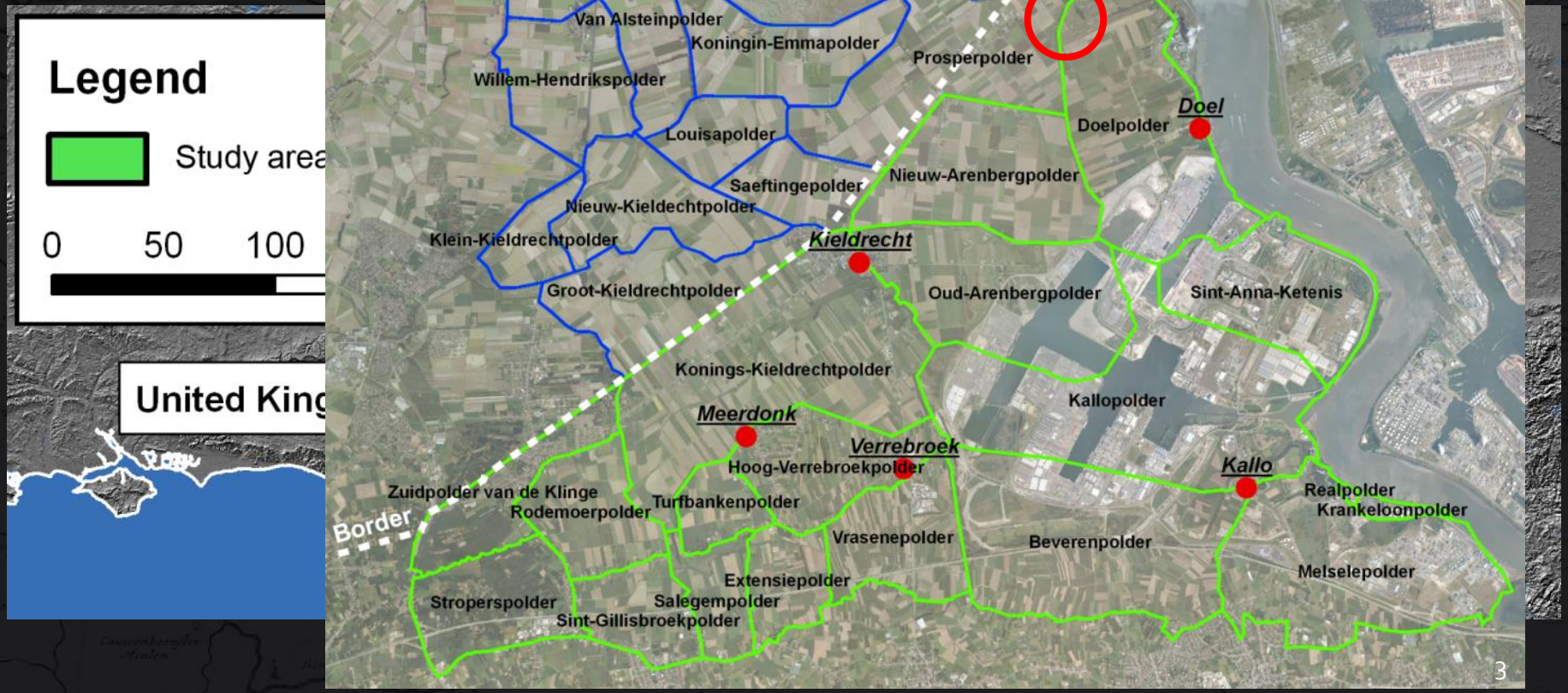
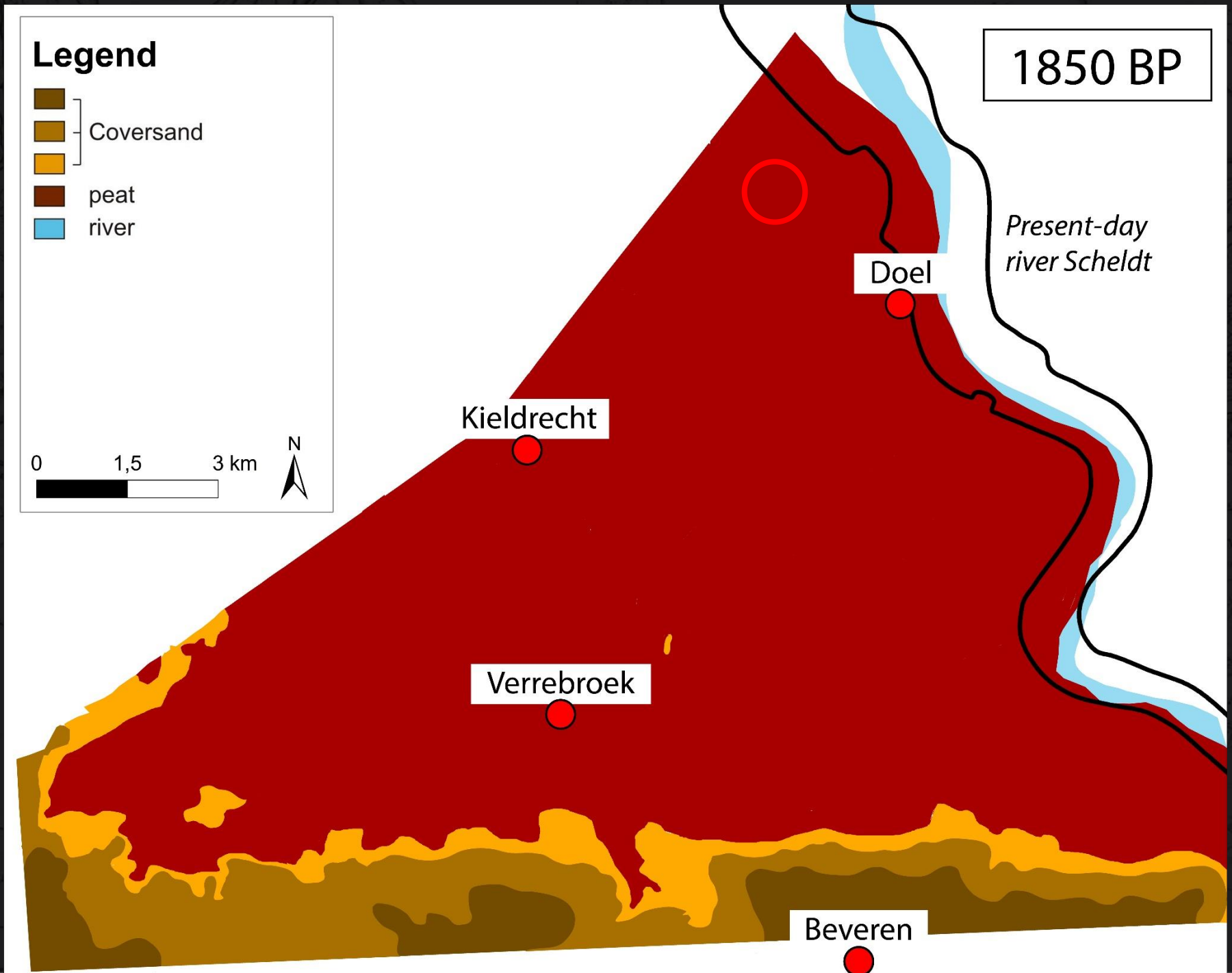
Presentation outline

1. Holocene evolutions
2. Medieval evolutions
3. Tactical inundations
4. Remaining embankment: Doelpolder
5. Re-embankments: Prosperpolder
6. Impact society on ecology
7. Impact ecology on society
8. Interactions

- Waasla
- Land o



1. HOLOCENE


Legend
Coversand
peat
river
0
1,5
3 km
N
1850 BP
Present-day
river Scheldt
Doel
Kieldrecht
Verrebroek
Beveren

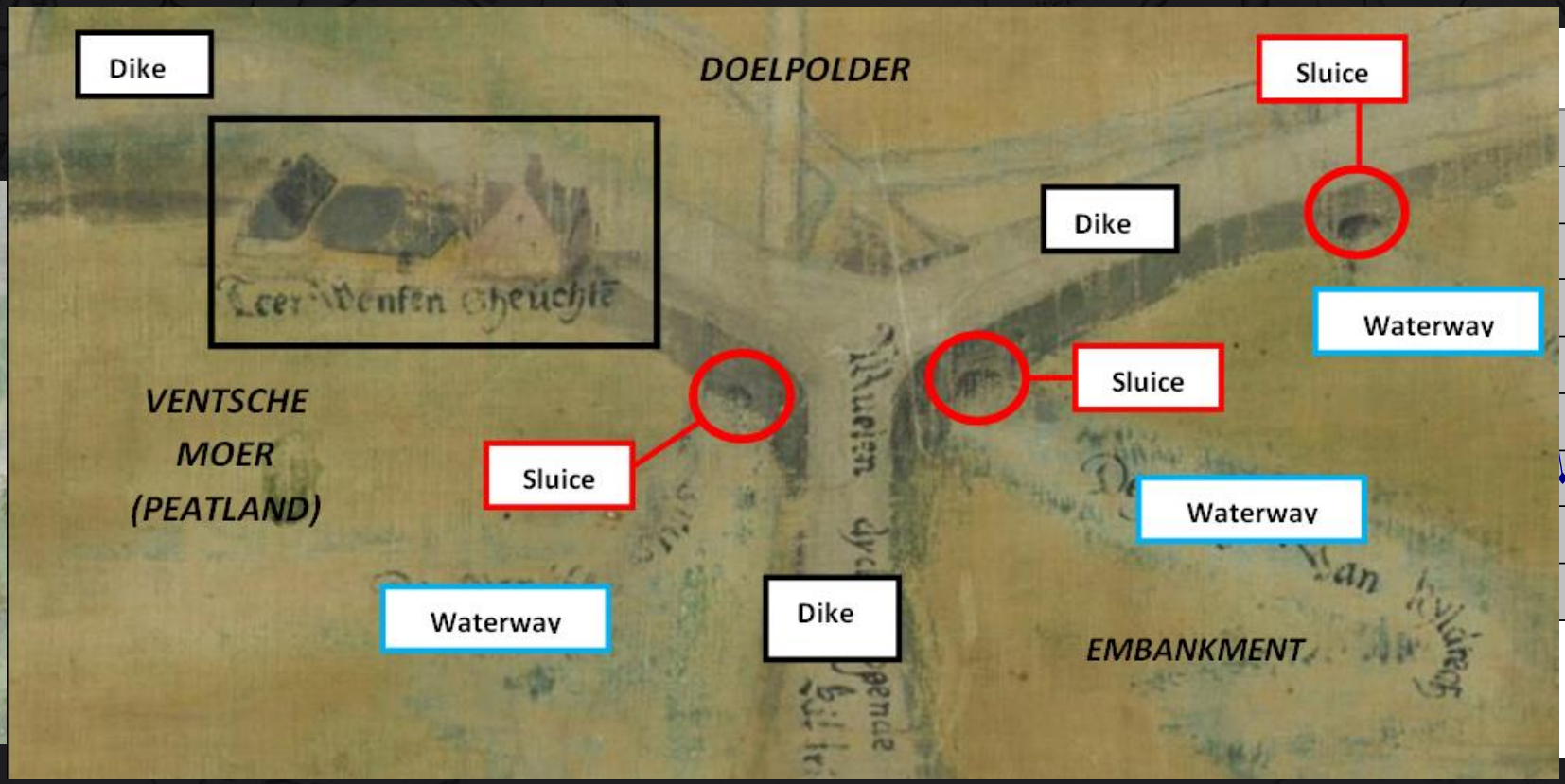
2. MEDIEVAL PERIOD

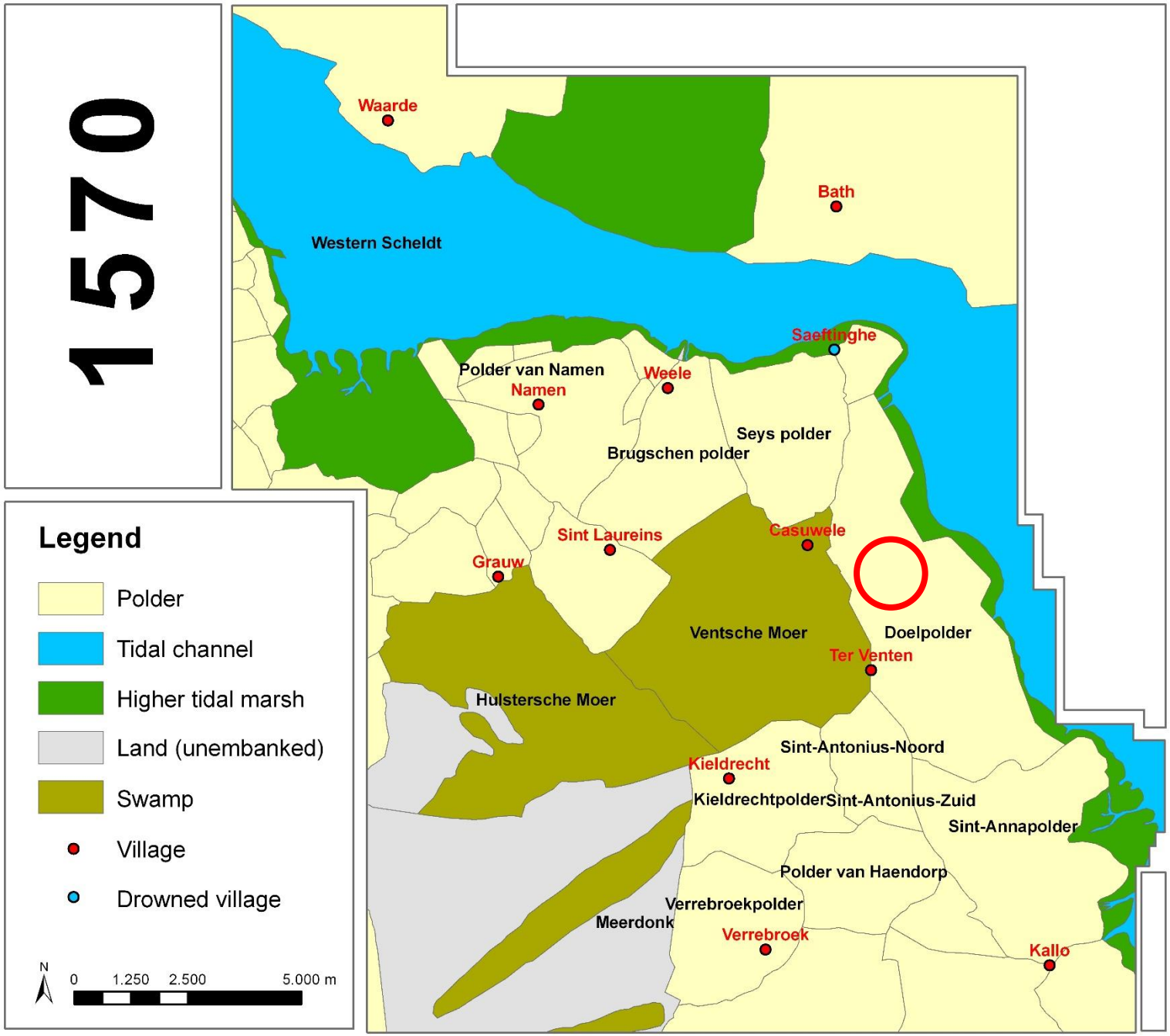
Medieval period

- North of the area: embankments by abbeys/lords

Medieval period

- South of the area: peat extraction Counts of Beveren



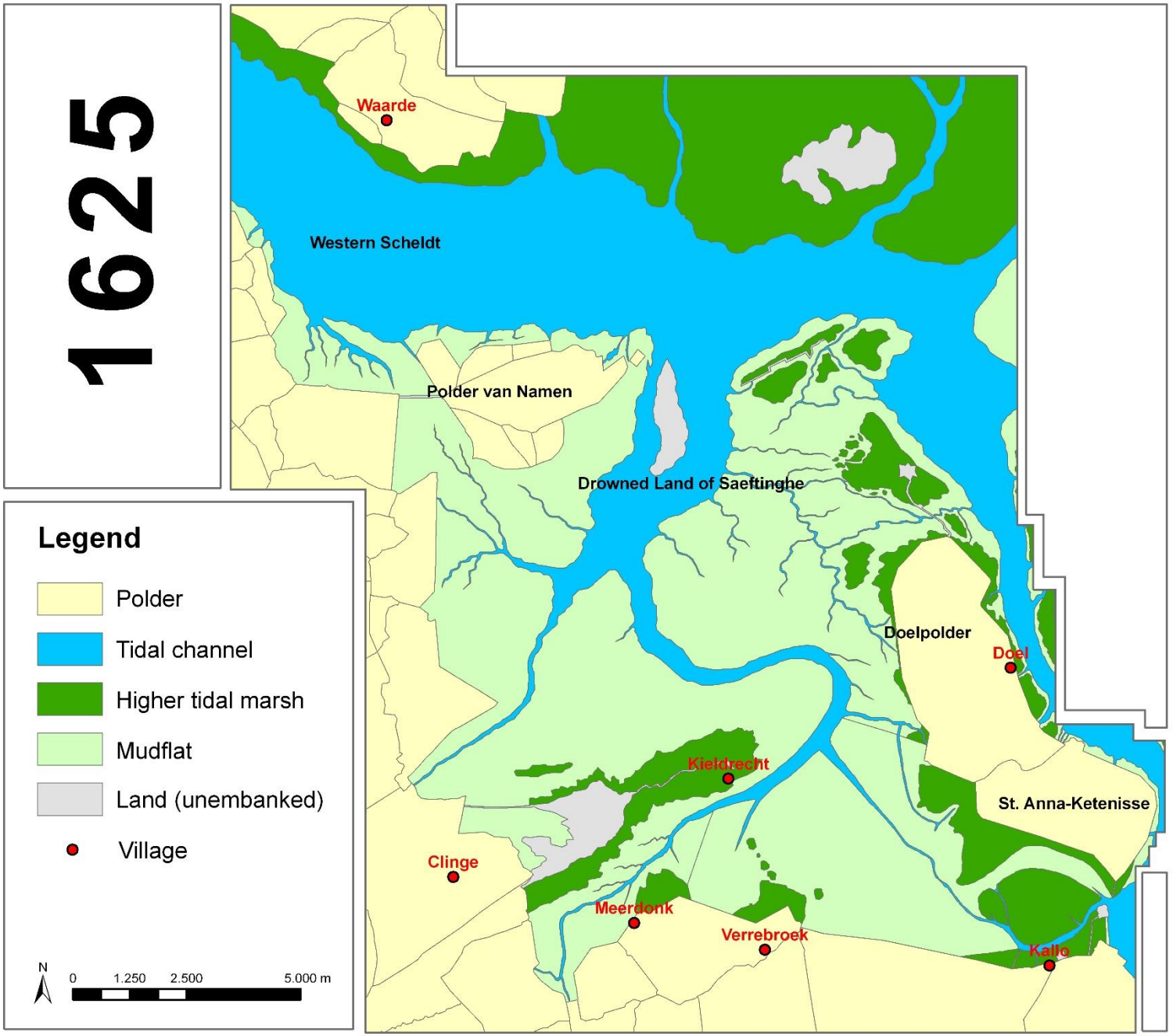

1570
Legend
Polder
Tidal channel
Higher tidal marsh
Land (unembanked)
Swamp
Village
Drowned village
N
0
1.250
2.500
5.000 m
Waarde
Bath
Western Scheldt
Saeftinghe
Polder van Namen
Namen
Weele
Seys polder
Brugschen polder
Sint Laureins
Grauw
Casuwele
Ventsche Moer
Doelpolder
Ter Venten
Hulstersche Moer
Sint-Antonius-Noord
Kieldrecht
KieldrechtpolderSint-Antonius-Zuid
Sint-Annapolder
Polder van Haendorp
Verrebroekpolder
Meerdonk
Verrebroek
Kallo

3. TACTICAL INUNDATIONS

- Tact


Schorre van 't Badt
Baths
Ril landt
De Dulft
Trom Vliet
Polder van Namen
Fort van Saftingen
Namen
Vrancken Dyck
Duyvels hoeck
Cruys Polder
Fort Kunsthagen
Anger Gat
Moer
Roemoer
De Turf bancke
't Fort Verrebroeck
Verre broeck
De Kruys dyck
't Bevers broeck
Pol der van Beveren
't Huys te Beveren
't Fort Callo
S. Gillis
Kete
Calf
Cluysen hof

1625


Waarde
Western Scheldt
Polder van Namen
Drowned Land of Saeftinghe
Doelpolder
Doel
Kieldrecht
St. Anna-Ketenisse
Clinge
Meerdonk
Verrebroek
Kallo
Legend
Polder
Tidal channel
Higher tidal marsh
Mudflat
Land (unembanked)
Village
N
0
1.250
2.500
5.000 m

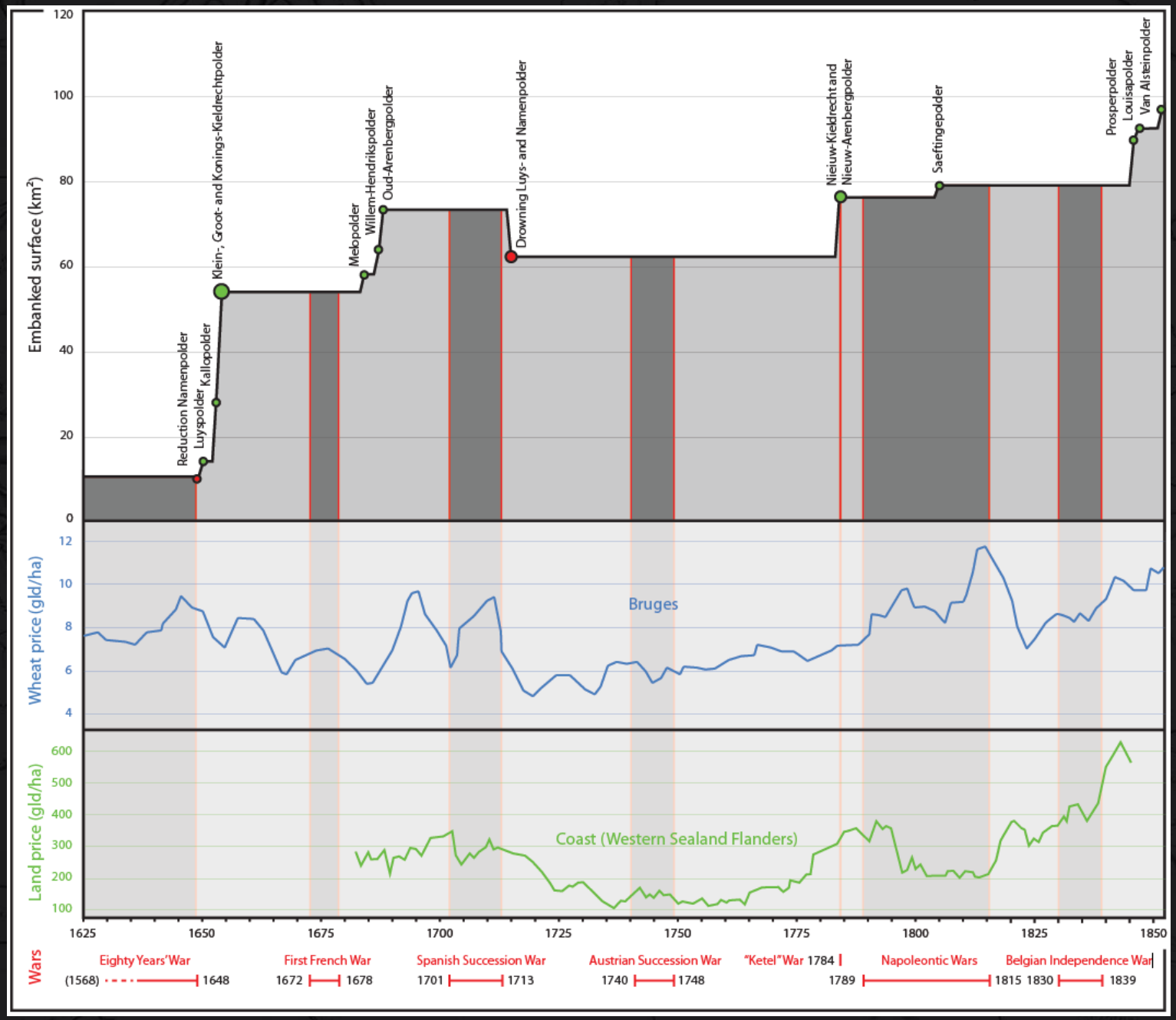
4. REMAINING EMBANKMENT: DOELPOLDER

Change in size

ARA, Kaarten en Plannen II, 8623


Legende
Eenvoudig raster, nieuw gesticht 17e/18e eeuw
Raster, middeleeuws met continuïteit
Raster, nieuw gesticht 17e/18e eeuw
Kruispuntdorp, nieuw gesticht 17e/18e eeuw
Versterkt raster, niet teruggaand op Middeleeuwen
Versterkt raster, teruggaand op Middeleeuwen
NEDERLAND
Willemstad
Klundert
Dinteloord
Fijnaart
St Philipsland
Colijnsplaat
Veere
Zoutelande
Borssele
Krabbendijke
Schoondijke
Hoofdplaat
Zuidzande
Blankenberge
Ijzendijke
Zaamslag
Zandvliet
Doel
Philippine
Middelburg (BE)
Oostende
Sas van Gent
Nieuwpoort
BELGIË
0
5
10
20 km
N

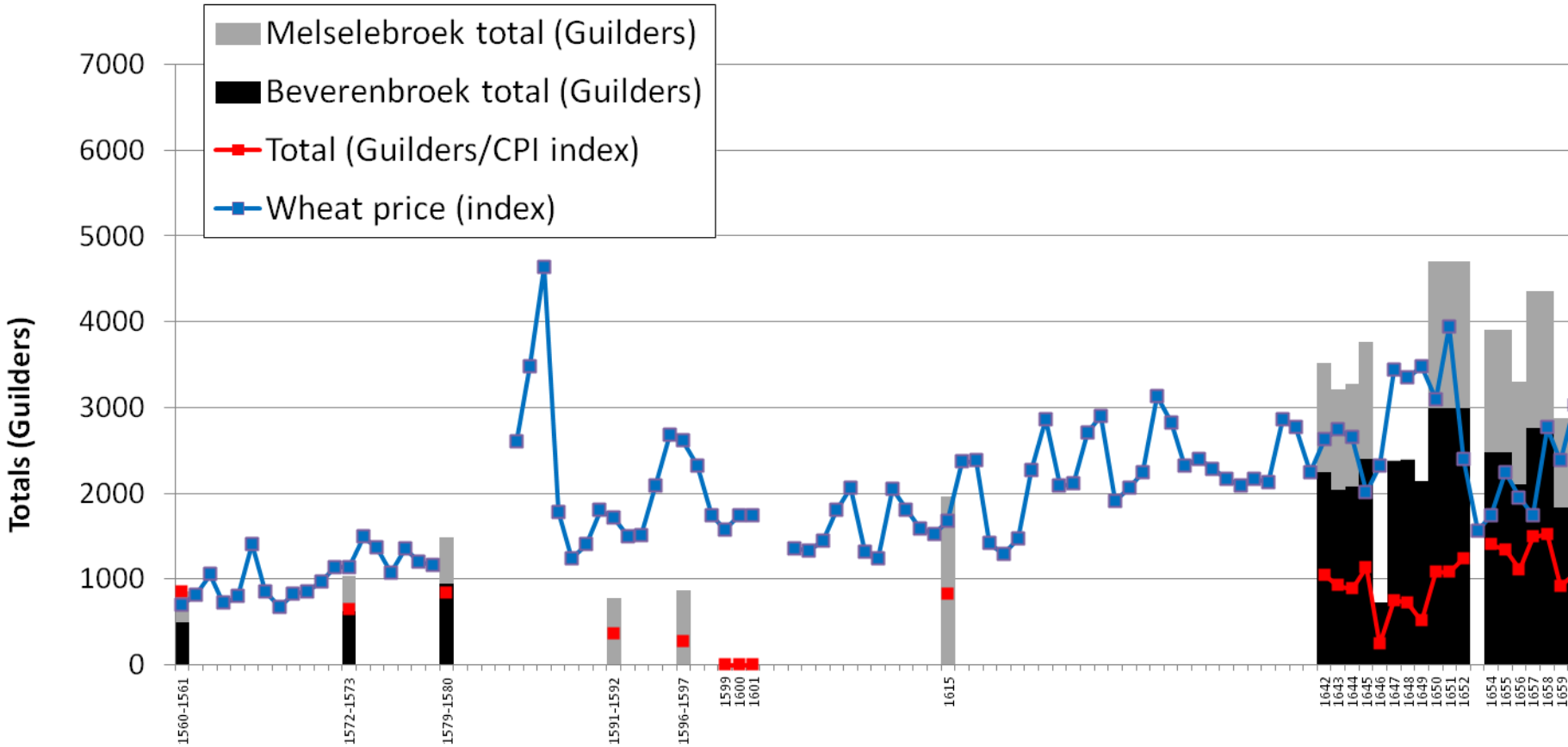
5. RE-EMBANKMENTS


Embanked surface (km²)
120
100
80
60
40
20
0
Reduction Namenpolder
Luyspolder
Kallopolder
Klein-, Groot- and Konings-Kieldrechtpolder
Mebopolder
Willem-Hendrikspolder
Oud-Arenbergpolder
Drowning Luys- and Namenpolder
Nieuw-Kieldrecht and Nieuw-Arenbergpolder
Saeftingepolder
Prosperpolder
Louisapolder
Van Alsteinpolder
Wheat price (gld/ha)
12
10
8
6
4
Bruges
Land price (gld/ha)
600
500
400
300
200
100
Coast (Western Sealand Flanders)
1625
1650
1675
1700
1725
1750
1775
1800
1825
1850
Wars
Eighty Years' War
(1568)
1648
First French War
1672
1678
Spanish Succession War
1701
1713
Austrian Succession War
1740
1748
"Ketel" War 1784
1789
Napoleontic Wars
1815
Belgian Independence War
1830
1839

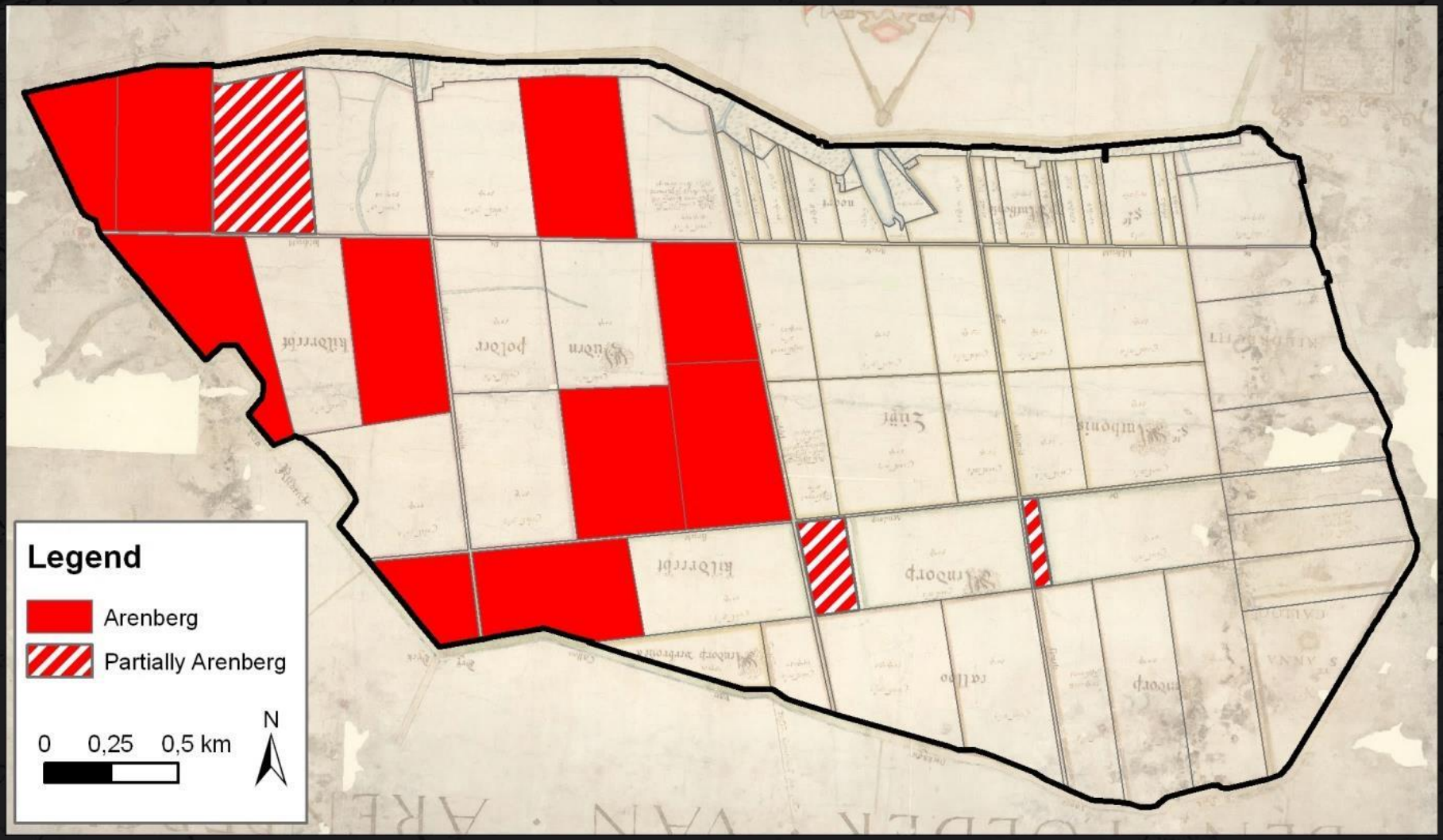
Main embanker: Arenberg family

- Acquisition Seigniory Beveren 1575/1613
- Evolution in strategy
  - Before 1750: traditional (land lords/co-embankers)
  - After 1750: transformation of the landscape
- Through active embankment practises
  - Monopolist position
  - Not according to entrepeneur-model
  - Expert advice
  - 'Agressive' embankment
  - Rational organisation of exploitation

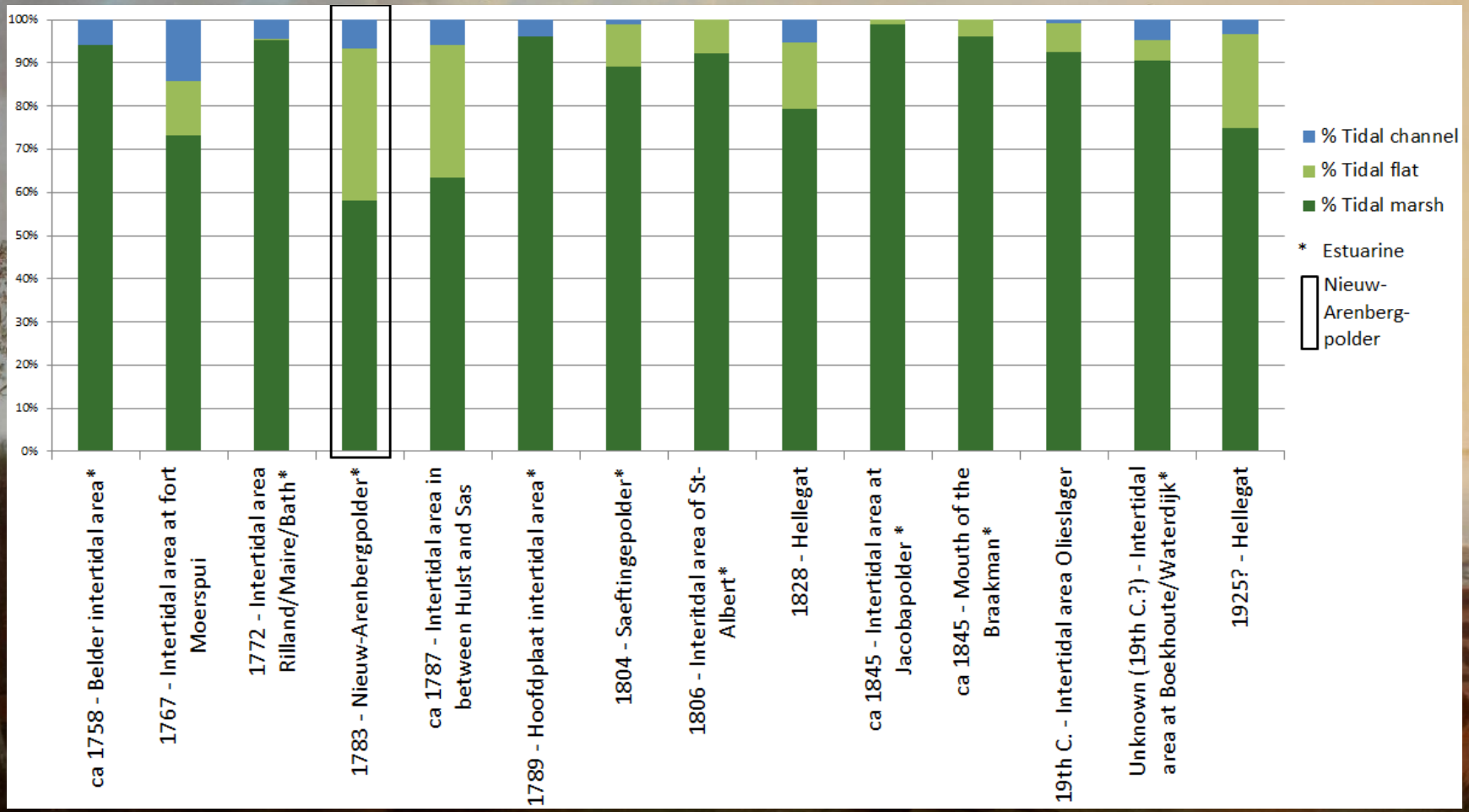
« Classical » income



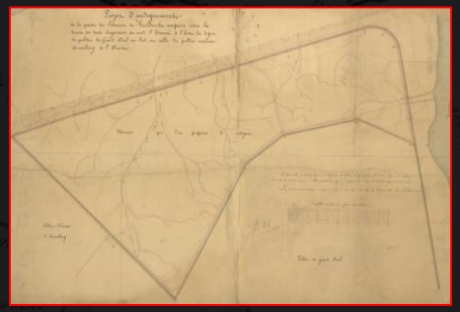
Co-embanking

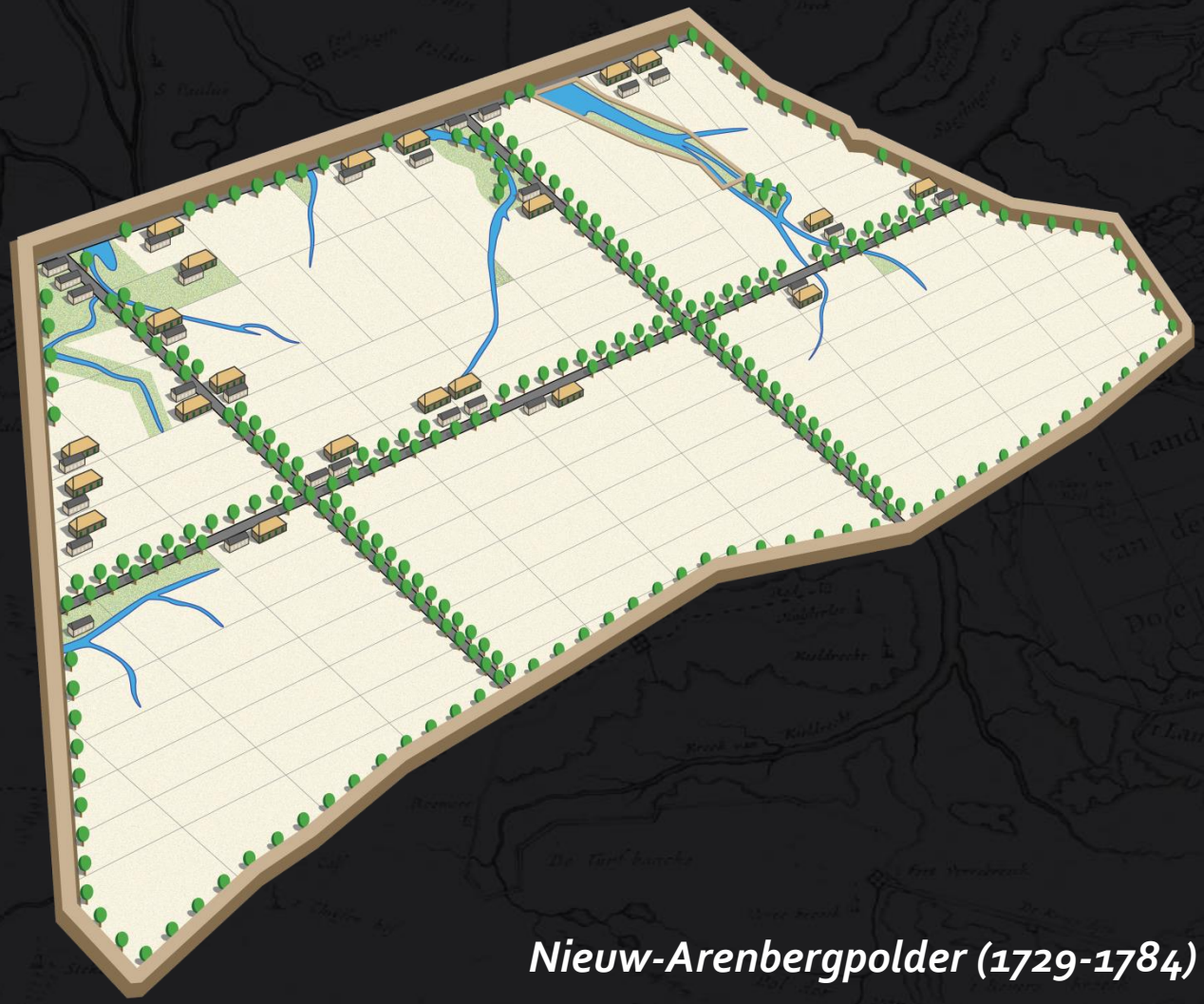


Active embanking



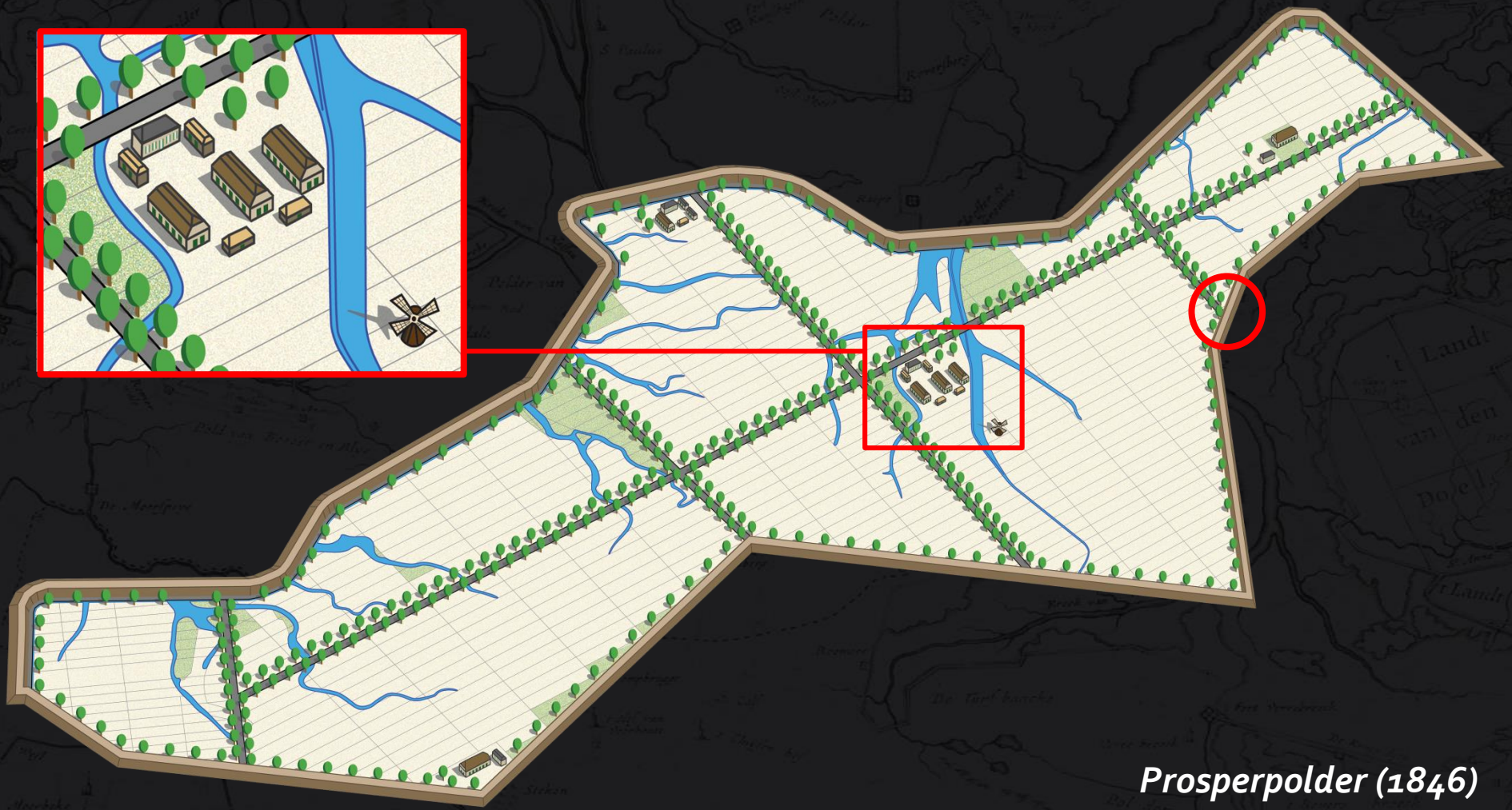
Rational landscape design





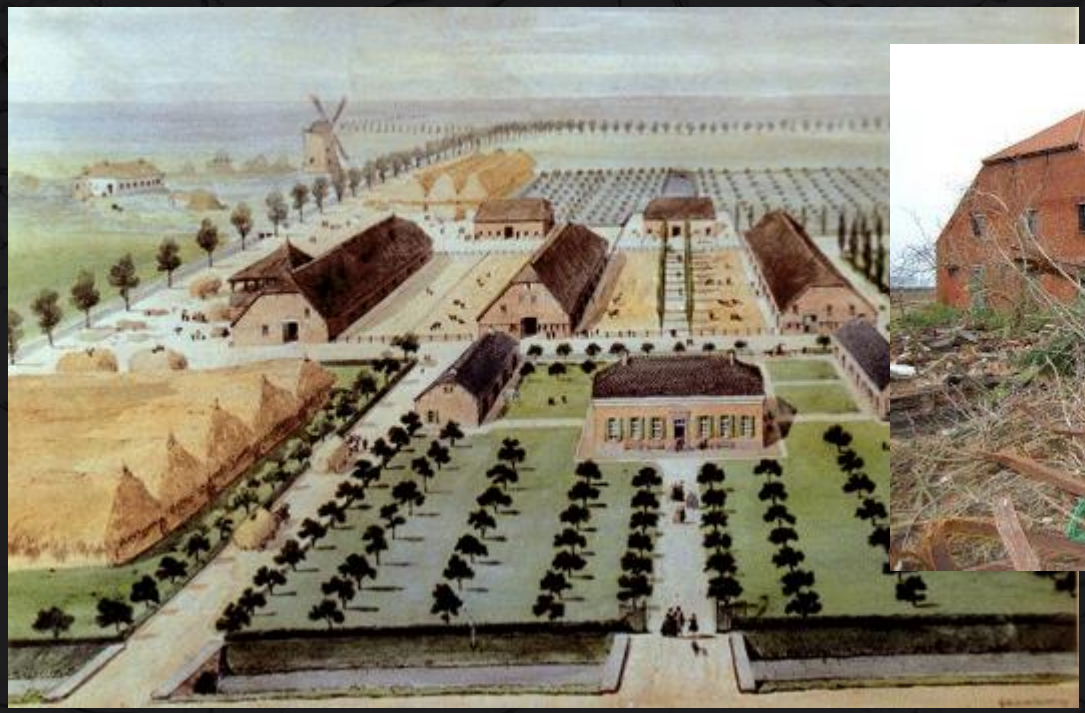
Nieuw-Arenbergpolder (1729-1784)

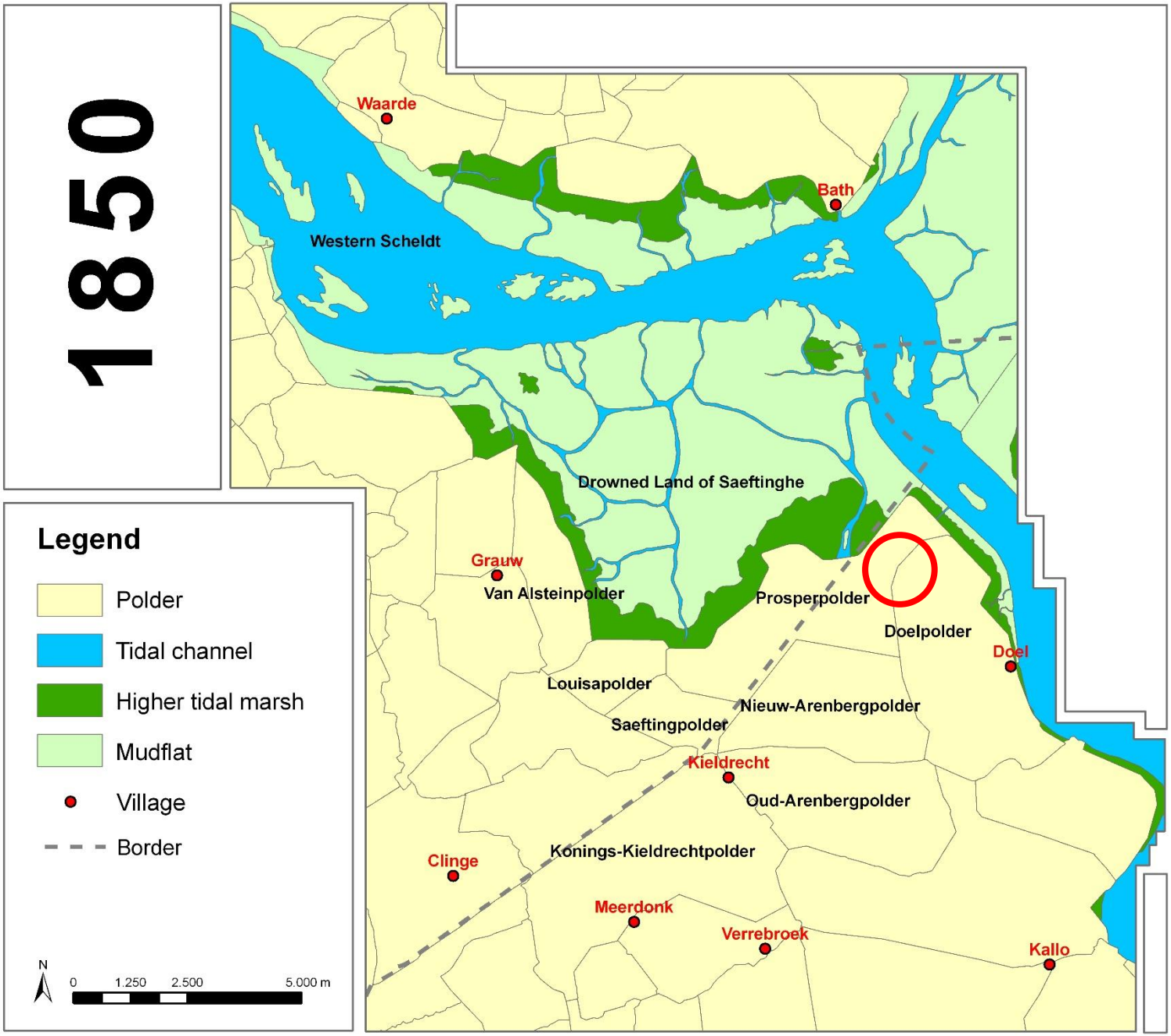
Innovative agriculture



Prosperpolder (1846)

Heritage Prosperpolder

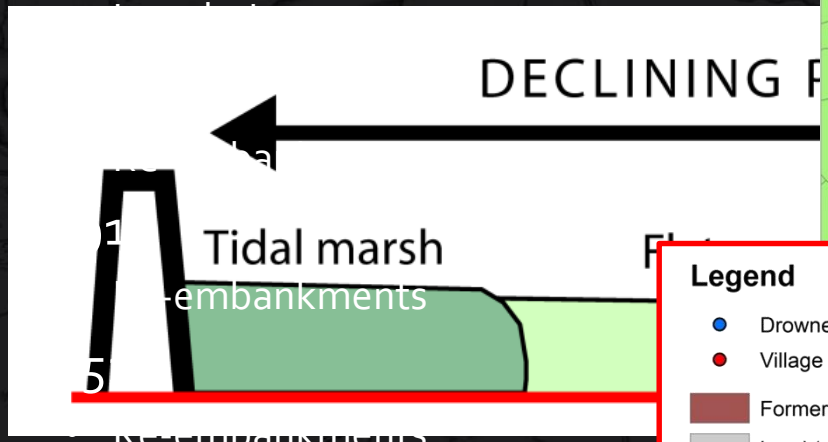


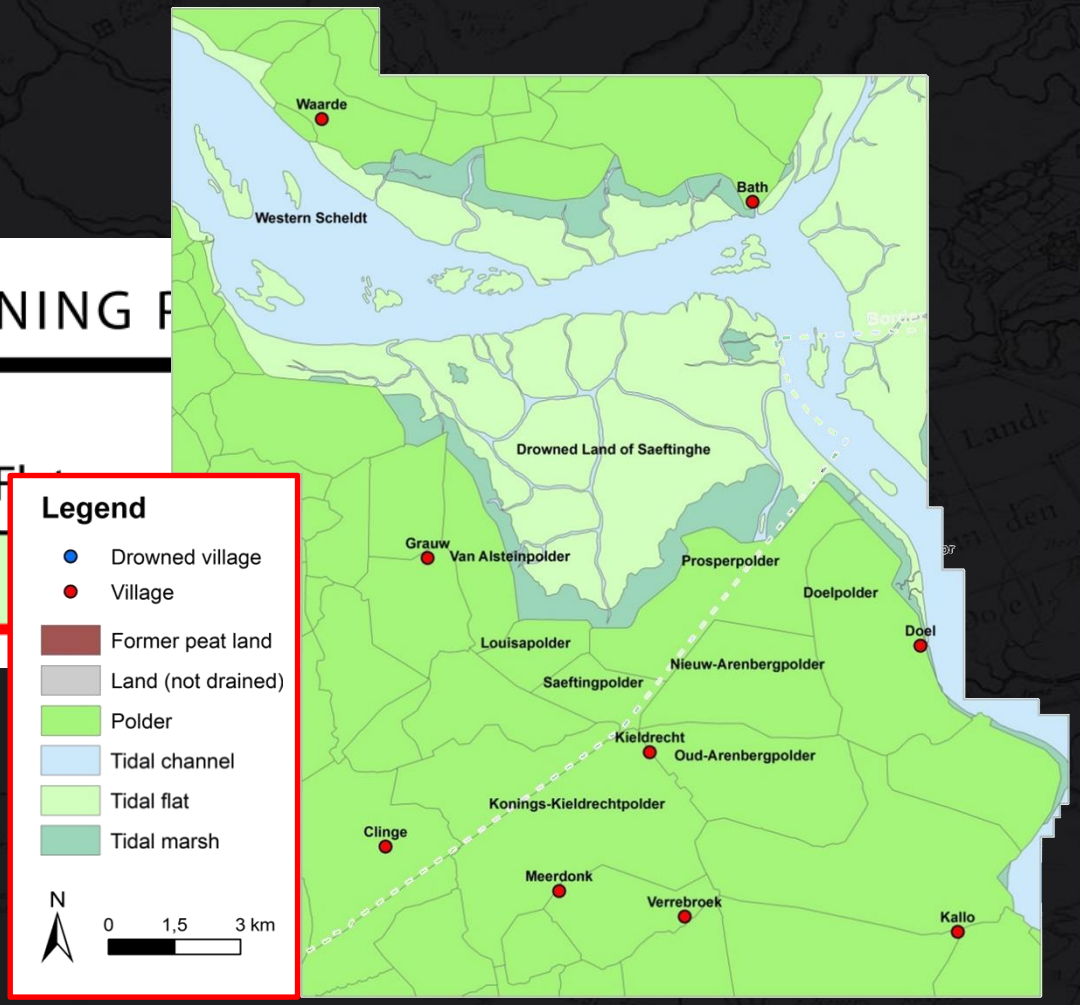

1850
Legend
Polder
Tidal channel
Higher tidal marsh
Mudflat
Village
Border
N
0
1.250
2.500
5.000 m
Waarde
Bath
Western Scheldt
Drowned Land of Saeftinghe
Grauw
Van Alsteinpolder
Prosperpolder
Doelpolder
Doel
Louisapolder
Nieuw-Arenbergpolder
Saeftingpolder
Kieldrecht
Oud-Arenbergpolder
Clinge
Konings-Kieldrechtpolder
Meerdonk
Verrebroek
Kallo

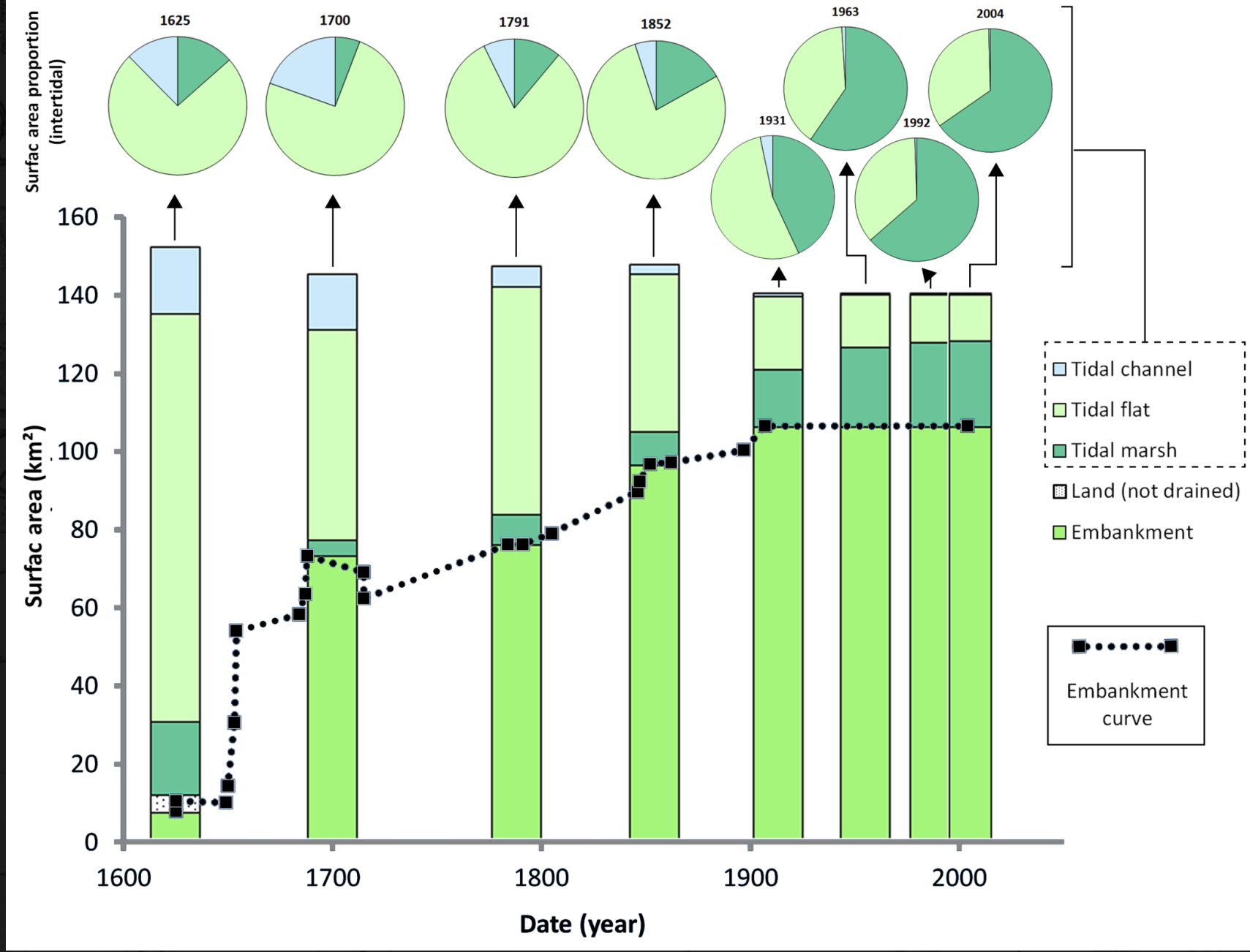
6. IMPACT SOCIETY ON ECOLOGY

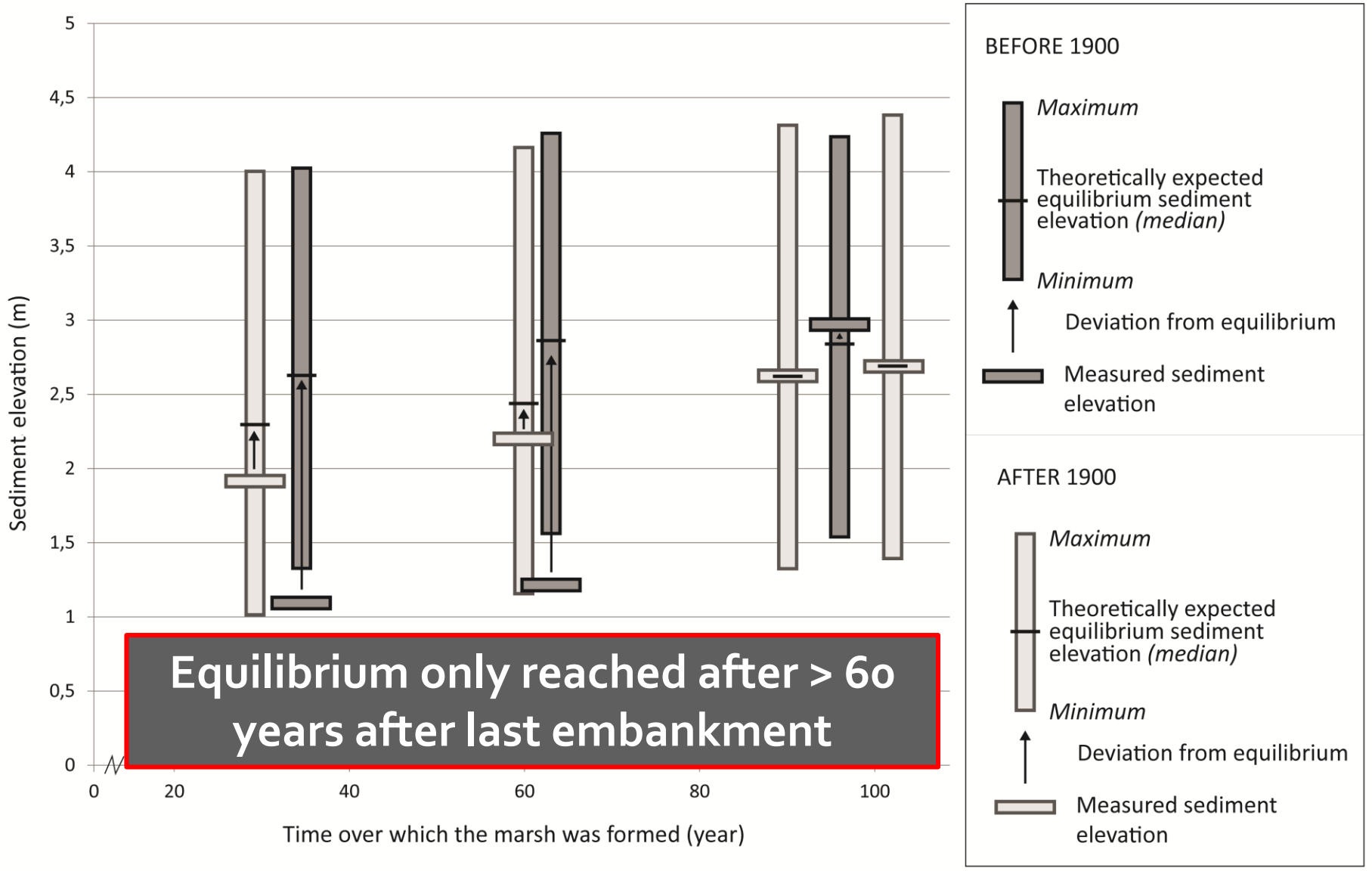
Landscape reconstructions

- 1570
  - Original configuration
- 1625
-
-
- 5
  - Re-embankments

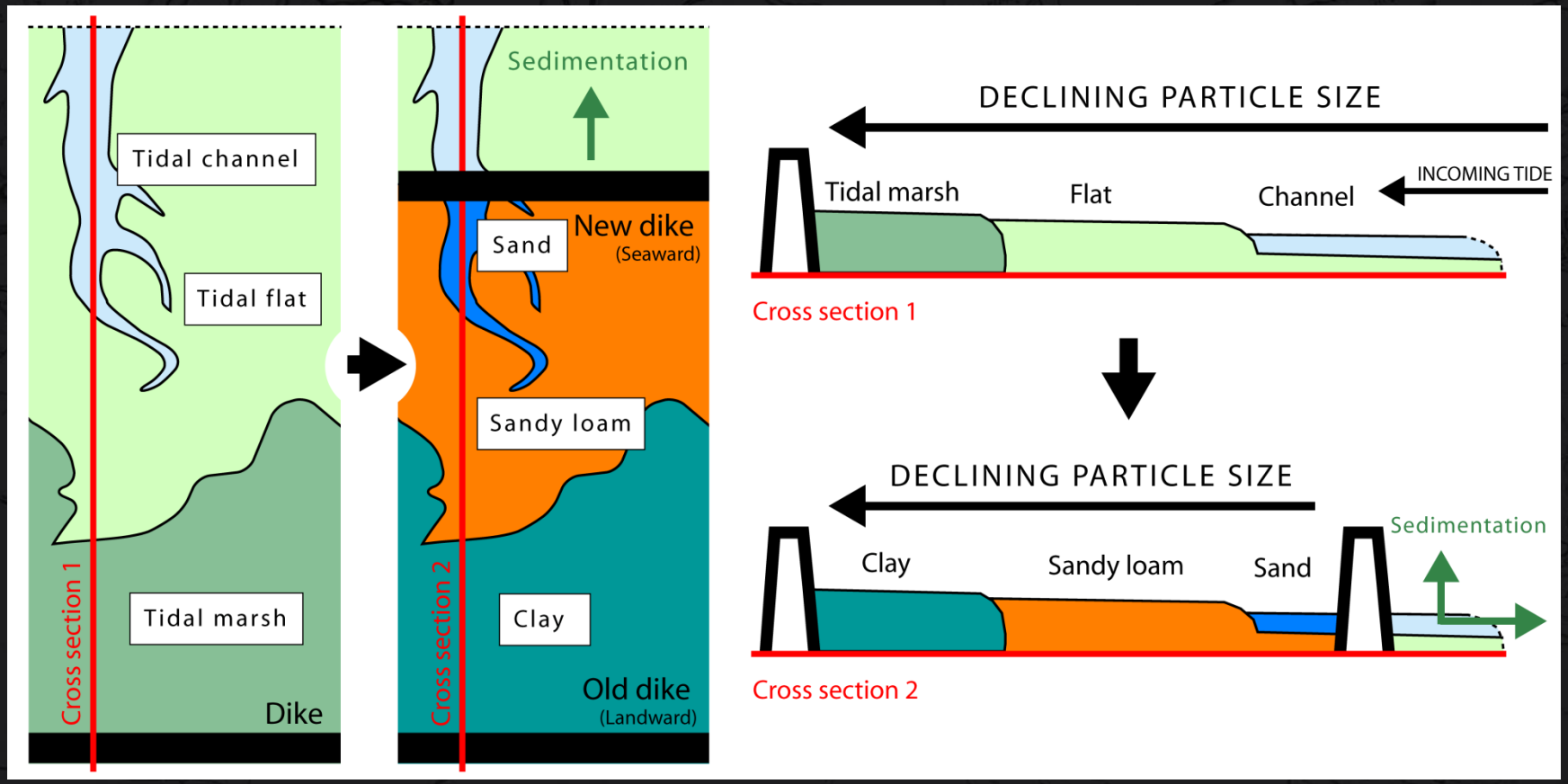




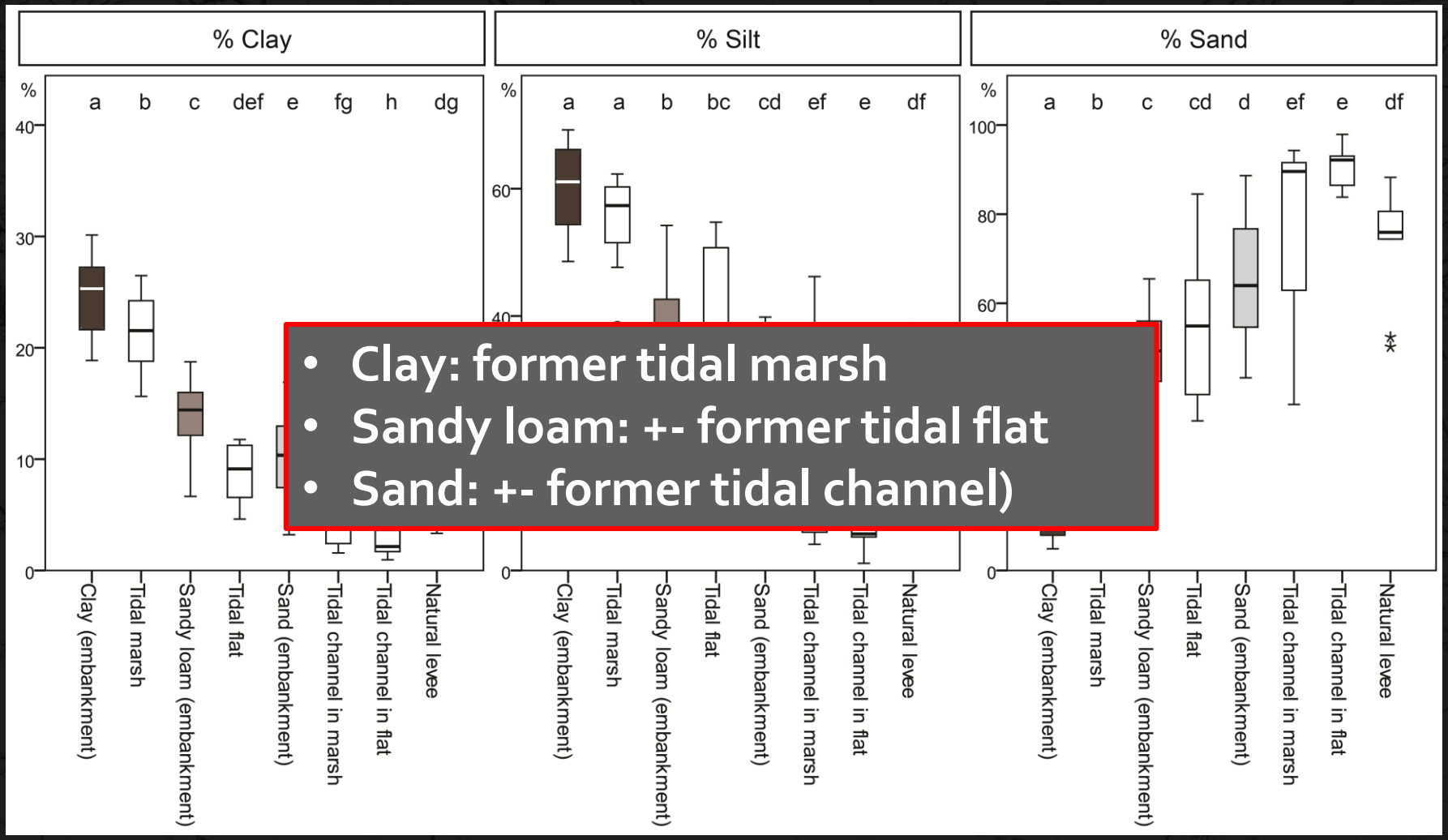

Surfac area proportion (intertidal)
1625
1700
1791
1852
1931
1963
1992
2004
Surfac area (km²)
160
140
120
100
80
60
40
20
0
1600
1700
1800
1900
2000
Date (year)
Tidal channel
Tidal flat
Tidal marsh
Land (not drained)
Embankment
Embankment curve


Sediment elevation (m)
5
4,5
4
3,5
3
2,5
2
1,5
1
0,5
0
0
20
40
60
80
100
Time over which the marsh was formed (year)
Equilibrium only reached after > 60 years after last embankment
BEFORE 1900
Maximum
Theoretically expected equilibrium sediment elevation (median)
Minimum
Deviation from equilibrium
Measured sediment elevation
AFTER 1900
Maximum
Theoretically expected equilibrium sediment elevation (median)
Minimum
Deviation from equilibrium
Measured sediment elevation

Fossilization

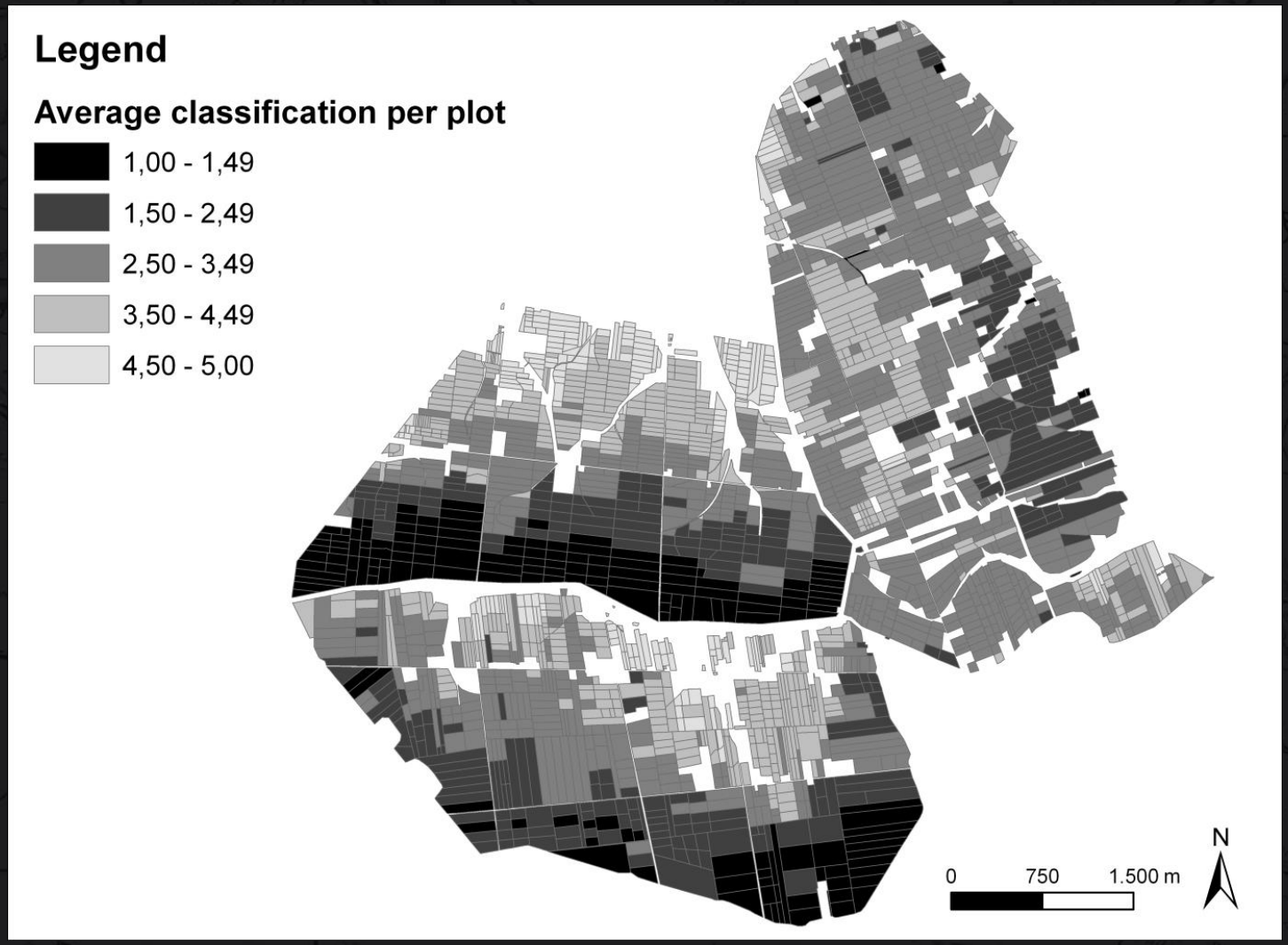


Fossilization

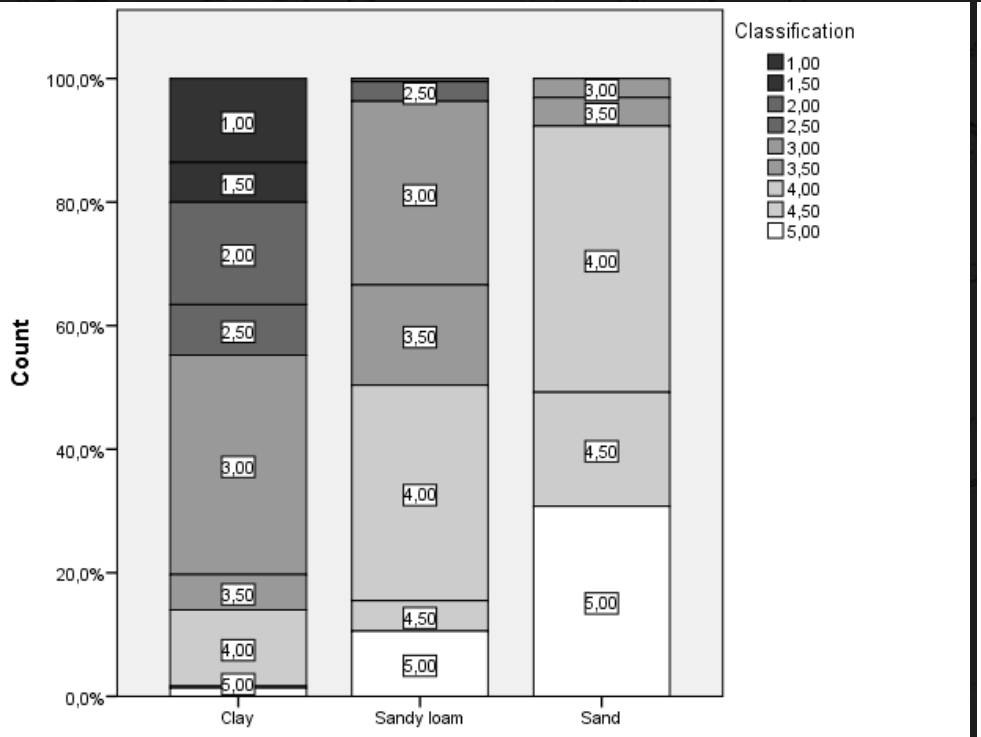


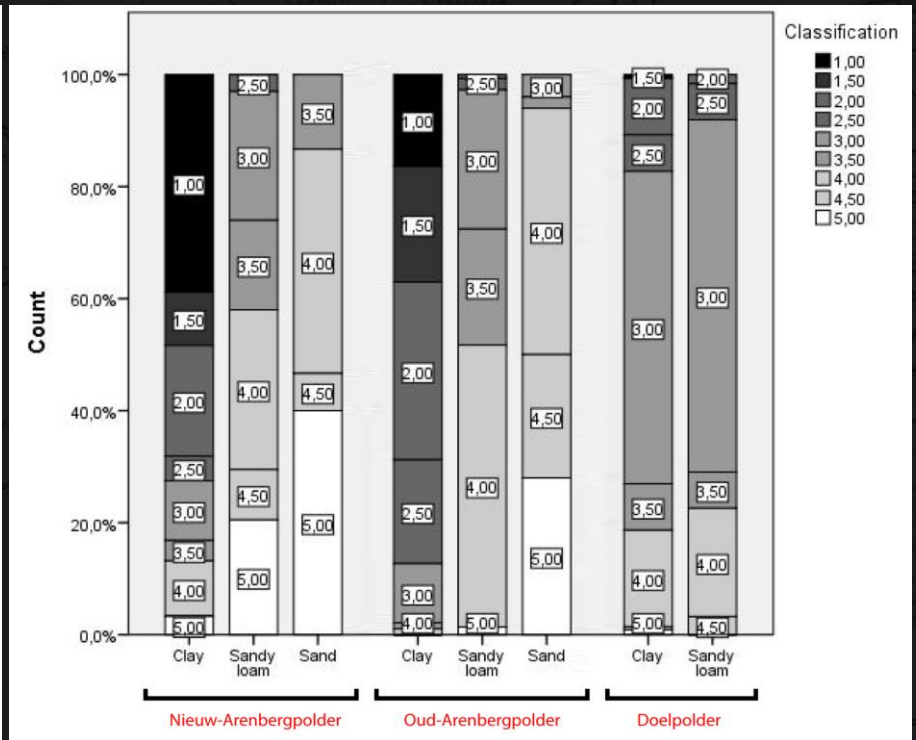
7. IMPACT ECOLOGY ON SOCIETY

Soil conditions & land value



Soil conditions & land value





- Clay (former marsh): high value
- Sandy loam (former tidal flat): medium value
- Sand (former tidal channel): low values
- But… normalization over time

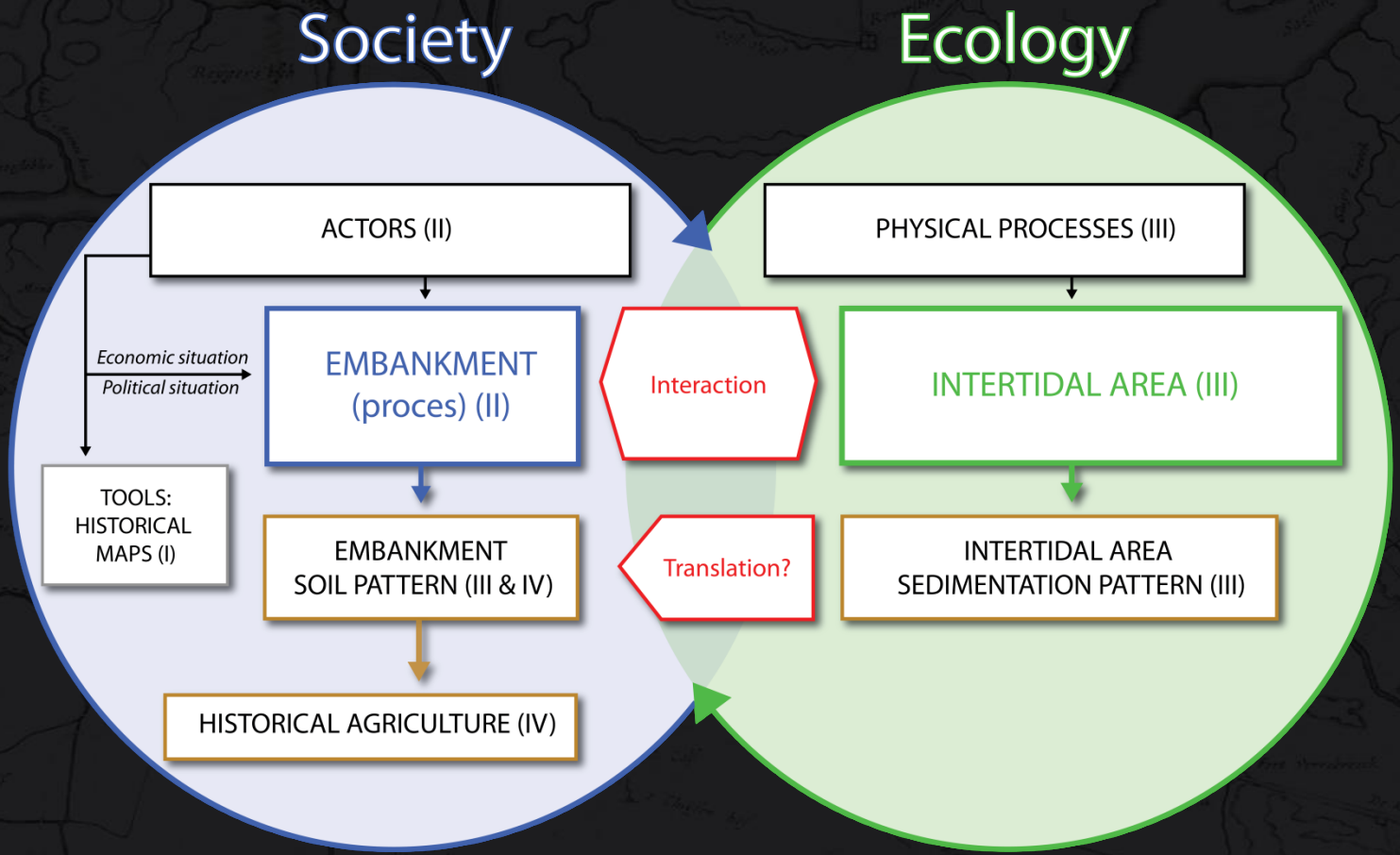
Soil conditions & crop rotation

YEAR	Class 1	Class 2	Class 3	Class 4	Class 5
Year 1	Fallow (++)	Fallow	Fallow	Fallow/Rye	Rye
Year 2	Rapeseed (--)	Rapeseed	Rapeseed	Wheat	Clover/Potatoes
Year 3	Barley (-)	Barley	Wheat/Barley	Oats/Beans	Rye
Year 4	Beans (+)	Beans	Beans	Rye	Oats
Yea					
Yea					
Yea					
Yea					
Yea					
Year 10	Oats (-)	Oats			
TOTAL INCOME (fl./ha)	1274.74	1133.78	819.97	474.99	270.29
DEDUCTIONS (fl./ha)	719.29	668.93	541.18	313.49	194.61
PROFIT(fl./ha)	555.45	464.85	278.79	161.5	75.68
PROFIT PER YEAR (fl./ha)	**55.54**	**46.48**	**34.85**	**26.92**	**18.92**
TAXABLE INCOME PER YEAR (fr./ha)	**105**	**88**	**65**	**50**	**25**

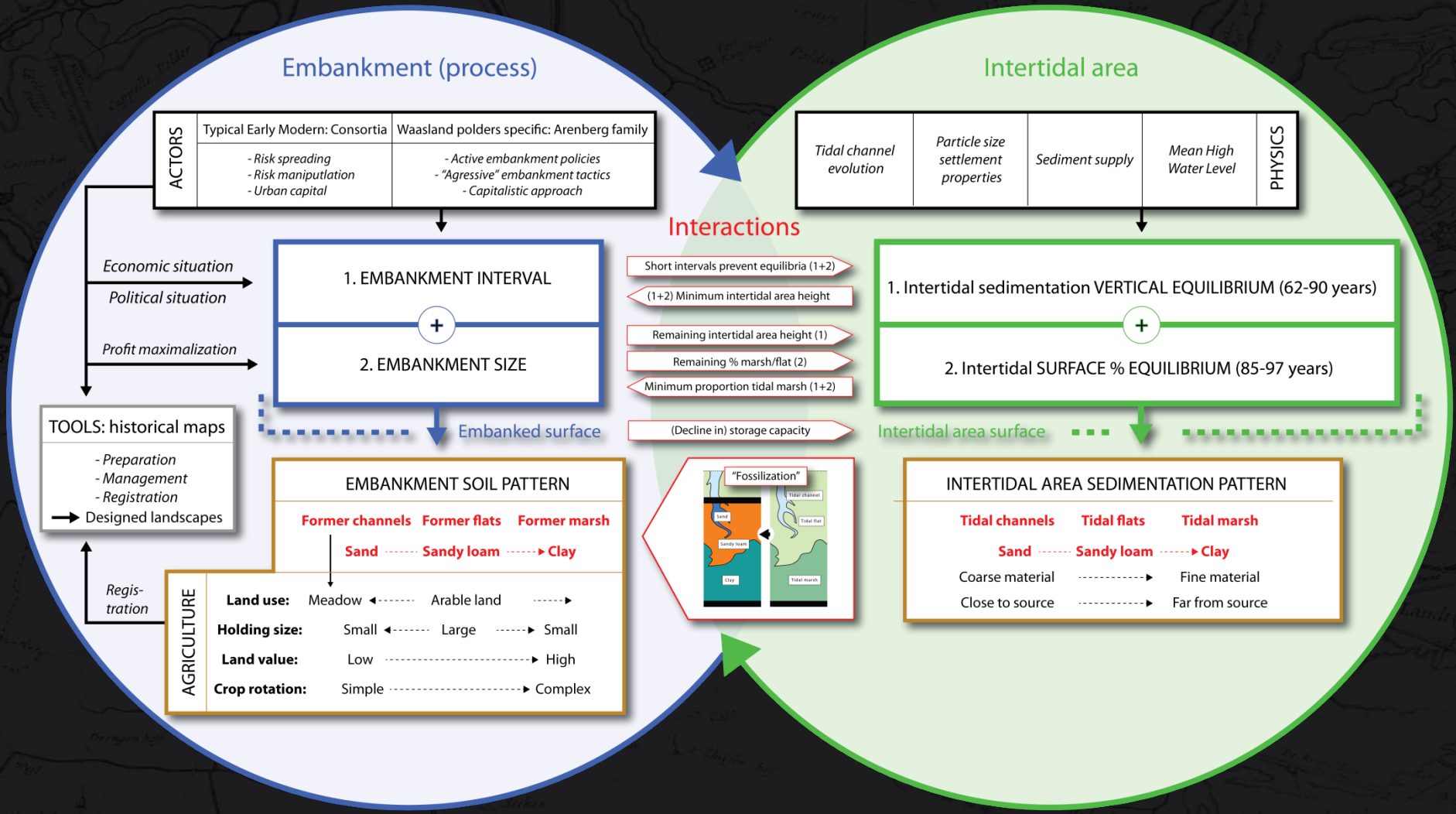
More complex rotational systems on high value lands

8. INTERACTIONS

Simple interaction scheme



Co Society interaction Ecology me



Thanks for your attention!

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