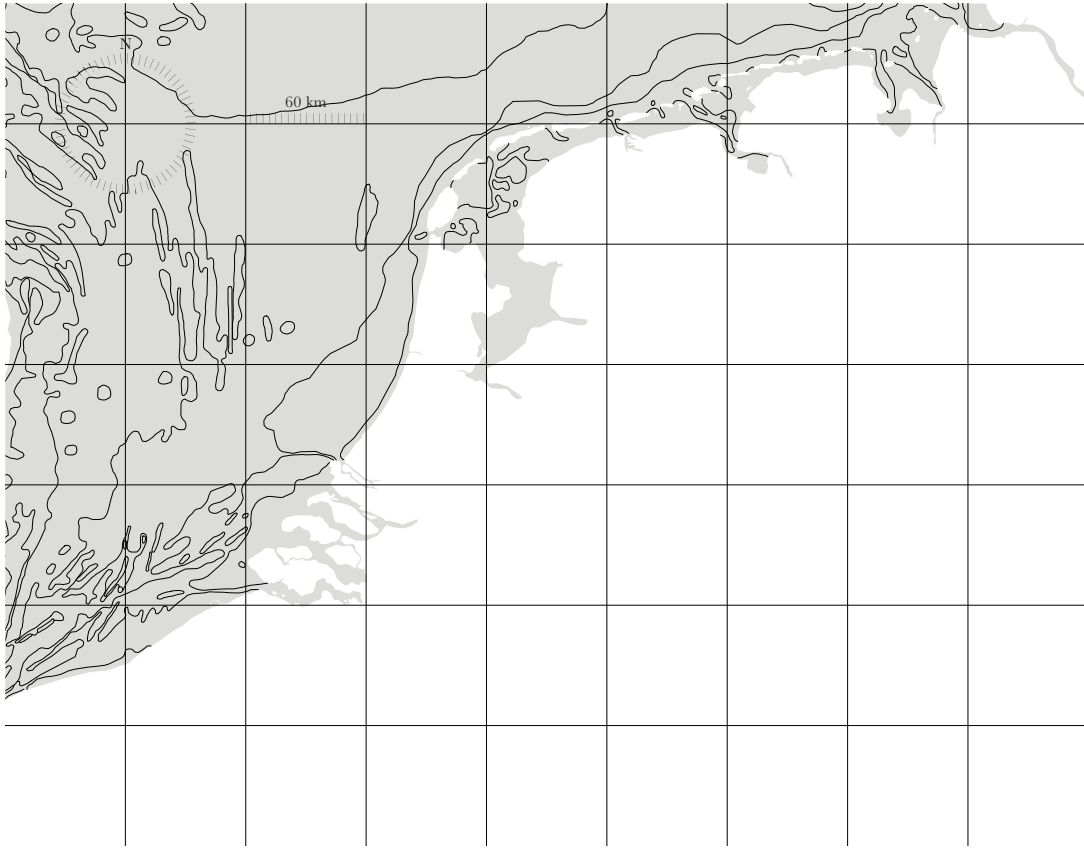


1. SEA LEVEL RISE + 0 m sea level rise with current flood defences	16. WATER SYSTEM river discharge distribution	31. HERITAGE memorial heritage	46. COASTLINE SHORTENING potential shortening 450 km
2. SEA LEVEL RISE + 0 m sea level rise without current flood defences	17. WATER SYSTEM ground water levels	32. HERITAGE power and authoritative heritage	47. PRIORITISATION Dutch layers approach / casco concept applied
3. SEA LEVEL RISE + 1 m sea level rise without flood defences	18. WATER SYSTEM salinity ground water	33. HERITAGE industrial heritage	48. THE NEW NETHERLANDS
4. SEA LEVEL RISE + 2 m sea level rise without flood defences	19. WATER SYSTEM subsidence	34. HERITAGE trade heritage	49. THE NEW NETHERLANDS current Delta Programme regions
5. SEA LEVEL RISE + 5 m sea level rise without flood defences	20. NATURE natura 2000	35. HERITAGE agricultural heritage	50. THE NEW NETHERLANDS revised Delta Programme regions
6. SEA LEVEL RISE + 10 m sea level rise without flood defences	21. TOPOGRAPHY	36. HERITAGE defence heritage	51. THE NEW NETHERLANDS IJsselmeer - Markermeer
7. FLOOD DEFENCES dunes	22. ECONOMY contribution to the GDP per province	37. HERITAGE collected heritage	52. THE NEW NETHERLANDS Wadden Sea - Greater Wadden Sea
8. FLOOD DEFENCES primary dikes	23. POPULATION density	38. HERITAGE healthcare heritage	53. THE NEW NETHERLANDS Southwest Delta - Southwest Estuary
9. FLOOD DEFENCES secondary dikes	24. POPULATION development projection 2016 - 2040	39. HERITAGE educational and scientific heritage	54. THE NEW NETHERLANDS Rhine debouchement & Drecht cities - Urban peninsula
10. FLOOD DEFENCES dams	25. HERITAGE natural heritage	40. HERITAGE utilitarian heritage	55. THE NEW NETHERLANDS rivers - river region
11. FLOOD DEFENCES protection levels 2012	26. HERITAGE water heritage	41. HERITAGE total	56. THE NEW NETHERLANDS old coast - coast of the New Netherlands
12. FLOOD DEFENCES length	27. HERITAGE cultural heritage	42. COASTLINE SHORTENING year 1500 / 2600 km long	57. ANTARCTICA
13. SAND EXTRACTION policy Dutch territorial waters North Sea	28. HERITAGE urban heritage	43. COASTLINE SHORTENING year 1850 / 2100 km long	58. ANTARCTICA marine based ice
14. WATER SYSTEM water bodies bigger than 0,5 m	29. HERITAGE transport heritage	44. COASTLINE SHORTENING year 1950 / 1600 km long	
15. WATER SYSTEM rivers	30. HERITAGE religious heritage	45. COASTLINE SHORTENING year 2018 / 880 km long	

1.

SEA LEVEL RISE

+ 0 m sea level rise with current flood defences

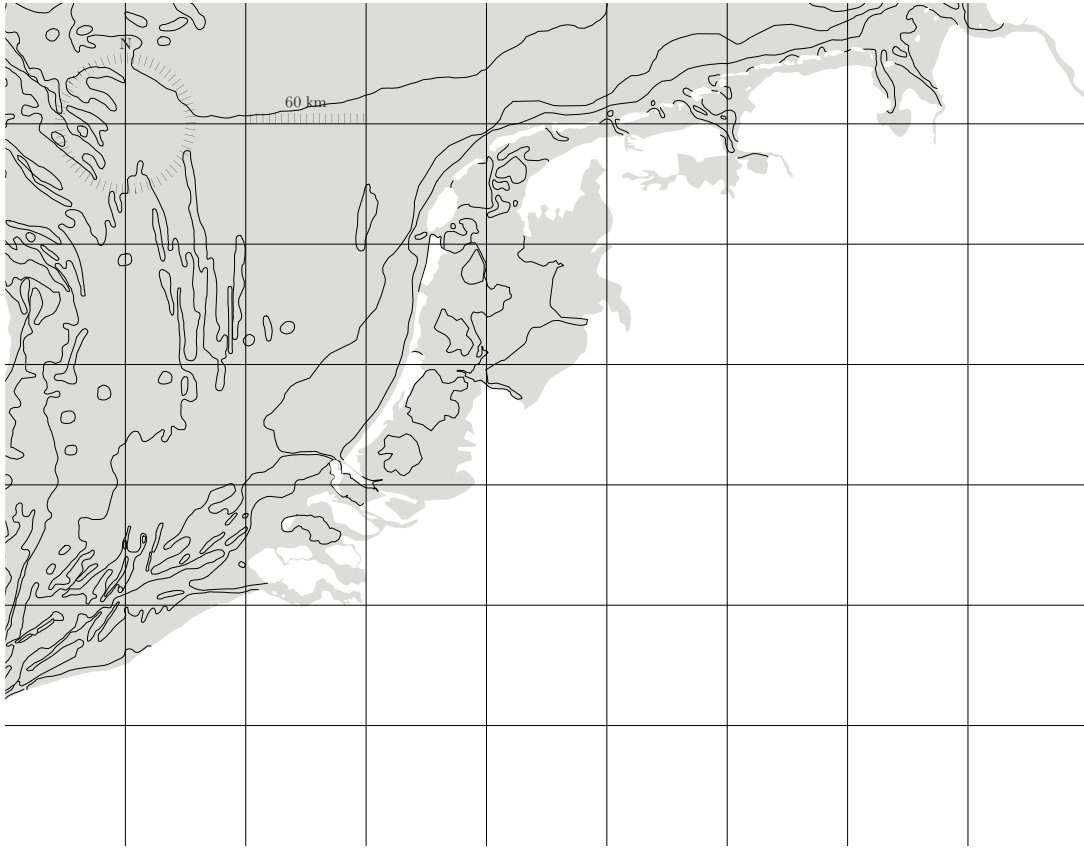


2.

SEA LEVEL RISE

+ 0 m sea level rise without current flood defences

modified from Climate Central 2018



3.

SEA LEVEL RISE

+ 1 m sea level rise without flood defences

modified from Climate Central 2018

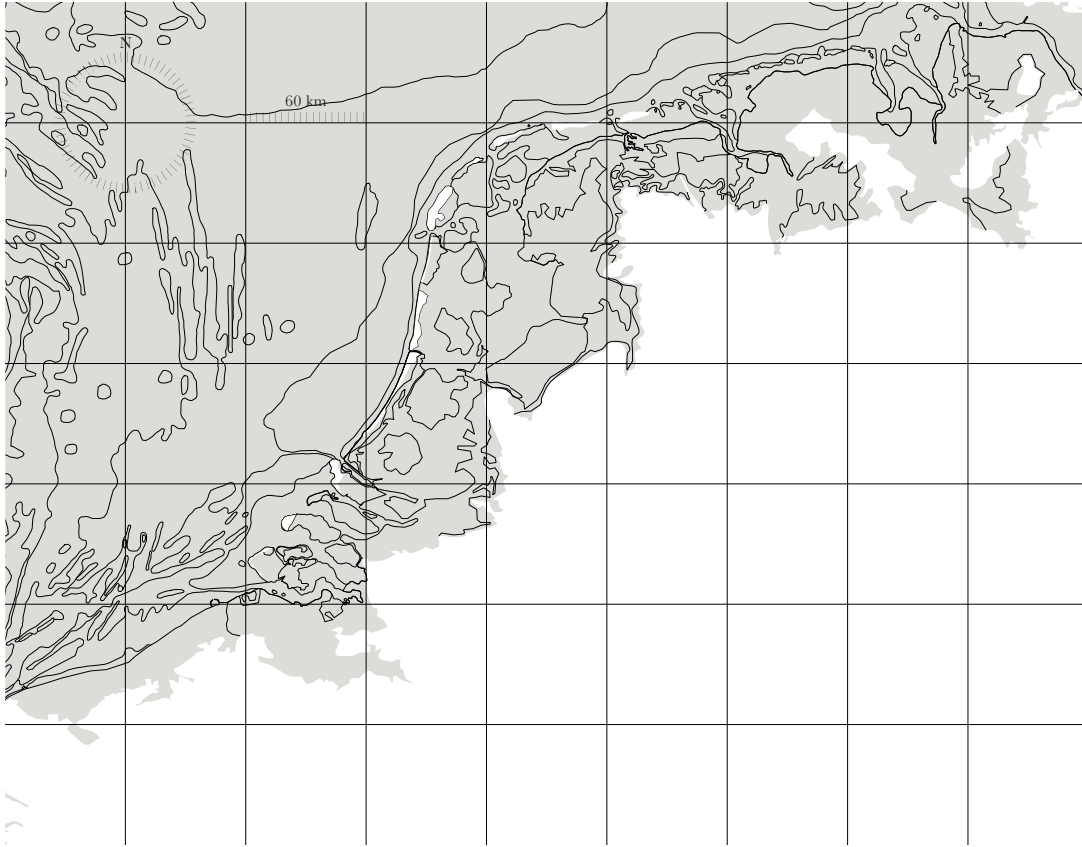


4.

SEA LEVEL RISE

+ 2 m sea level rise without flood defences

modified from Climate Central 2018

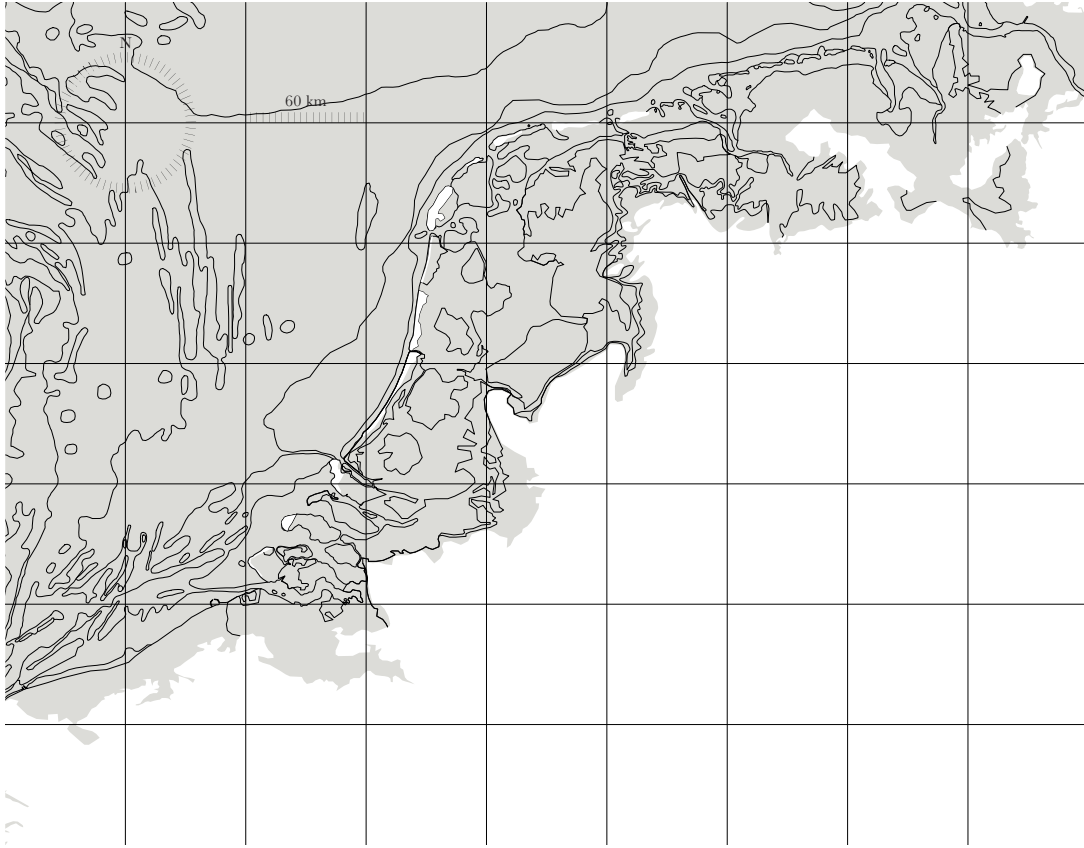


5.

SEA LEVEL RISE

+ 5 m sea level rise without flood defences

modified from Climate Central 2018

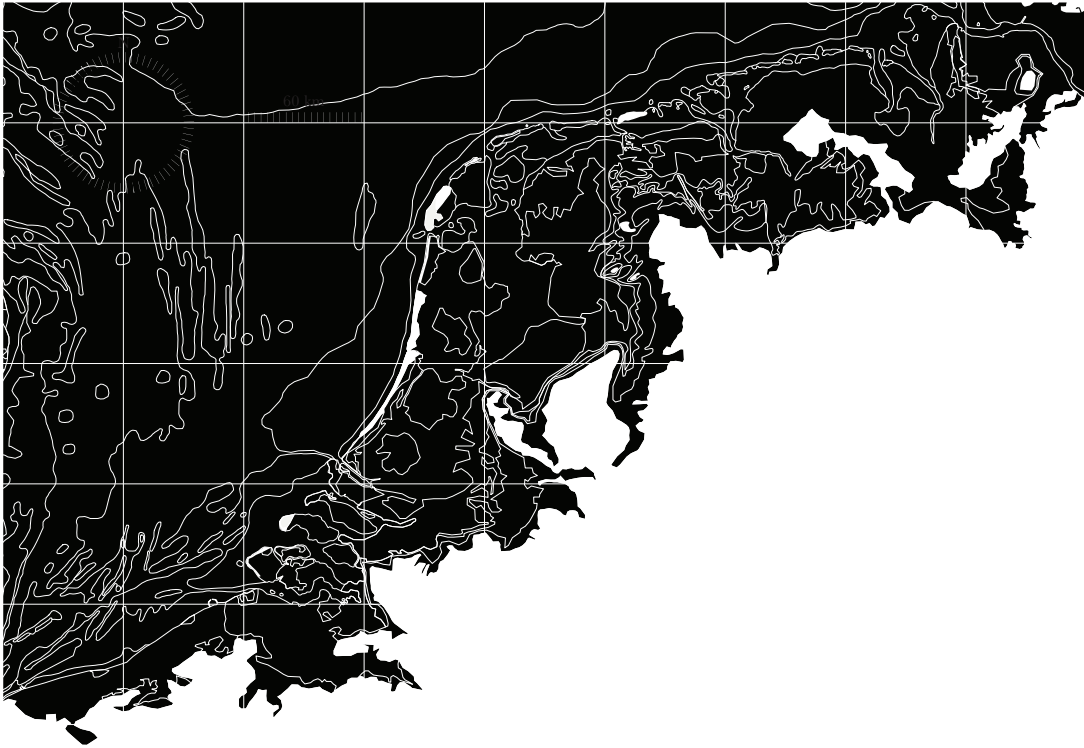


6.

SEA LEVEL RISE

+ 10 m sea level rise without flood defences

modified from Climate Central 2018

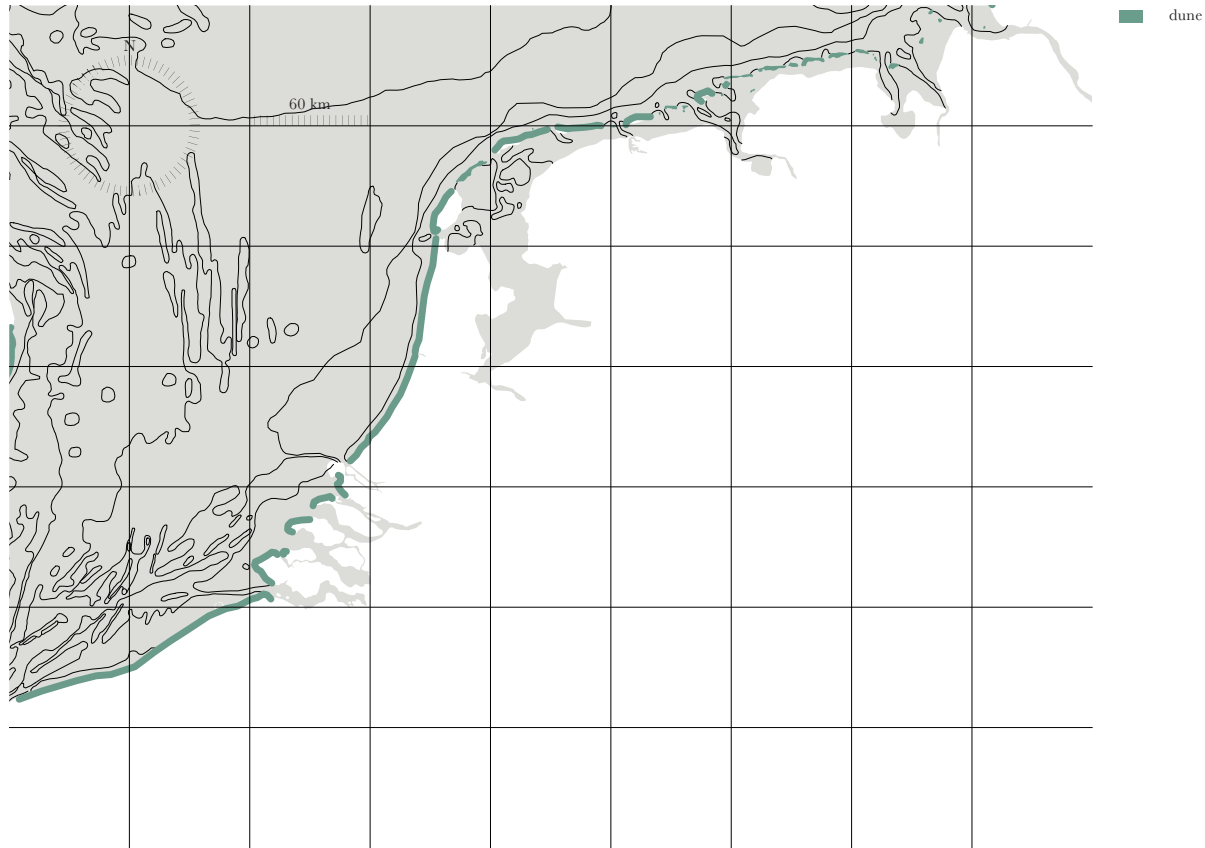


7.

FLOOD DEFENCES

dunes

modified from Rijkswaterstaat 2012

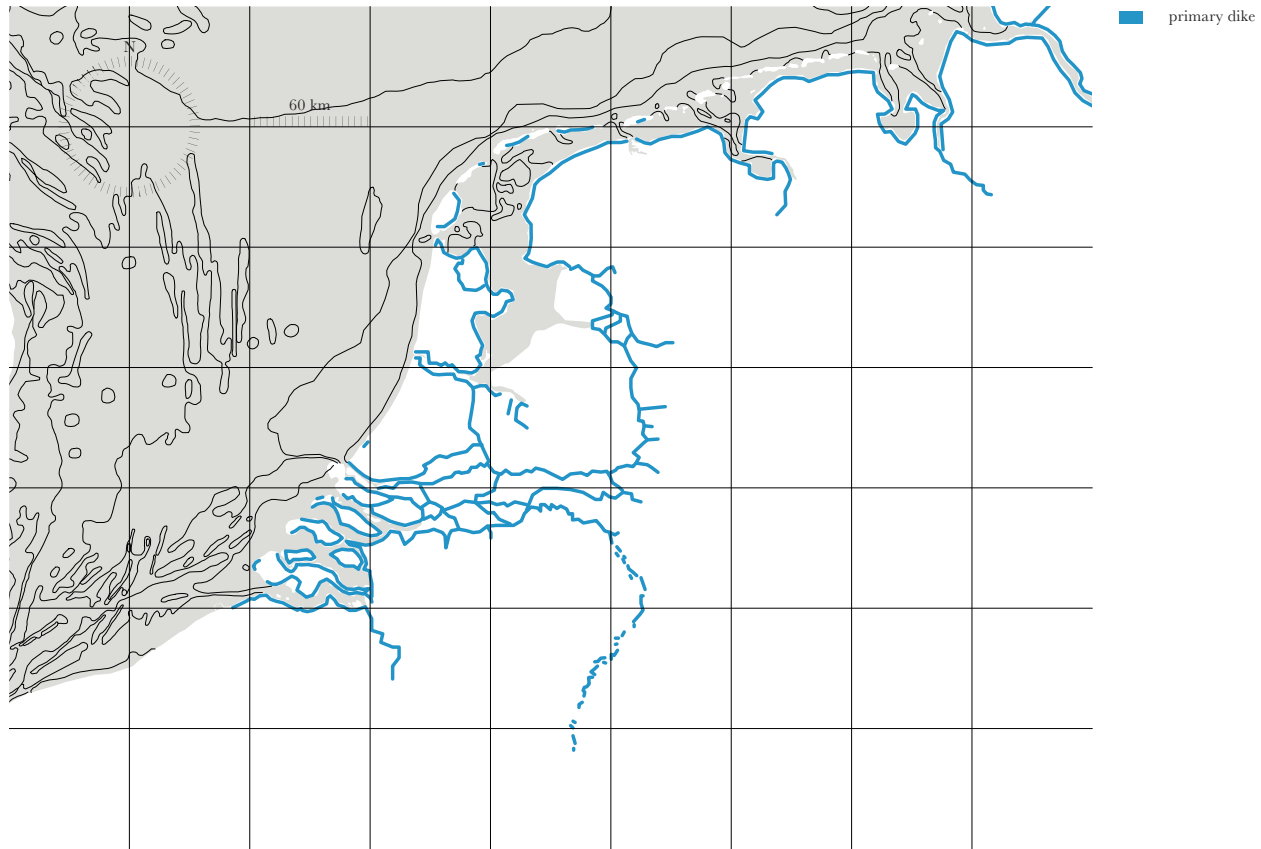


8.

FLOOD DEFENCES

primary dikes

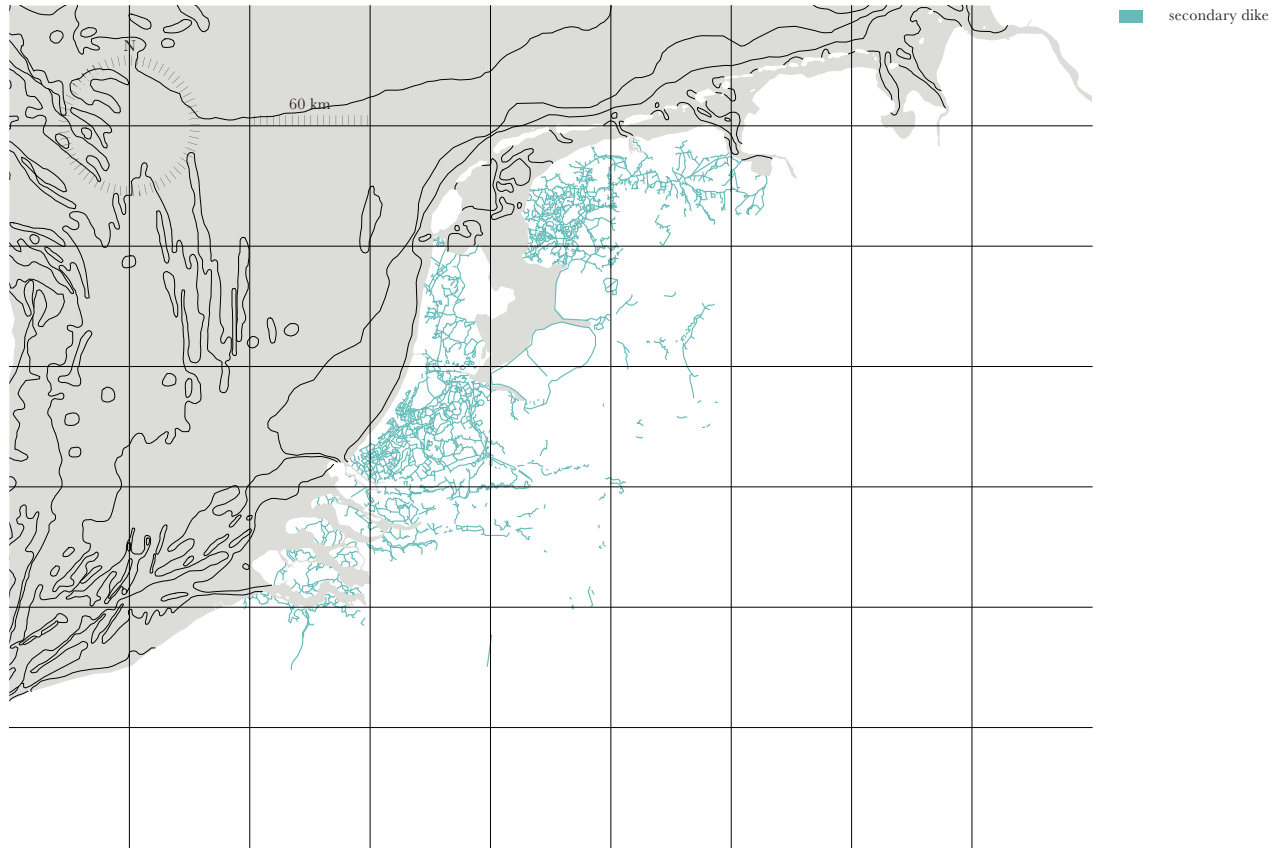
modified from Rijkswaterstaat 2012



9.

FLOOD DEFENCES
secondary dikes

modified from VROM & LNV 2007

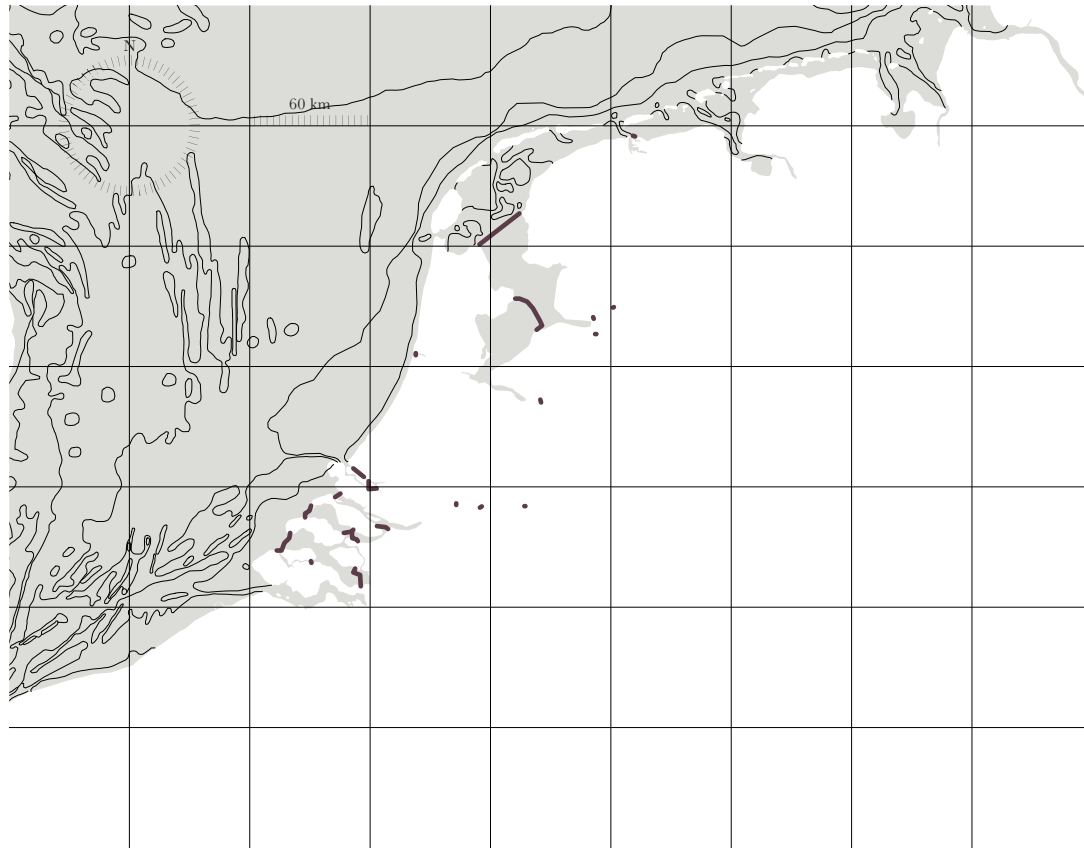


10.

FLOOD DEFENCES

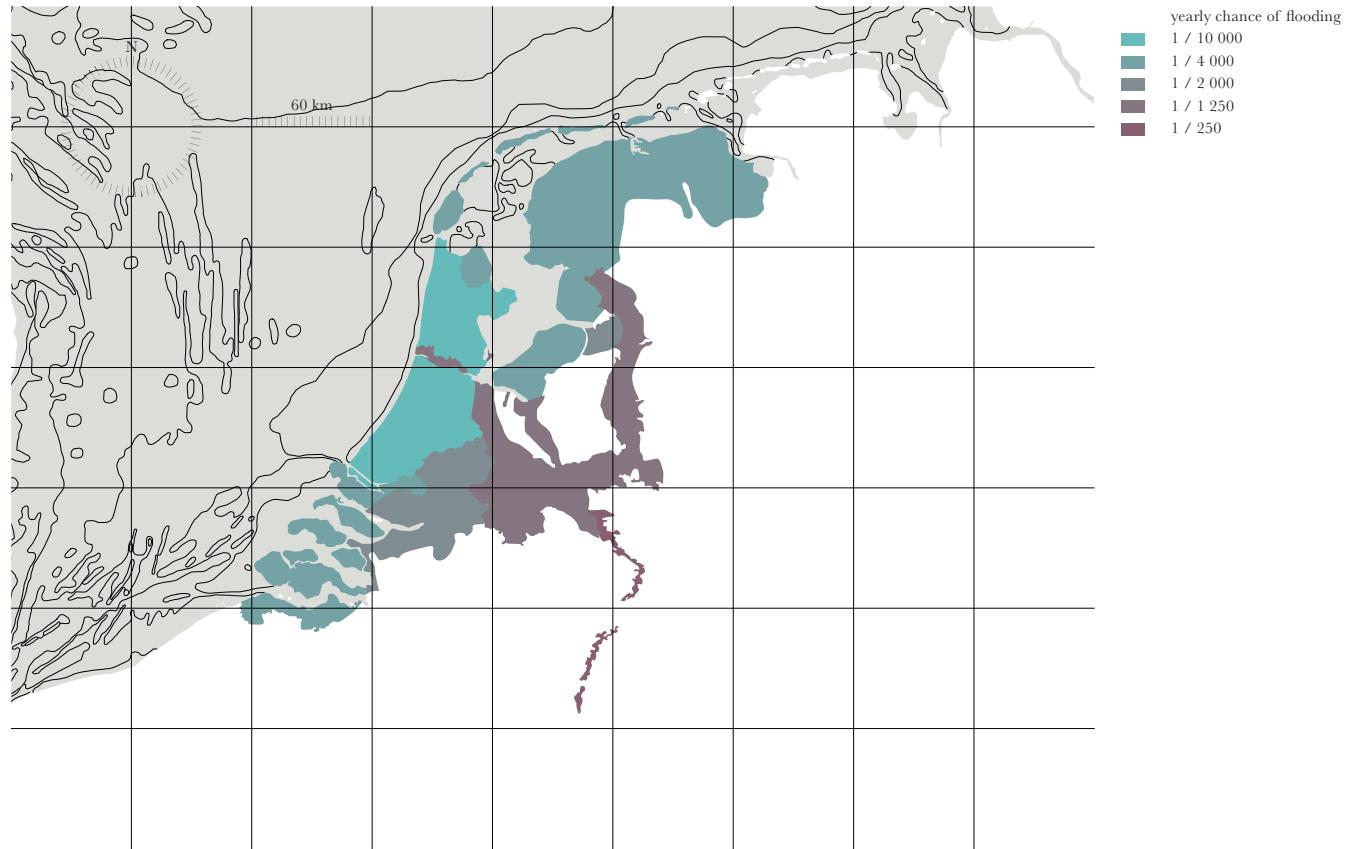
dams

modified from Rijkswaterstaat 2012



11.

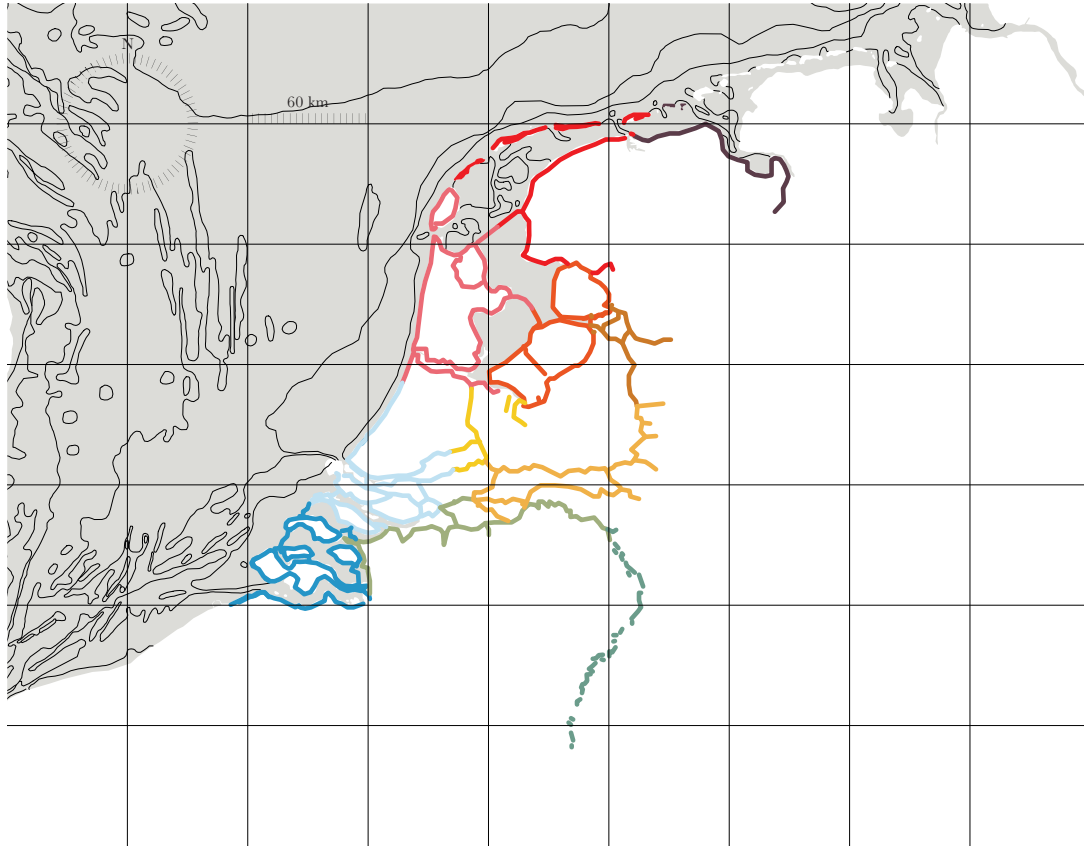
FLOOD DEFENCES
protection levels 2012
modified from Rijkswaterstaat 2012



12.

FLOOD DEFENCES
length

modified from Inspectie Leefomgeving en Transport 2013



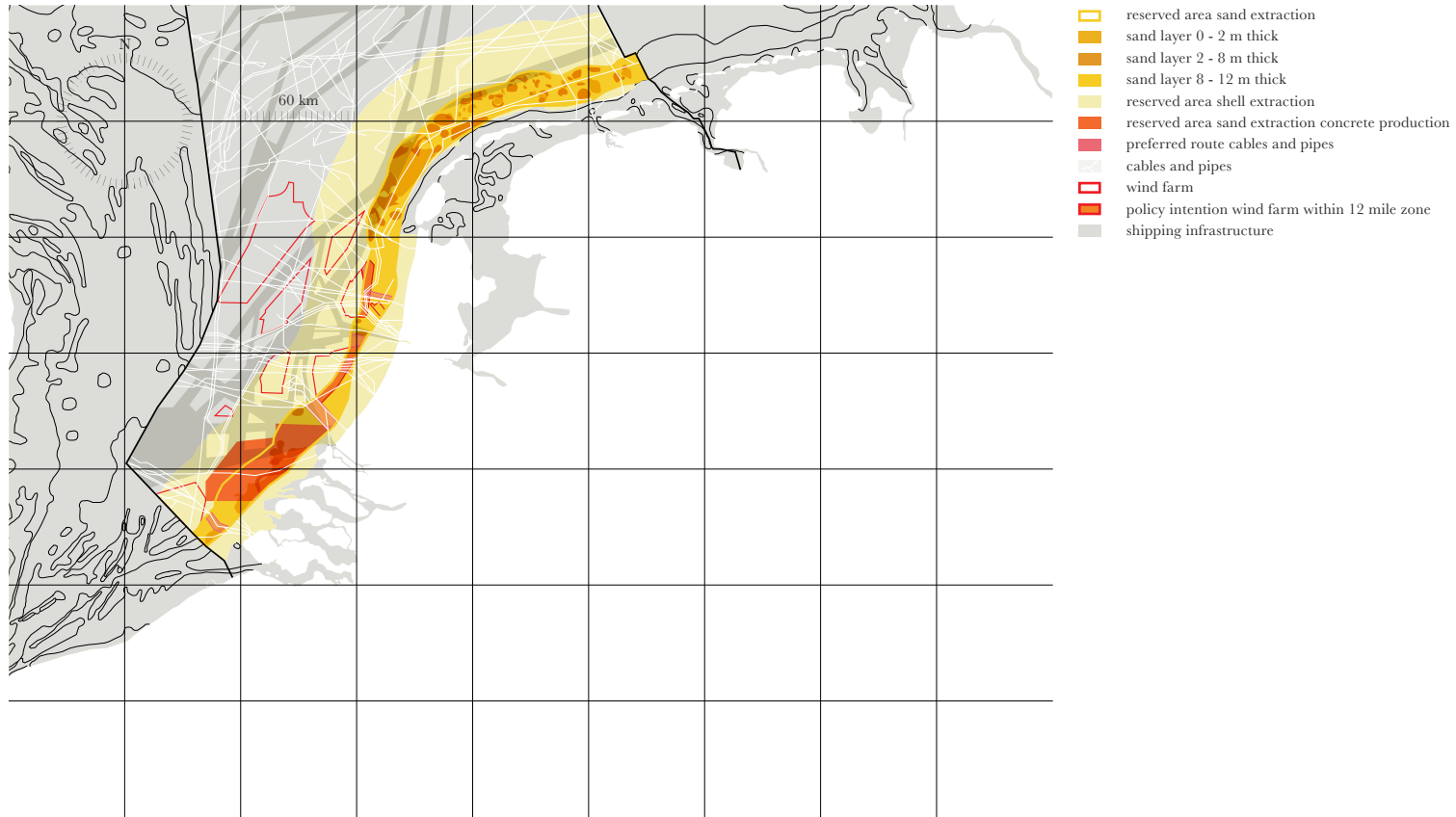
province	length
Groningen	115 km
Friesland	245 km
Flevoland	235 km
Noord-Holland	394 km
Overijssel	272 km
Gelderland	565 km
Utrecht	111 km
Noord-Brabant	330 km
Limburg	169 km
Zeeland	554 km
Zuid-Holland	777 km
total	3 767 km

13.

SAND EXTRACTION

policy Dutch territorial waters North Sea

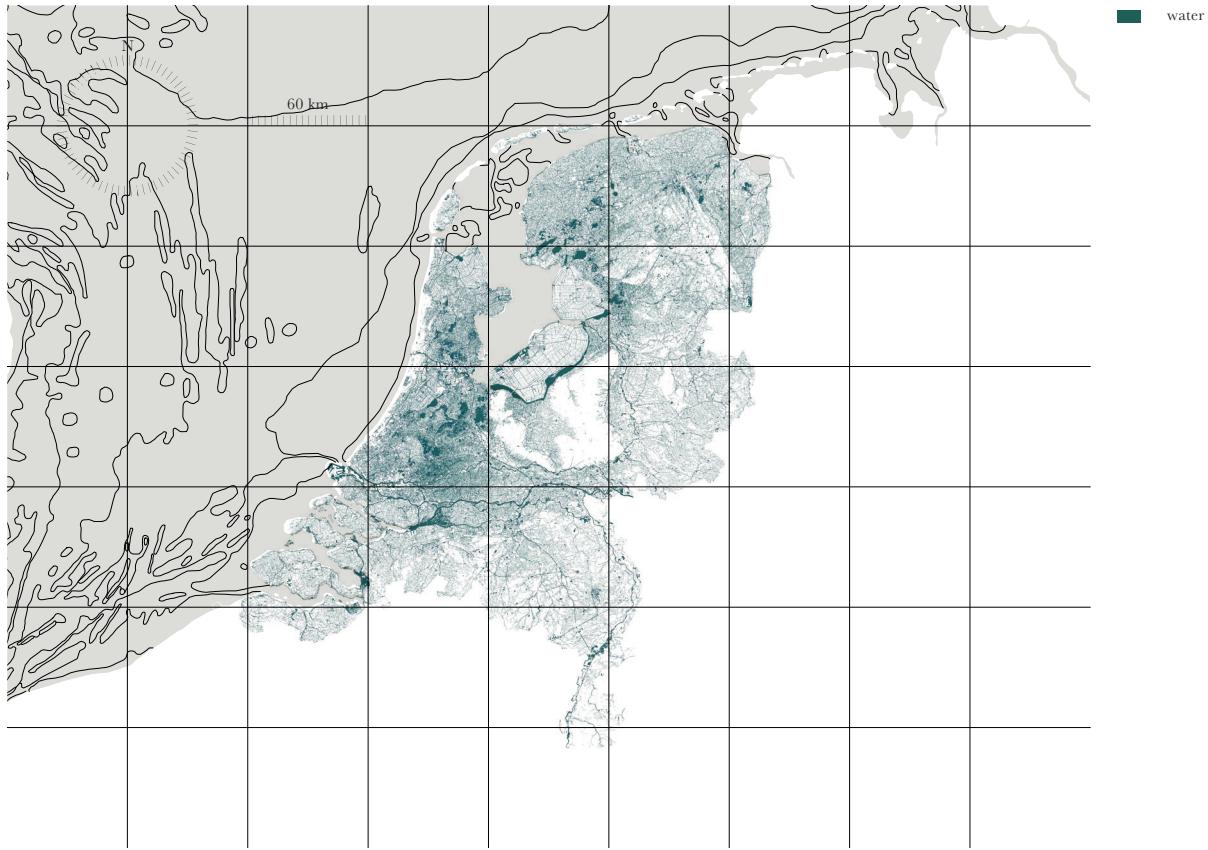
modified from Noordzeeloket 2018



14.

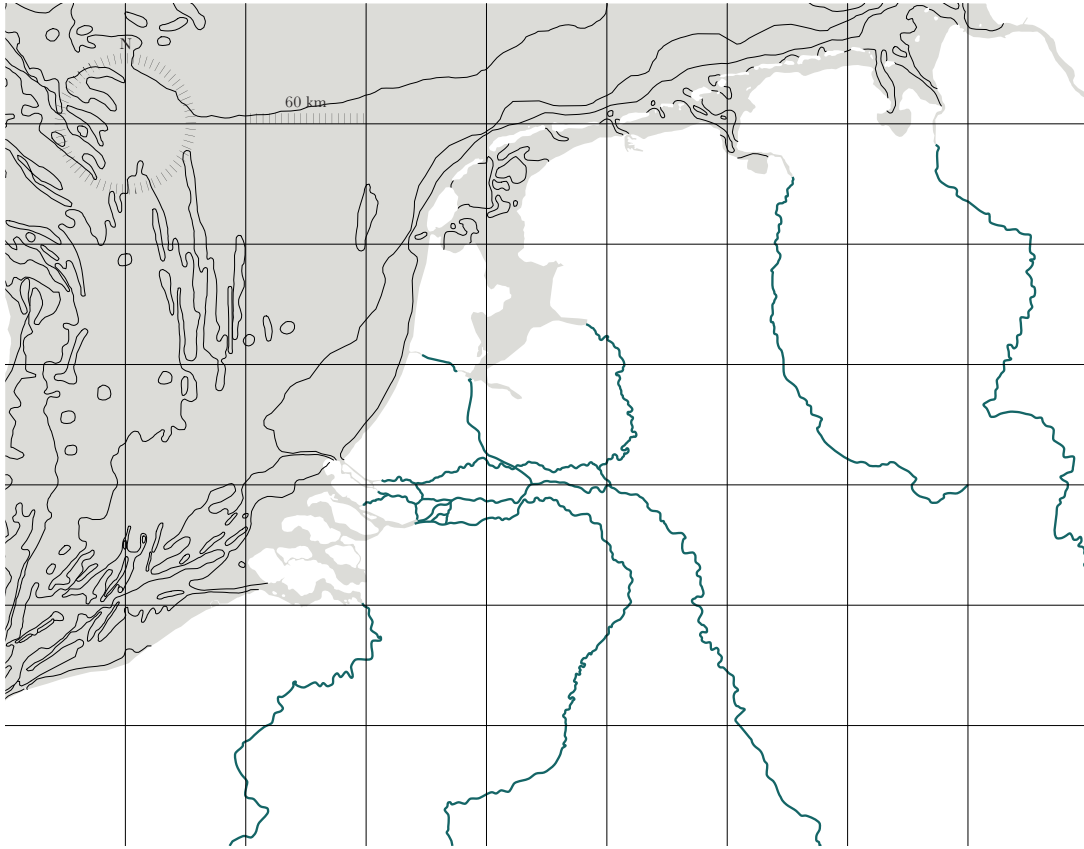
WATER SYSTEM

water bodies bigger than 0,5 m



15.

WATER SYSTEM
rivers

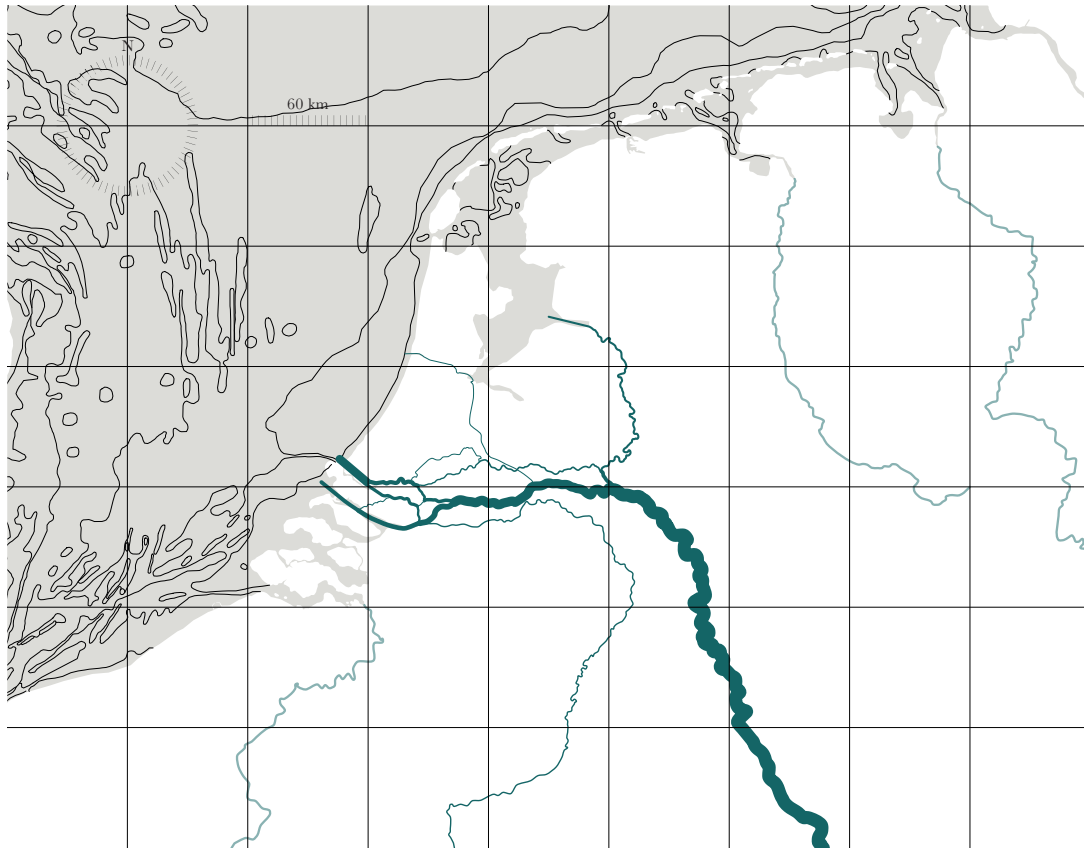


16.

WATER SYSTEM

river discharge distribution

modified from Lamm 2014



inflow river water

Meuse 10,1 %
Rhine 89,9 %

distribution river water

Waal 64,1 %
Pannerdensch Kanaal 25,8 %
Nederrijn 11,4 %
Amsterdam-Rijnkanaal 0,6 %
Hollandse IJssel 0,6 %
Lek 10,2 %
Beneden Merwede 24,6 %
Nieuwe Merwede 39,5 %
Noord 18,2 %
Dordtse Kil 16,5 %
Oude Maas Dordrecht 6,4 %
Nieuwe Maas 29,0 %
Oude Maas 22,9 %
Hollands Diep 33,2 %
Spui 5,5 %

outflow river water

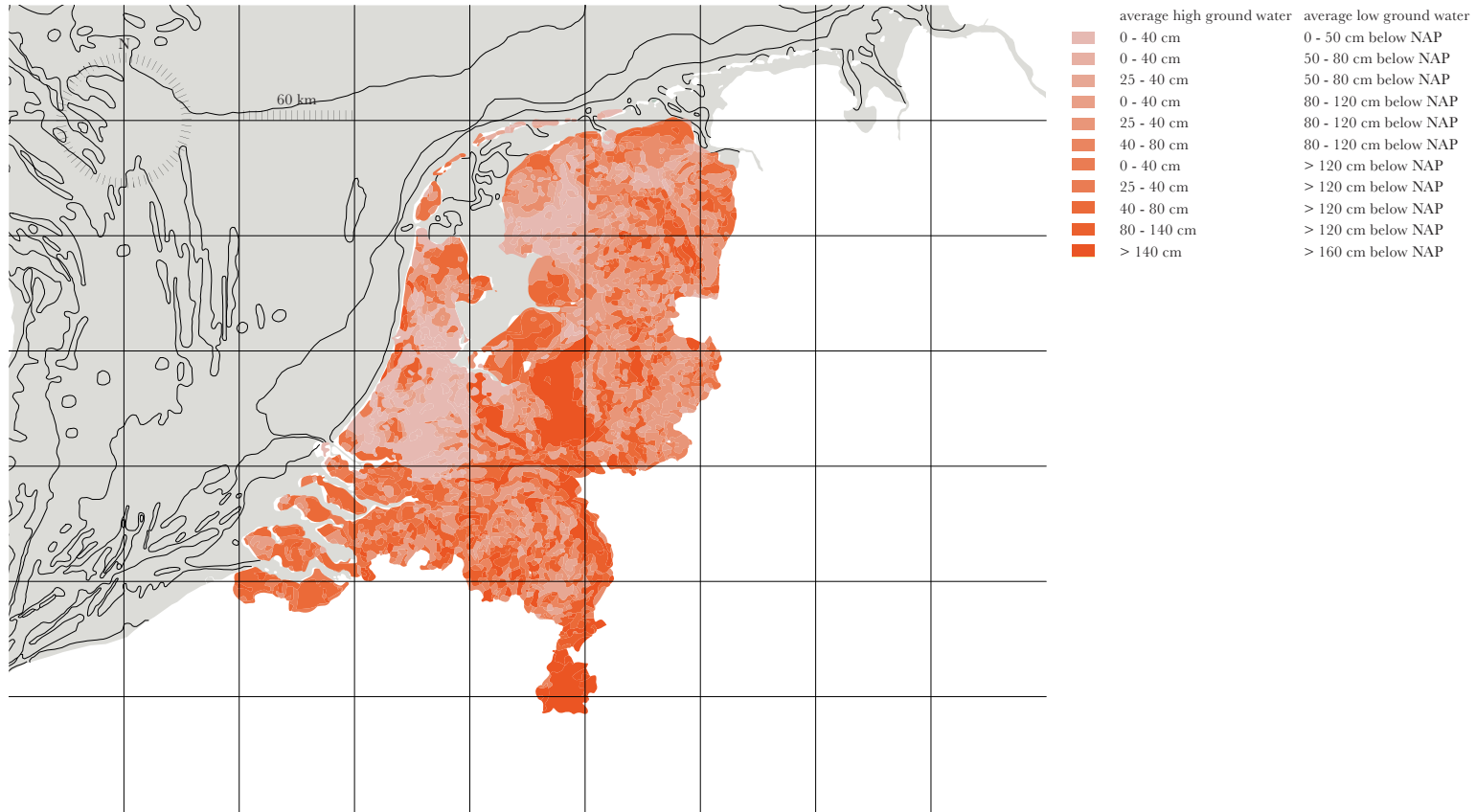
IJssel 14,4 %
Noordzeekanaal 0,6 %
Nieuwe Waterweg 57,4 %
Haringvliet 27,6 %

17.

WATER SYSTEM

ground water levels

modified from Wageningen Environmental Research 2018

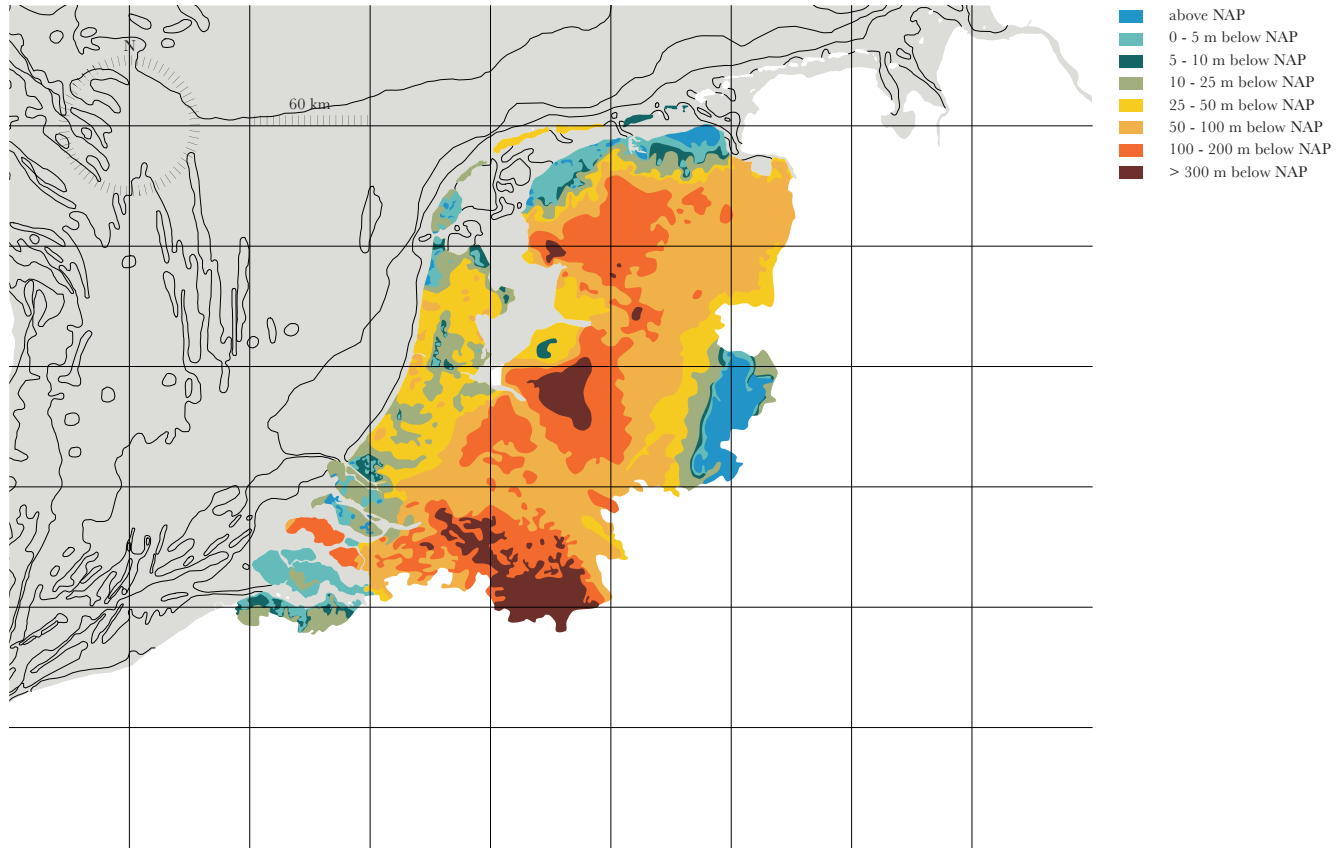


18.

WATER SYSTEM

salinity ground water

modified from Deltares / TNO 2017

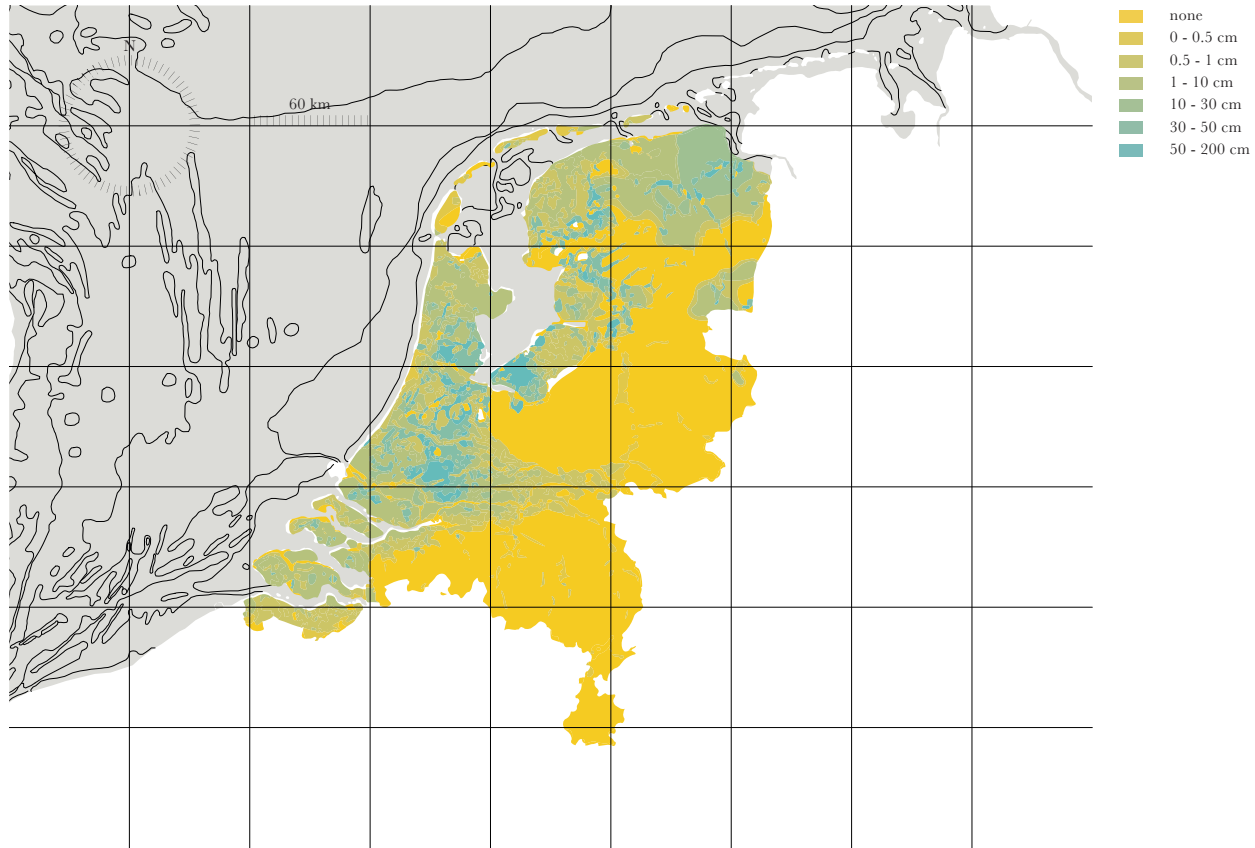


19.

WATER SYSTEM

subsidence

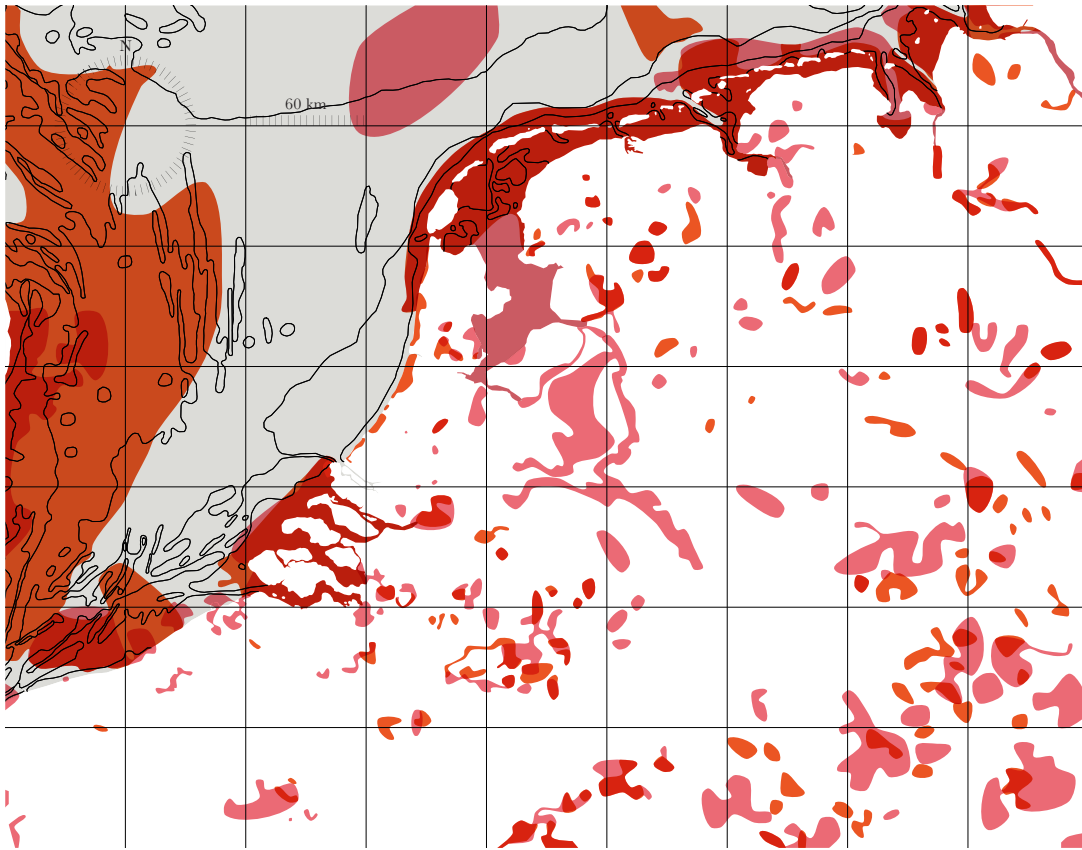
modified from Deltares



20.

NATURE
natura 2000

modified from European Environmental Agency 2016

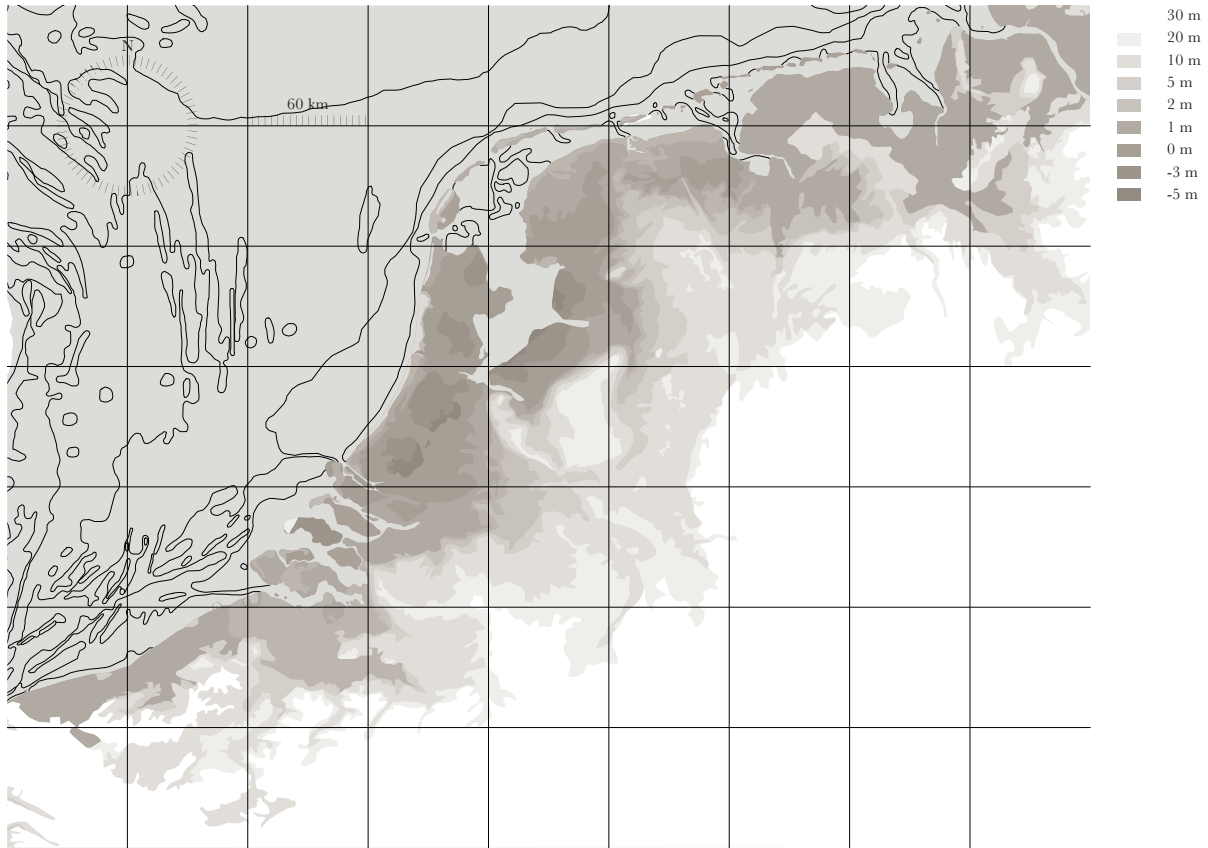


- habitats directive site
- birds directive site
- habitats and birds directive site

21.

TOPOGRAPHY

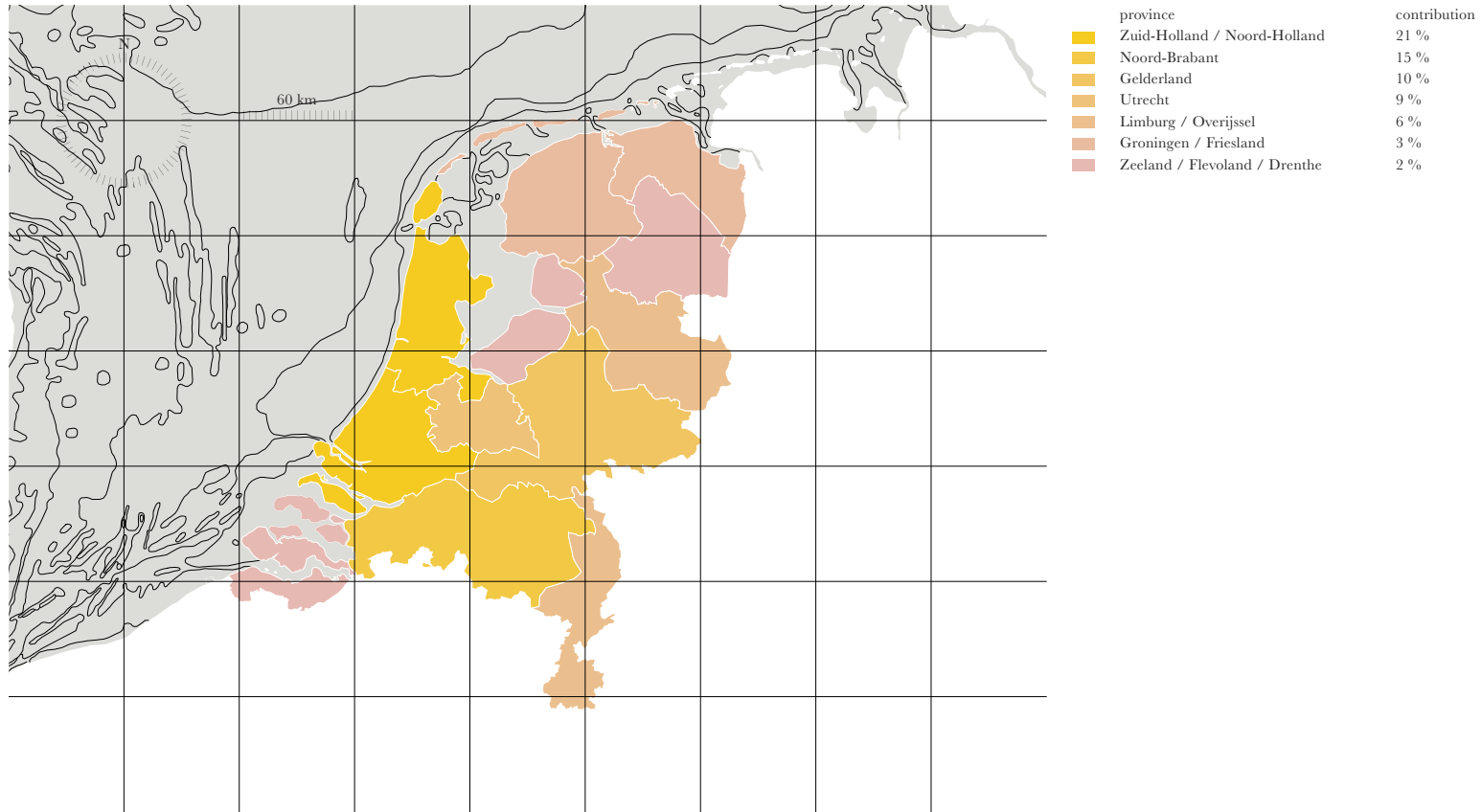
modified from PDOK 2018



ECONOMY

contribution to the GDP per province

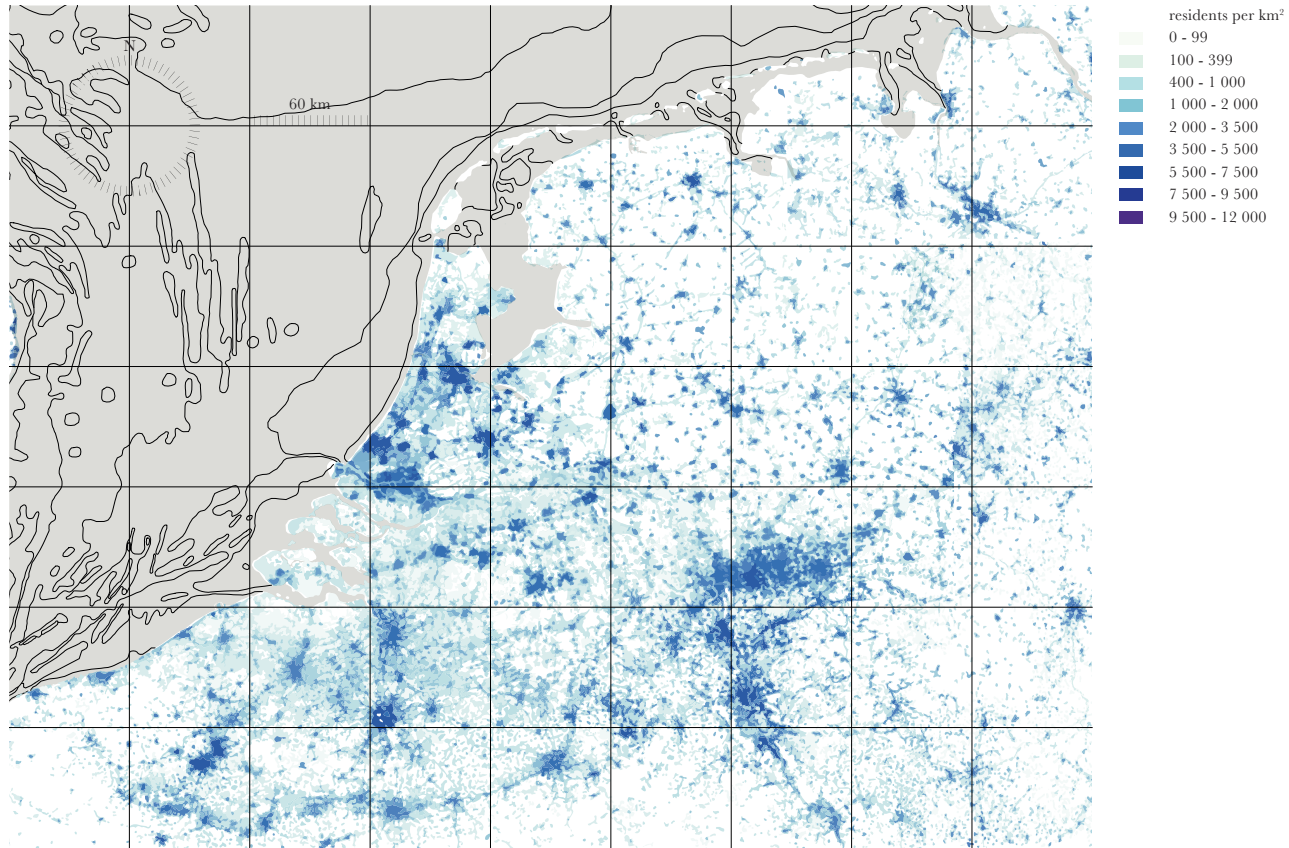
modified from CBS 2018



23.

POPULATION
density

modified from GEOstata and European Union 2017

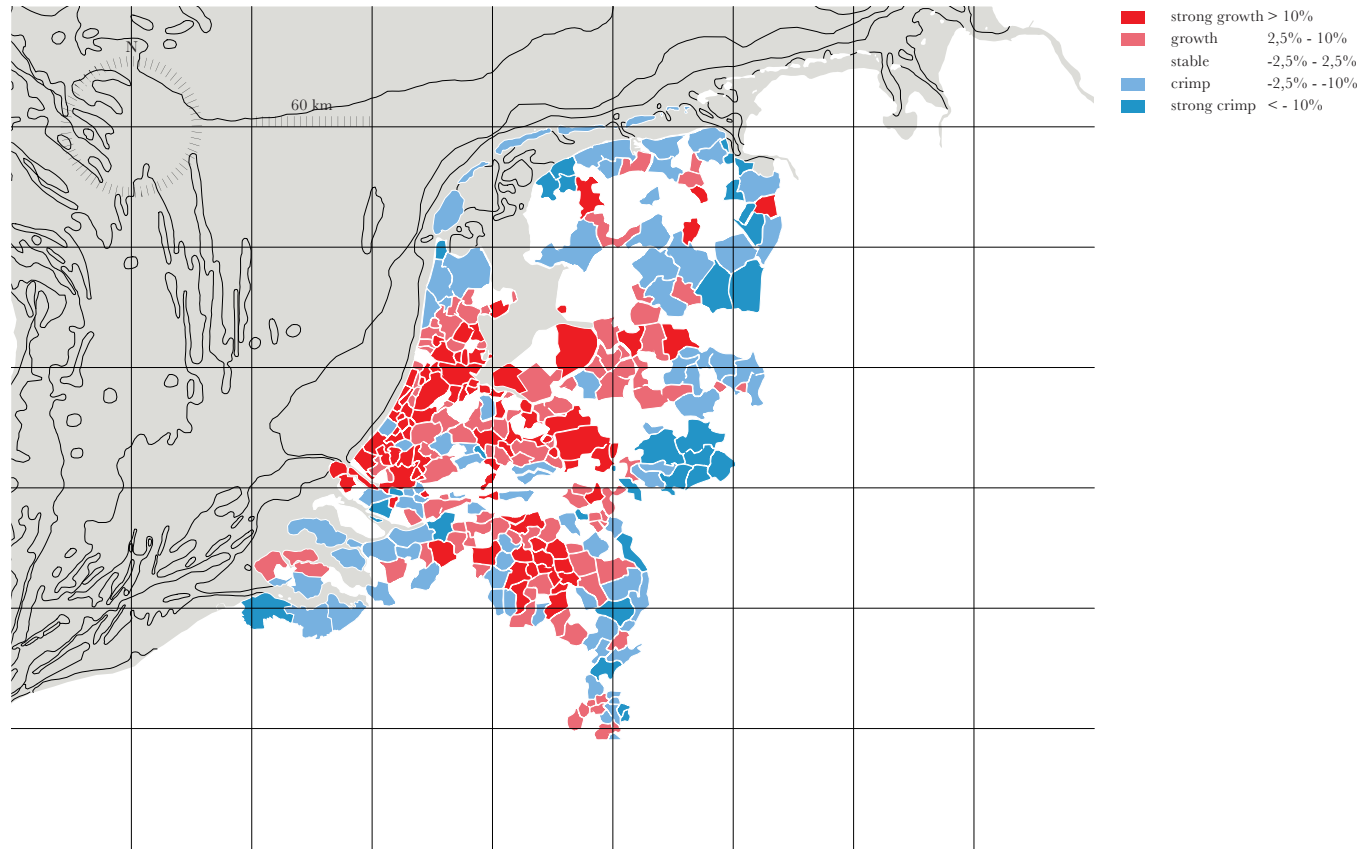


24.

POPULATION

development projection 2016 - 2040

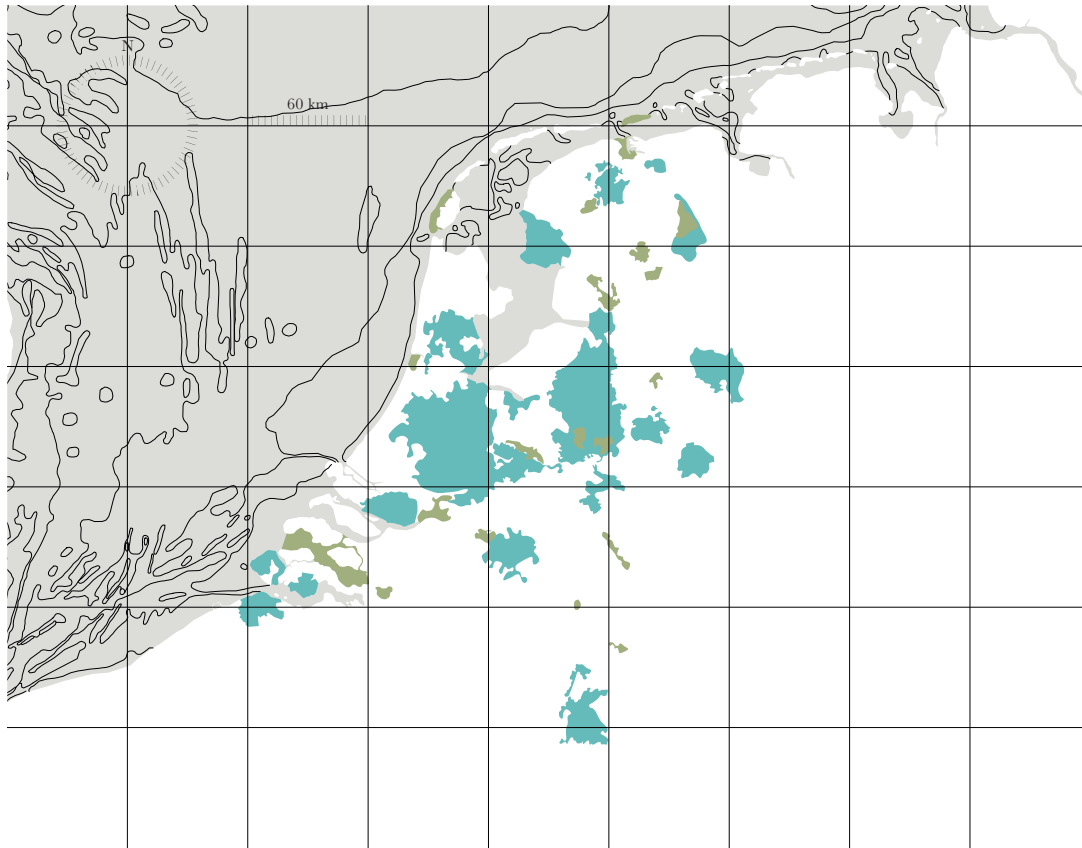
modified from Koosman et al. 2016



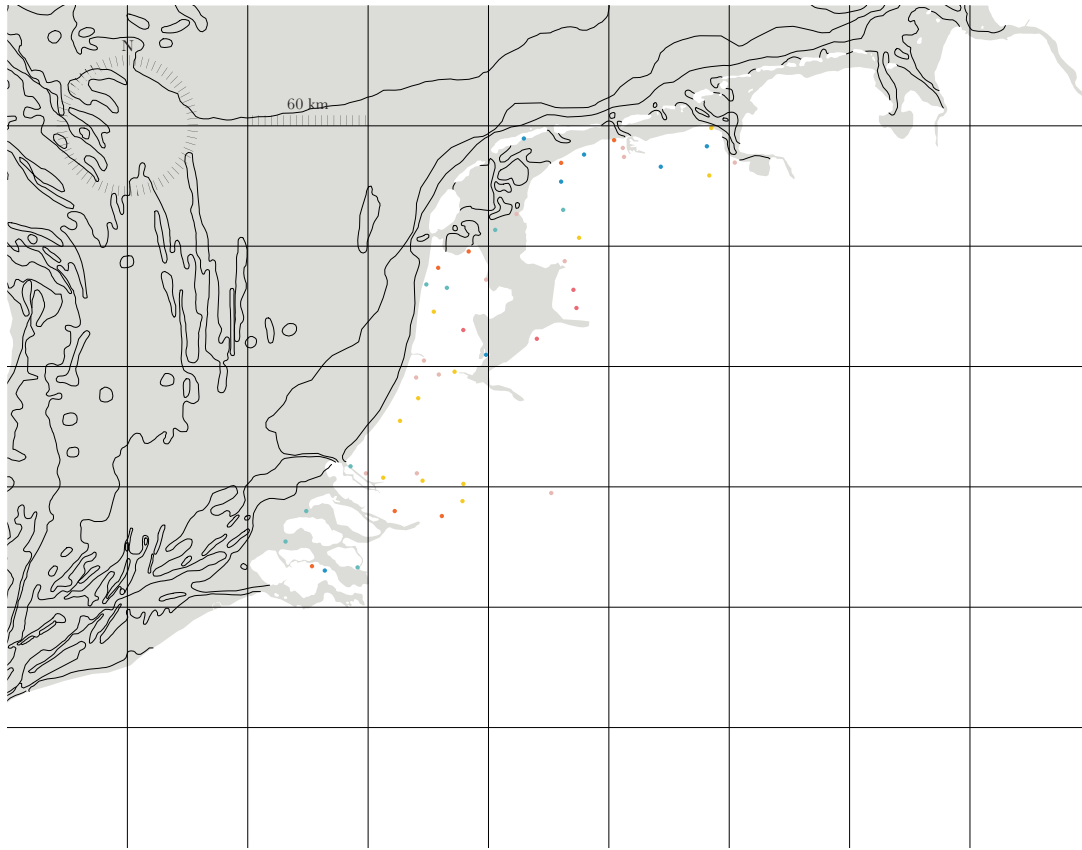
25.

HERITAGE

natural heritage



landscapes Veluwe / Groene Hart
reserves Utrechtse Heuvelrug / Hoge Veluwe / Biesbosch

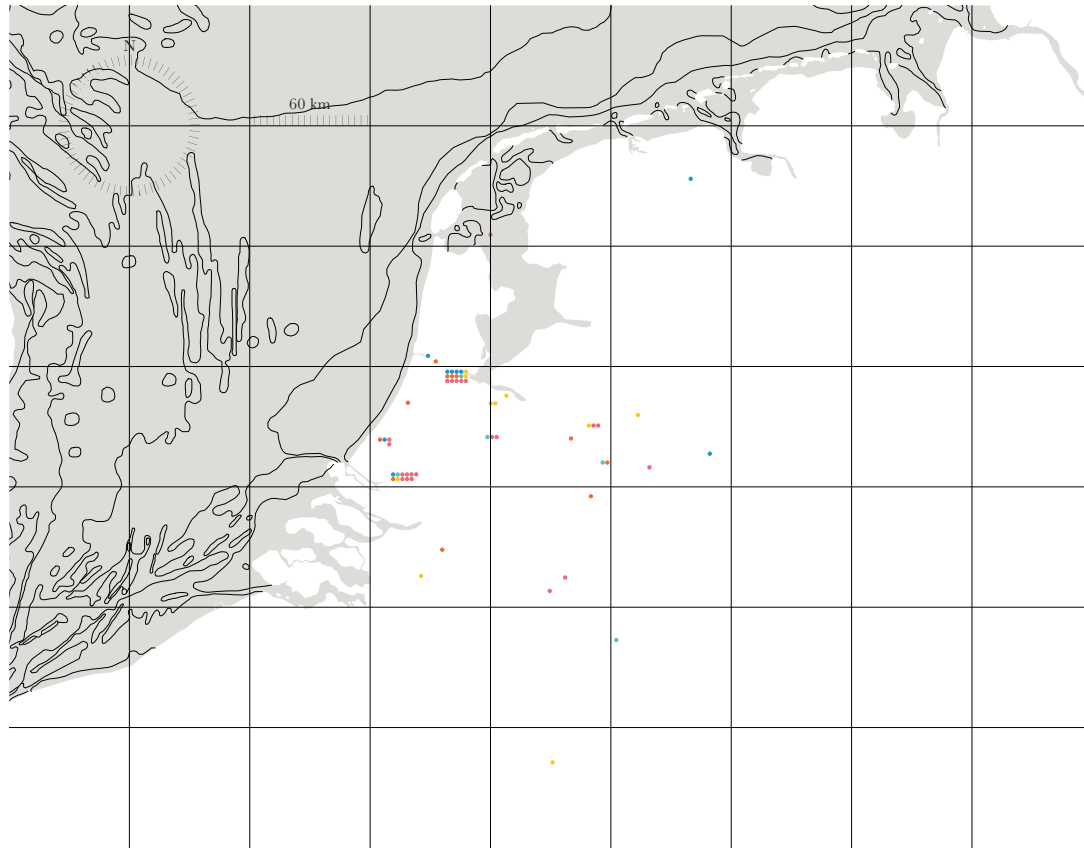


- terpen
- flood defences
- dikes
- polder mills
- reclaimed land
- sluices / locks / pumps

- Hegebeintum
- Afsluitdijk / Oosterscheldekering
- wierdijk (Wieringen) / pole dike (Bunschoten)
- Kinderdijk / Oudenhofmolen (Oegstgeest) / Uitwijkse Molen (Sleeuwijk)
- Noordoostpolder / Beemster Polder / Haarlemmermeerpolder
- Boog van Ziel (Termunterzijl) / Lorentzsluizen (Afsluitdijk) / Ezumazijl Sluice / Ir. D.R. Woudagemaal (Lemmer) / Gemaal Lely / (Medemblik) / Gemaal De Cruquius (Cruquius)

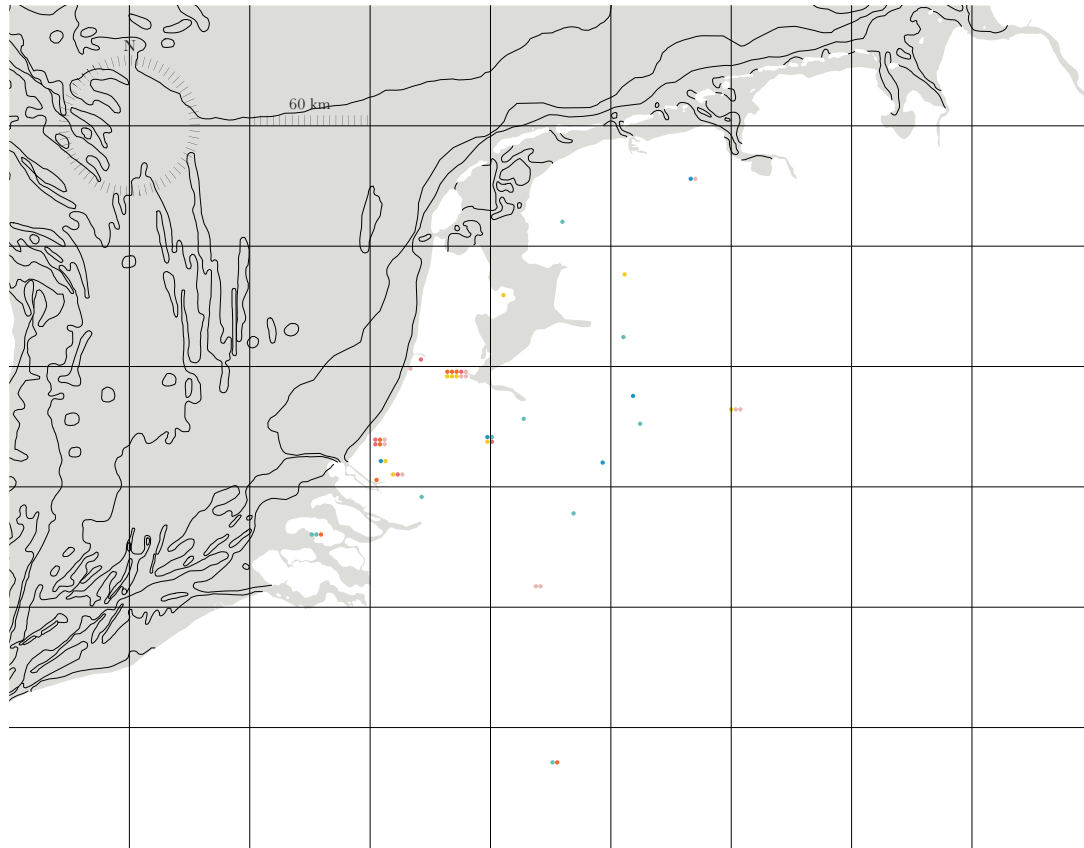
HERITAGE

cultural heritage



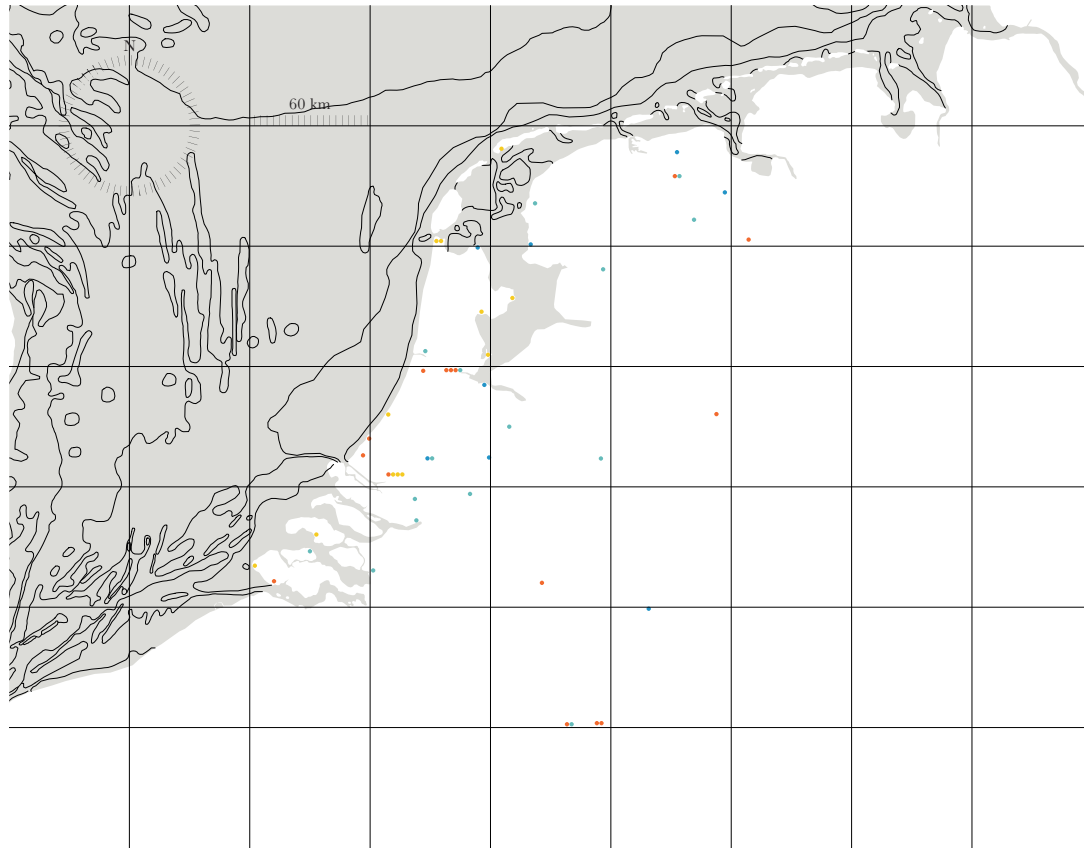
- tourism
 - sport / recreation
 - music
 - entertainment
 - visual arts / literature
 - architecture
- Artis (Amsterdam) / Kurhaus (Scheveningen)
 - Olympisch Stadion (Amsterdam) / Stoop's Bad (Overveen) / Hollandse Manege (Amsterdam)
 - Concertgebouw (Amsterdam) / Muziekkoepel (Roermond)
 - Theater Tuschinski (Amsterdam) / Koninklijk Theater Carré (Amsterdam) / city theater (Amsterdam / Haarlem / Leiden)
 - Rembrandthuis (Amsterdam)
 - Kunsthall (Rotterdam) / Rietveld-Schröderhuis (Utrecht)

HERITAGE
urban heritage



- medieval Proosdij (Deventer) / Stadskaasteel Oudaen (Utrecht)
- city walls / -gates Waterpoort (Sneek) / Sassenpoort (Zwolle) / Koppelpoort (Amersfoort) / Groothoofdspoort (Dordrecht) / Helpoort (Maastricht)
- canal- / patrician houses Amsterdam canal belt / Huis Schuylenburch (The Hague)
- 19th century expansion Rams Woerthe (Steenwijk) / Snouck van Loosenpark (Enkhuizen) / De Pijp (Amsterdam)
- pre-WWII expansion Het Schip (Amsterdam) / Papaverhof (The Hague) / Justus van Effencomplex (Rotterdam)
- reconstruction Rotterdam / Philips (Eindhoven)

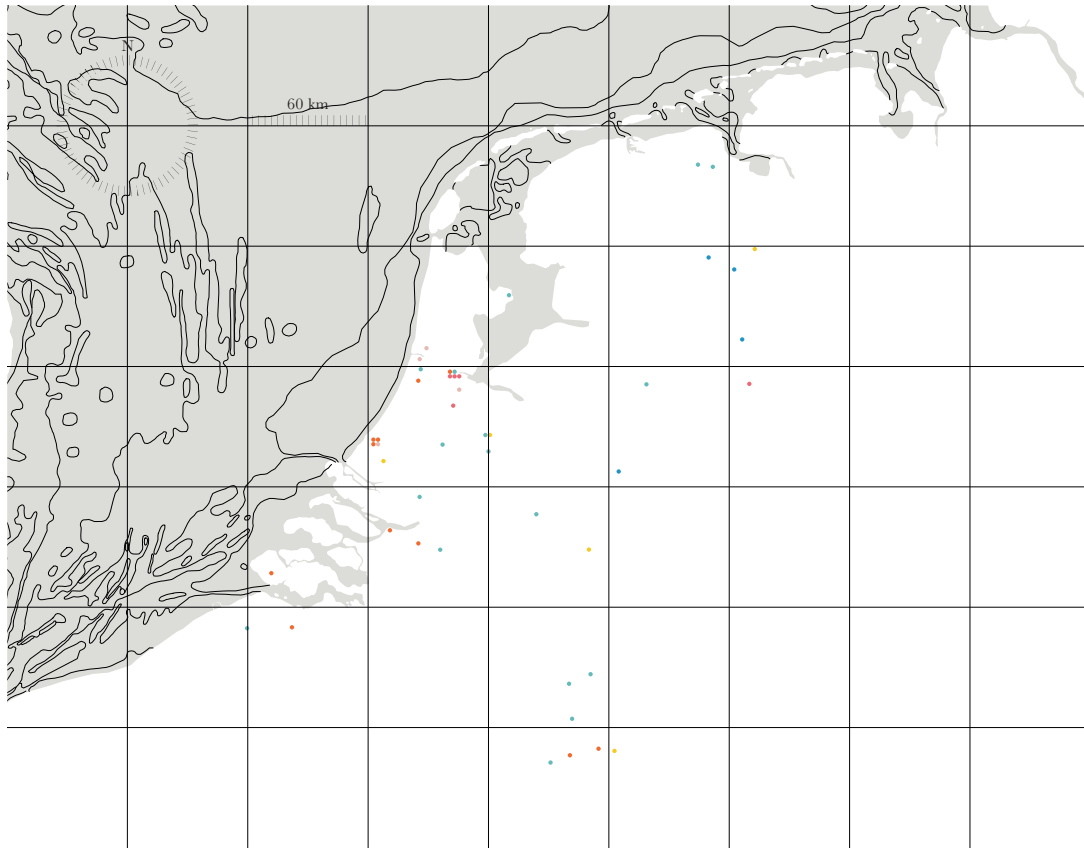
HERITAGE
transport heritage



- inland water Sylhus (Hindeloopen) / Sur Meuse (Blerick)
- road Ventilatiotorens Velsertunnel (Velsen) / Tolhuis (Gouda / Gorinchem) / Wegh der Weegen (Utrecht) / Sint Servaasbrug (Maastricht)
- rail De Hef (Rotterdam) / station (Haarlem / Amsterdam / Eindhoven / Groningen / The Hague / Valkenburg / Vlissingen)
- sea Brandaris (Terschelling) / Wilhelminapier (Rotterdam)

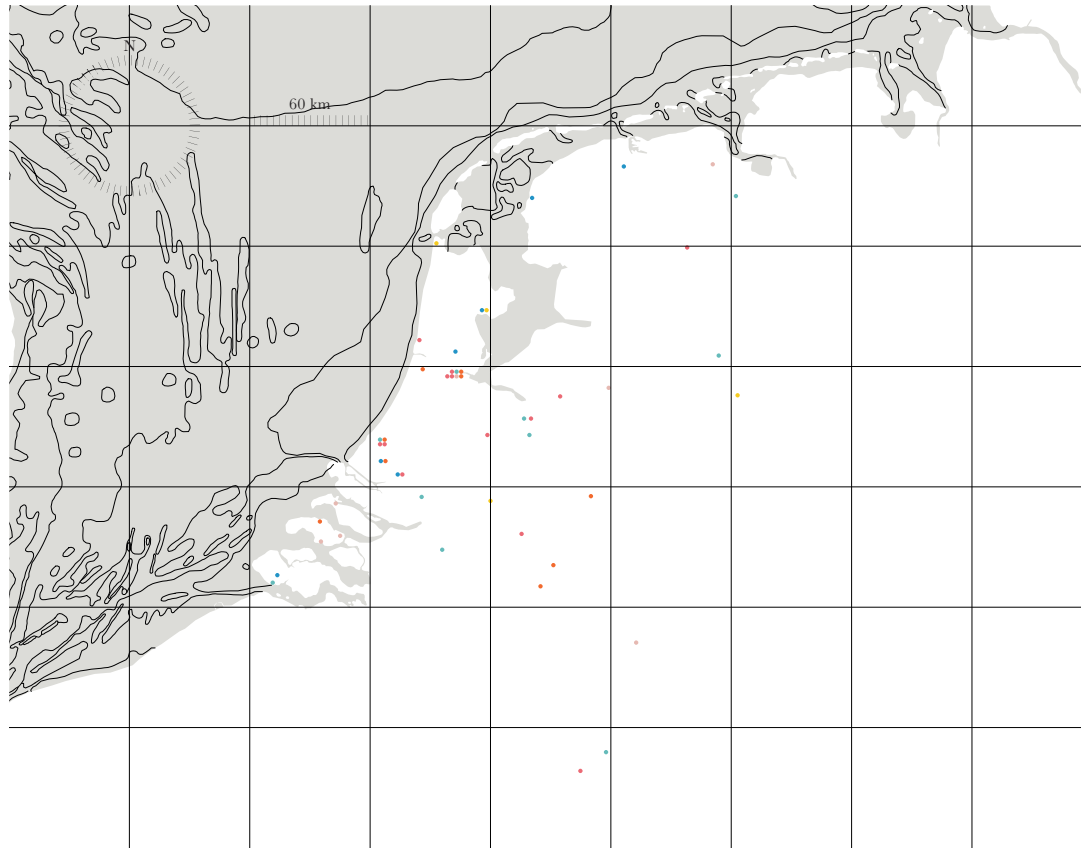
HERITAGE

religious heritage



HERITAGE

memorial heritage

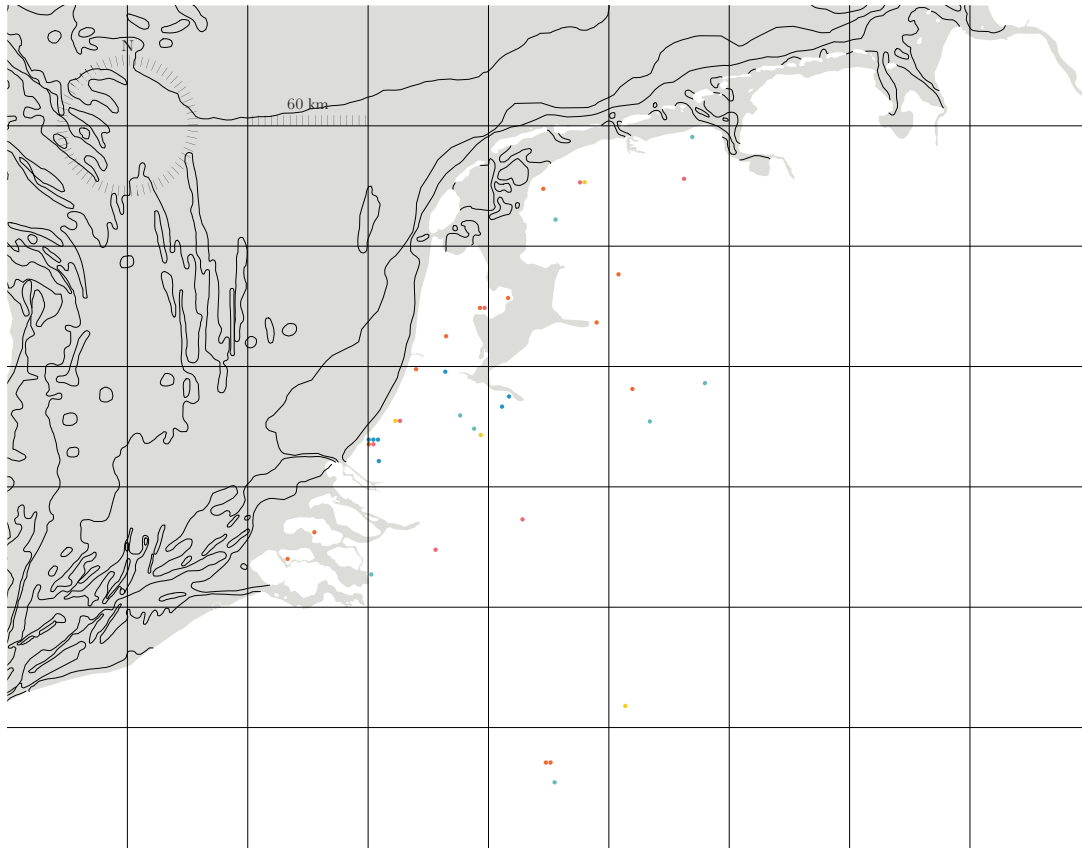


- < 1800
- 1800 - 1945 war / authority
- 1800 - 1945 culture / science
- 1800 - 1945 others
- WWII
- > 1945

grave Willem van Oranje (Delft)
 Graaf Adolffmonument (Heiligerlee) / Belgenmonument (Amersfoort) /
 Pyramide van Austerlitz
 statue Frans Hals (Haarlem) / Rembrandt (Amsterdam) / Hugo de Groot
 (Delft)
 Monument voor het Reddingswezen (Den Helder) / Monument voor
 scheiding Maas en Waal (Poederloijenschoek)
 Kamp Westerbork (Hooghalen) / Anne Frank House (Amsterdam) /
 National Monument (Amsterdam)
 Nationaal Monument Watersnood (Ouwkerk)

HERITAGE

power and authoritative heritage

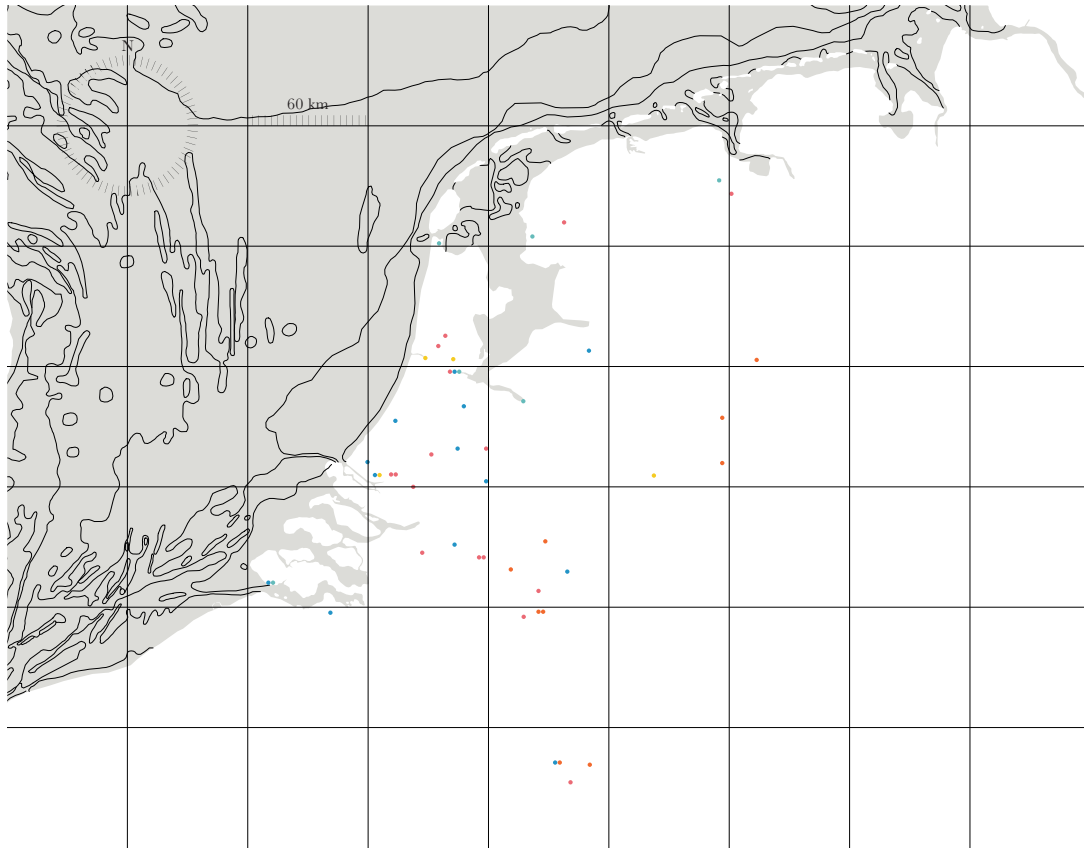


- royal
- nobility
- country houses
- political
- justice
- prisons

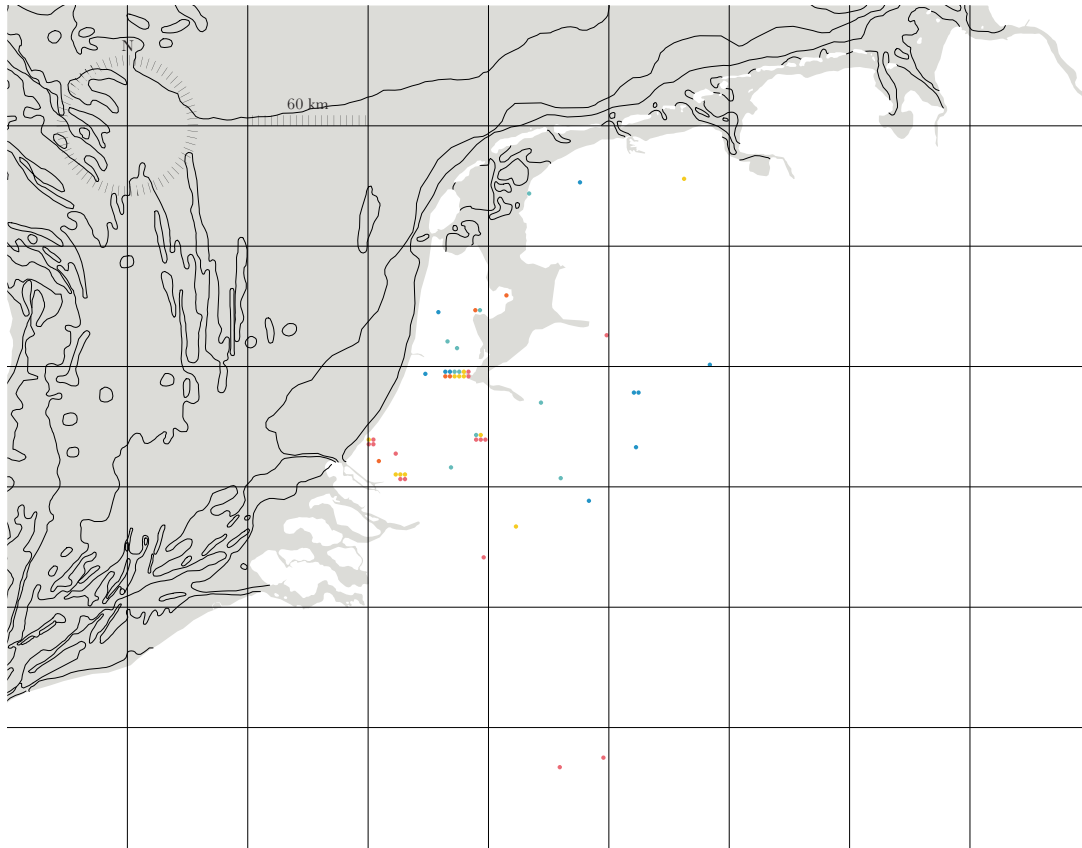
Kasteel Drakensteyn (Lage Vuursche) / Paleis op de Dam (Amsterdam) / Paleis Soestdijk (Baarn) / Paleis Noordeinde (The Hague)
 Kasteel Eijsden (Laag-Caestert) / Kasteel Nijenrode (Breukelen) / Slot Zuylen (Oud-Zuilen)
 Jachthuis Sint Hubertus (Hoenderloo) / Trompenburgh ('s-Graveland) / Kasteel Groeneveld (Baarn)
 city hall (Kampen / Enkhuizen / Weesp / Veere / Maastricht) / Binnenhof (The Hague)
 Paleis van Justitie (Leeuwarden)
 Mesdagkliniek (Groningen) / Blokhuispoort (Leeuwarden) / Koepelgevangenis (Breda)

HERITAGE

industrial heritage



■ crafts	Touwslagerij Deetman (Elburg) / distilleries (Schiedam)
■ shipyards	Rijkswerf Willemsoord (Den Helder) / NDSM werf (Amsterdam) / Nieuwboer shipyard (Spakenburg)
■ water mills	Kilsdonkse molen (Beugt) / Venbergse Watermolen (Valkenswaard)
■ corn mills	Zaanse Schans (Zaandam) / De Grafelijke Korenmolen (Zeddam)
■ factories	Van Nellefabriek (Rotterdam) / Tonnemafabriek (Sneek) / Zeepezierij De Adelaar (Wormerveer)

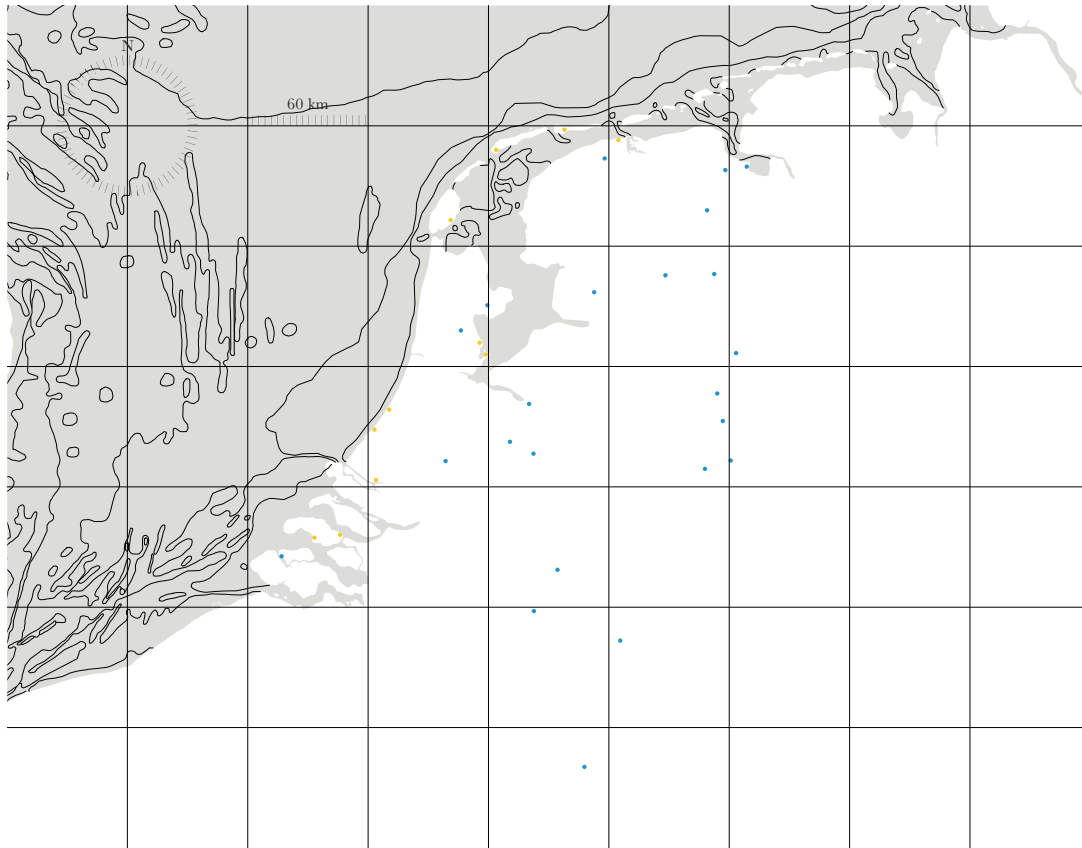


- markets
- warehouses
- VOC / WIC
- shops / offices
- financial

Waag (Deventer / Doesburg / Leeuwarden / Nijmegen) / fish market (Alkmaar)
 Het Arsenal (Amsterdam) / Werfkelders (Utrecht) / Stadskorenpakhuys
 (Schoonhoven)
 Peperhuis (Enkhuizen) / Oost and West Indisch Huis (Amsterdam / Delft)
 De Bijenkorf (Amsterdam) / De Passage (The Hague) / Lijnbaan (Rotterdam) / De
 Inkpot (Utrecht) / Scheepvaarthus (Amsterdam)
 Koninklijke Nederlandse Munt (Utrecht) / Beurs van Berlage (Amsterdam) /
 Munttoren (Amsterdam)

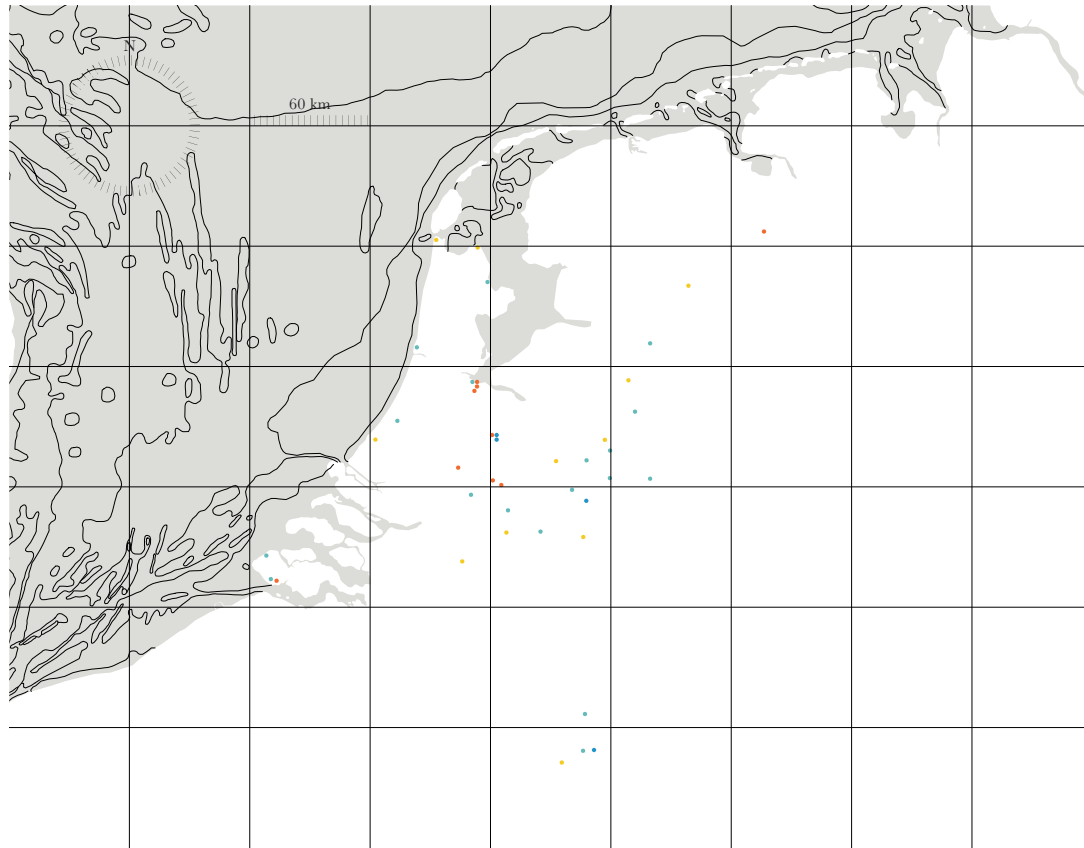
HERITAGE

agricultural heritage



- farms Oldambtster boerderij Duurswold (Schildwolde) / De Barmhartige Samaritaan (Hoorn) / Stolpboerderij De Eenhoorn (Middenbeemster)
- fishery Het Wakend Oog (Terschelling) / fishers village (Schokland / Marken / Volendam)

HERITAGE
defence heritage

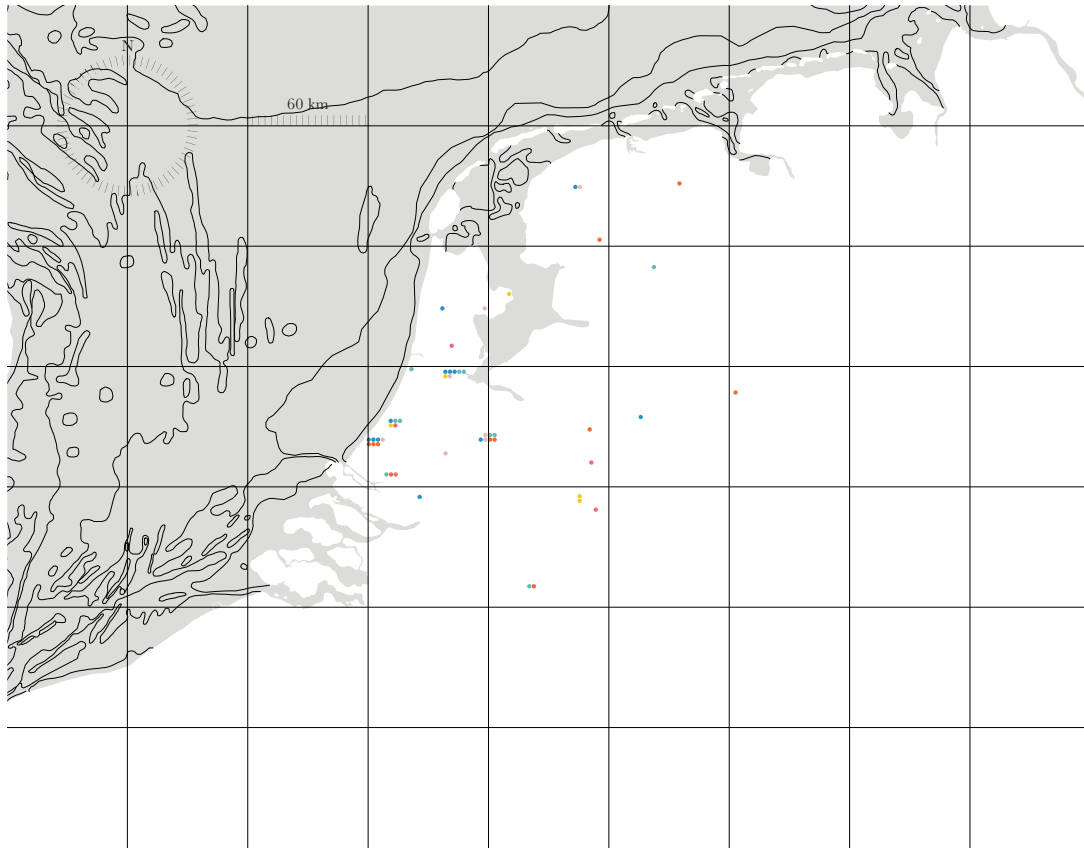


- Roman
- medieval
- fortified towns / water defence lines
- WWII / Cold War

- Castellum Traiectum (Utrecht)
- Burcht Leiden / Kasteel Valkenburg / Ringwalburg (Oost Souburg)
- Bourtange / Nieuwpoort / forts (IJmuiden / Abcoude / Muiden / Utrecht)
- IJssellinie (Olst) / Atlantikwall (Scheveningen / Kijkduin) / Kamp Vught

HERITAGE

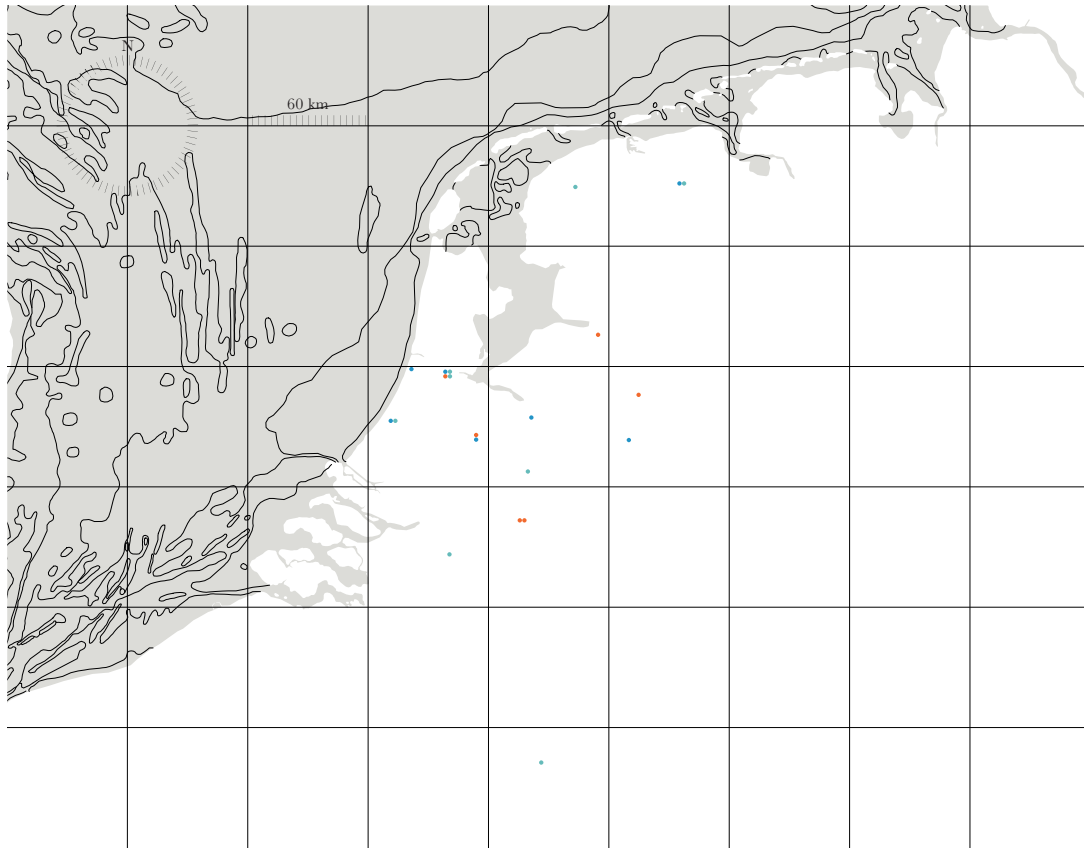
collected heritage



■ books / documents	De Librije (Zutphen) / Bibliotheca Thysiana (Leiden) / Handelingenkamer (The Hague)
■ natural history / science	Teylers Museum (Haarlem)
■ art	Gemeentemuseum (The Hague) / Panorama Mesdag (The Hague) / Kröller-Müller (Otterlo)
■ antiquities / history	Rijksmuseum van Oudheden (Leiden) / Joods Historisch Museum (Amsterdam)
■ ethnology	Wereldmuseum (Rotterdam) / Tropenmuseum (Amsterdam)
■ others	Rijksmuseum (Amsterdam)

HERITAGE

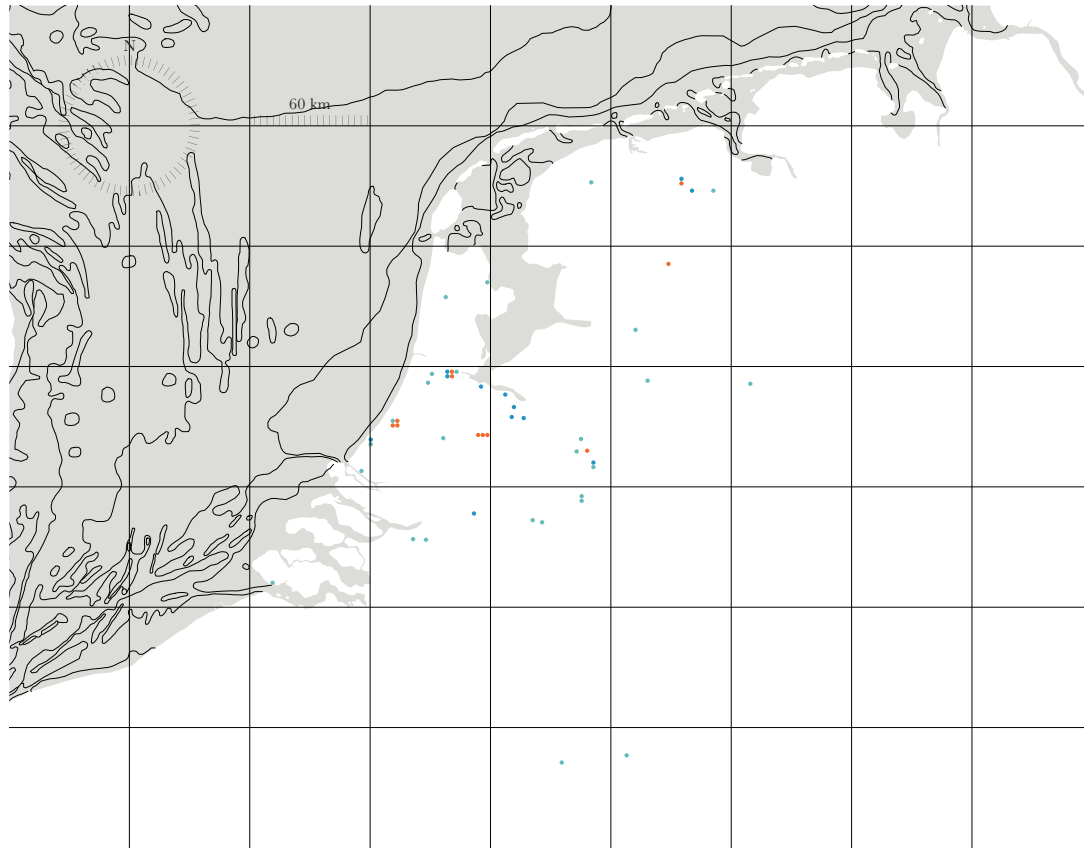
healthcare heritage



- courtyards Schweer bey der Beckehof (Dieren) / De Armen de Poth (Amersfoort) / Deutzenhofje (Amsterdam)
- orphanages Nieuw Burgerweeshuis (Amsterdam) / Gereformeerd Weeshuis (Maastricht) / Koninklijk Weeshuis (Buren)
- hospitals Stichting Engelenberg (Kampen) / Sint Joannes de Deo (Utrecht)

HERITAGE

educational and scientific heritage



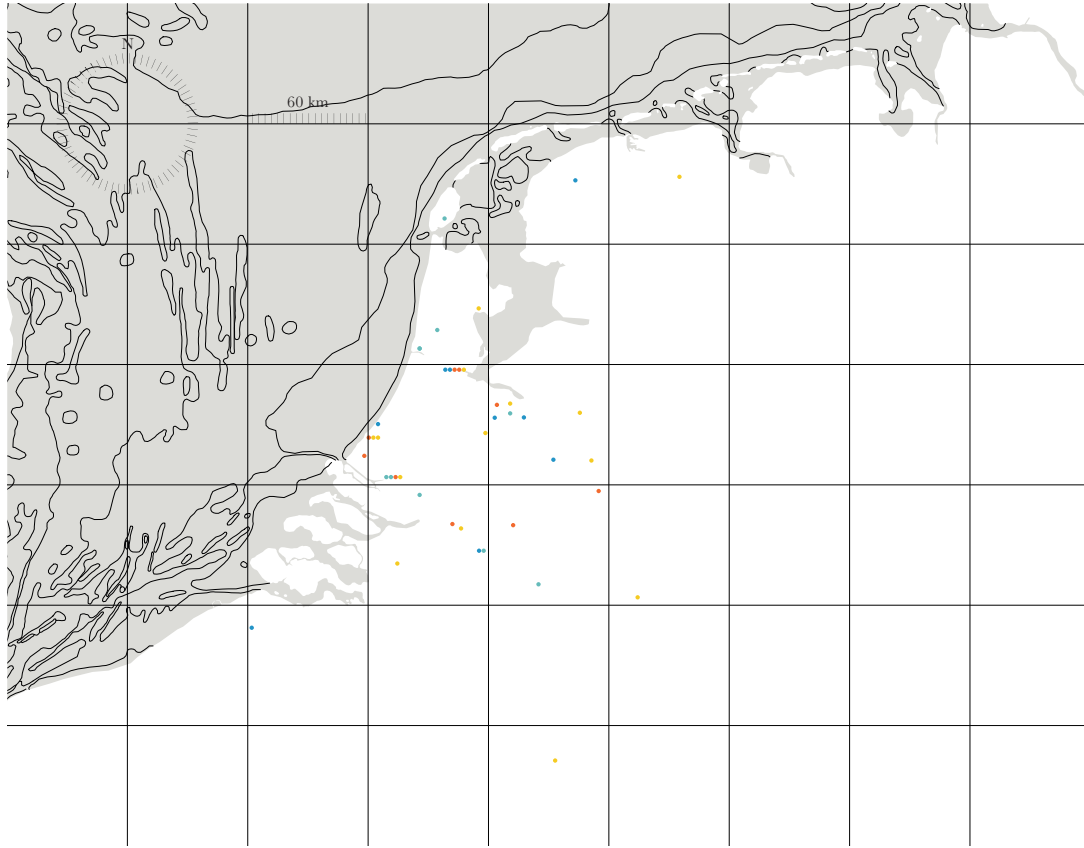
- primary education
- secondary
- academia / science

Siebe Jan Boumaschool (Groningen) / Eben Haezer (Abcoude) / Witte School (Arnhem)
Abdij Rolduc (Kerkrade) / Instituut Saint Louis (Oudenbosch) / College Hageveld (Heemstede)
Academiegebouw (Groningen / Leiden / Utrecht) / Hortus Botanicus (Leiden) / Oude Sterrewacht (Leiden)

40.

HERITAGE

utilitarian heritage

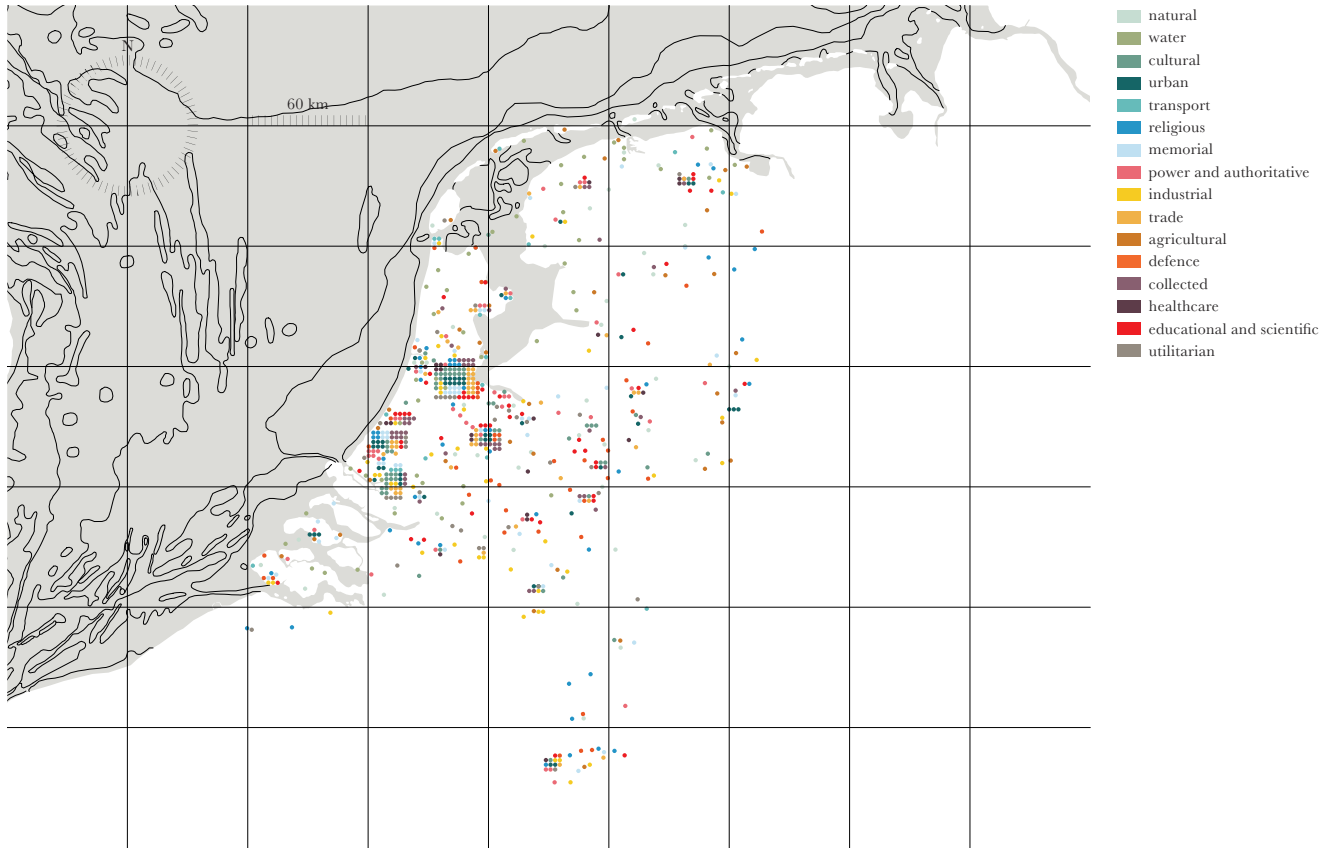


- fire fighting
- water supply
- power supply
- communication

Schipperplein (Scheveningen)
Wezenputten (Texel) / Waterleidingduinen (Zandvoort) / Watertoren (Soestdijk /
IJmuiden / Rotterdam / Dordrecht)
Westergasfabriek (Amsterdam) / Elektrisch onderstation (Beek) / Dongecentrale
(Geertruidenberg)
post office (Groningen / Amsterdam / Utrecht / The Hague / Arnhem / Rotterdam) /
Radiozendstation Kootwijk / Telefooncentrale Eemnesserweg (Baarn)

41.

HERITAGE
total

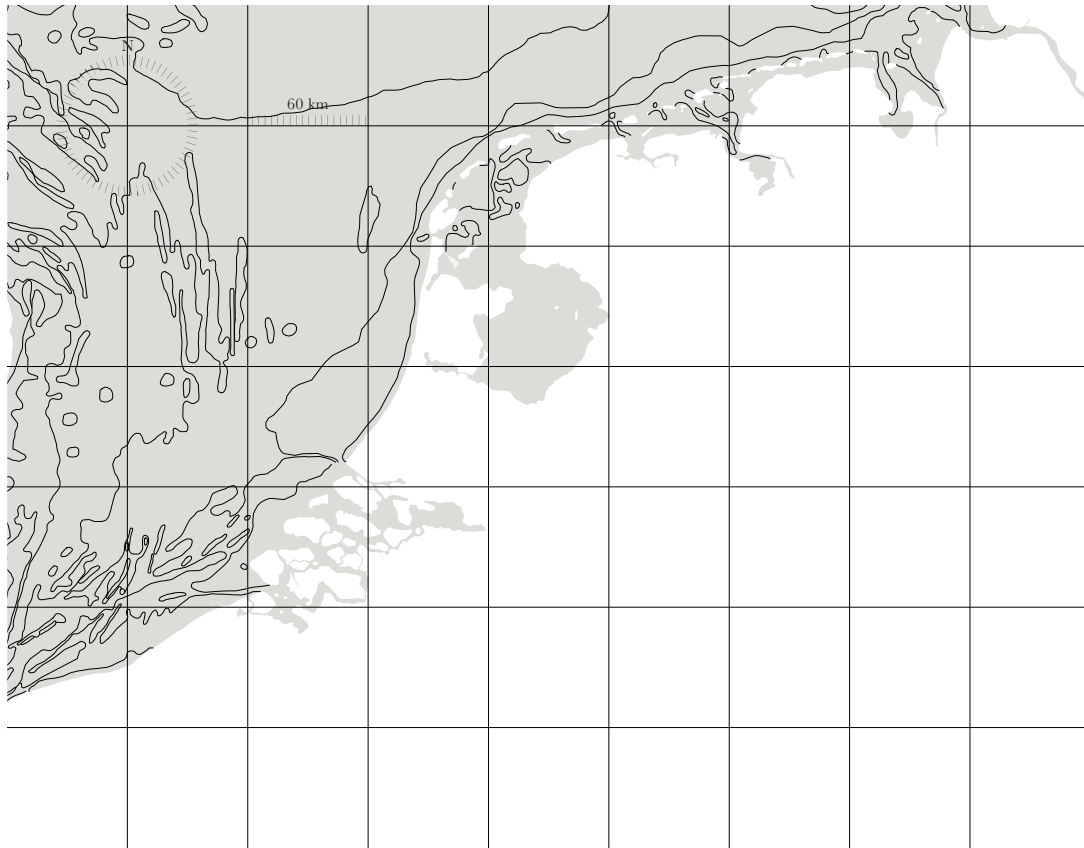


42.

COASTLINE SHORTENING

year 1500 / 2600 km long

modified from Vos and De Vries 2013

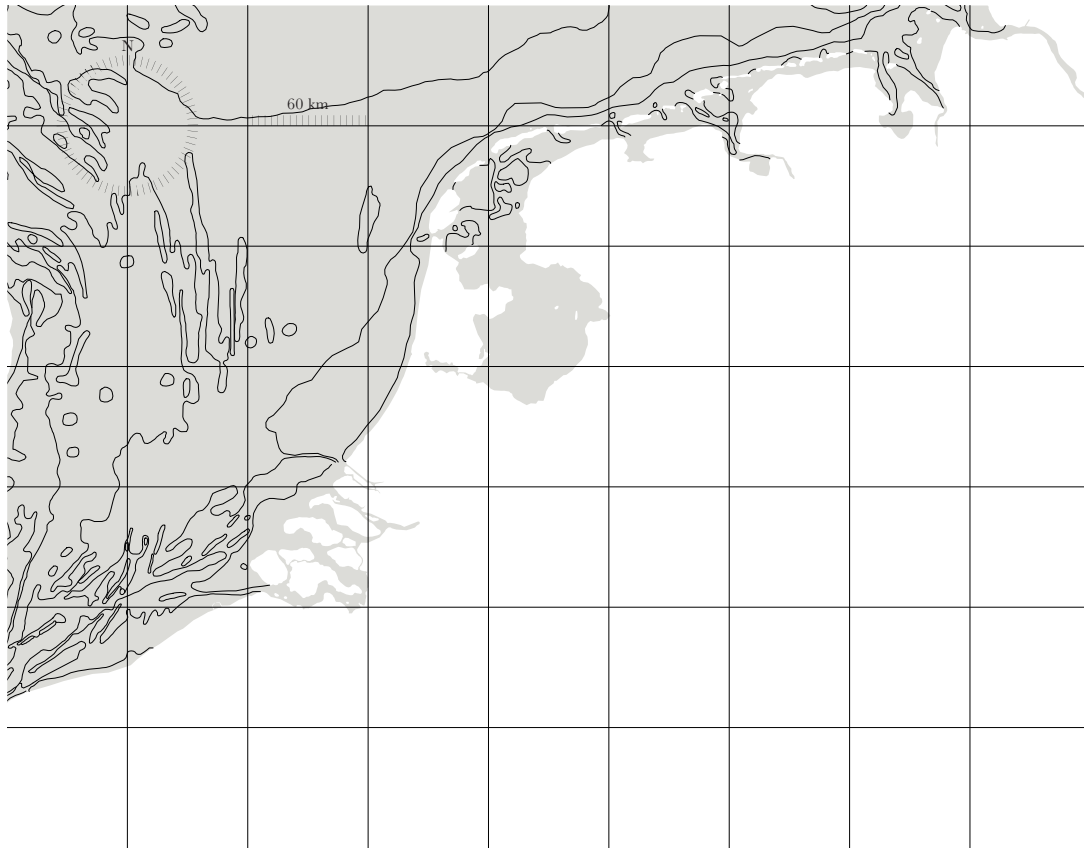


43.

COASTLINE SHORTENING

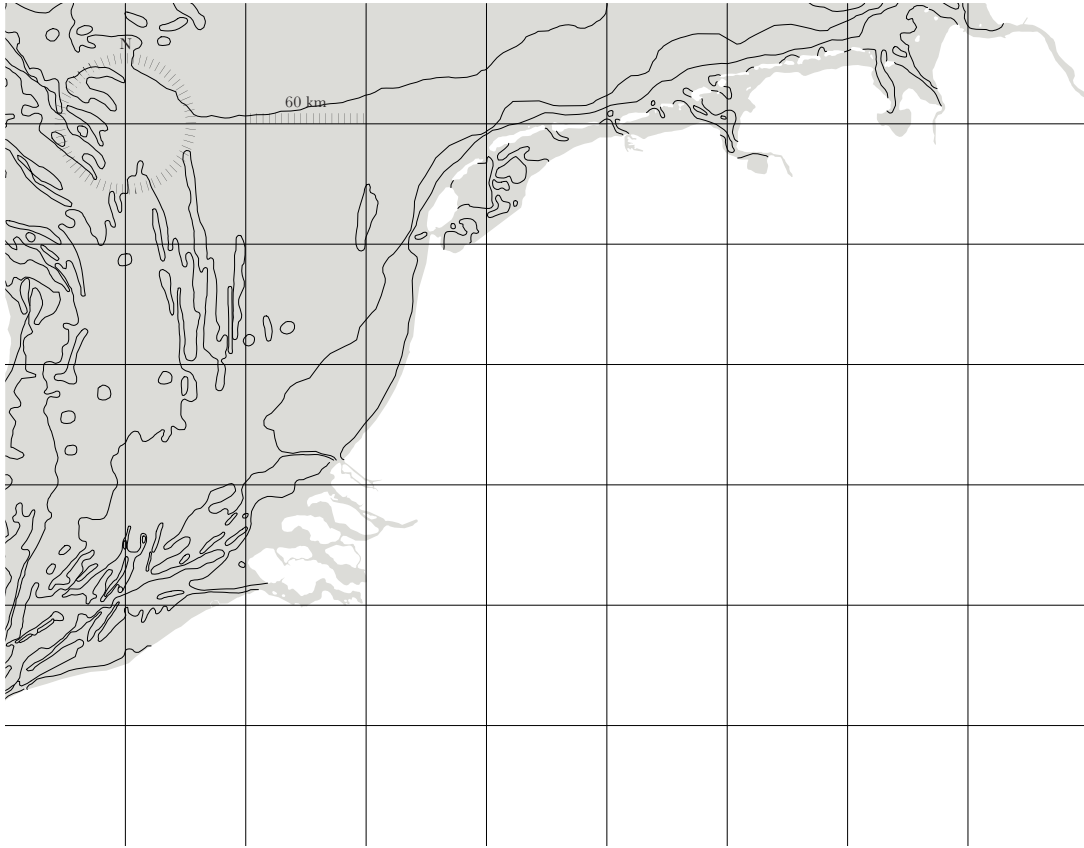
year 1850 / 2100 km long

modified from Vos and De Vries 2013



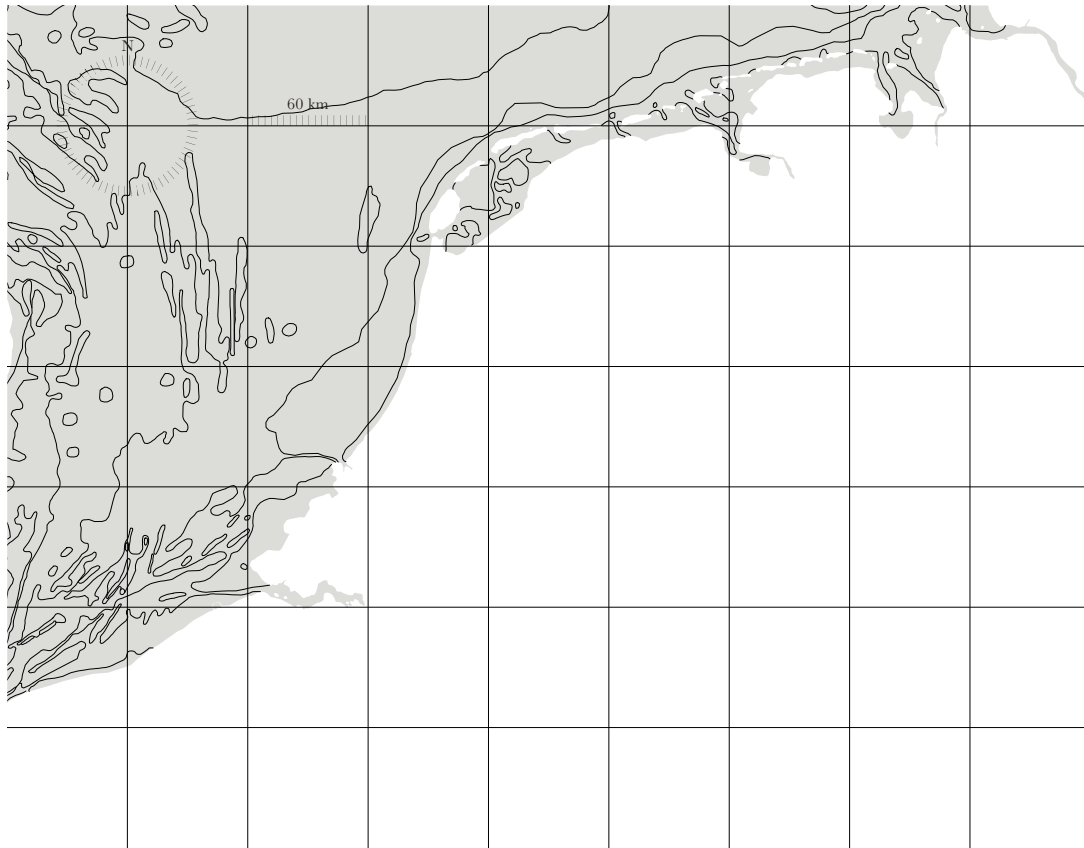
44.

COASTLINE SHORTENING
year 1950 / 1600 km long
modified from Vos and De Vries 2013



45.

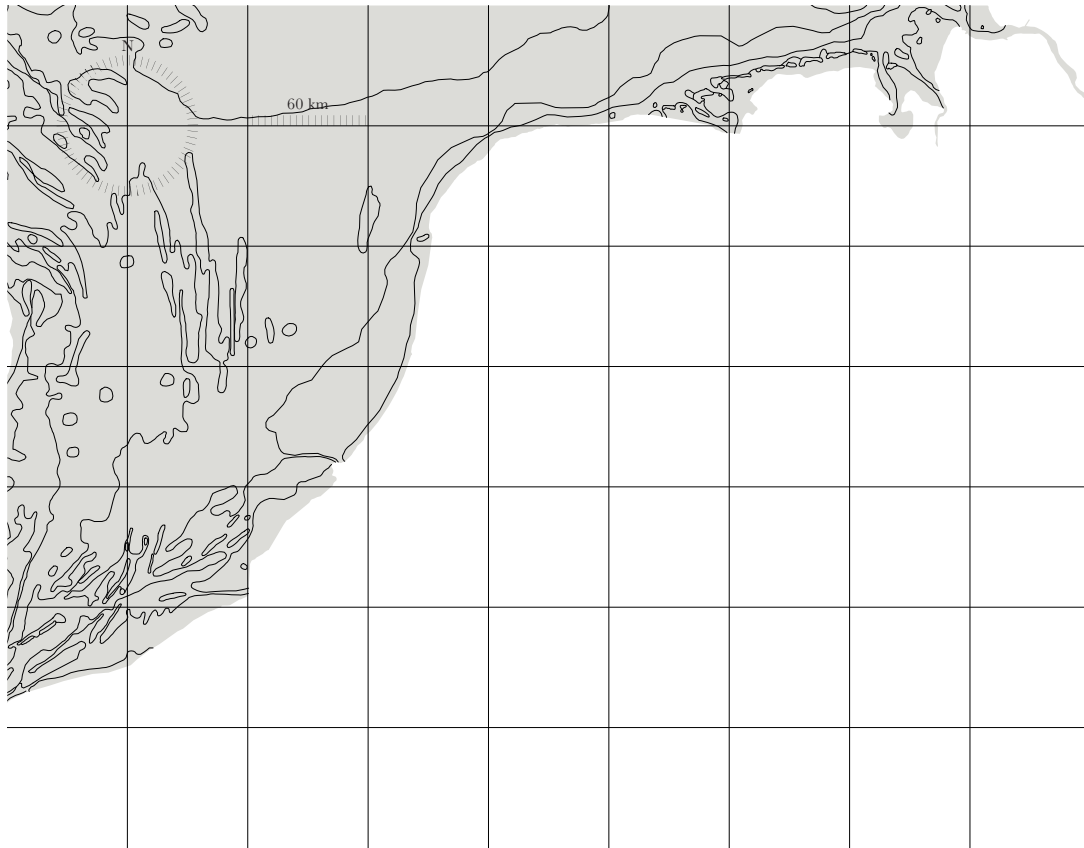
COASTLINE SHORTENING
year 2018 / 880 km long
modified from Vos and De Vries 2013



46.

COASTLINE SHORTENING

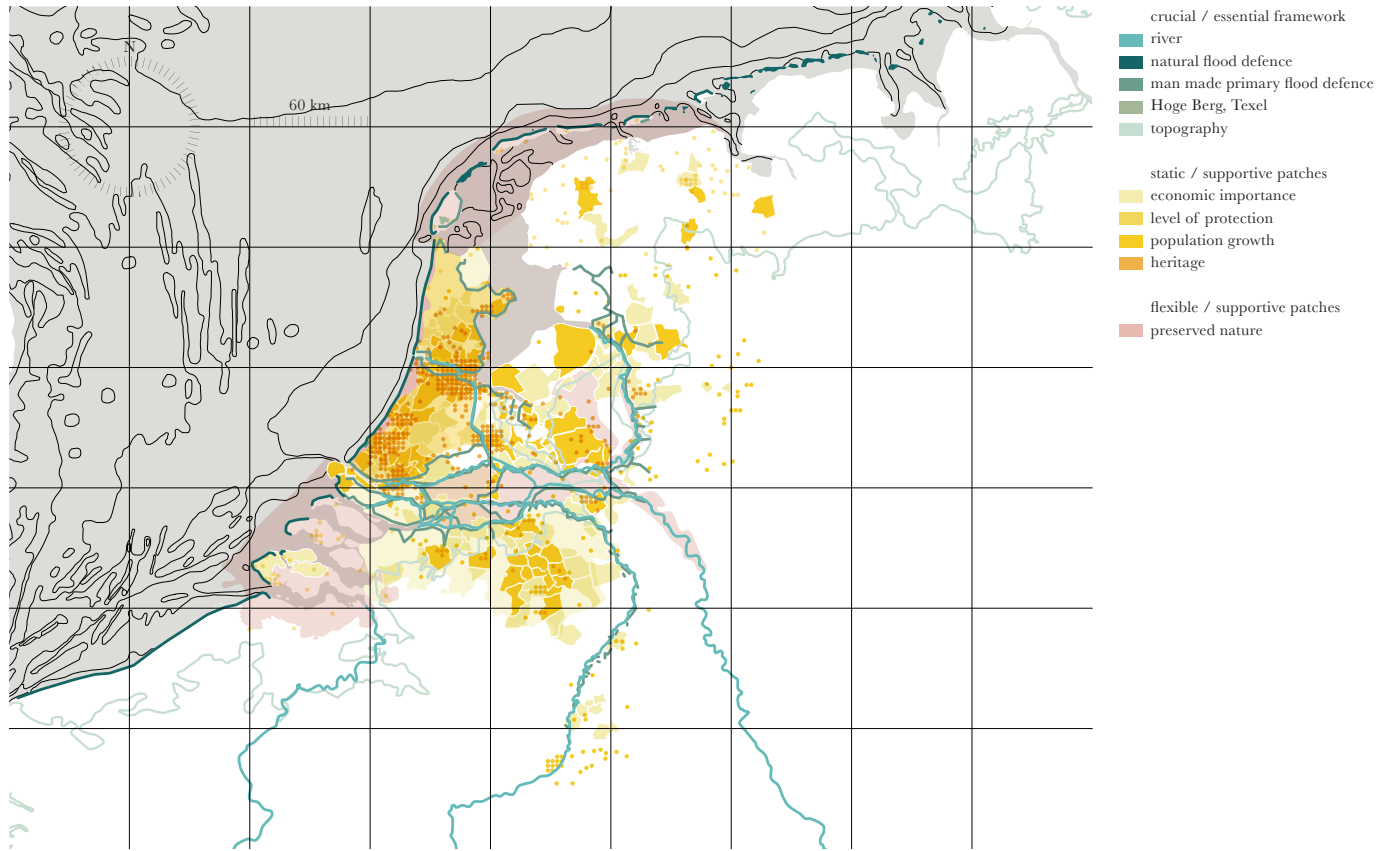
potential shortening 450 km

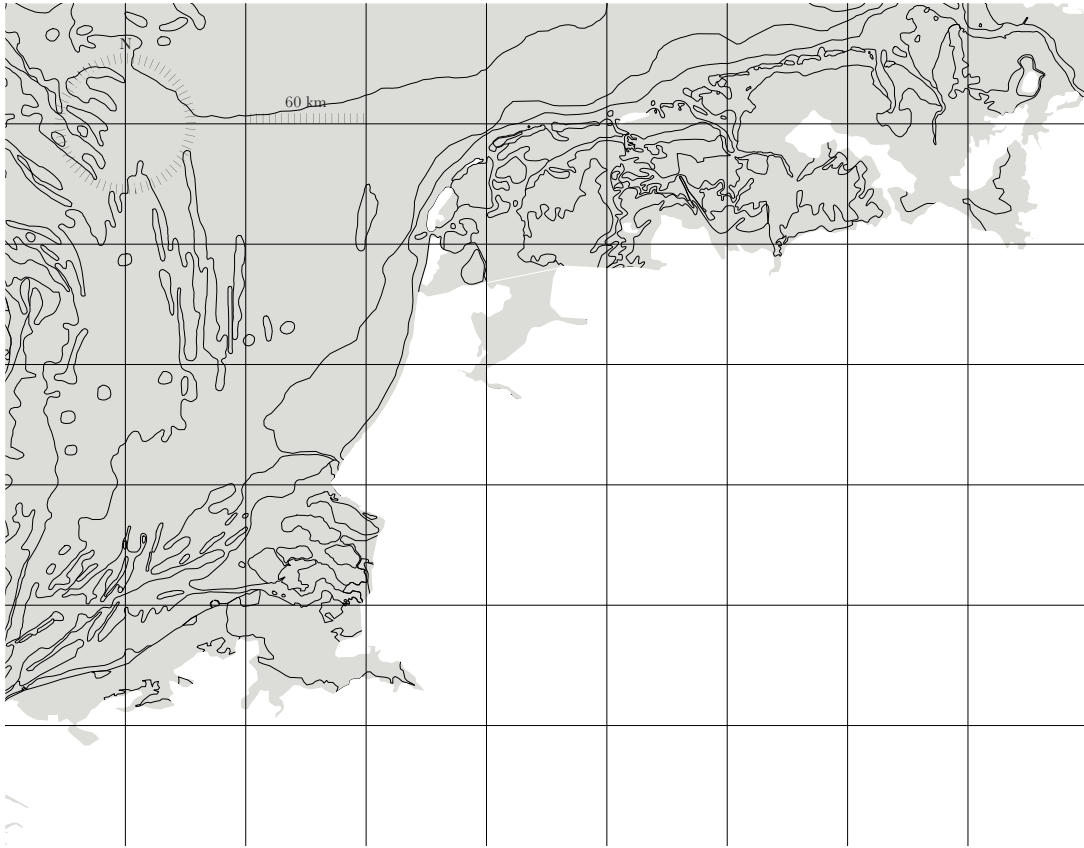


47.

PRIORITISATION

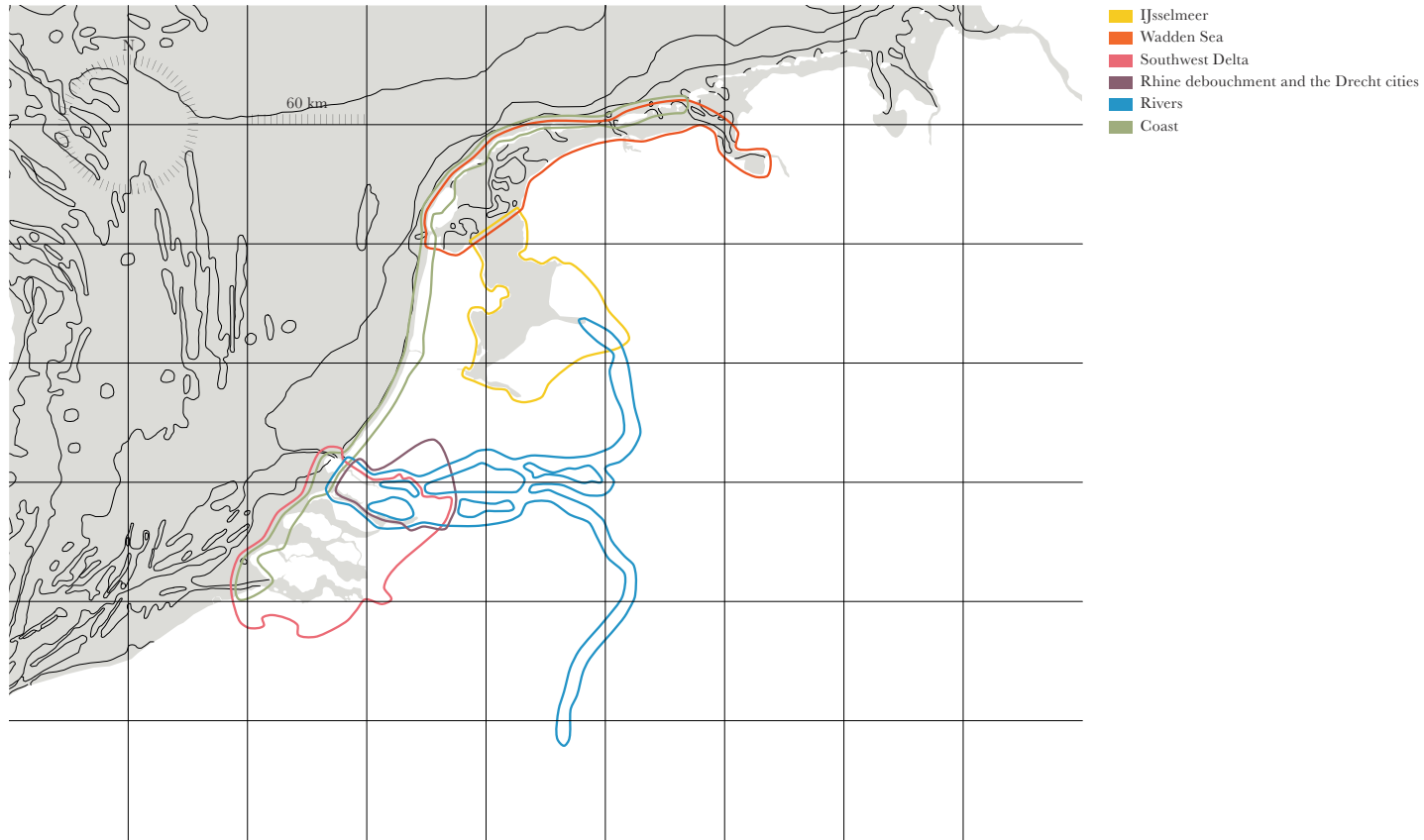
Dutch layers approach / casco concept applied



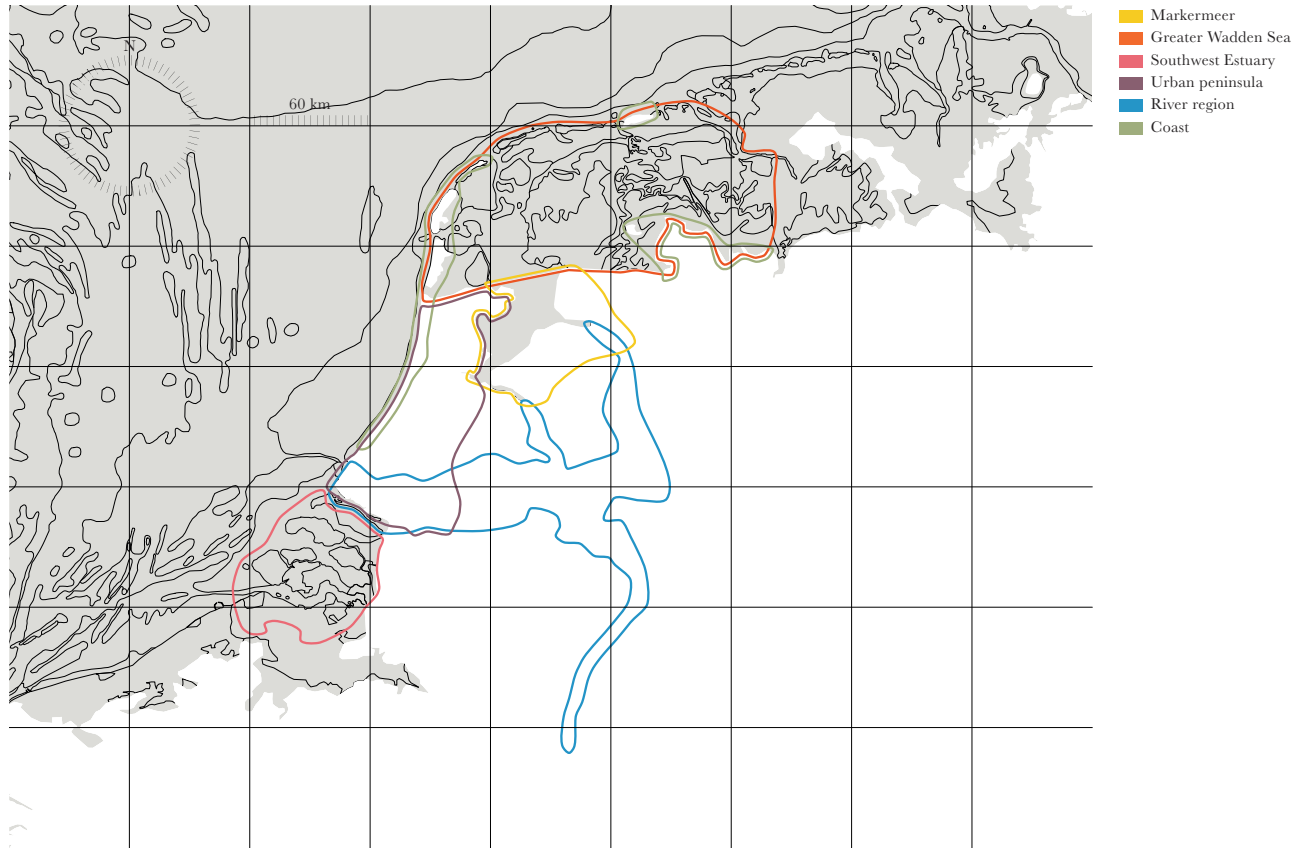


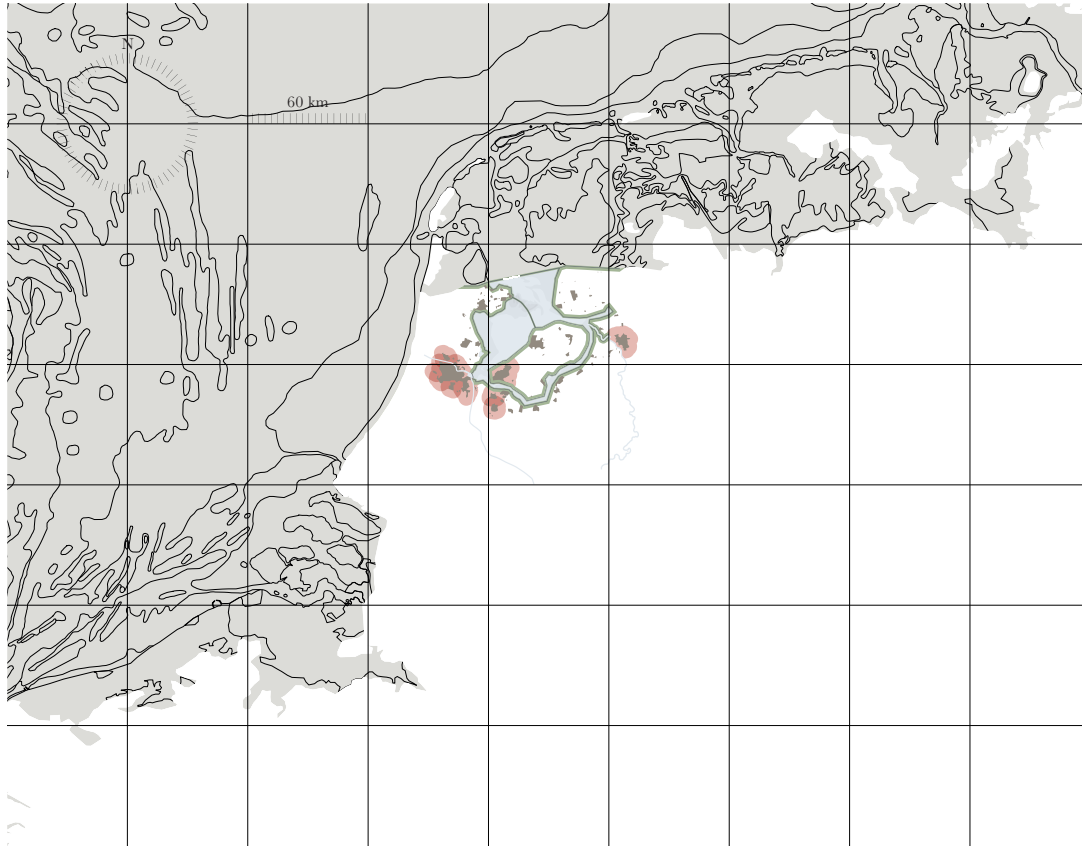
THE NEW NETHERLANDS
current Delta Programme regions

modified from Delta Commissaris 2016



THE NEW NETHERLANDS
revised Delta Programme regions





IJsselmeer

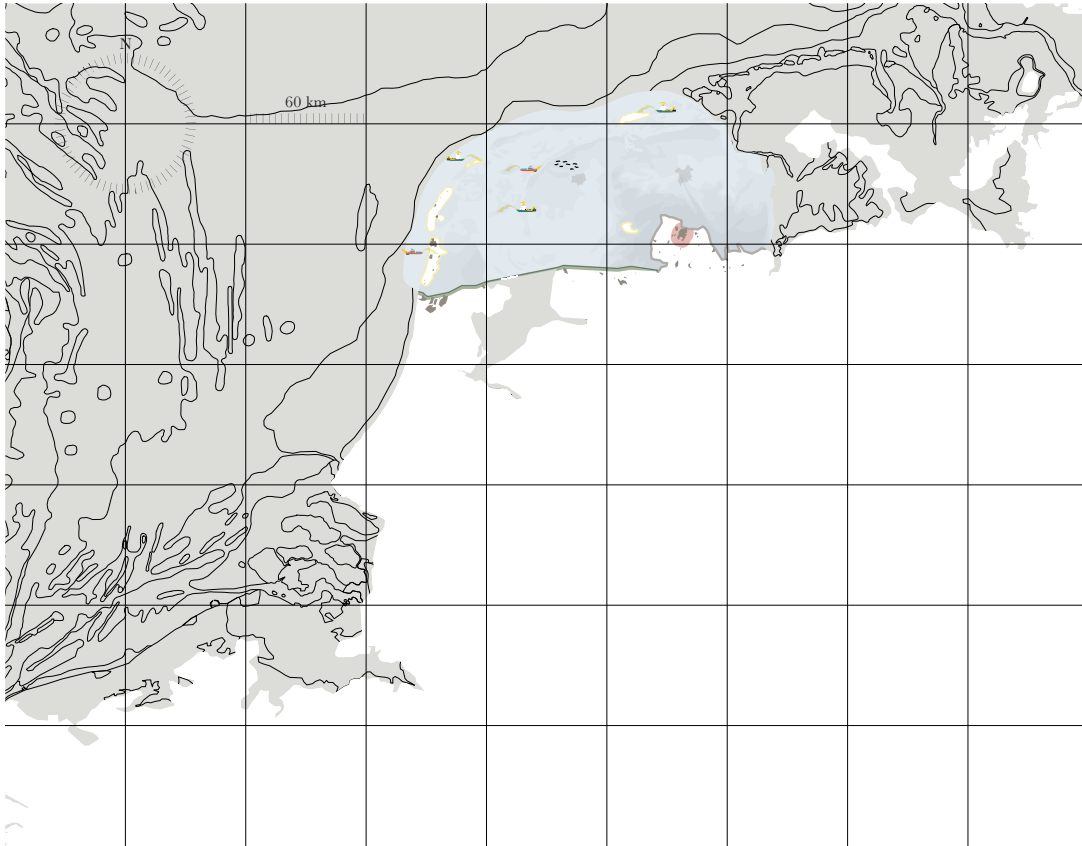
- ~ maintenance, improvement and standardisation of flood defences
- ~ control of lake water level

Markermeer

- ~ maintenance, improvement and standardisation of flood defences
- ~ innovation and integration of dikes
- ~ control of lake water level
- ~ enlargement of storage capacity
- ~ implementation of pump capacity
- ~ relocation of the Afsluitdijk

THE NEW NETHERLANDS

Wadden Sea - Greater Wadden Sea



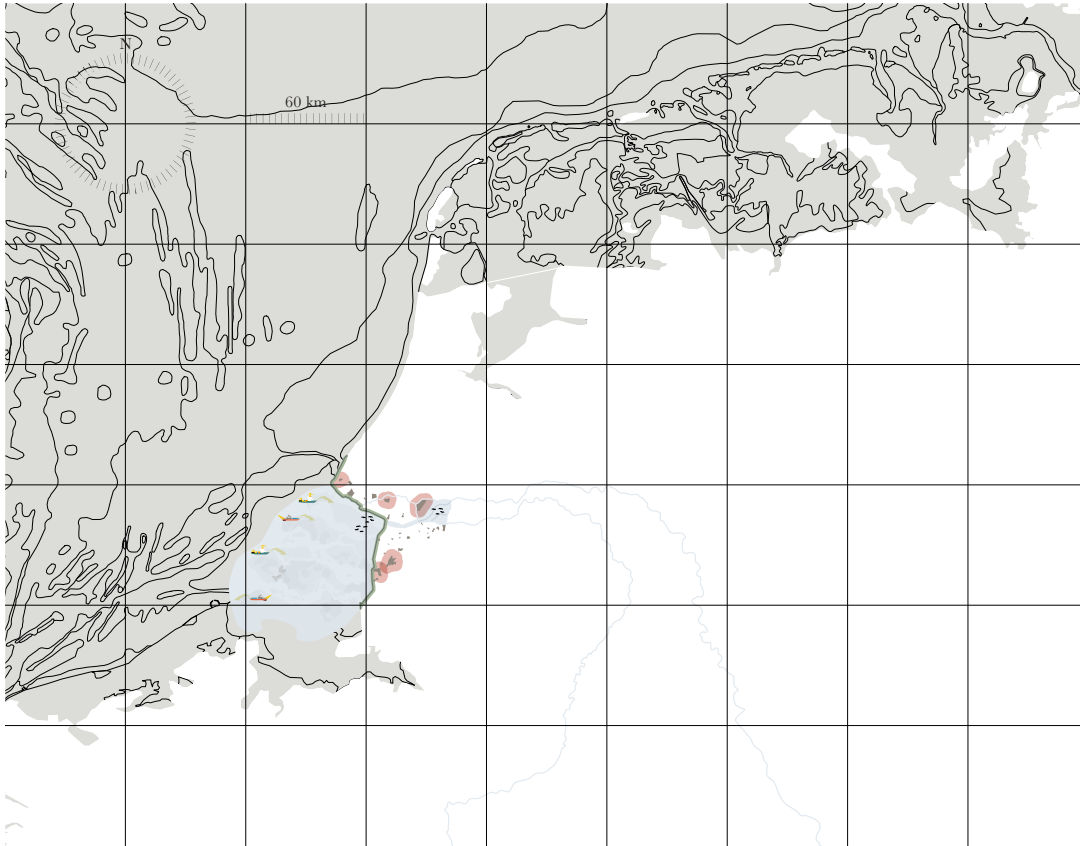
Wadden Sea

- ~ impact assessment of increasing security norms
- ~ climate change consequences assessment
- ~ climate resiliency assessment of outerdike regions
- ~ reducing wave energy
- ~ coastal- and island management
- ~ innovation of dikes
- ~ control and management of sedimentation
- ~ maintenance of natural system

Greater Wadden Sea

- ~ impact assessment of decreasing security norms
- ~ climate change consequences assessment
- ~ reducing wave energy
- ~ coastal- and island management
- ~ innovation and integration of dikes
- ~ control and management of sedimentation
- ~ maintenance of natural system
- ~ facilitation of the new shore
- ~ aligning with German planning

THE NEW NETHERLANDS
Southwest Delta - Southwest Estuary



Southwest Delta

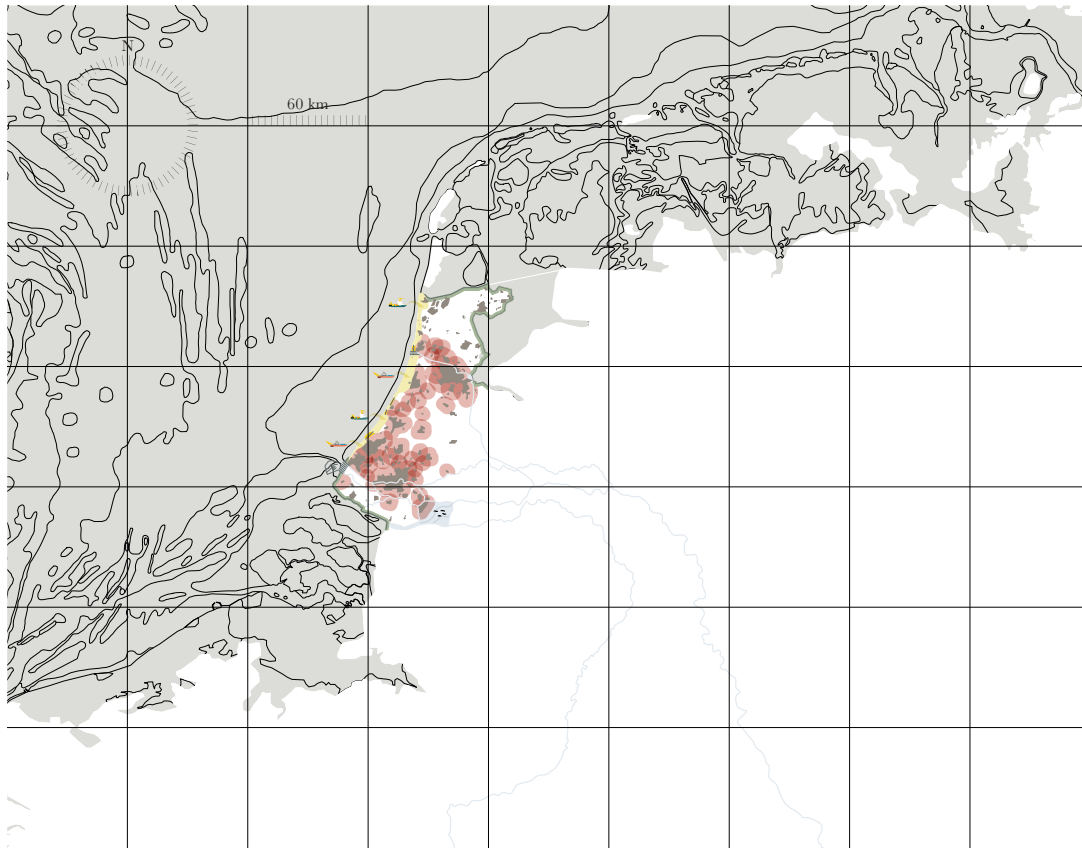
- ~ maintenance, improvement and standardisation of flood defences
- ~ spatial development
- ~ economic development
- ~ maintenance of natural system
- ~ control of salt intrusion

Southwest Estuary

- ~ maintenance, improvement and standardisation of flood defences
- ~ maintenance of natural system
- ~ control of salt intrusion
- ~ innovation and integration of dikes
- ~ reducing wave energy
- ~ control and management of sedimentation
- ~ facilitation of the new shore
- ~ maintenance of accessibility of the Port of Antwerp
- ~ aligning with Belgian planning

THE NEW NETHERLANDS

Rhine debouchment & Drecht cities - Urban peninsula

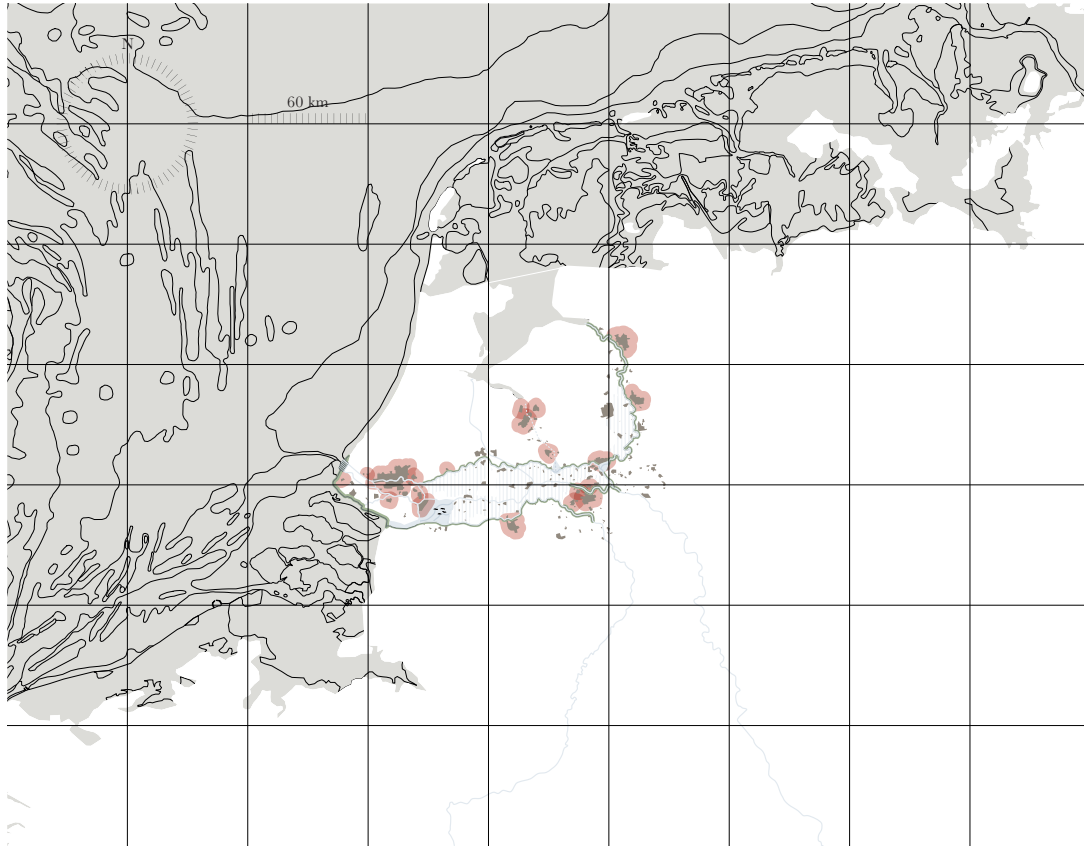


Rhine debouchment and the Drecht cities

- ~ maintenance, improvement and standardisation of flood defences
- ~ spatial development
- ~ economic development
- ~ international positioning
- ~ urban water management
- ~ anticipating to river discharge fluctuations

Urban peninsula

- ~ maintenance, improvement and standardisation of flood defences
- ~ innovation and integration of dikes
- ~ spatial development
- ~ economic development
- ~ international positioning
- ~ extreme urban water management
- ~ facilitation of higher population densities
- ~ maintenance of accessibility of the Port of Rotterdam
- ~ anticipating to river discharge fluctuations



Rivers

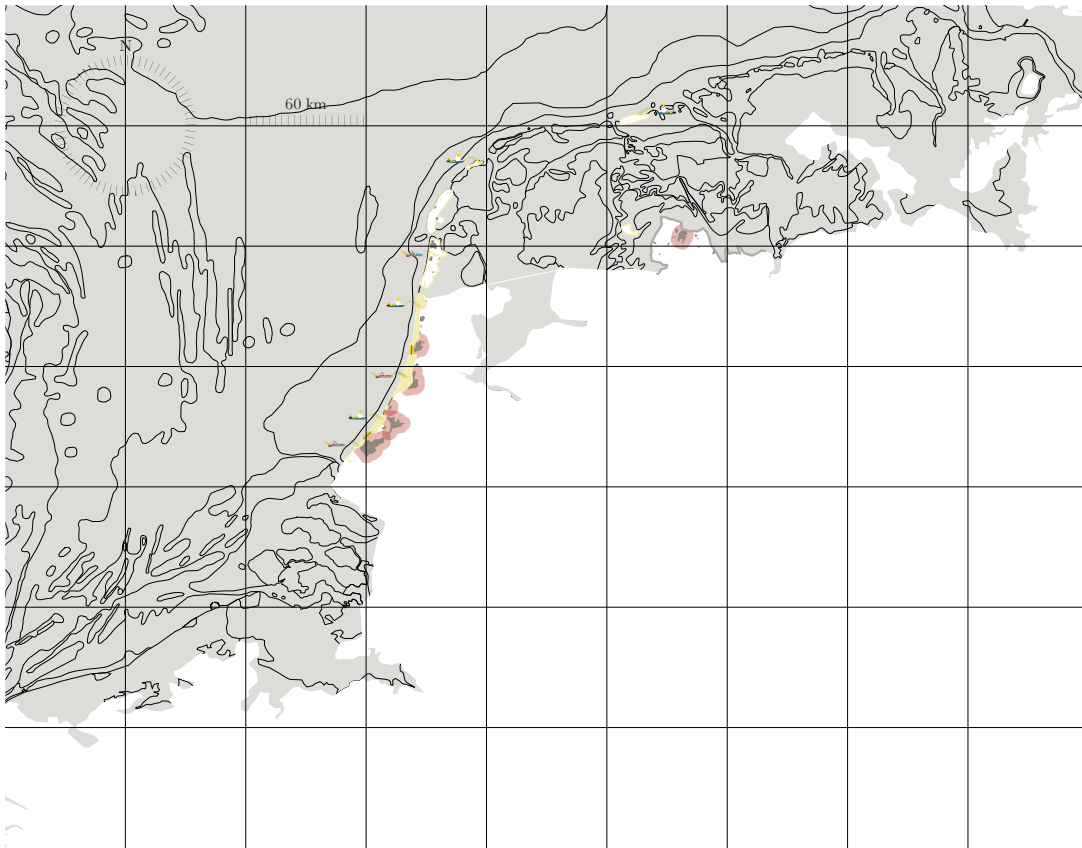
- ~ maintenance, improvement and standardisation of flood defences
- ~ spatial development
- ~ spatial quality assessment
- ~ maintenance of natural system
- ~ anticipating to river discharge fluctuations

River region

- ~ maintenance, improvement and standardisation of flood defences
- ~ innovation and integration of dikes
- ~ spatial development
- ~ spatial quality assessment
- ~ maintenance of natural system
- ~ anticipating to river discharge fluctuations
- ~ regulating river discharge division
- ~ facilitation of the Gelderse Valley flow path
- ~ enlargement of retention capacity
- ~ implementation of pump capacity

THE NEW NETHERLANDS

old coast - coast of the New Netherlands



Coast

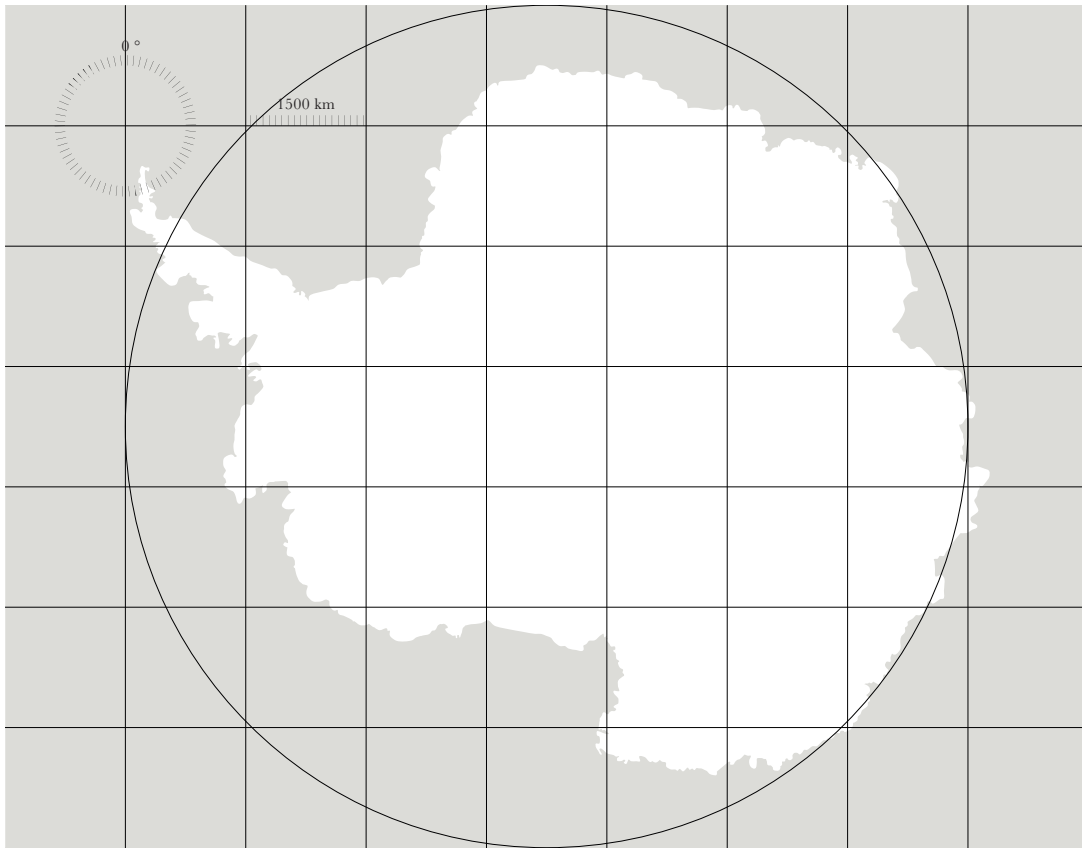
- ~ indication of weak links
- ~ beach nourishment

Coast of the New Netherlands

- ~ indication of weak links
- ~ dune management
- ~ beach nourishment
- ~ facilitation of the new shore

57.

ANTARCTICA



58.

ANTARCTICA
marine based ice

modified from National Snow & Ice Data Center 2018

