



enabling delta life



netherlands centre for coastal research



Rijkswaterstaat

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Spanjaards Duin

Morphological and ecological developments 2009-2021

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Compensation objectives: N2000 qualifying dune nature



6.1 ha Moist dune valley H 2190

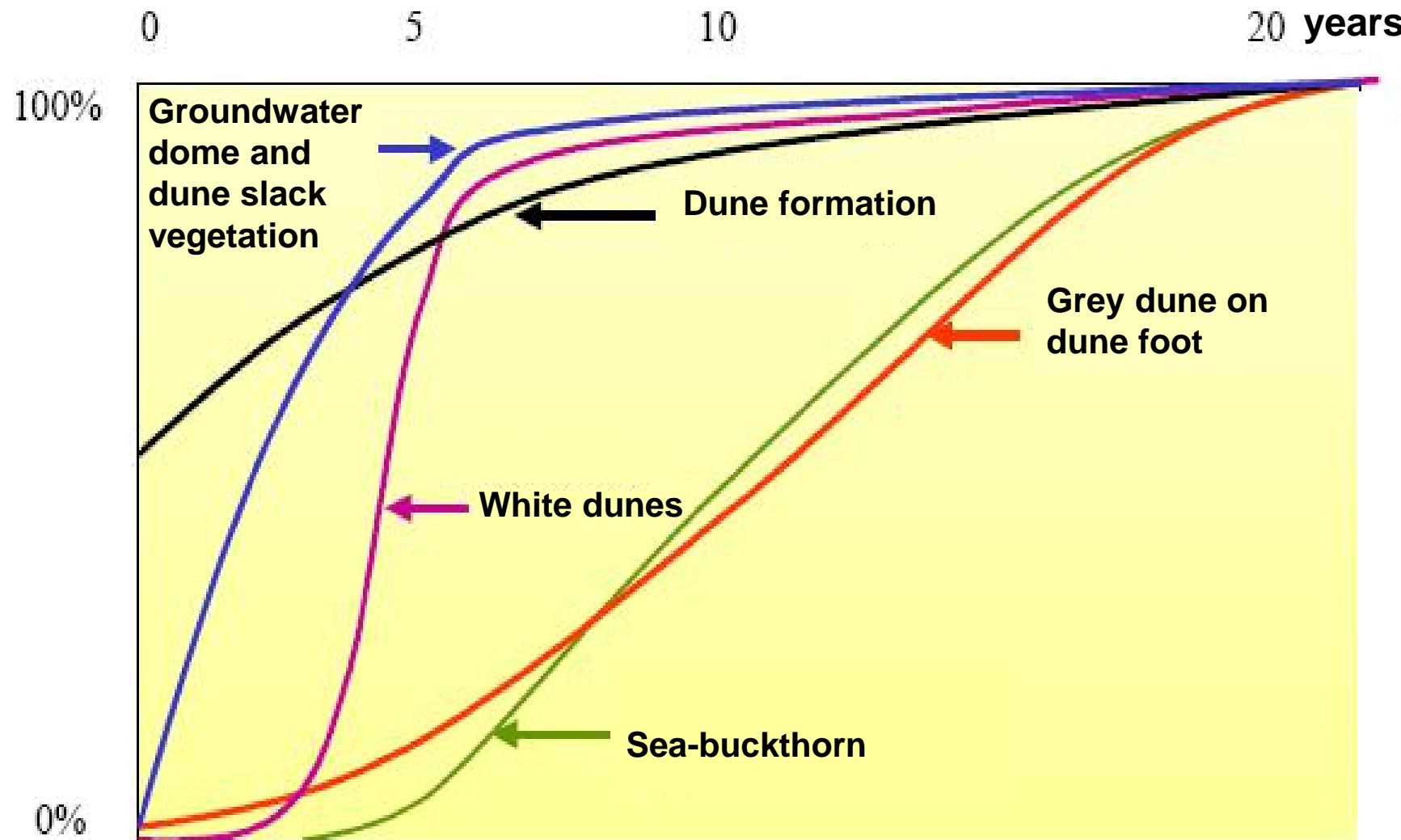


1 population of Fen orchid (*Liparis loeselii*)



9.8 ha Dry grey dune H 2130

Estimated development time beforehand



Situation in 2010 T=0

★ You are here



Situation now

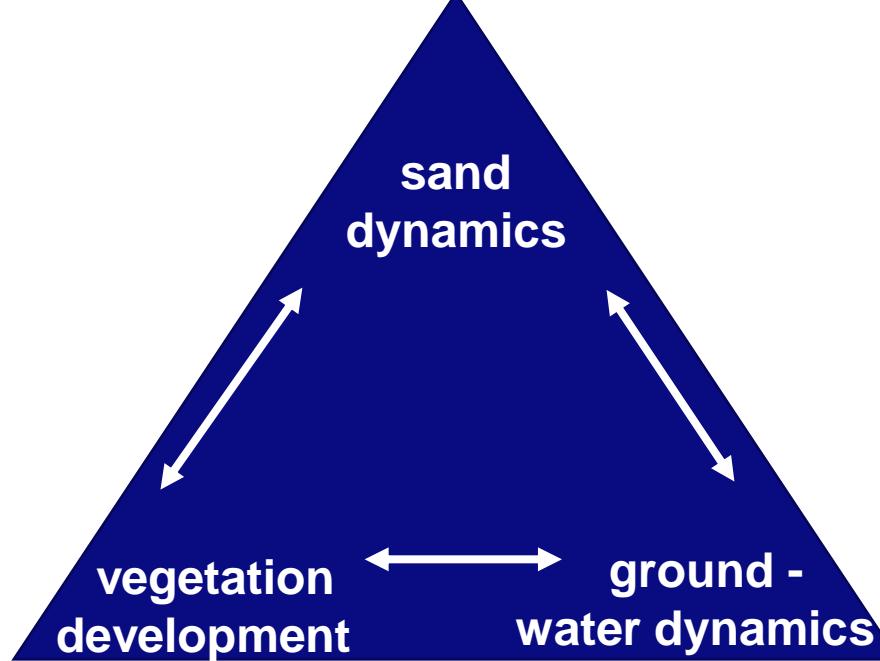
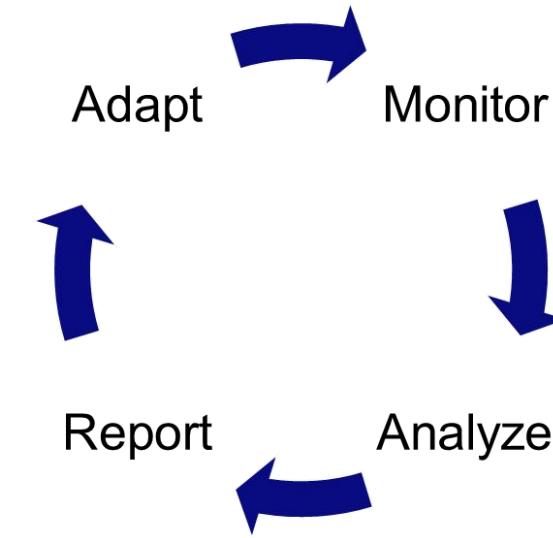
June '21



March 2021



Results monitoring 2009-2021



Morphodynamics



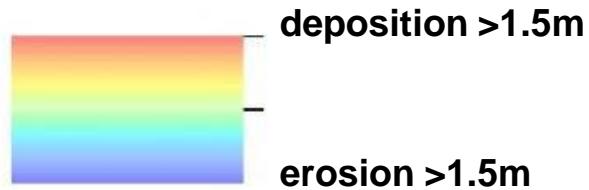
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Shell pavement

Erosion & accumulation

height difference



Note:

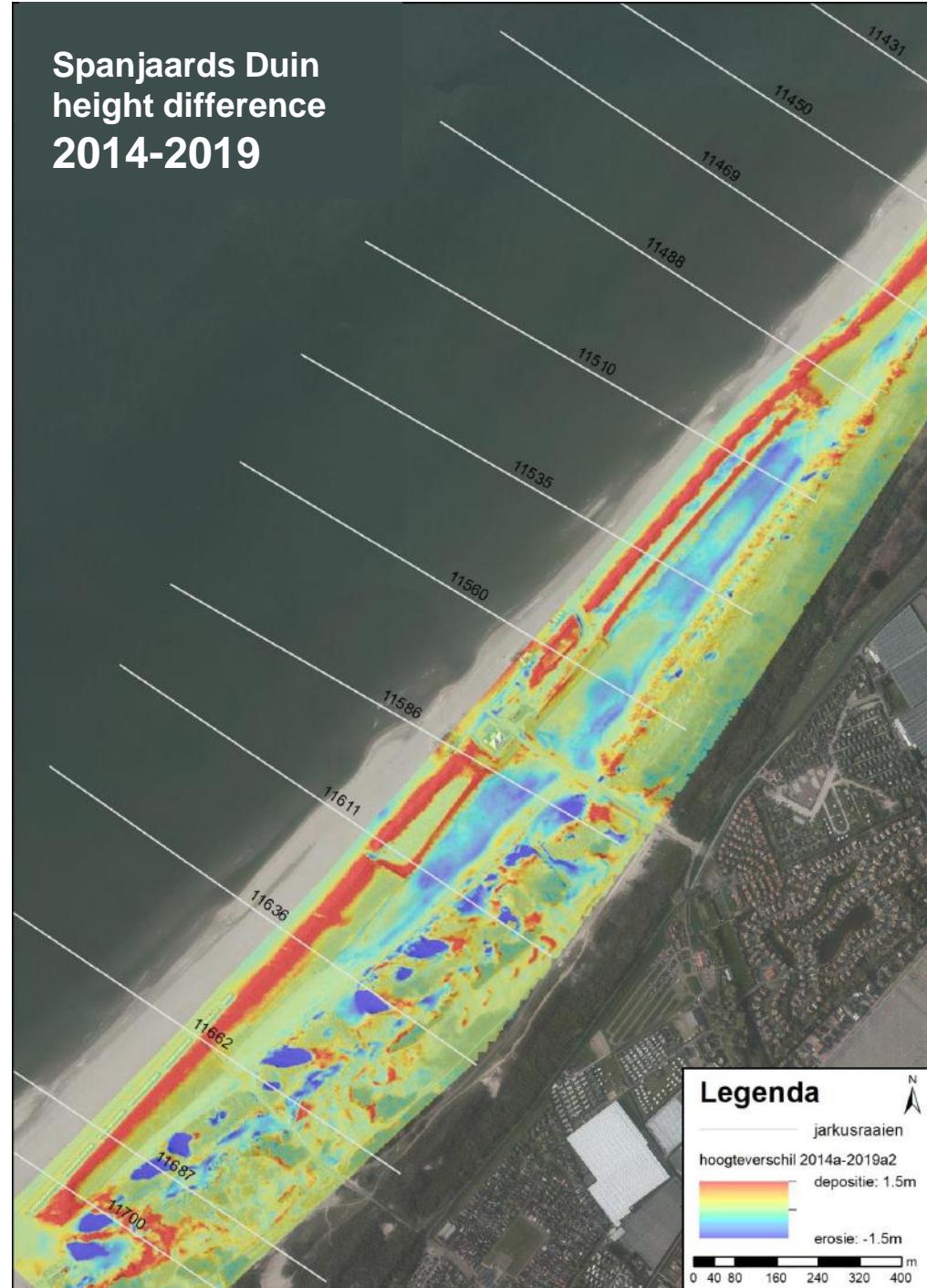
- Deposition new fore dune
- Valley acts as wind funnel
- Rejuvenation old fore dune

Deltares



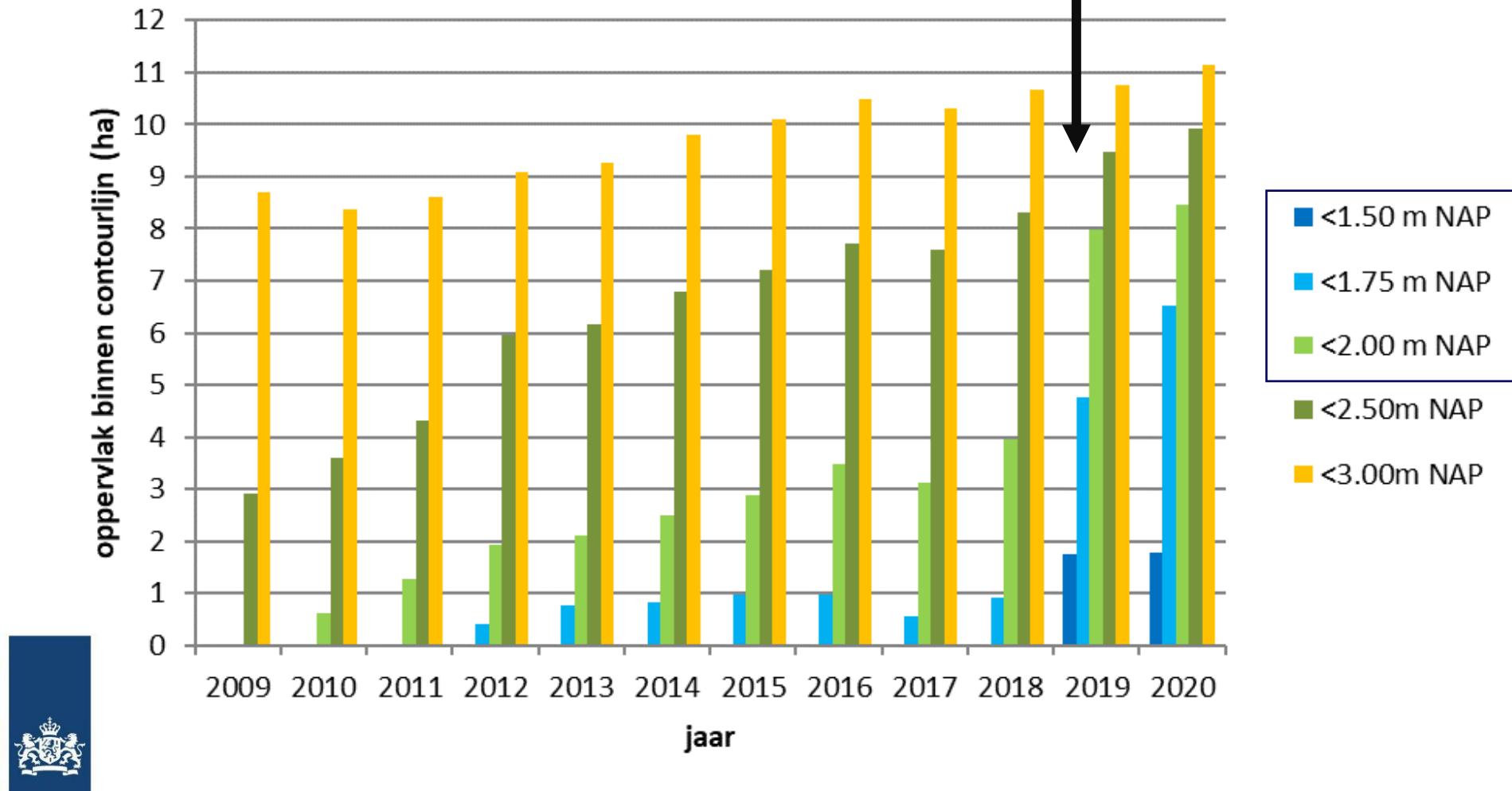
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Spanjaards Duin
height difference
2014-2019

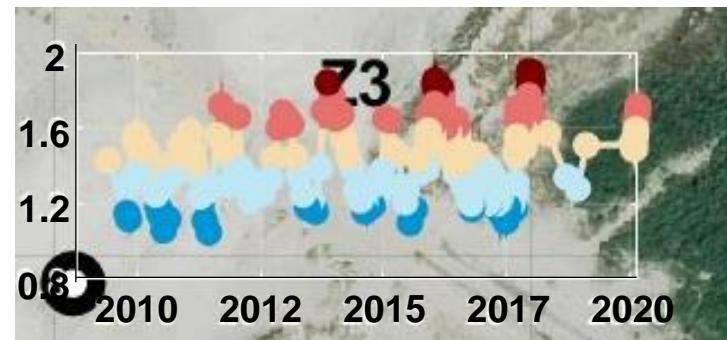
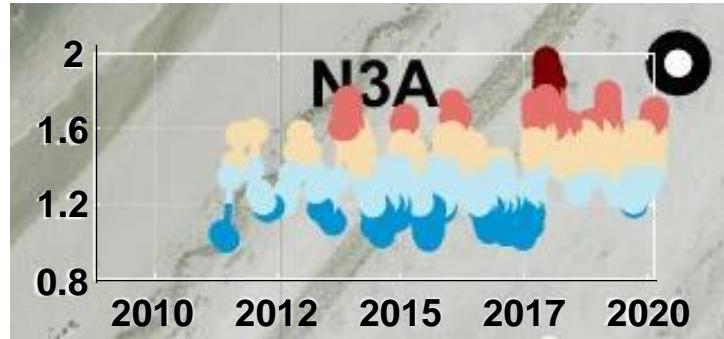


Large scale morphological development (especially in the valley)

Lowering of valley bottom



Ground water dynamics



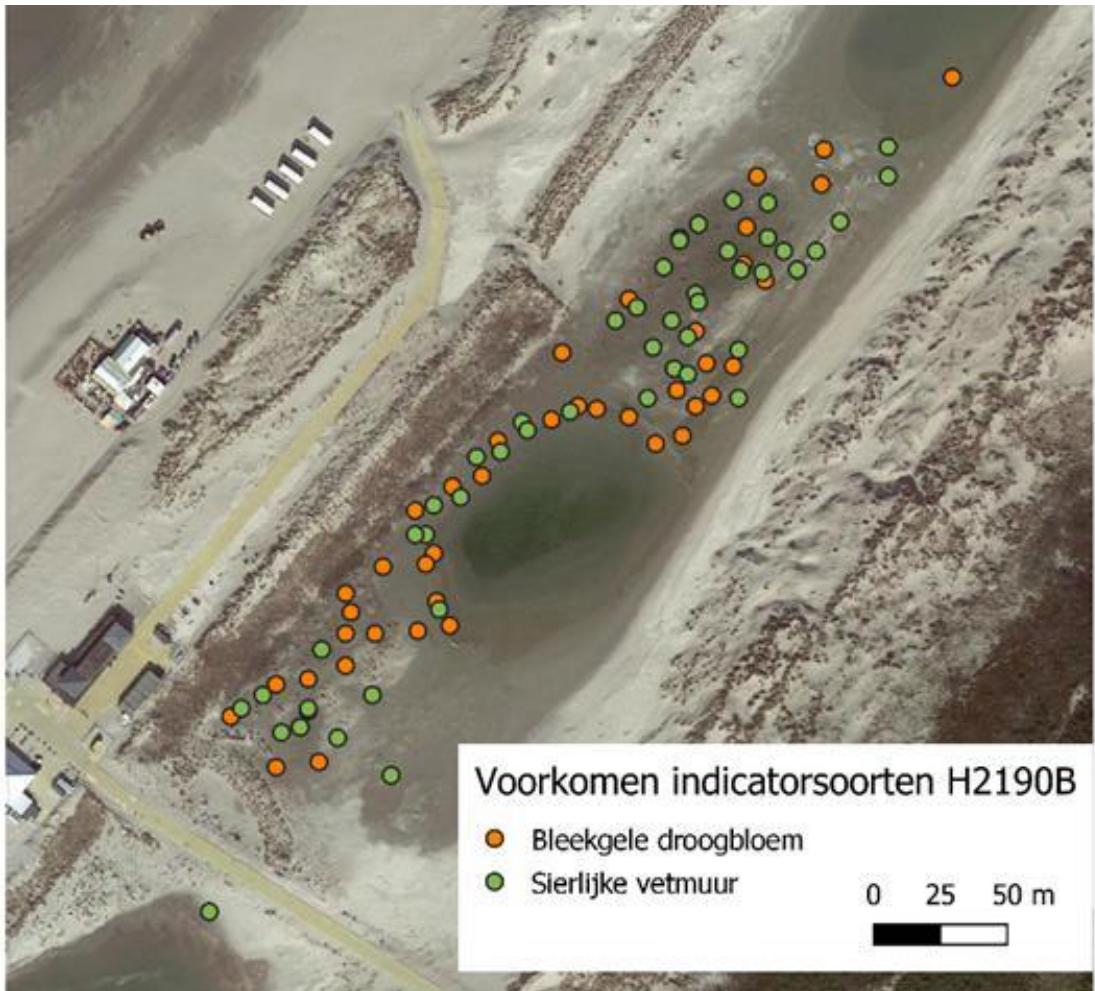
Vegetation types

Monitoring tools

- Mapping
- Indicator species
- Permanent quadrat



Indicator species dune slack habitat -2020



Presence indicator species
dune slack vegetation, 2020

- *Gnaphalium luteo-album*
- *Sagina nodosa*



Indicator species grey dune habitat - 2020



Sedum acre
Muurpeper



ecoresult
ecologisch advies en onderzoek



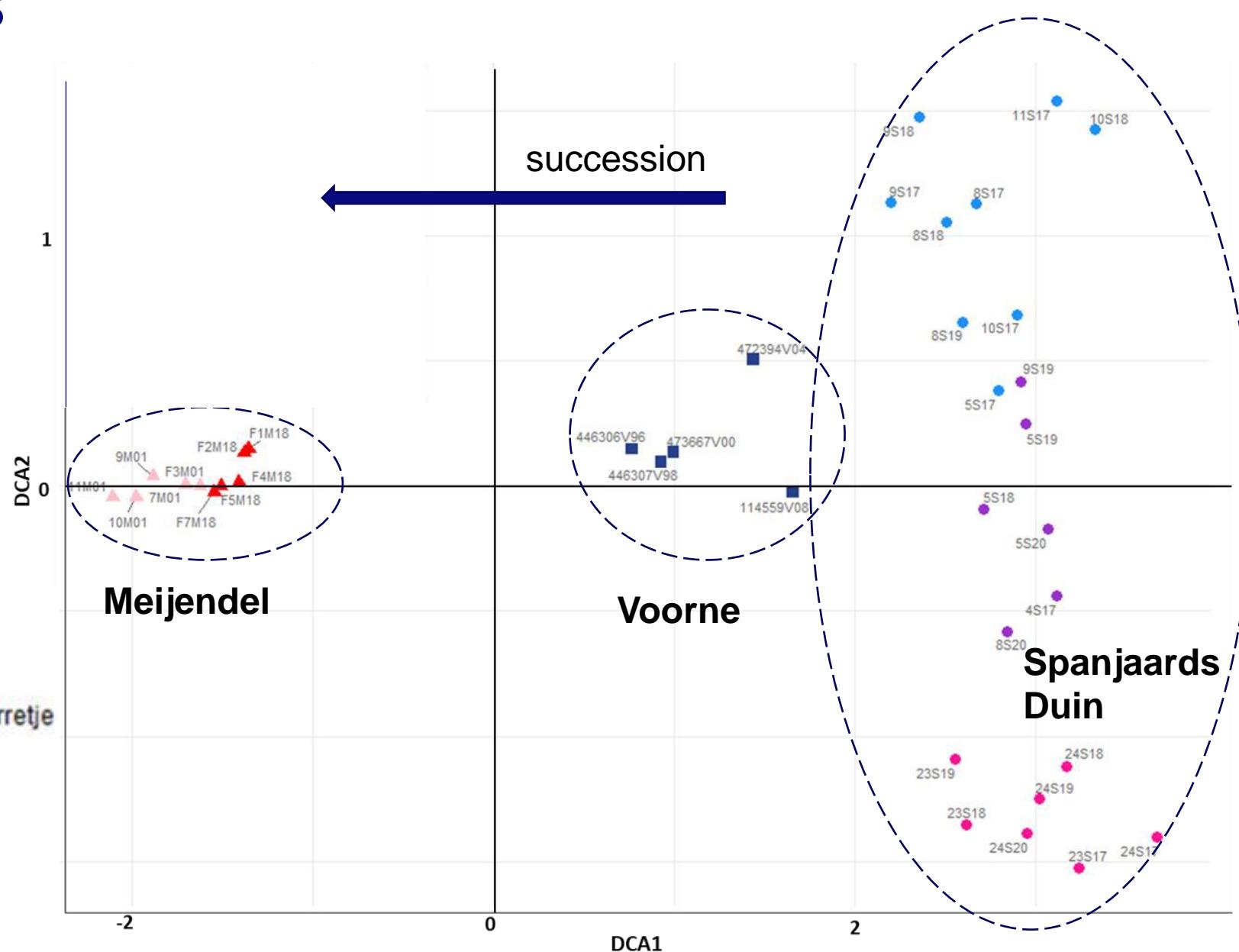
Phleum arenarium
Zanddoddegras



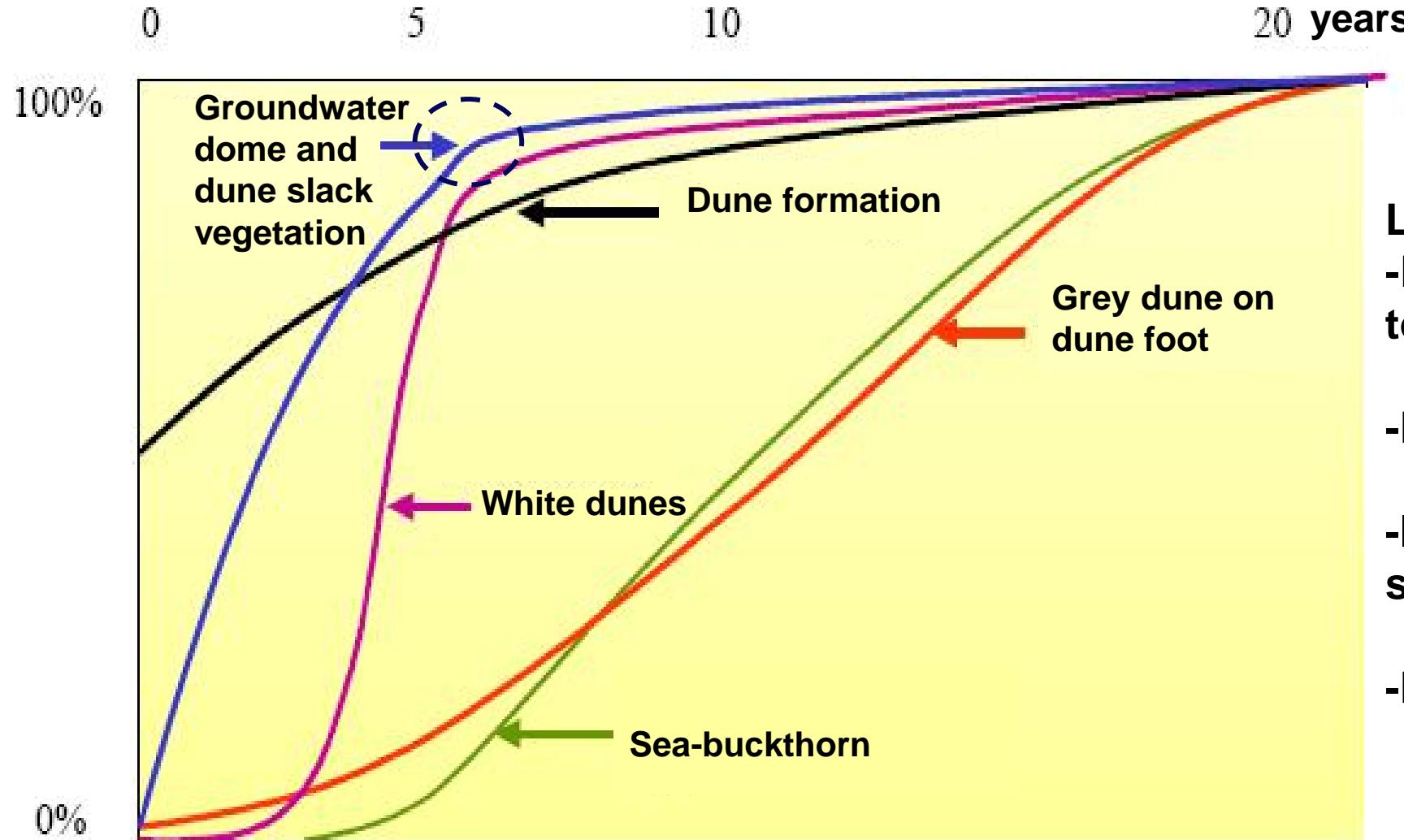
Spanjaards Duin compared to other dune landscapes, results from pq's

vegetatie type

- 7a helm festuca aanzet duinsterretje
- 7b helm phleum arenarium aanzet duinsterretje
- 8 onvol duinsterretje
- 9 duinsterretje
- 10 duinpaardenbloem duinbuntgras
- 11 duinpaardenbloem



What did we learn about the development of habitats?



Lessons and actions:

- Excavate valley bottom towards freatic level
- Minimize sand transport
- Introduce hay to create a seed bank
- Mind the sea-buckthorn!

Thank you!



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