Spatial relations among coastal bird populations: searching for new breeding habitats in intensively used estuaries.

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Problem

- Breeding habitats of many coastal birds strongly decline.
  - Recreation, Economic activities, Water regulation
- Therefore these birds seek more and more artificial nesting sites.
  - Rooftops, harbor plains
- This is problematic because birds are protected

Potential solution

- Creation of new breeding habitats to compensate loss in economically important sites.

- But
  - Does this work?

First step

- Does this work in theory?
- Where should these alternative breeding habitats are located?

- Metapopulation model (METAPHORE)
  - Individual based
  - Spatial explicit
  - Metapopulation ->birds return to their old breeding site

Species

Common Tern

Sterna hirundo

Visdief

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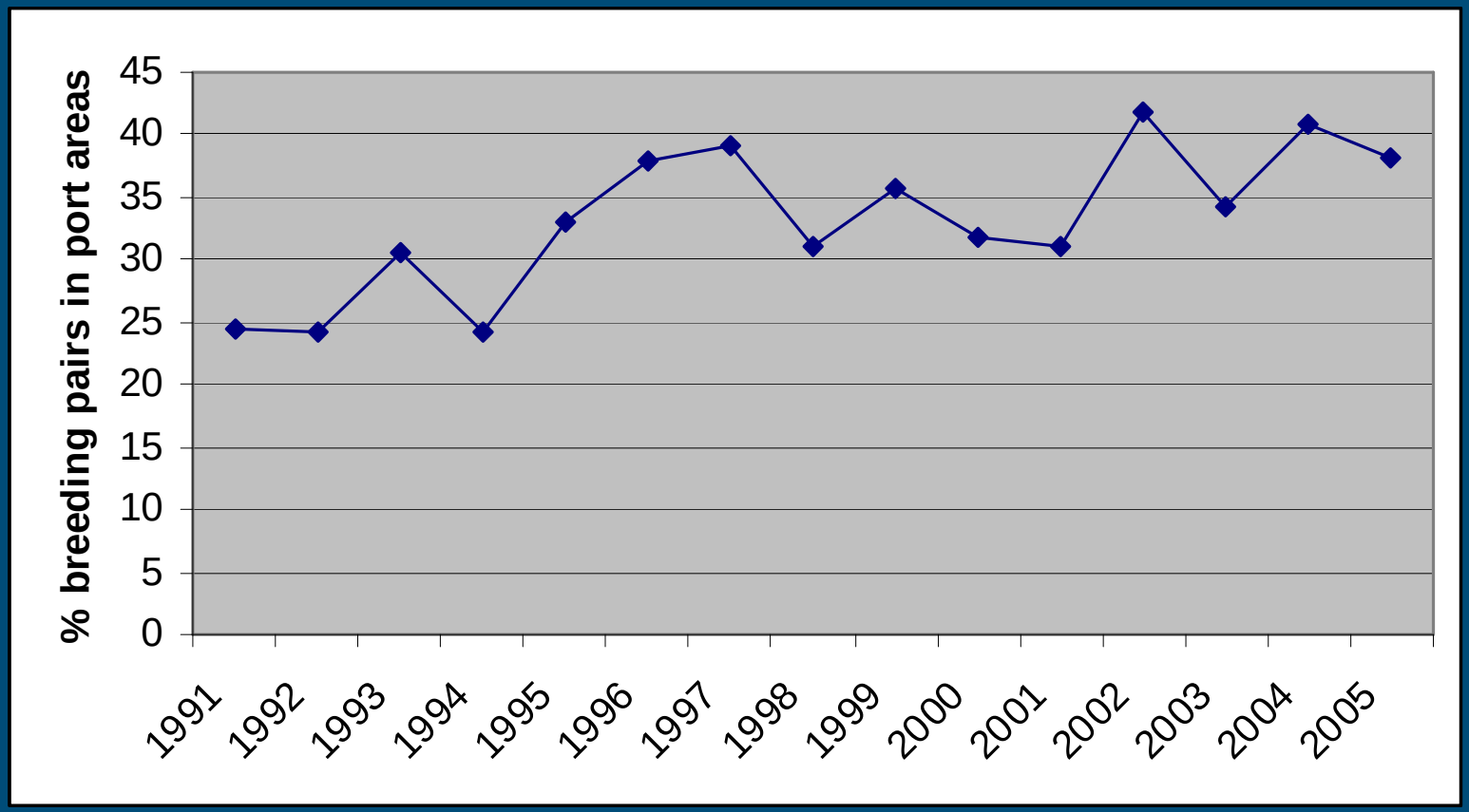
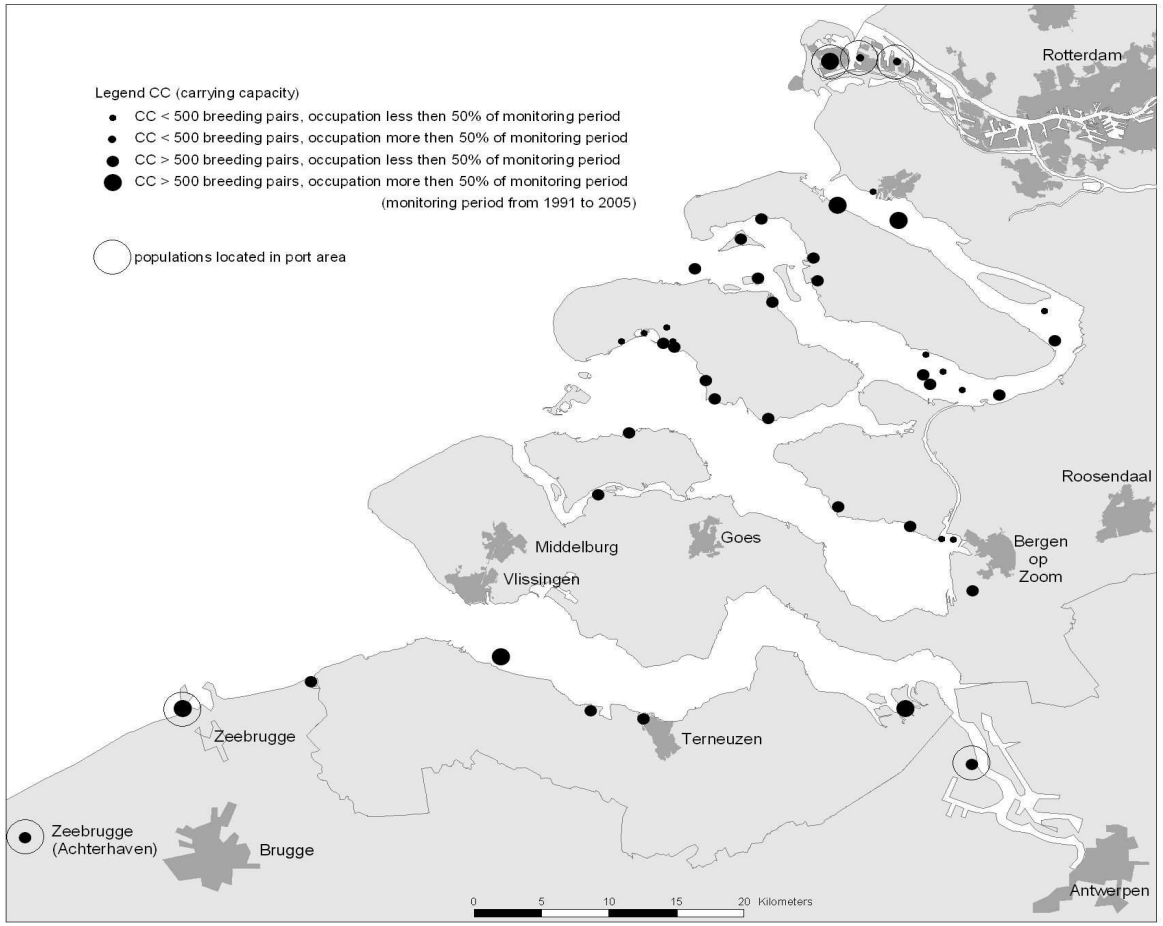
Proportion of common tern population breeding in port areas



Location: Rhine-Meuse-Scheldt estuary



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Parameterization & Calibration

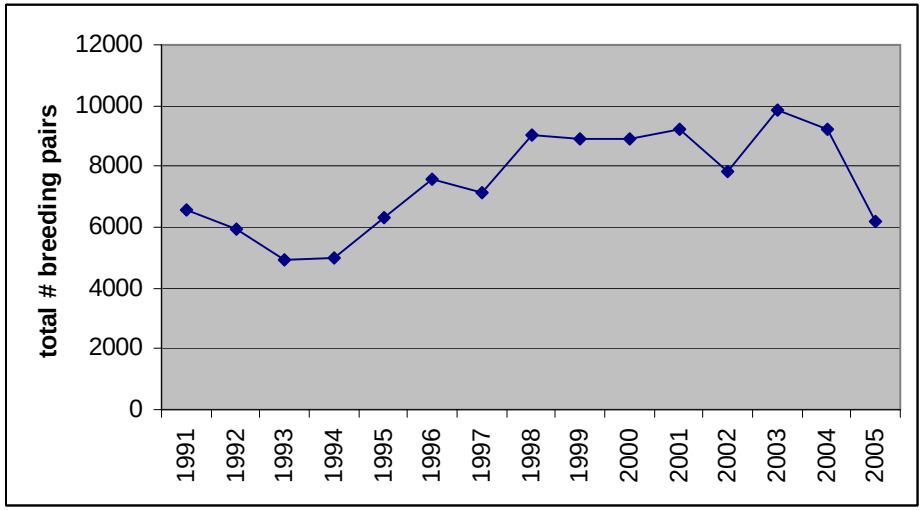
Parameterization

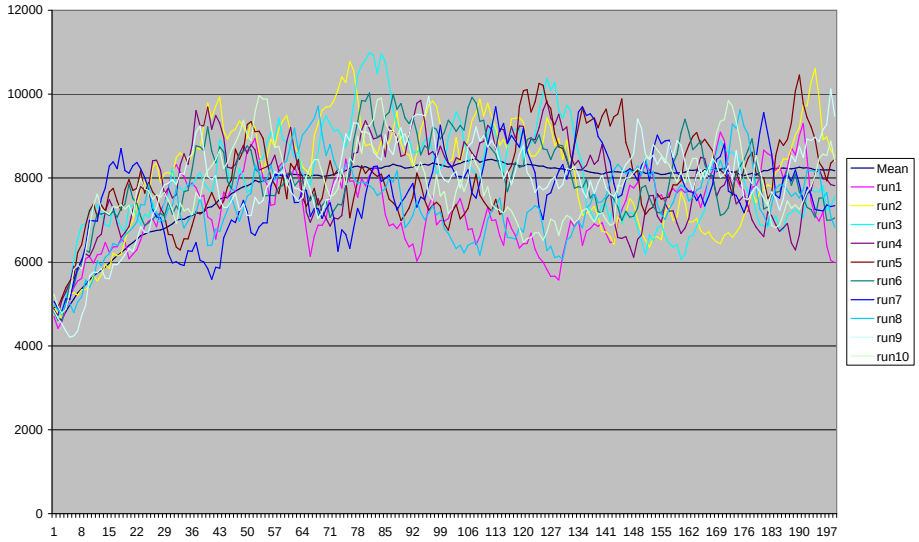
- Population dynamics adapted from Schröder et al. (1996).
- Dispersal parameters based on Van der Hoorn (1997)
- We added some density dependent interactions
    - Maximal per capita reproduction at intermediate density
    - Density dependent dispersal /acceptance

Calibration

- 0 Scenario (present situation)
- Calibrate juvenile recruitment 0.14->0.18 Fem/Fem

Calibration results





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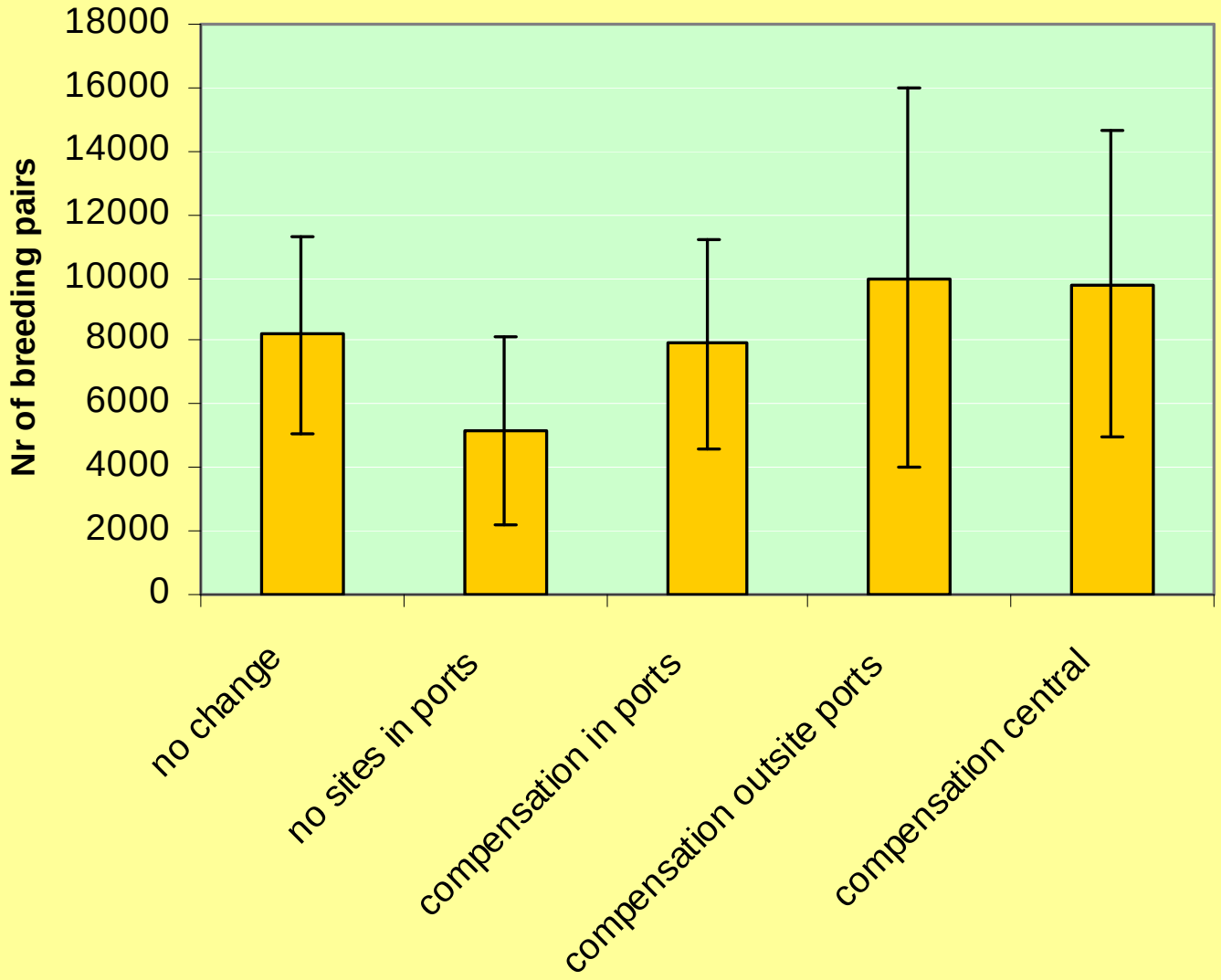
5 Scenarios

- basic, representing the present situation
- basic without port habitats
- basic with new habitats in the port areas as compensation
- basic with extra new habitats in the neighbourhood of port areas as compensation
- basic with new extra habitats on an optimal location in the habitat network as compensation

Scenarios



Error bars

max min

(50 simulations)

Conclusions

- Compensation might be an option
- The population might profit from extra breeding habitat
- Location does not seem to matter to much
  - (versus vogel habitat richtlijnen)

That compensation might work

- Sterneneiland harbor of Zeebrugge (2004)
  - 1832 breeding pairs of the Common Tern (Visdief)
  - 138 breeding pairs of the Little Tern (Dwergstern)
  - 4067 breeding pairs of the Sandwich Tern (Grotestern)

Future

- Finalizing Common tern publication
  - Improve our model
  - Look at Dynamics over time
    - Look at scenario change e.g. 0->3
- Other coastal birds
  - Little Tern (Dwerg stern), Sandwich Tern (grote stern)
  - Meeuwen
- Sea mammals

End