



**cocoa**  
Nutrient cocktails  
in the coastal zone  
of the Baltic Sea



# Experience in participating in two BONUS projects with Russia

Jacob Carstensen, Aarhus University

**HYPER = Hypoxia mitigation for Baltic Sea ecosystem restoration (2009-2011)**  
**COCOA = Nutrient cocktails in the coastal zone of the Baltic Sea (2014-2017)**



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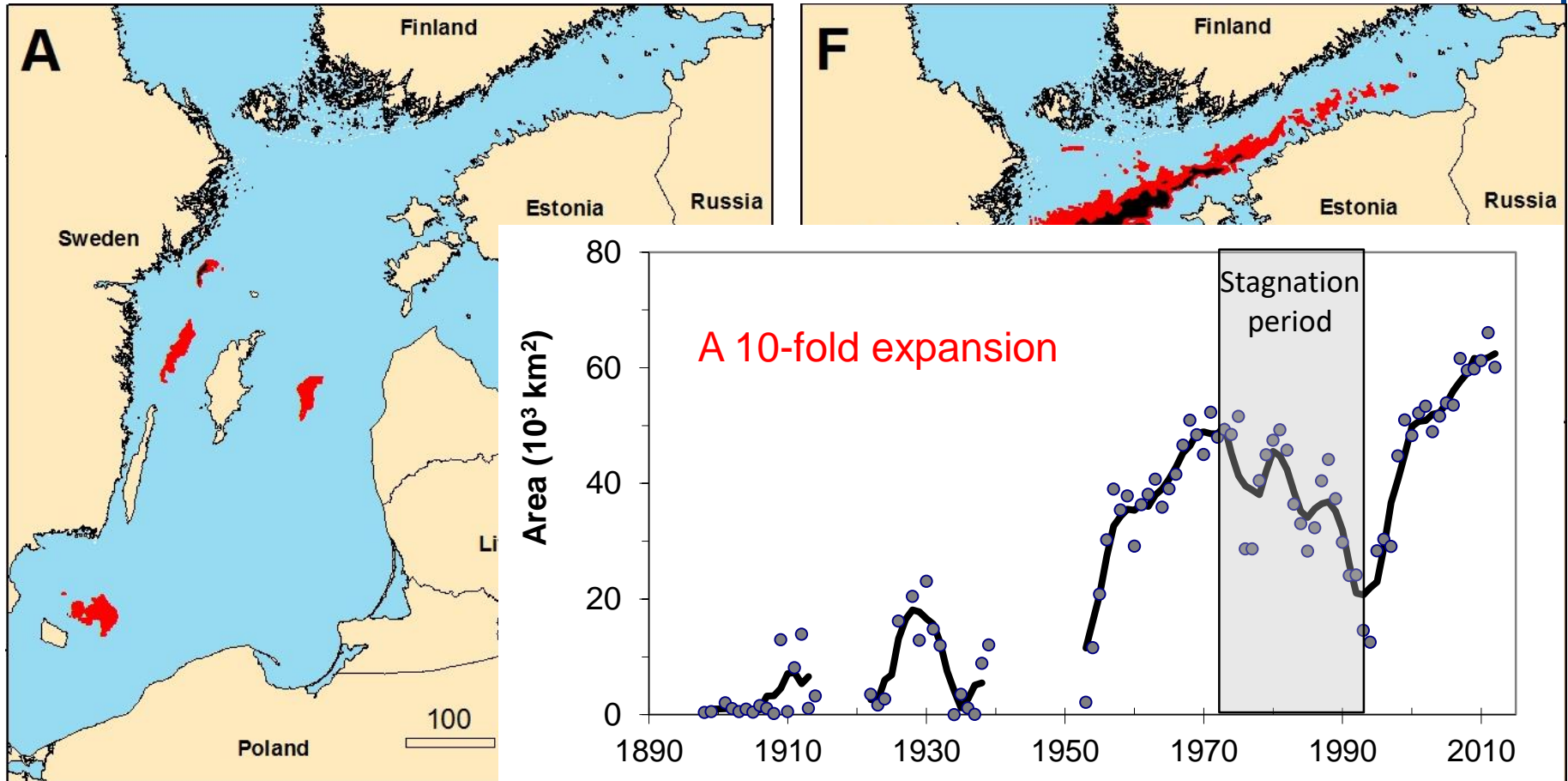


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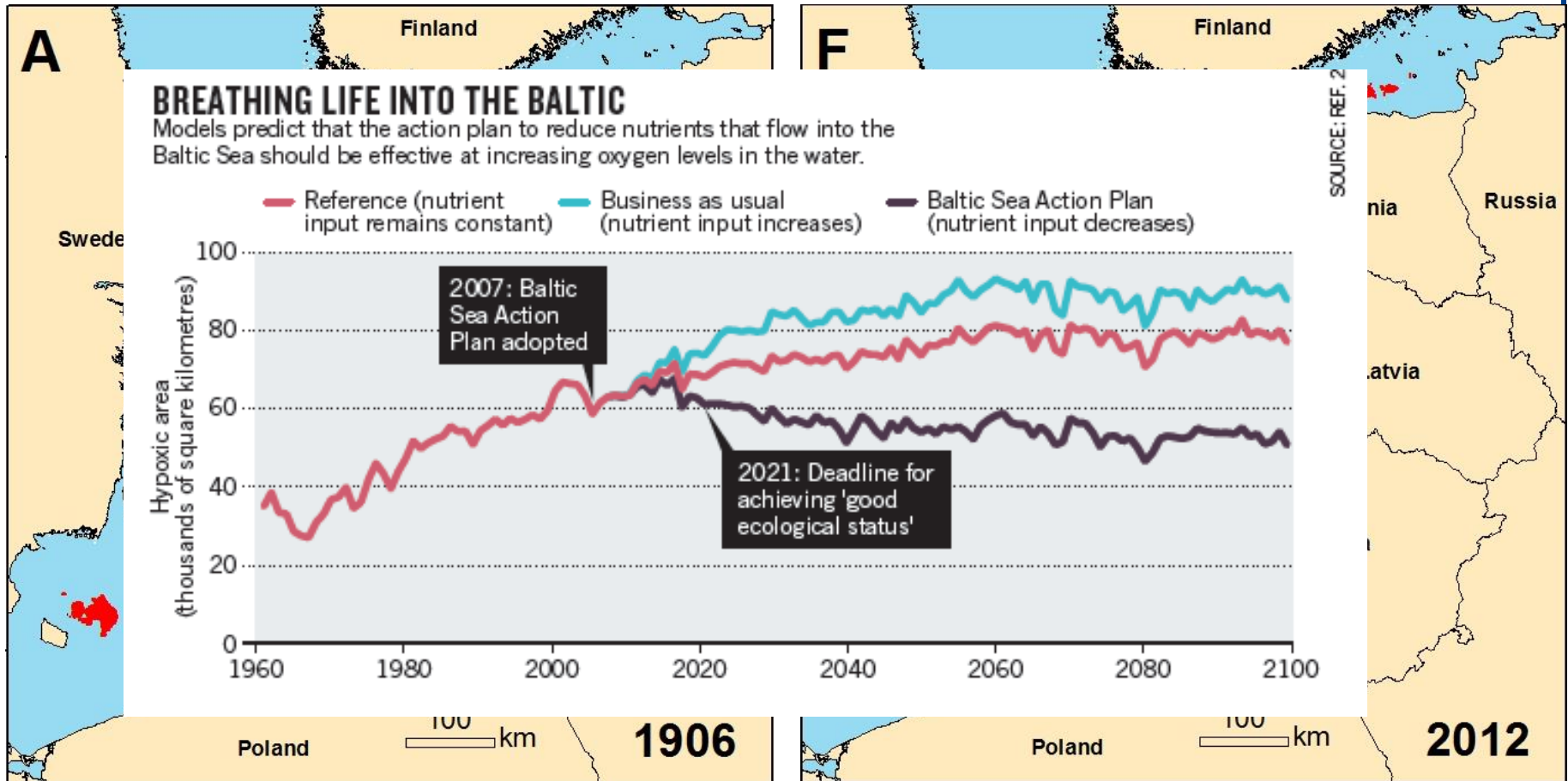


# What are the trends and drivers of hypoxia in the open Baltic Sea?



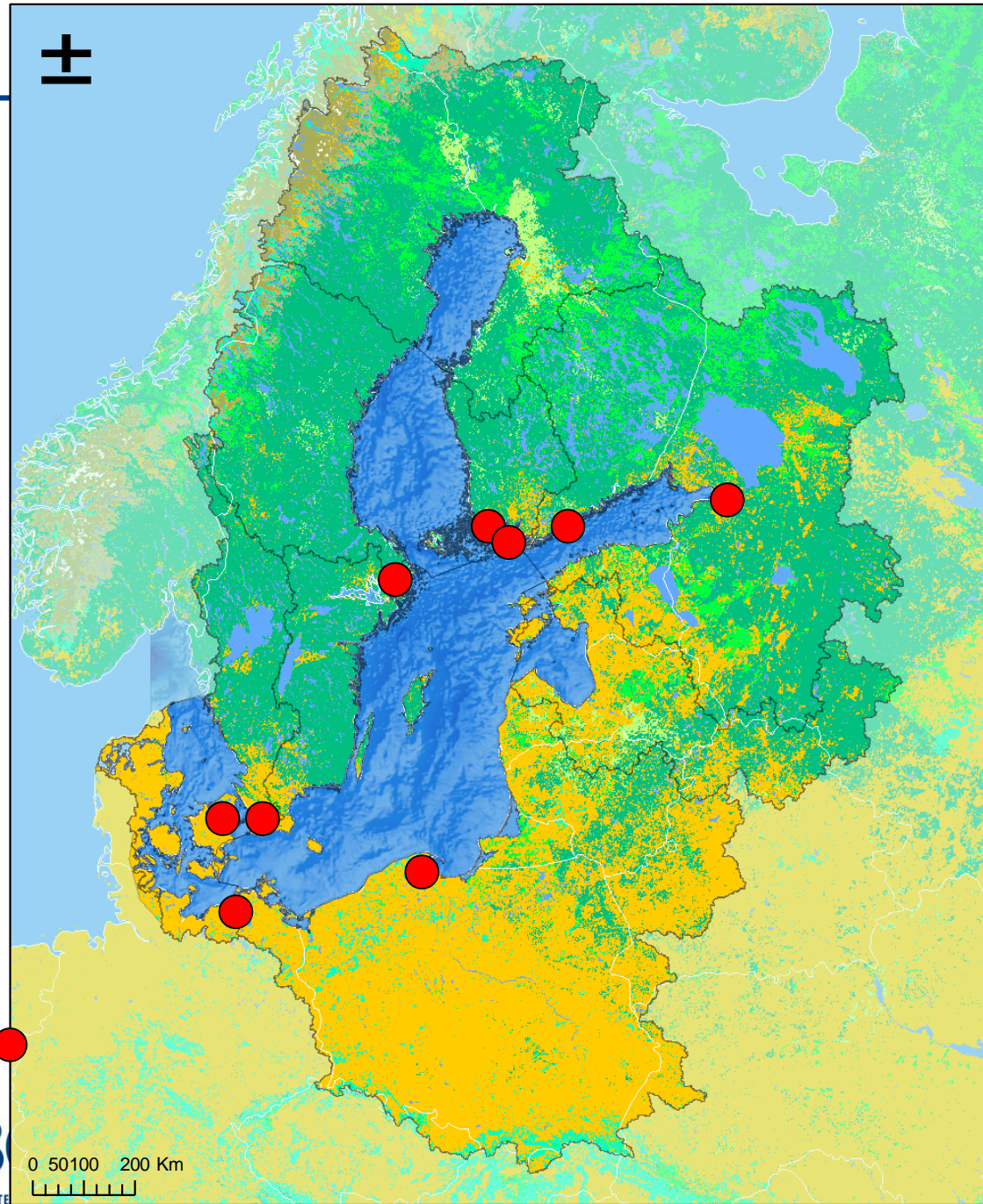
Source: Carstensen et al. (2014) PNAS

# What are the trends and drivers of hypoxia in the open Baltic Sea?



Sources: Meier et al (2011) GRL and Conley (2012) Nature

- Aarhus University
- Lund University
- Stockholm University
- Åbo Akademic Univ.
- Univ. of Helsinki
- Finnish Env. Inst.
- **Zoological Inst., RAS**
- University of Gdansk
- Inst. Oceanogr. Warnemünde
- Utrecht University





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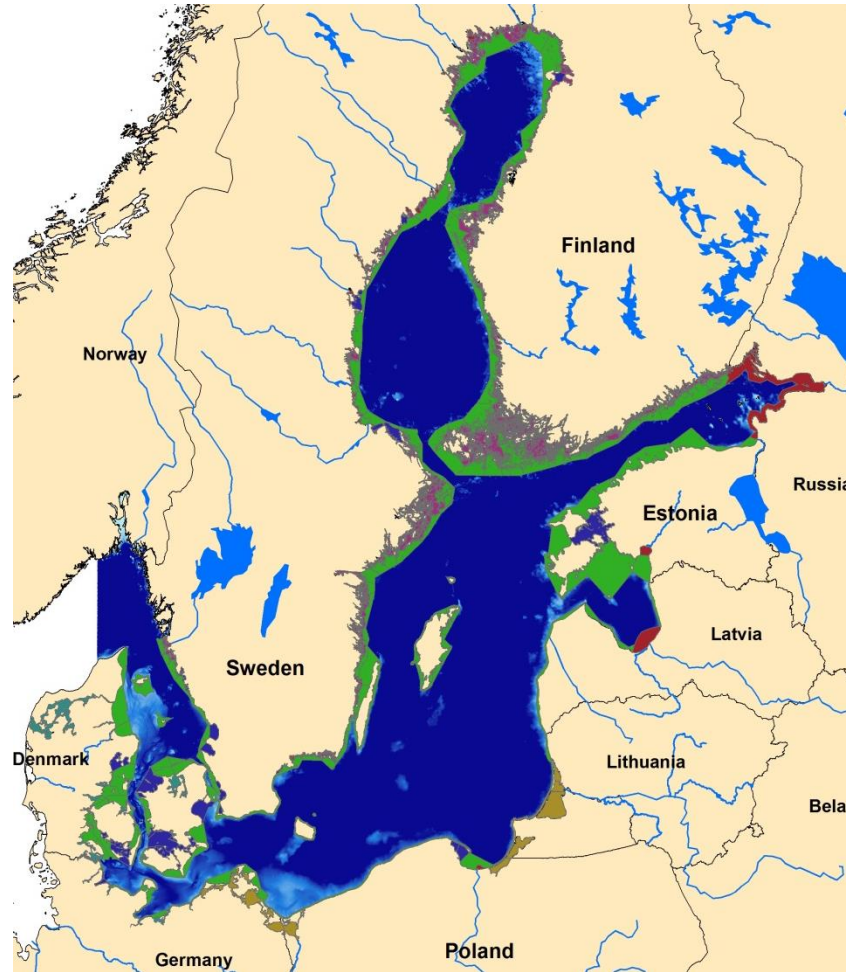
# How effective is the coastal zone for removing nutrients?



Nutrient cocktail



Coastal  
filter



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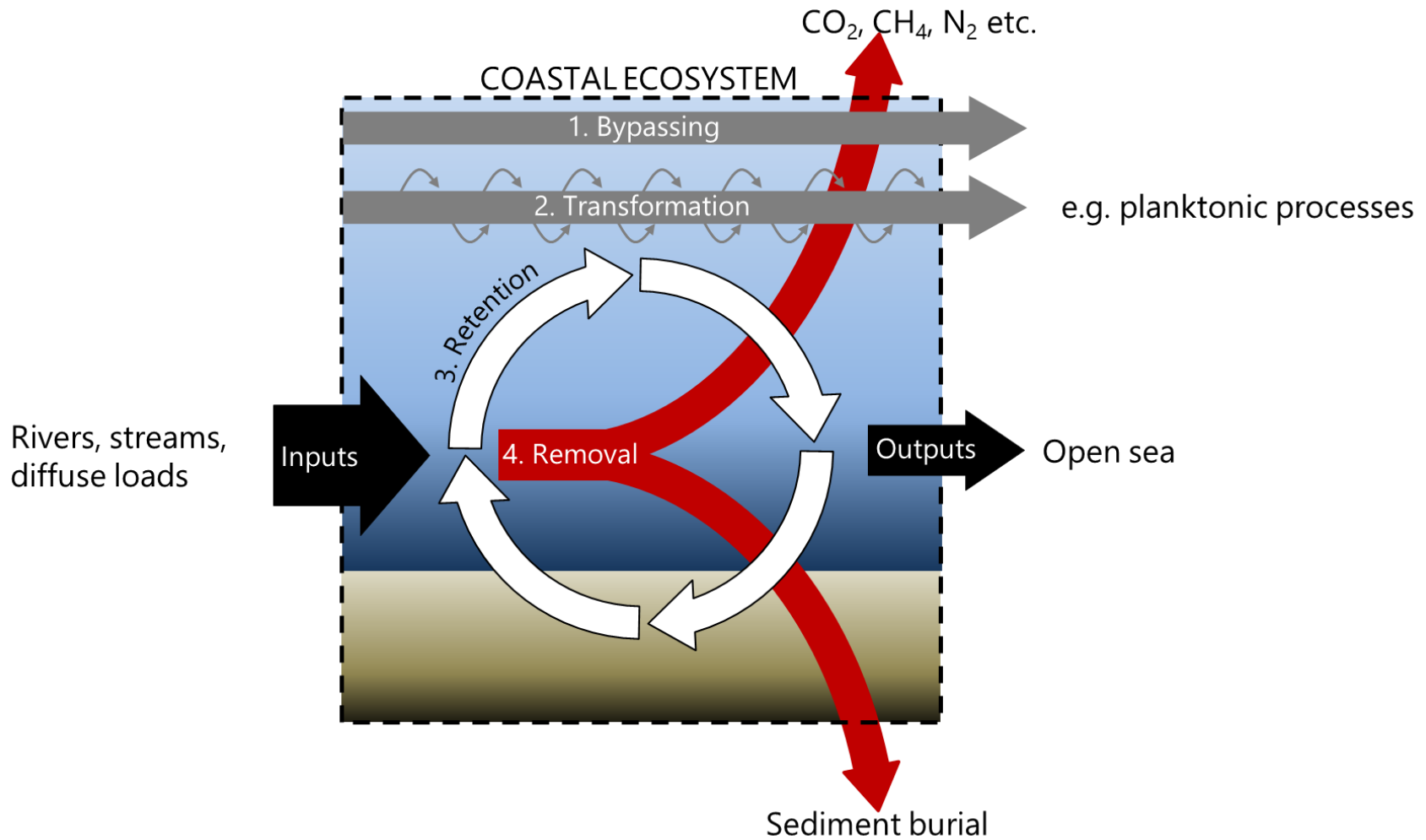






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# Concept of the coastal filter



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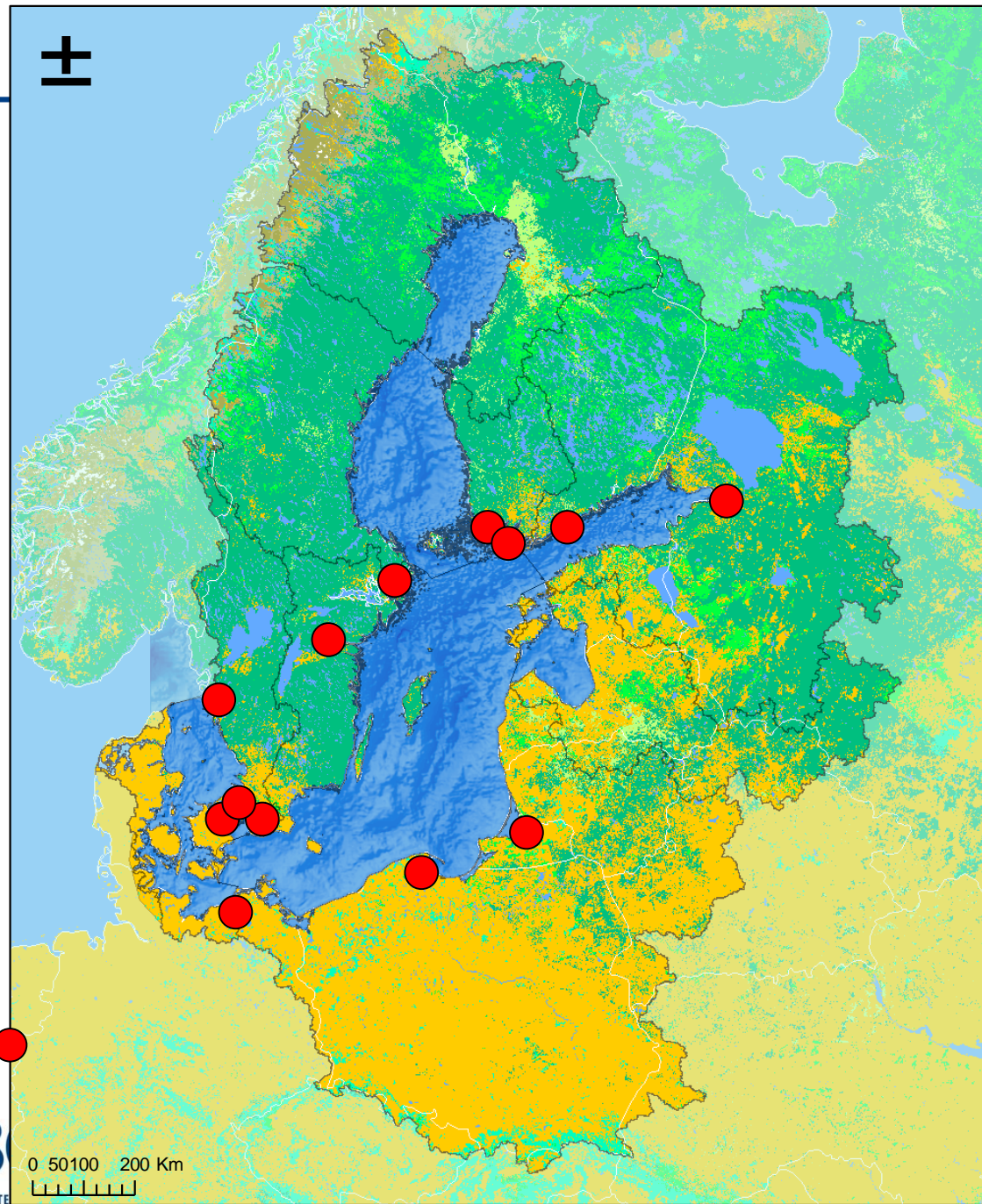


*Asmala et al. 2017*



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- Aarhus University
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**B**

0 50 100 200 Km







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**HYPER**  
HYPOxia  
mitigation for Baltic Sea  
Ecosystem Restoration

# Why did we have Russian partners onboard?



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SEVENTH FRAMEWORK  
PROGRAMME



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# Russian contributions

Marine Pollution Bulletin 61 (2010) 198–204



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Contents lists available at [ScienceDirect](http://ScienceDirect)

## Marine Pollution Bulletin

journal homepage: [www.elsevier.com/locate/marpolbul](http://www.elsevier.com/locate/marpolbul)



### Ecosystem changes in the Neva Estuary (Baltic Sea): Natural dynamics or response to anthropogenic impacts?

Sergey Golubkov \*, Alexander Alimov

*Zoological Institute of the Russian Academy of Sciences, Universitetskaya Emb. 1, St. Petersburg 199034, Russian Federation*

AMBIO 2014, 43:26–36  
DOI 10.1007/s13280-013-0474-7



### Hypoxia in the Baltic Sea: Biogeochemical Cycles, Benthic Fauna, and Management

Jacob Carstensen, Daniel J. Conley, Erik Bonsdorff, Bo G. Gustafsson,  
Susanna Hietanen, Urszula Janas, Tom Jilbert, Alexey Maximov,  
Alf Norkko, Joanna Norkko, Daniel C. Reed, Caroline P. Slomp,  
Karen Timmermann, Maren Voss



## Russian contributions

- **HYPER**
  - 8 peer-reviewed publications with Russian authors
  - 2 joint publications with other partners
  - Data for comparative studies
- **COCOA**
  - 6 peer-reviewed publications with Russian authors
  - 3 joint publications with other partners
  - Data for comparative studies

## Hypoxia Is Increasing in the Coastal Zone of the Baltic Sea

Daniel J. Conley,<sup>\*,†</sup> Jacob Carstensen,<sup>‡</sup> Juris Aigars,<sup>§</sup> Philip Axe,<sup>||</sup> Erik Bonsdorff,<sup>⊥</sup> Tatjana Eremina,<sup>#</sup> Britt-Marie Haahti,<sup>⊥</sup> Christoph Humborg,<sup>§,@</sup> Per Jonsson,<sup>@</sup> Jonne Kotta,<sup>%</sup> Christer Lännegren,<sup>▽</sup> Ulf Larsson,<sup>||</sup> Alexey Maximov,<sup>○</sup> Miguel Rodriguez Medina,<sup>§</sup> Elzbieta Lysiak-Pastuszek,<sup>■</sup> Nijolė Remeikaite-Nikienė,<sup>○</sup> Jakob Walve,<sup>||</sup> Sunhild Wilhelms,<sup>††</sup> and Lovisa Zillén<sup>†</sup>

<sup>†</sup>Department of Earth and Ecosystem Sciences, Lund University, SE-223 62 Lund, Sweden

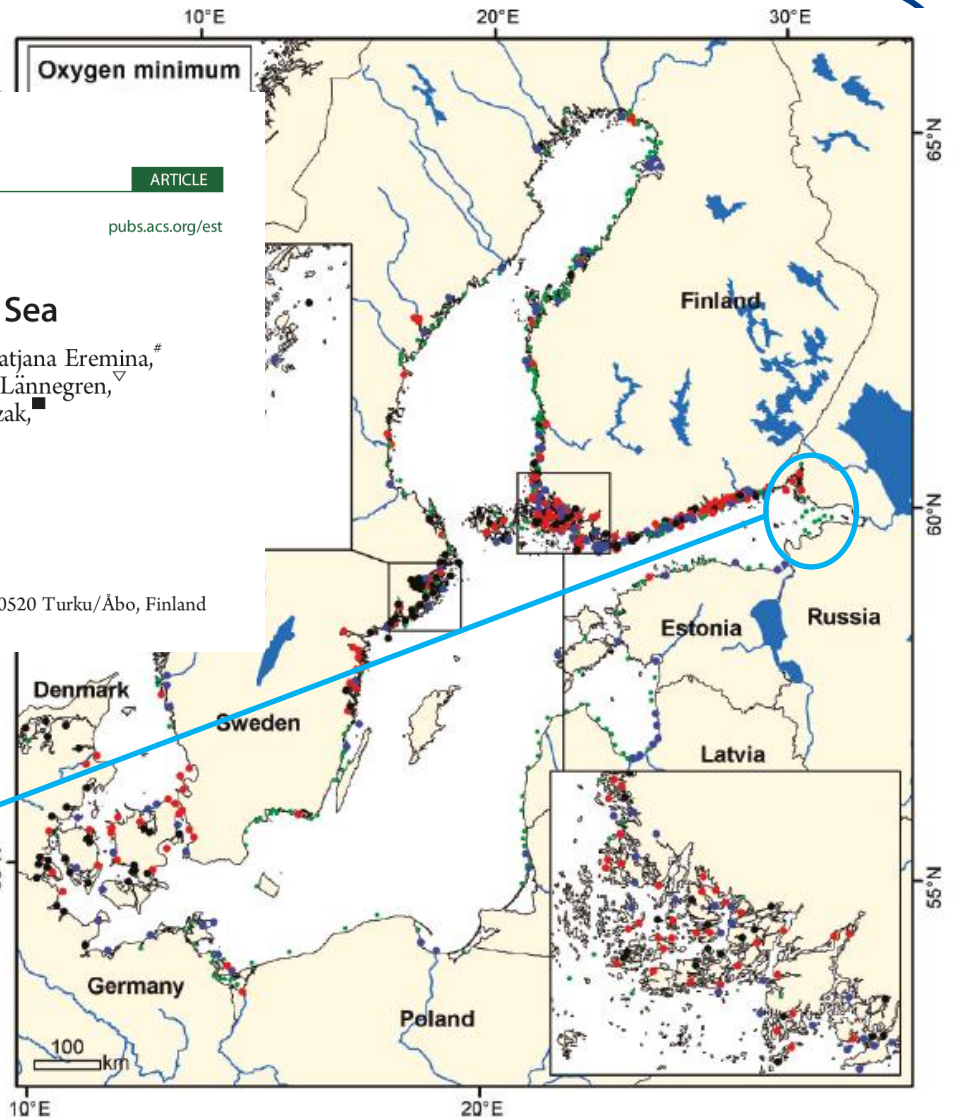
<sup>‡</sup>National Environmental Research Institute, Aarhus University, DK-4000 Roskilde, Denmark

<sup>§</sup>Latvian Institute of Aquatic Ecology, LV-1007 Riga, Latvia

<sup>||</sup>Swedish Meteorological and Hydrological Institute, SE-426 71 Västra Frölunda, Sweden

<sup>⊥</sup>Department of Biosciences, Environmental and Marine Biology, Åbo Akademi University, BioCity, FI-20520 Turku/Åbo, Finland

<sup>#</sup>Russian State Hydrometeorological University, 195196 St. Petersburg, Russia



Russian monitoring data

ORIGINAL RESEARCH ARTICLE

## Context-dependent consequences of *Marenzelleria* spp. (Spionidae: Polychaeta) invasion for nutrient cycling in the Northern Baltic Sea<sup>☆</sup>

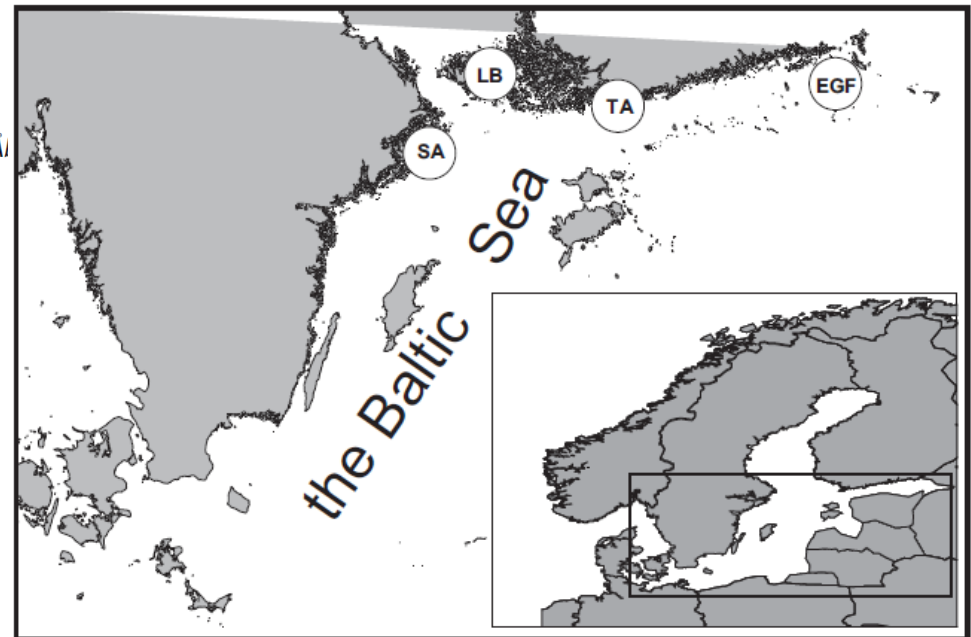
Alexey Maximov<sup>a,\*</sup>, Erik Bonsdorff<sup>b</sup>, Tatjana Eremina<sup>c</sup>, Laura Kauppi<sup>d</sup>,  
Alf Norkko<sup>d</sup>, Joanna Norkko<sup>d</sup>

<sup>a</sup> Zoological Institute Russian Academy of Sciences, St. Petersburg, Russia

<sup>b</sup> Environmental and Marine Biology, Faculty of Science and Engineering, Åbo

<sup>c</sup> Russian State Hydrometeorological University, St. Petersburg, Russia

<sup>d</sup> Tvärminne Zoological Station, University of Helsinki, Hanko, Finland





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## Why did we have Russian partners onboard?

- **Specialised scientific knowledge (benthos)**
- **Contribution with scientific products (papers)**
  - Just as productive as other partners!
- **Access to data and important ecosystem**
  - We would never have had access to these data without them as partners!



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## Were there any challenges?

- **Scientific discussions – language proficiency!**
- **No participation in common sampling campaigns**
  - Their expertise was also covered with EU partners
  - Problems with permissions for EU scientists to take samples in Eastern Gulf of Finland



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## Conclusions

- Russian partners were specialists with a minor budget
- The contribution to project governance and overarching project objectives was limited
- They gave access to data from important area
- The performance was as expected and not different from EU partners



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