
PFAS I VANDMILJØET

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PFAS PROJECTS/ACTIVITIES AT AU-1

Ongoing projects/activities:

- ▶ PFAS in marine mammals from Greenland (part of the Arctic Monitoring Assessment Program) since 2005
- ▶ PFAS precursors in the atmosphere of Greenland (since 2007)
- ▶ Human exposure to PFAS (Danish and Greenlandic cohorts) in collaboration with AU HEALTH
- ▶ PFAS analysis in fish from marine and freshwater ecosystems since 2011 (NOVANA, MST) (method accredited by DANAK since 2020)

PFAS PROJECTS/ACTIVITIES AT AU-2

Previous projects:

- ▶ PFAS in Antarctic food web (with Griffith University, AUS)
- ▶ PFAS in the terrestrial environment of Greenland
- ▶ PFAS in cetaceans from the Mediterranean Sea (with University of Murcia, Spain)
- ▶ PFAS in white-tailed eagles (with University of Antwerp, Belgium)
- ▶ PFAS in North Atlantic pilot whales (with Harvard University, US)
- ▶ PFAS in Danish marine mammals (harbor porpoises and seals)
- ▶ Endocrine-disrupting chemicals (incl. PFAS) in Danish streams

RELEASE TO THE ENVIRONMENT

Sources

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graph TD; Sources[Sources] --> Direct[Direct emission of a specific PFAS (from e.g. manufacturing, use or disposal)]; Sources --> Indirect[Indirect: transformation from a precursor compound in the environment (e.g. fluorotelomer alcohols, perfluorosulfonamides)];
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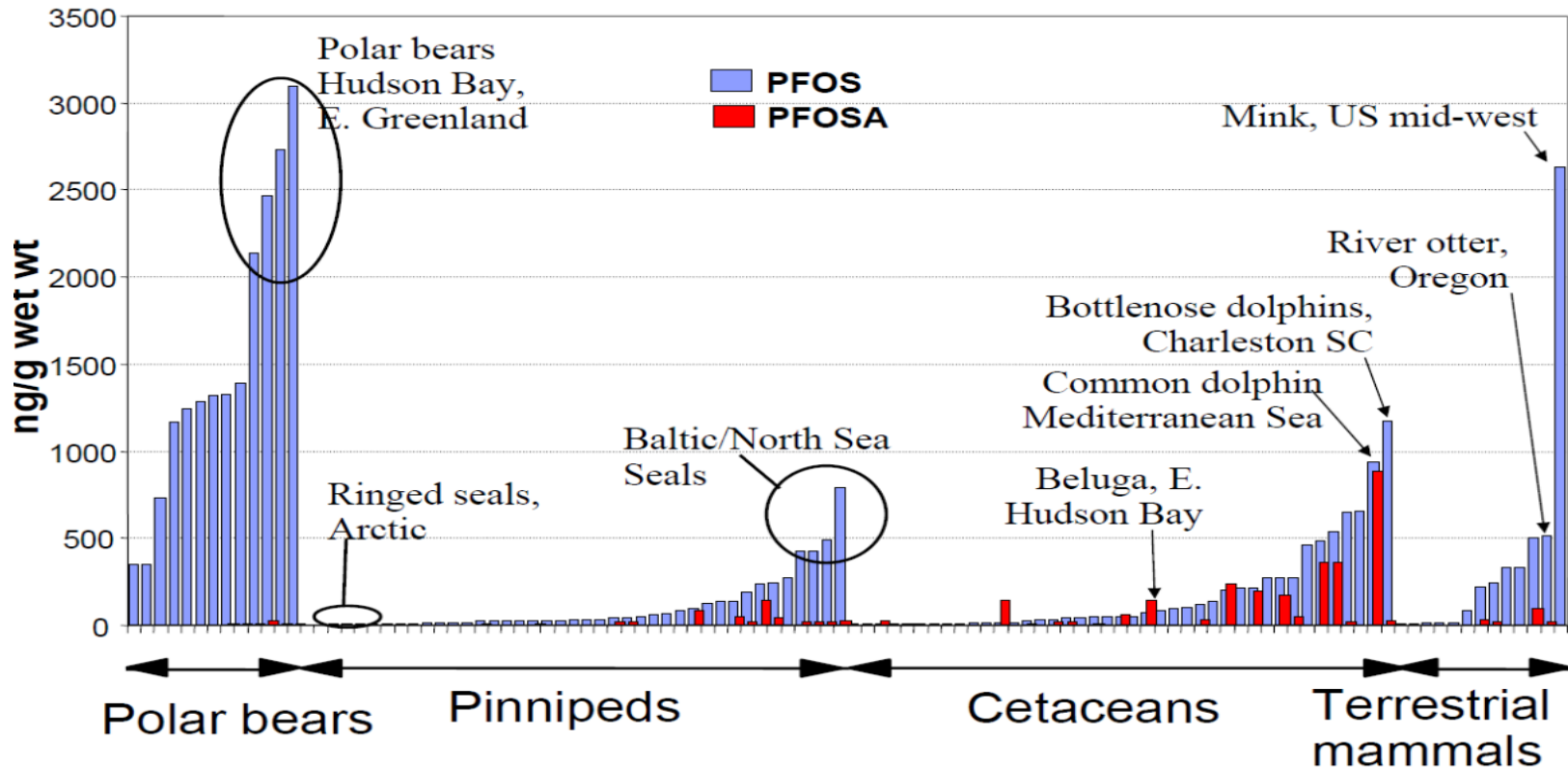
SOURCES OF PFAS

- ▶ **Point sources:** manufacturing plants, landfills, wastewater treatment plants (WTTPs)
- ▶ **Diffuse sources:** atmospheric transport of more volatile precursors (e.g. FTOH) or transport through ocean currents

ENVIRONMENTAL FATE OF PFAS

- ▶ Very stable because of the strong C-F bond
- ▶ Readily adsorbed by living organisms
- ▶ Bound to proteins (e.g. serum albumine)
- ▶ Bioaccumulate in the food chain (as the others halogenated POPs)
- ▶ Globally distributed





Passive sampling of PFAS in Danish streams

POCIS

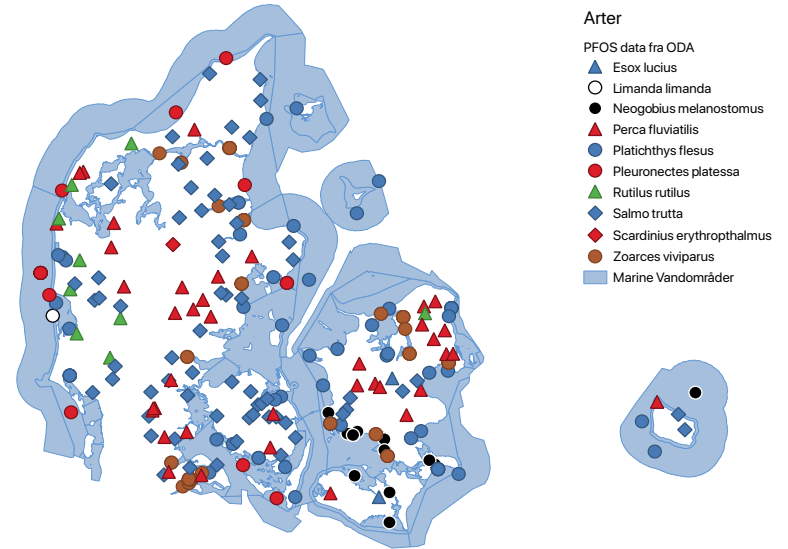


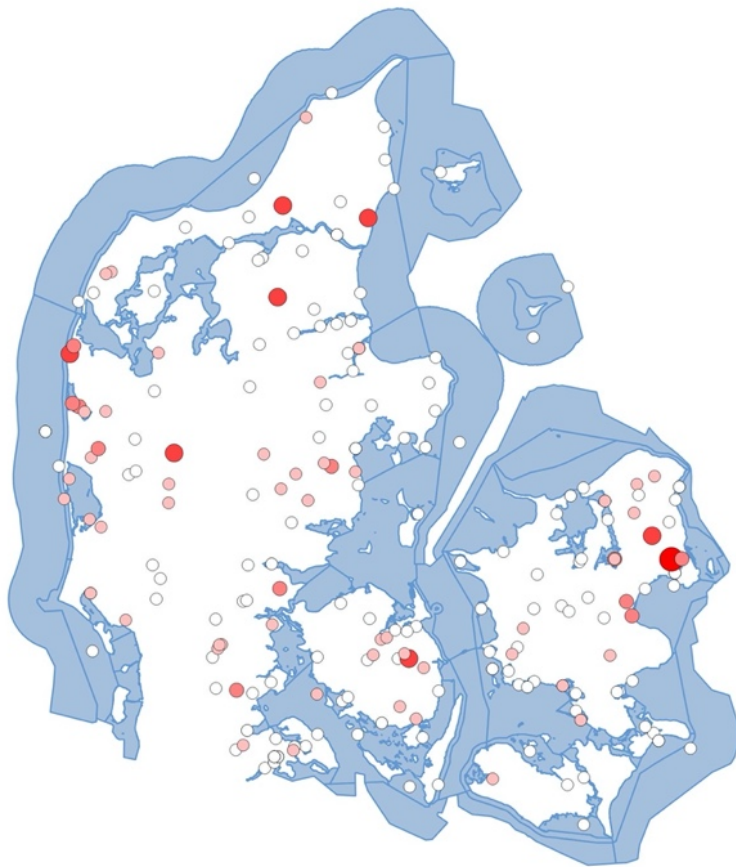
PFAS IN DANISH STREAMS

Localities	PFHxS ng L ⁻¹	PFOS ng L ⁻¹	PFHpA ng L ⁻¹	PFOA ng L ⁻¹	PFNA ng L ⁻¹	PFDA ng L ⁻¹
Odense upstream	nd	0.08	nd	0.17	0.04	0.02
Odense downstream	0.01	0.36	0.03	0.31	0.06	0.14
Ringsted upstream	nd	0.06	nd	0.08	nd	0.02
Ringsted downstream	nd	0.10	0.04	0.31	0.08	0.05
Åmose å	nd	0.14	nd	0.17	nd	0.01
Lystrup Å	nd	0.04	nd	0.08	0.01	0.01
Suså	0.10	1.66	nd	0.15	nd	0.01

NOVANA monitoring program

- Sampling stations: marine (coastal), lakes and streams
- PFAS in fish liver
- 276 samples analyzed since 2011



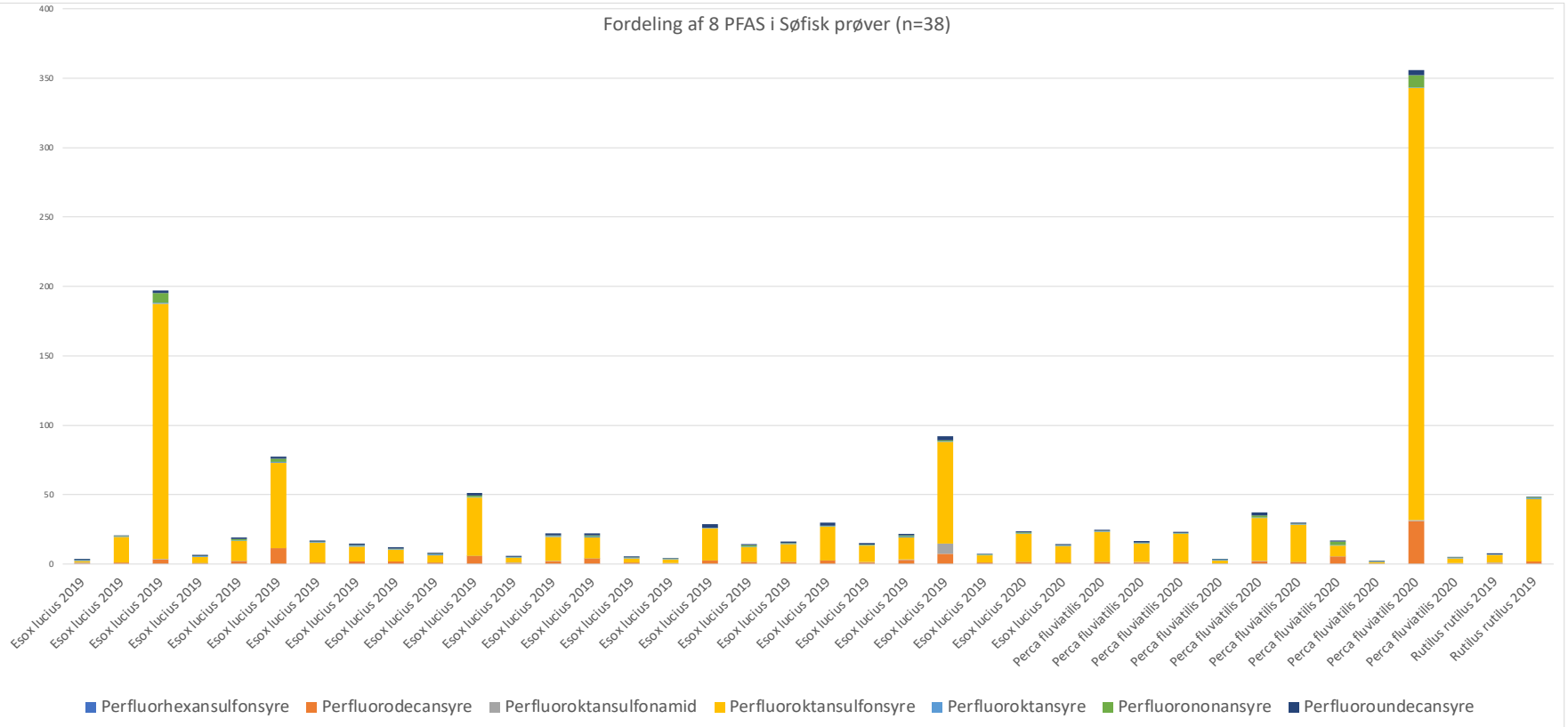


Sum af 8 PFAS

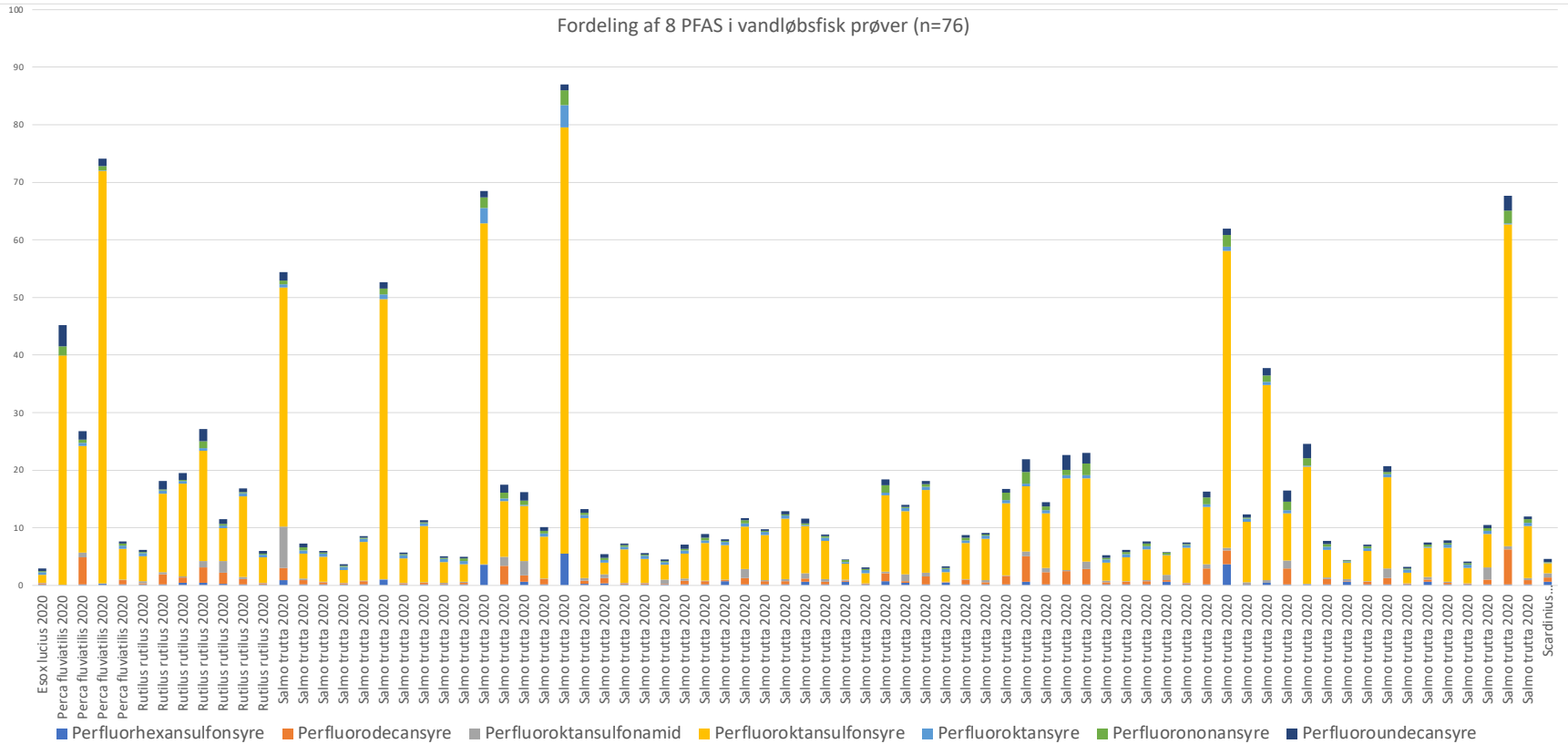
- 0 - 12
- 12 - 30
- 30 - 62
- 62 - 197
- 197 - 356

■ Marine Vandområder

Fordeling af 8 PFAS i Søfisk prøver (n=38)



Fordeling af 8 PFAS i vandløbsfisk prøver (n=76)



FUTURE CHALLENGES

- ▶ PFOS and PFOA production and use are regulated by the authorities, but what about the other PFAS?
- ▶ Monitoring program for PFAS should be continuously updated with the new compounds that are being used as substitutes (e.g. GEN-X, ADONA).
- ▶ Microplastic as a carrier of PFAS in the aquatic environment?



Article

Perfluoroalkylated Substances (PFAS) Associated with Microplastics in a Lake Environment

Occurrence and abundance of poly- and perfluoroalkyl substances (PFASs) on microplastics (MPs) in Pearl River Estuary (PRE) region: Spatial and temporal variations[☆]

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