

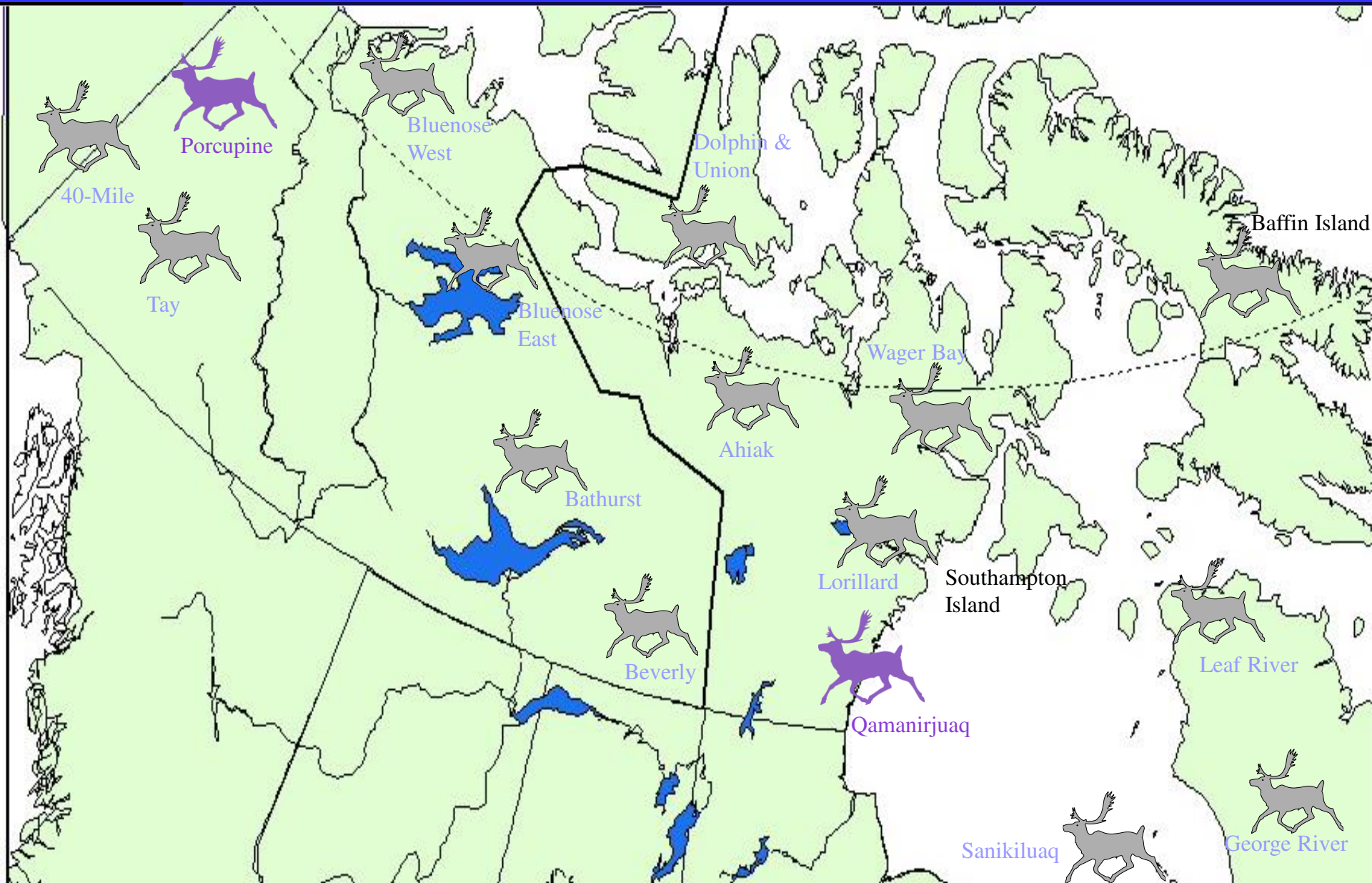
Contaminants in Porcupine Caribou

Mary Gamberg, Whitehorse, Yukon



Photo Credit: Peter Mather

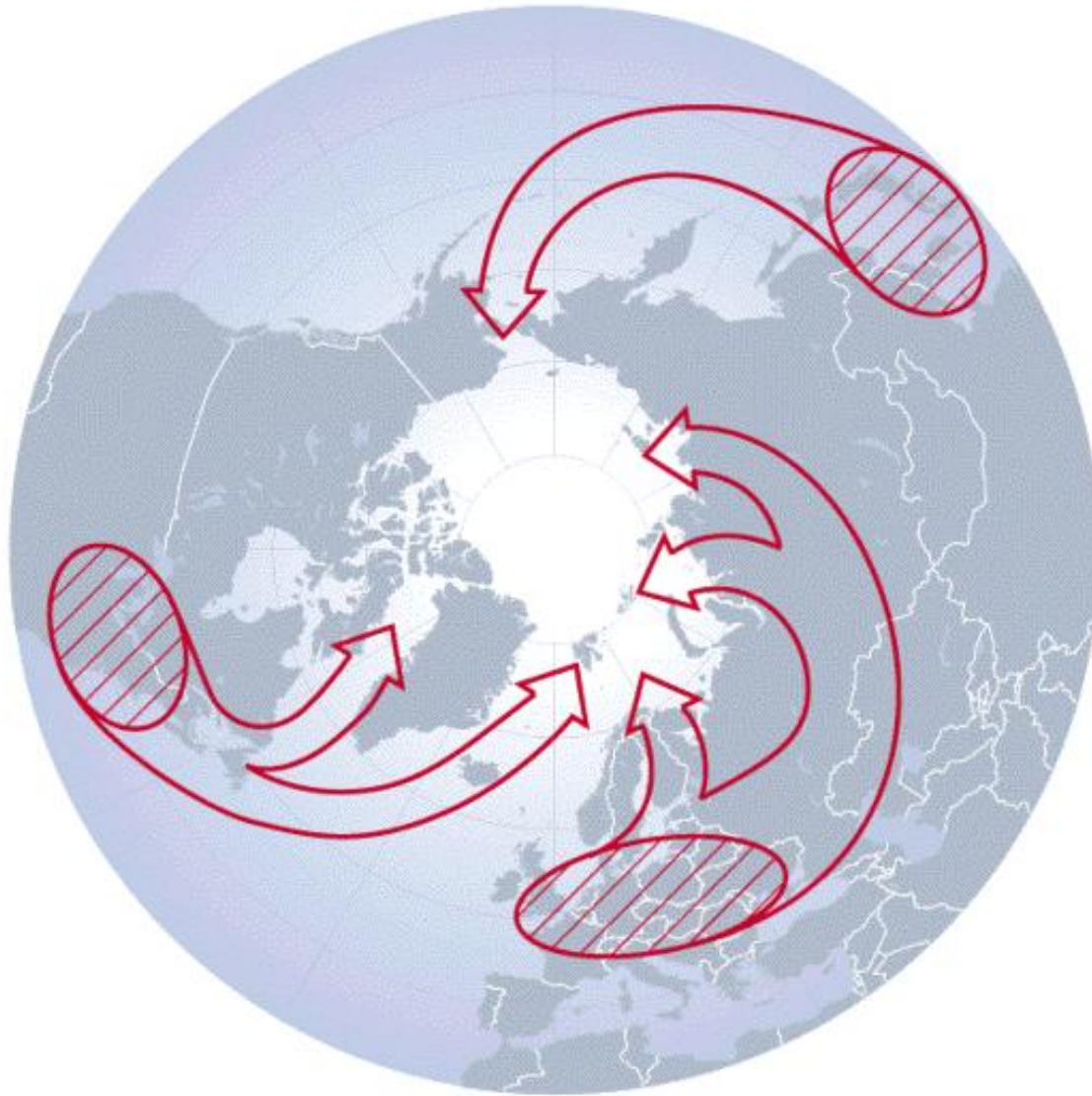
Northern Contaminants Program




How do
contaminants
get into the
caribou?



Dominating air currents



 Central industrial areas

Contaminants in Arctic Caribou

- PFAS (liver)
- Cadmium (kidney, liver)
- Mercury (kidney, liver)

PFAS

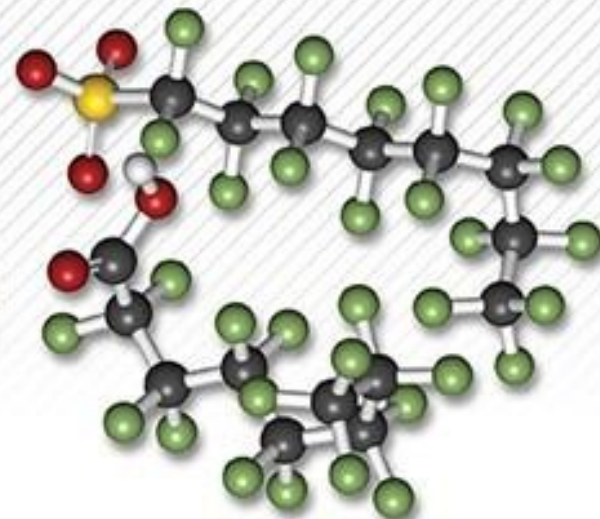
PERFLUOROALKYL AND
POLYFLUOROALKYL
SUBSTANCES



RAINCOATS



MICROWAVE
POPCORN
BAGS



FIRE
RETARDANT
FOAMS



ELECTRONICS



FAST FOOD
CONTAINERS



NONSTICK
COOKWARE



PERSONAL
CARE
PRODUCTS



STAIN-
RESISTANT
CARPET

PFAS in Porcupine Caribou

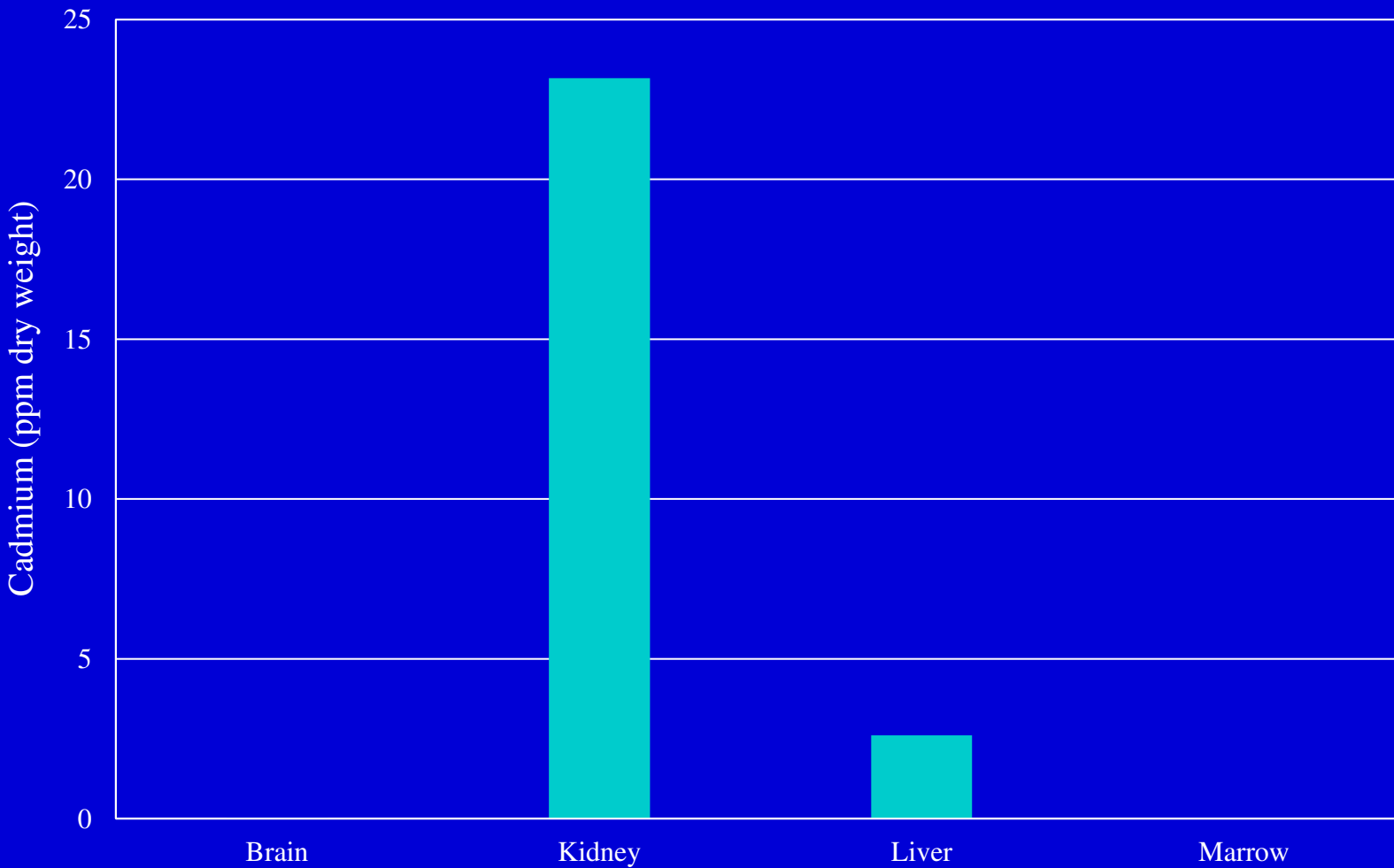
- Accumulate in caribou liver
- Levels are low in Porcupine caribou
- Some groups of PFAS are declining over time in the Porcupine caribou, likely due to new legislation

Cadmium

- **Nickel-cadmium batteries; pigments and plastics, electroplating**
- **Mining and smelting**
- **Smoking cigarettes**
- **Natural sources (geological)**
- **Chronic – Kidney damage; cancer**



Cadmium in Qamanirjuaq Caribou Tissues



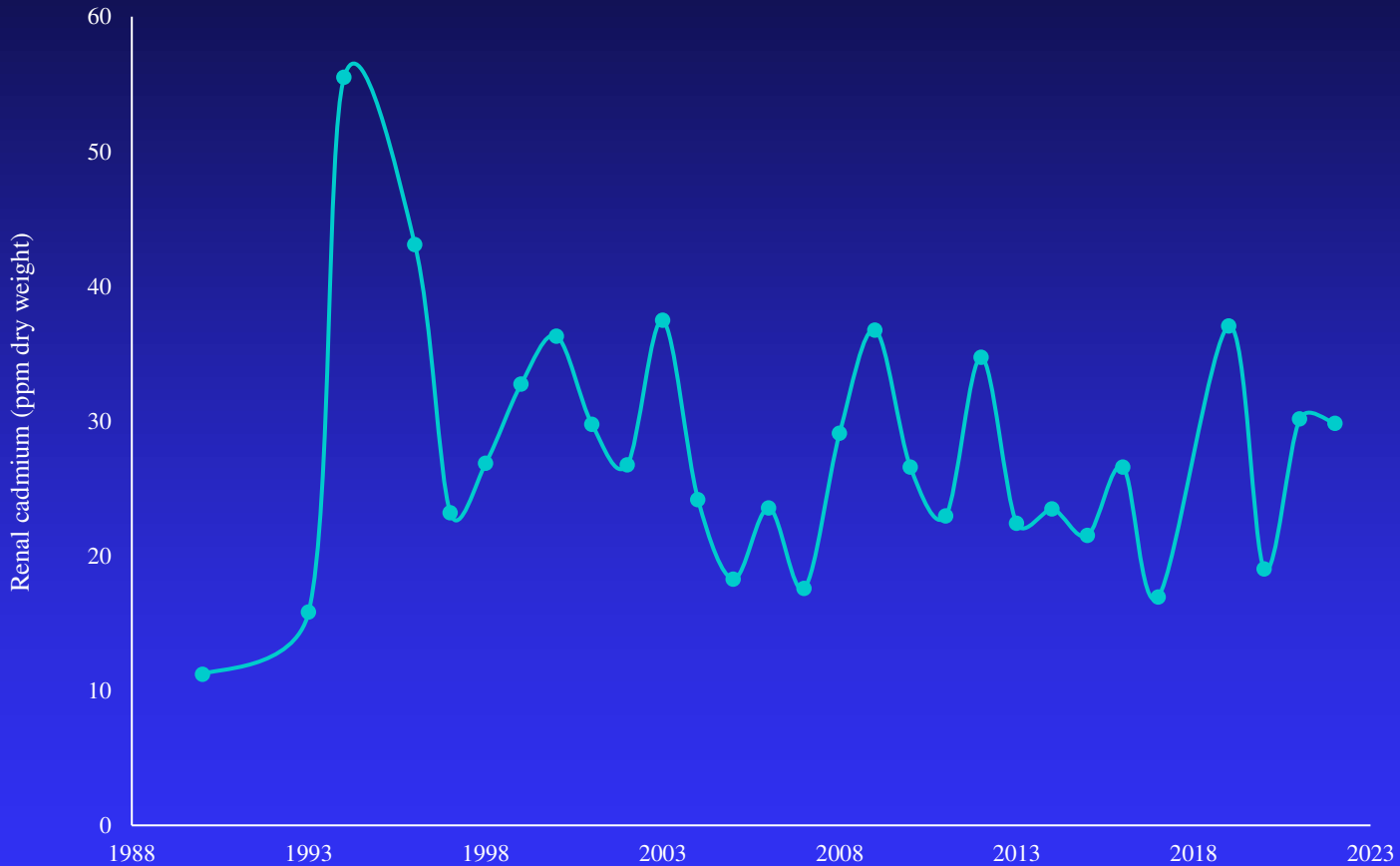


Health Assessment

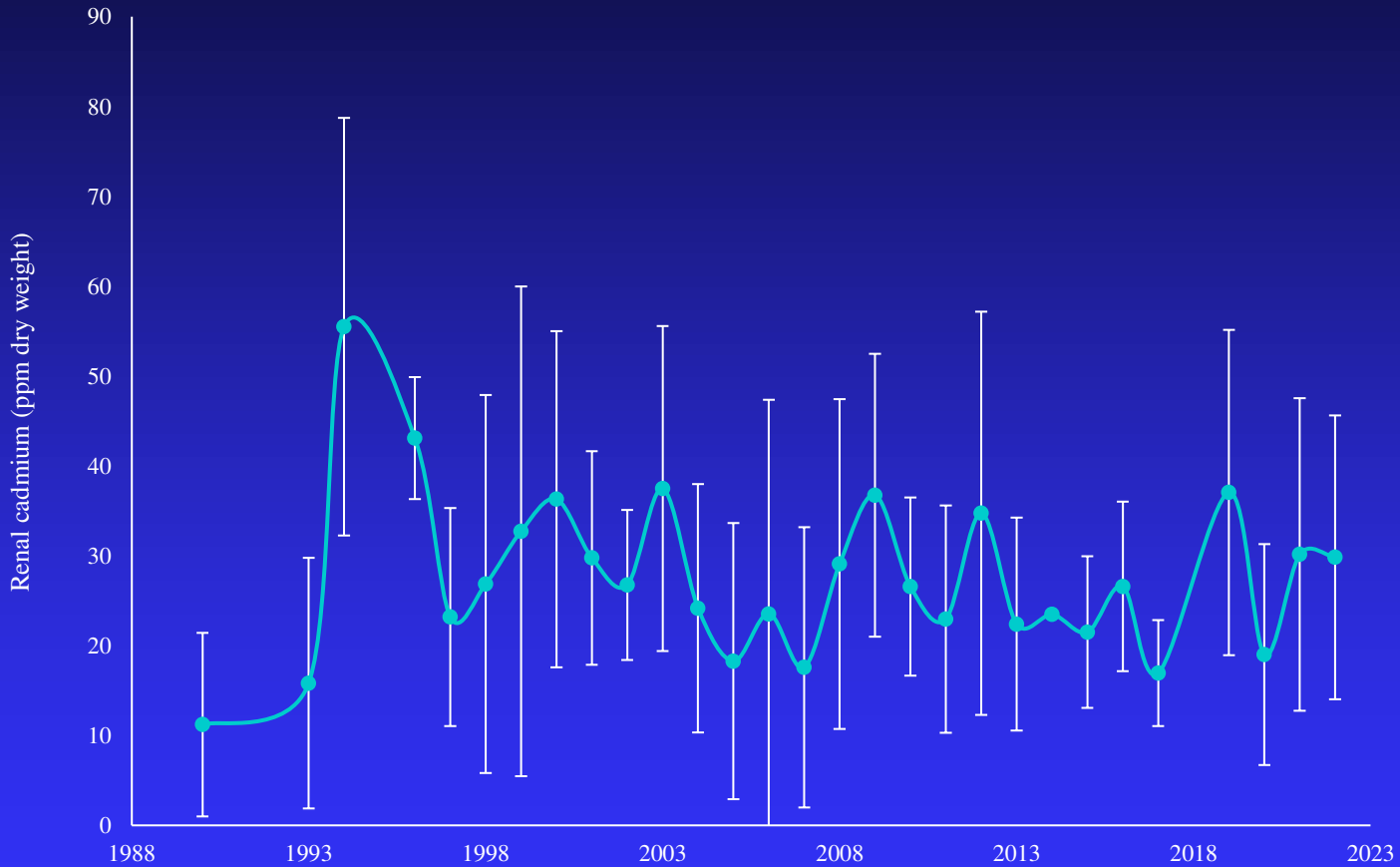
Recommended maximum yearly intake

CARIBOU	Kidneys	Livers	Meat
Porcupine	24	12	All You Want

Cadmium in Porcupine Caribou Bull Kidneys



Cadmium in Porcupine Caribou Bull Kidneys



Is Cadmium Affecting the Caribou?



Is Cadmium Affecting the Caribou?



Mercury

Man-made Sources

- Coal-fired power plants
- Industrial processes (chlorine, steel phosphate and gold production; metal smelting; electronics; incineration of municipal wastes)
- Small scale artisanal mining



Mercury

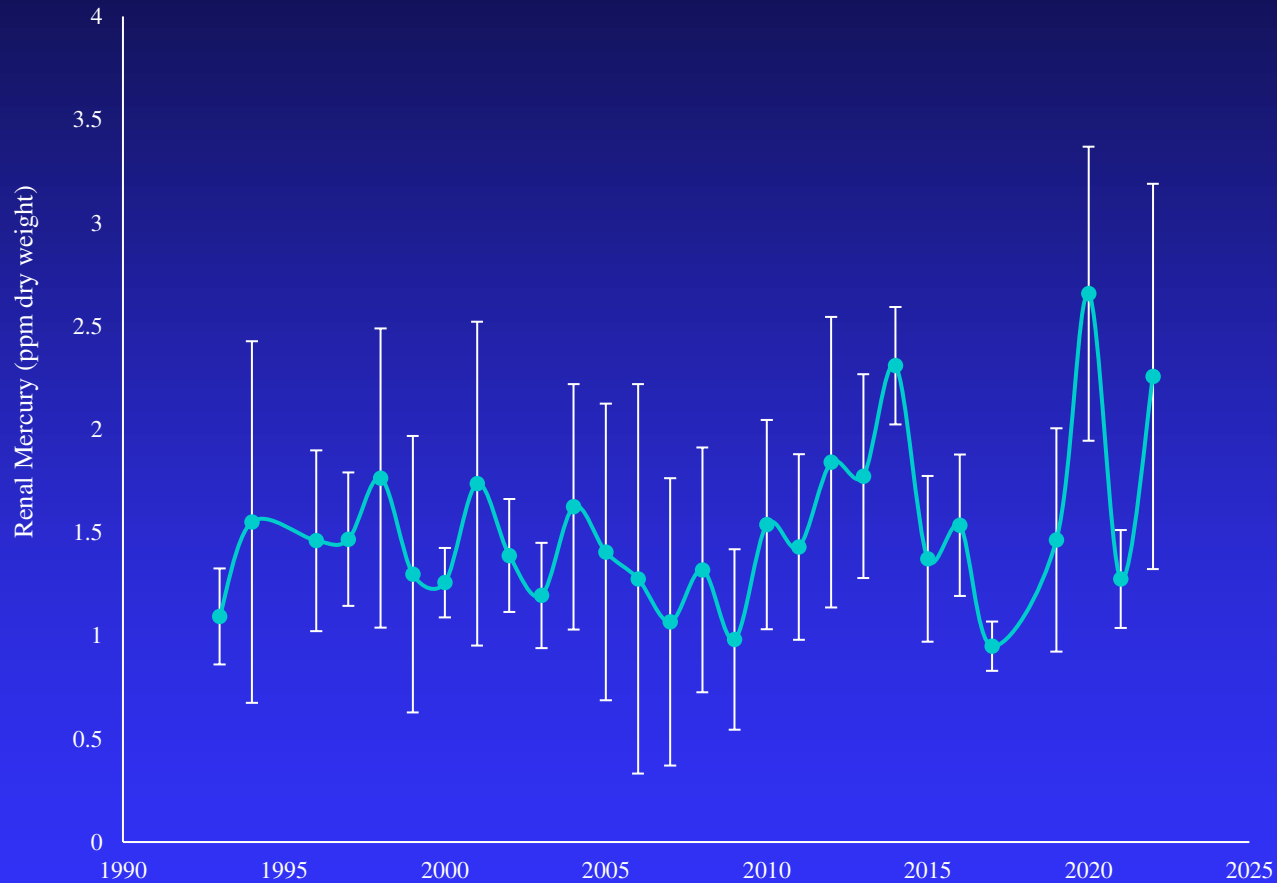
Natural Sources

- Volcanoes
- Forest Fires
- Geologic sources

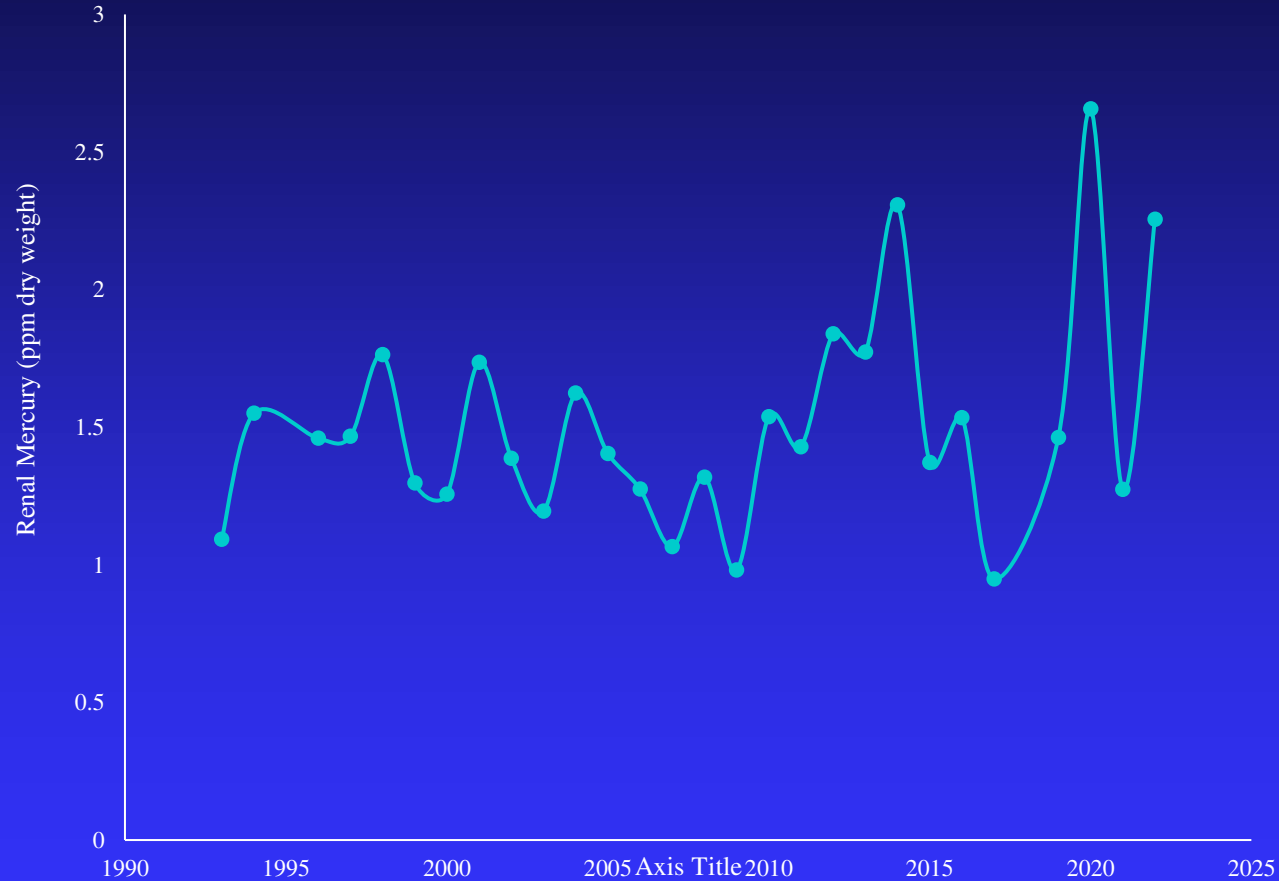


Mercury is toxic

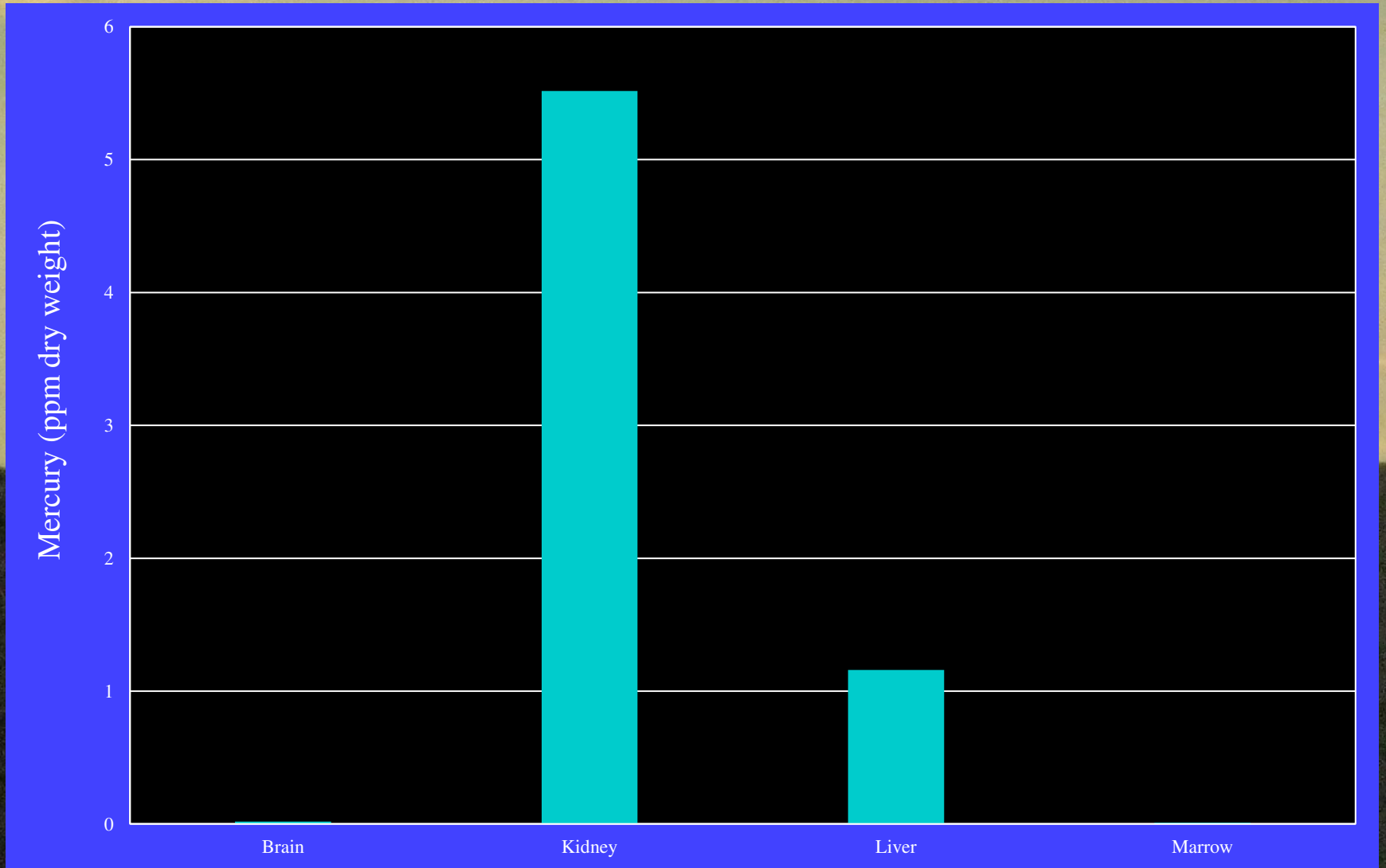
Mercury in Porcupine Caribou Bull Kidneys



Mercury in Porcupine Caribou Bull Kidneys



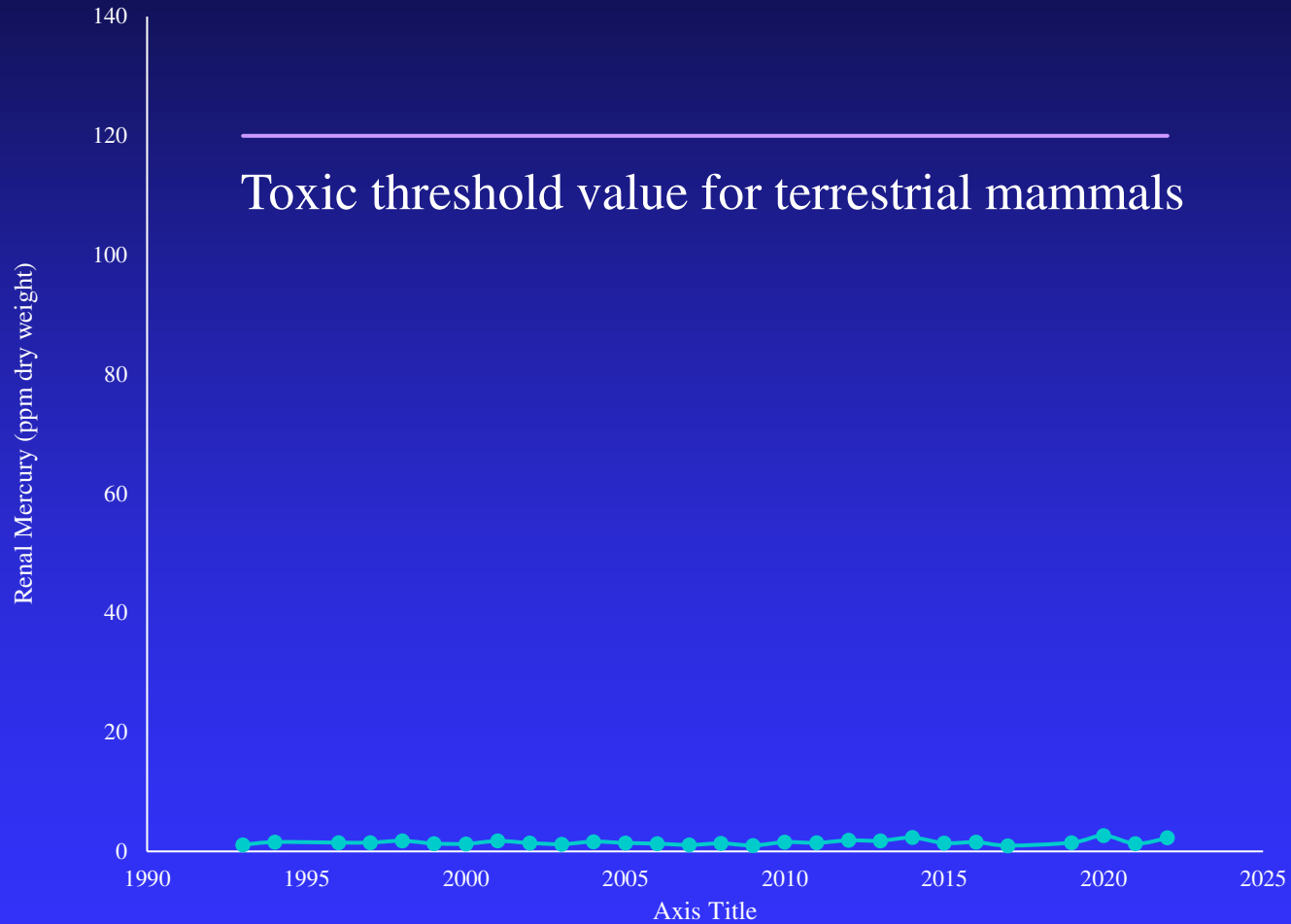
Mercury in Qamanirjuaq Caribou



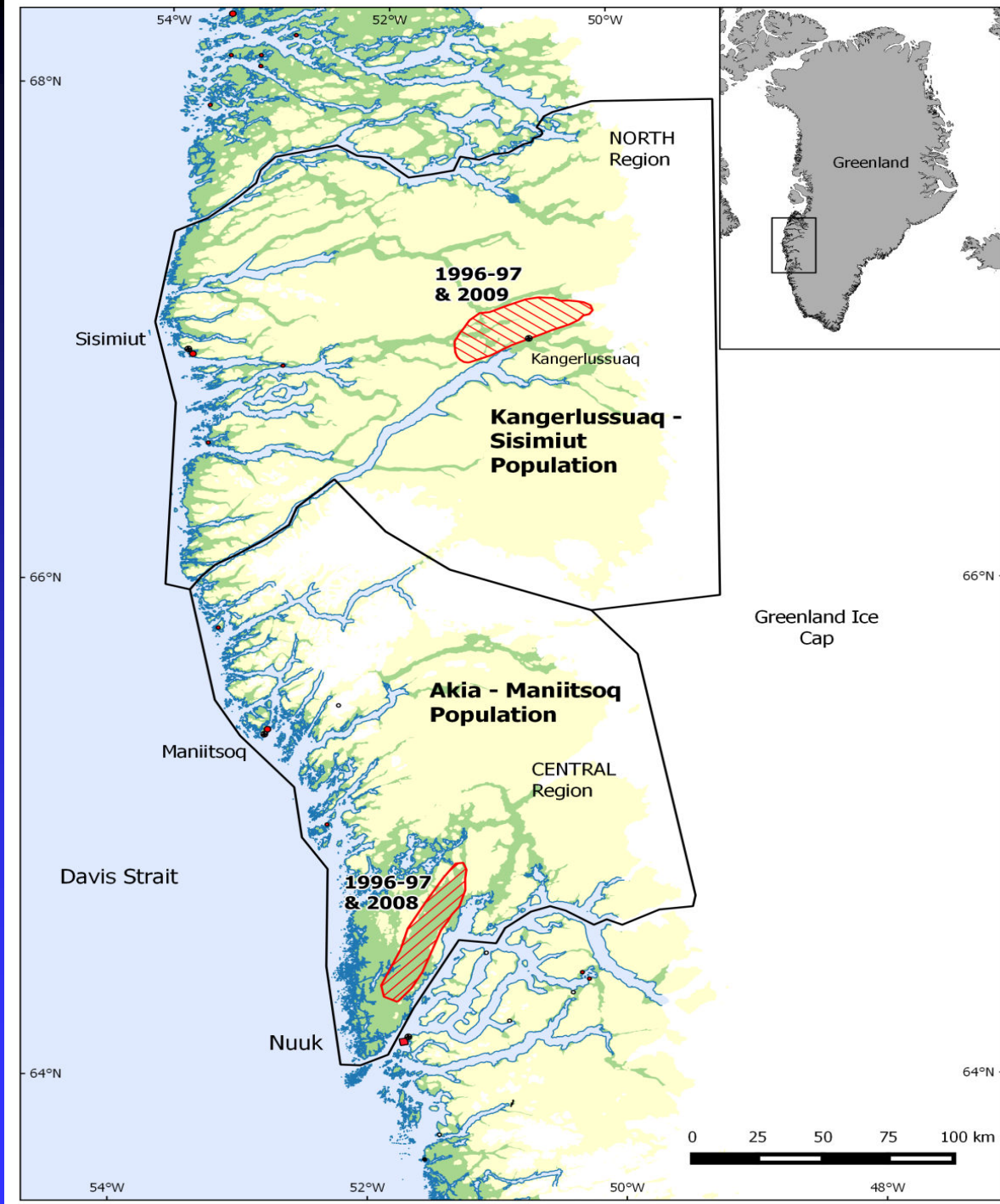
Is Mercury Affecting the Caribou?

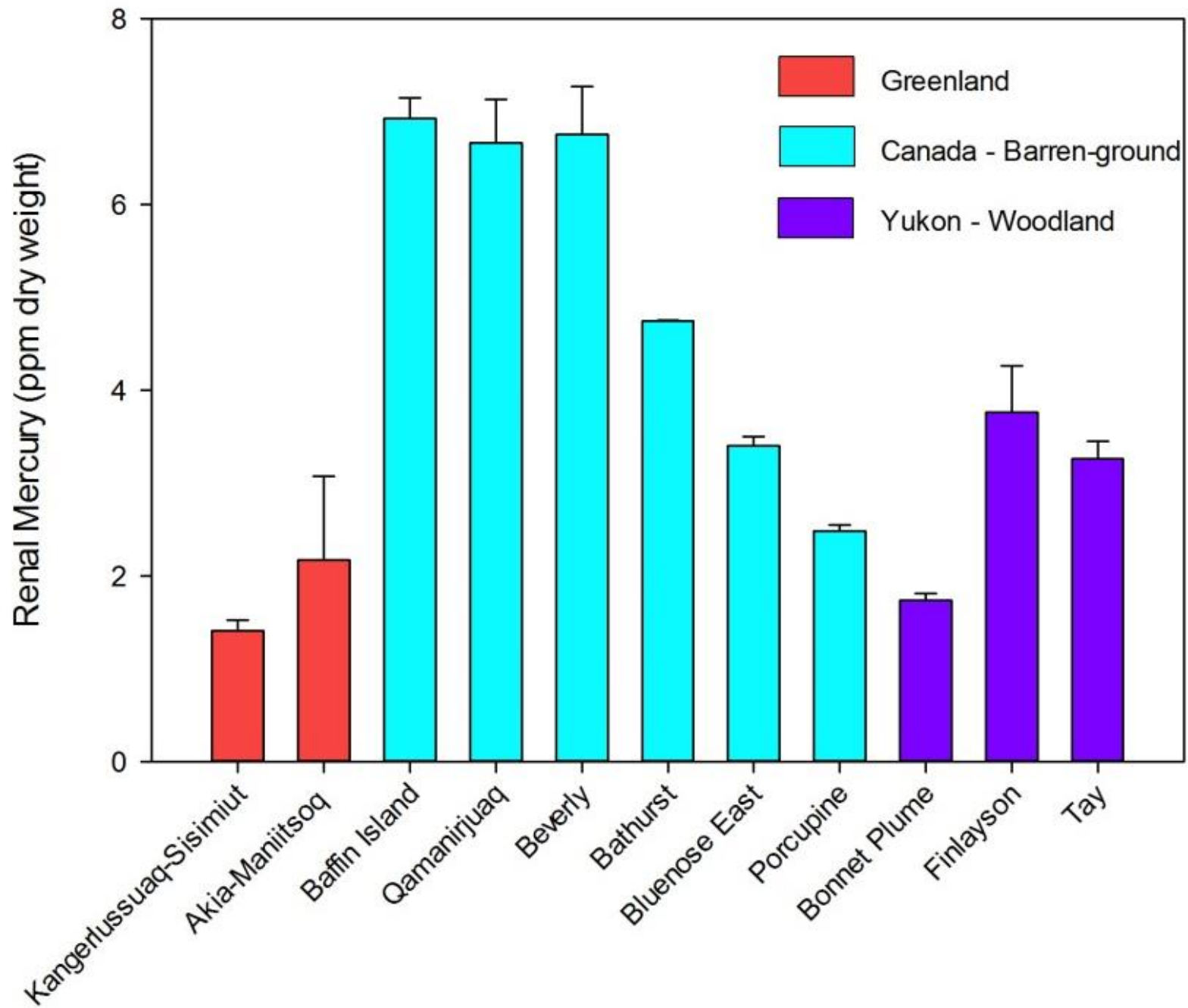


Is Mercury Affecting the Caribou?



Contaminants in two populations of Greenland caribou





Is mercury preventing pregnancy?

Epigenetics!



Plastics



Porcupine Caribou Analyses

- Kidney, liver – elements
- Liver
 - PFAS
 - Legacy POPs
 - non-targeted analysis
 - Plastics and plastic additives
 - Genomic markers

We rely on hunters!



Photo Credit: Peter Mather