



# Current capacity for a European raptor biomonitoring scheme: Spatiotemporal trends in the exposure to and effects of Mercury

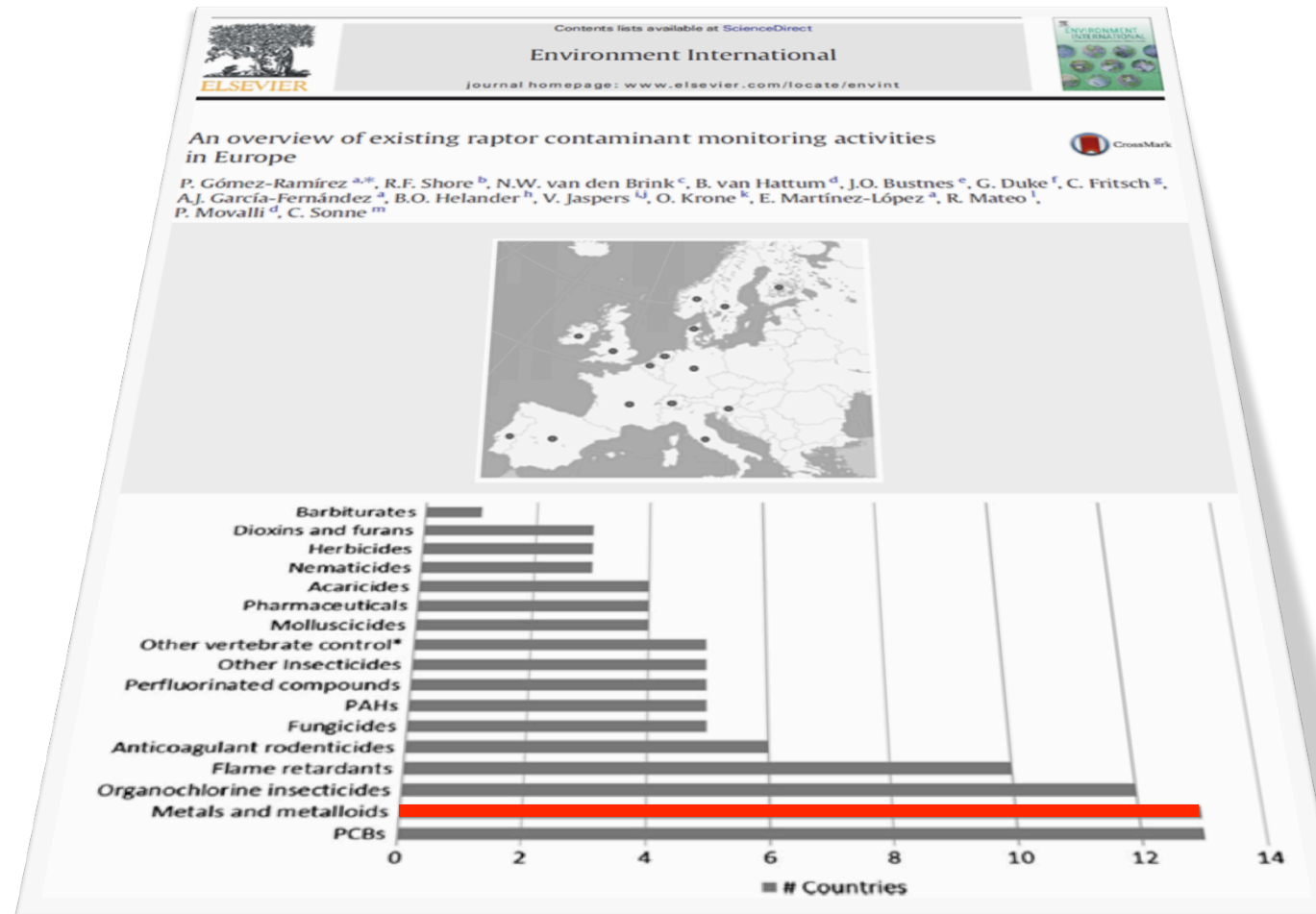
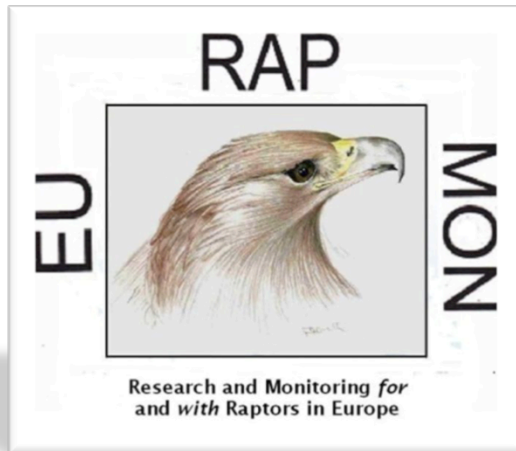
## Objective R1

### **To assess current capacities for pan-European raptor biomonitoring and develop a framework for a European Raptor Biomonitoring Scheme (ERBioMS)**

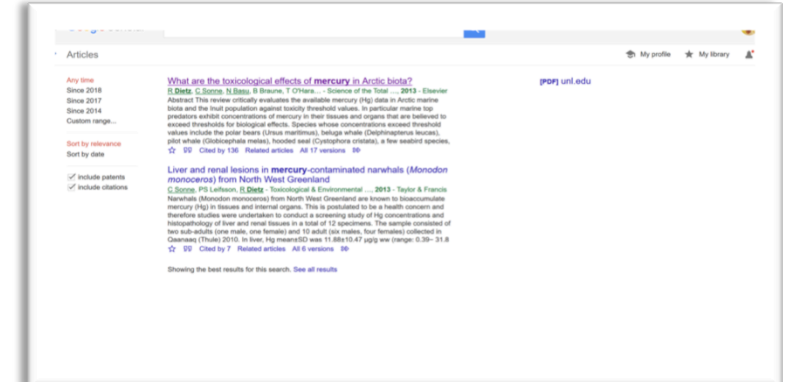
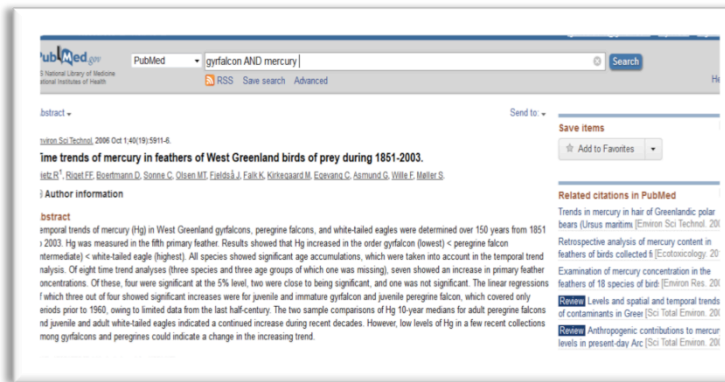
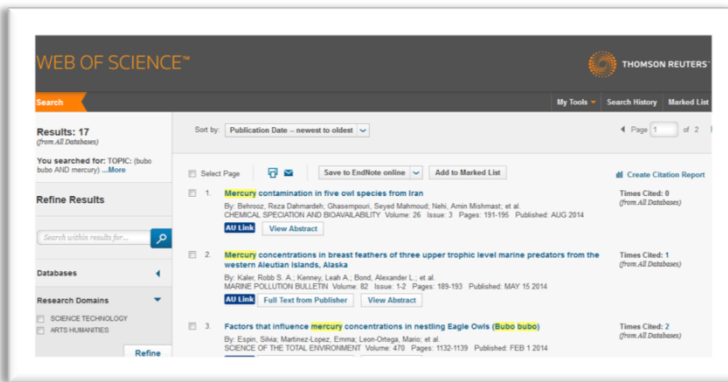
- Focus on current capabilities to detect temporal and spatial trends in contaminant exposure and key areas of weakness (in the absence of coordination).
- Develop an ERBioMS framework capable of delivering pan-European surveillance and monitoring of key pollutants (EU chemicals law and relevant global and regional conventions).

### **Concretely (case studied for a set of priority compounds)**

- Which species are feasible?
- Which geographic extent is feasible?
- Which tissues are feasible?
- What are the spatiotemporal trends?
- What are the potential biases?



# Methods



reference	year	effect	type	matrix	age	sex	dead	year	range	year	n	%	land	reg	space	inc	n	nests	mean	SD	med	min	max	n	nests	min
Koeman et al. 1971	DE+1971	-	E	E	-	-	-	1971	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	3	3	1.53	0.64	1.85	0.80	1.95	3	3	0.3
Dehne 1981	DE+1981	-	E	L	-	-	-	1981	n	-	-	-	DE	DE	Schleswig-Holstein	-	-	-	-	-	-	-	-	-	-	-
Koeman et al. 1971	DE+1969	-	E	L	ad	F	Y	1969	1978	-	-	-	DE	N-DE	Schleswig-Holstein	-	-	-	-	-	-	-	-	-	-	-
Falandysz 1984	DE+1982	dead	IT	L	ad	F	Y	1982	n	-	-	-	DE	N-DE	Uman Island	-	-	-	-	-	-	-	-	-	-	-
Kemmer et al. 2001	DE+1982	-	IT	L	ad	F	Y	1982	n	-	-	-	DE	N-DE	Uman Island	-	-	-	-	-	-	-	-	-	-	-
Dehne 1981	DE+1981	-	IT	L	ad	F	Y	1981	n	-	-	-	DE	N-DE	Uman Island	-	-	-	-	-	-	-	-	-	-	-
Koeman et al. 1971	DE+1969	-	IT	K	ad	F	Y	1969	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	-	-	-	-	-	-	-	-	-	-
Falandysz 1984	DE+1982	dead	IT	K	ad	F	Y	1982	n	-	-	-	DE	N-DE	Uman Island	-	-	-	-	-	-	-	-	-	-	-
Kemmer et al. 2001	DE+1982	-	IT	K	ad	F	Y	1982	n	-	-	-	DE	N-DE	Uman Island	-	-	-	-	-	-	-	-	-	-	-
Falandysz 1984	DE+1982	dead	IT	K	ad	F	Y	1982	n	-	-	-	DE	N-DE	Uman Island	-	-	-	-	-	-	-	-	-	-	-
Falandysz 1984	DE+1982	dead	IT	L	ad	F	Y	1982	n	-	-	-	DE	N-DE	Uman Island	-	-	-	-	-	-	-	-	-	-	-
Falandysz 1984	DE+1982	dead	IT	H	ad	F	Y	1982	n	-	-	-	DE	N-DE	Uman Island	-	-	-	-	-	-	-	-	-	-	-
Falandysz 1984	DE+1982	dead	IT	Bo	ad	F	Y	1982	n	-	-	-	DE	N-DE	Uman Island	-	-	-	-	-	-	-	-	-	-	-
Dehne 1981	DE+1981	dead	IT	B	-	-	-	1981	n	-	-	-	DE	N-DE	Uman Island	-	-	-	-	-	-	-	-	-	-	-
Bahr et al. 1993	DE+1990	-	Fx	Fp	imad	-	-	1990	n	-	-	-	DE	N-DE	Brandenburg/Mecklenburg	-	62	28	31.07	11.51	29.96	20.16	43.00	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1949	-	Fx	Fl	-	-	-	1949	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	2	2	21.00	3.55	21.00	18.48	23.51	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1950	-	Fx	Fl	-	-	-	1950	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	2	2	20.54	3.59	20.54	18.14	22.95	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1951	-	Fx	Fl	-	-	-	1951	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	1	1	11.82	0.00	11.82	11.82	11.82	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1952	-	Fx	Fl	-	-	-	1952	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	1	1	28.29	0.00	28.29	28.29	28.29	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1953	-	Fx	Fl	-	-	-	1953	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	2	2	19.43	10.78	19.43	11.83	27.04	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1955	-	Fx	Fl	-	-	-	1955	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	1	1	7.48	0.00	7.48	7.48	7.48	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1956	-	Fx	Fl	-	-	-	1956	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	1	1	12.21	0.00	12.21	12.21	12.21	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1957	-	Fx	Fl	-	-	-	1957	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	1	1	10.51	0.00	10.51	10.51	10.51	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1958	-	Fx	Fl	-	-	-	1958	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	3	3	17.36	4.54	15.49	14.29	21.24	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1959	-	Fx	Fl	-	-	-	1959	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	2	2	12.77	5.46	12.77	8.91	16.63	-	-	-
Niecke et al. 1999	DE+1959	-	Fx	Fl	ad	-	-	1959	n	-	-	-	DE	N-DE	Mecklenburg-Vorpommern	-	1	1	11.75	0.00	11.75	11.75	11.75	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1960	-	Fx	Fl	-	-	-	1960	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	3	3	15.06	4.89	13.09	11.46	16.63	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1961	-	Fx	Fl	-	-	-	1961	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	2	2	13.92	6.42	13.92	9.38	18.46	-	-	-
Niecke et al. 1999	DE+1961	-	Fx	Fl	ad	-	-	1961	n	-	-	-	DE	N-DE	Mecklenburg-Vorpommern	-	1	1	19.80	0.00	19.80	19.80	19.80	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1962	-	Fx	Fl	-	-	-	1962	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	3	3	15.88	6.24	14.23	10.80	21.91	-	-	-
Niecke et al. 1999	DE+1962	-	Fx	Fl	ad	-	-	1962	n	-	-	-	DE	N-DE	Mecklenburg-Vorpommern	-	1	1	30.00	0.00	30.00	30.00	30.00	-	-	-
Scharenberg and Struwe-Juhl 2000	DE+1963	-	Fx	Fl	-	-	-	1963	n	-	-	-	DE	N-DE	Schleswig-Holstein	-	1	1	5.41	0.00	5.41	5.41	5.41	-	-	-



from R Studio



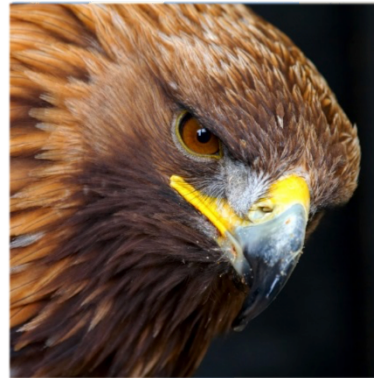
# Which species are feasible?





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review estimated (minimum) test at 2014 rep)



# Which geographical extent is feasible?

## Mammivorous (nocturnal)

- barn owl
- Eurasian eagle-owl
- long-eared owl
- tawny owl

## Mammivorous (diurnal)

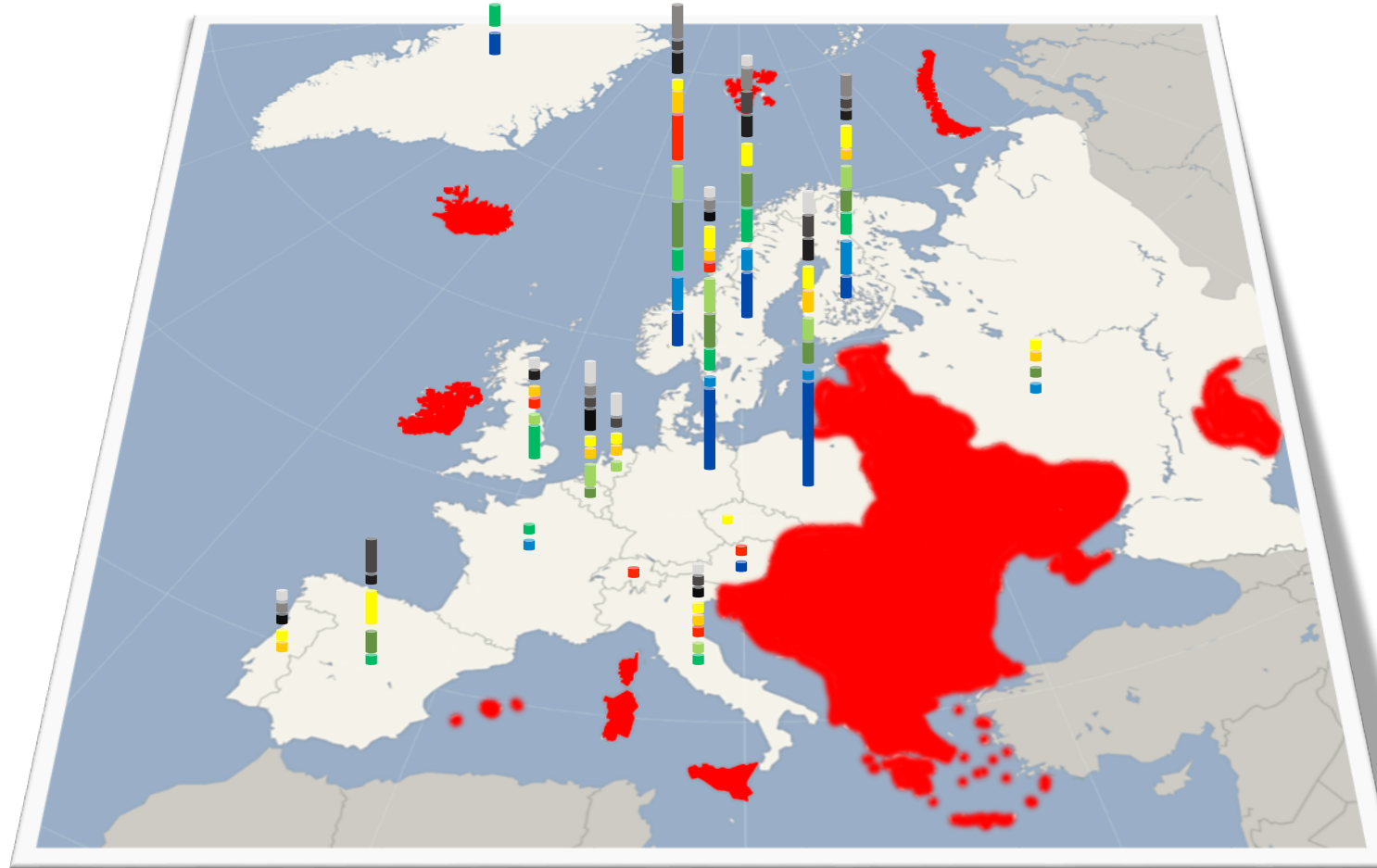
- common buzzard
- common kestrel
- golden eagle

## Avivorous

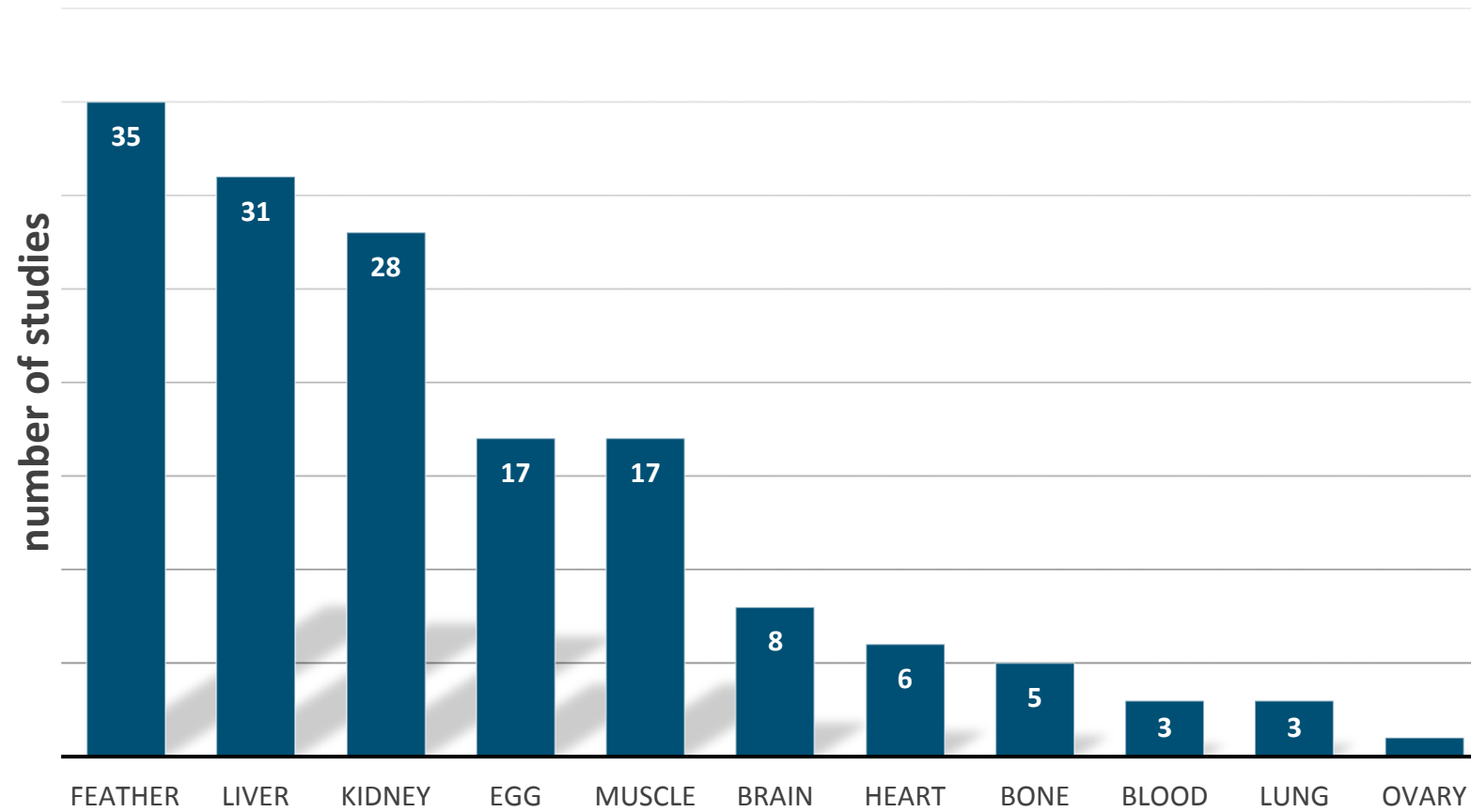
- Eurasian sparrowhawk
- Northern goshawk
- peregrine falcon

## Piscivorous

- osprey
- white-tailed eagle

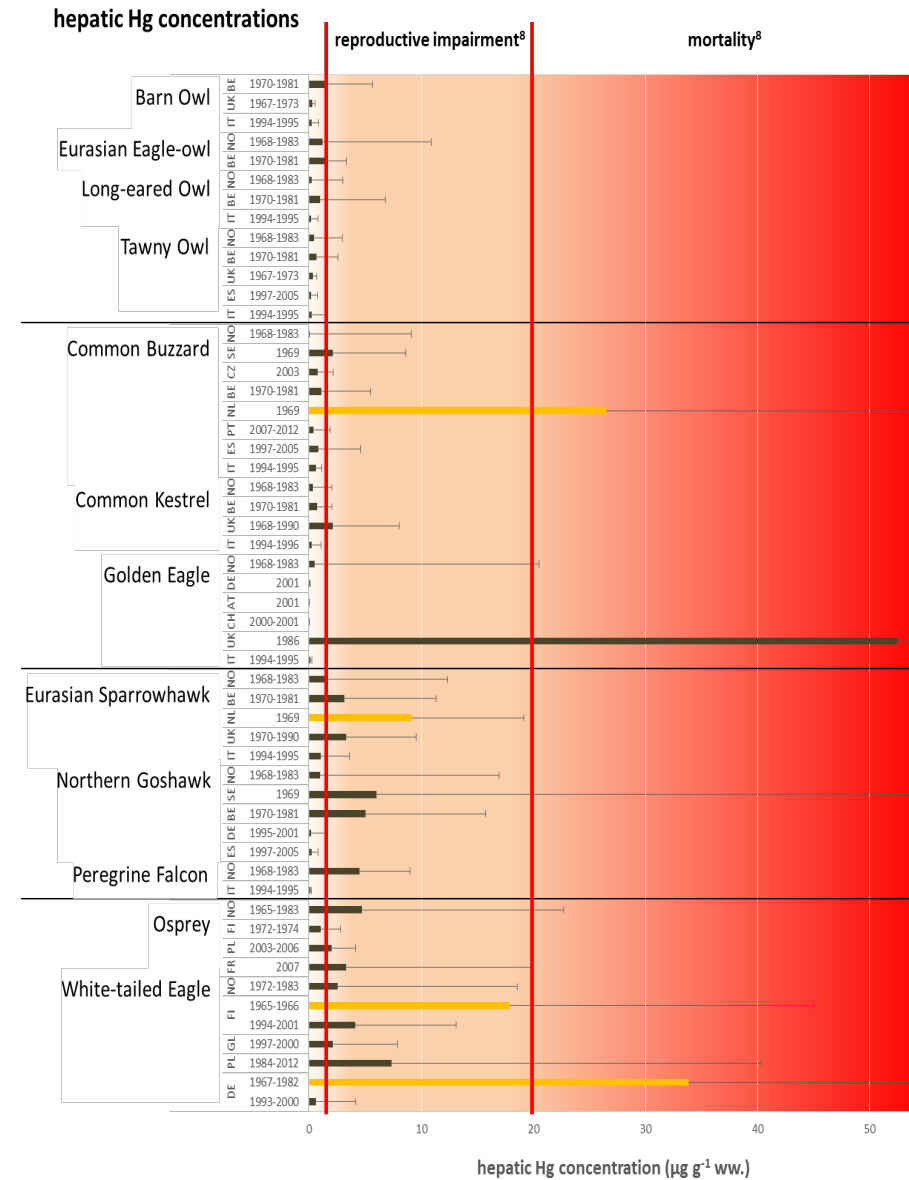
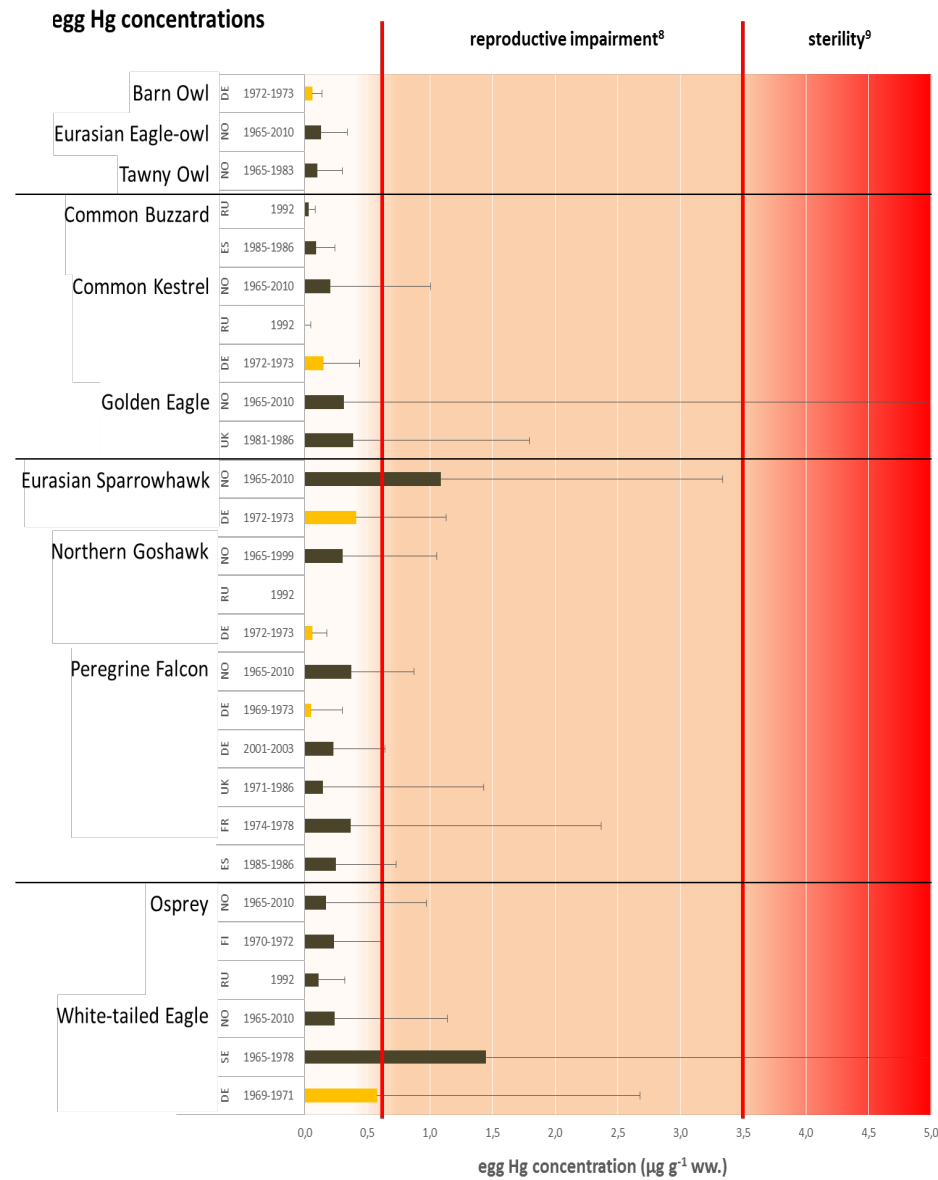


# What tissues are feasible?

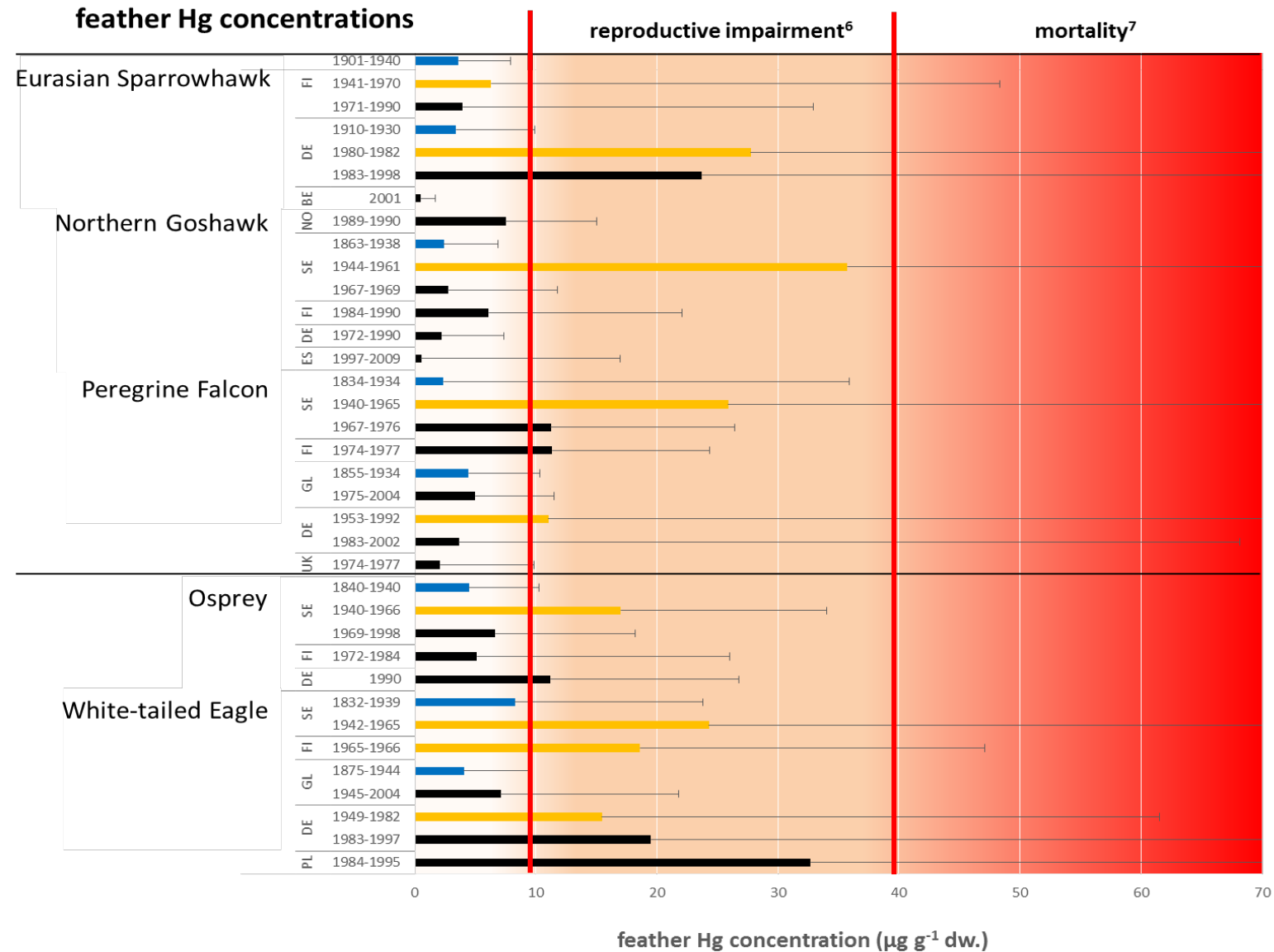




# What are the spatiotemporal trends?



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### Objective R1

**To assess current capacities for pan-European raptor biomonitoring and develop a framework for a European Raptor Biomonitoring Scheme (ERBioMS)**

#### Databases

- Literature database
- Database on exposure (including metadata)
- Database on effects (including metadata)

#### Papers

- Scientific report
- Fact sheet
- Peer-reviewed paper

#### Other

- Interactive Shiny website apps



To be continued ...