



Development of a proof of concept study to test and demonstrate ERBioMS, ERSpeB & ERSamP



Chris Wernham, Associate Director, BTO Scotland

With thanks to Rafa Mateo for ideas and original presentation and participants in Thessaloniki and Florence for additional ideas

Proof of concept: Raptor Biomonitoring



- Objectives
 - Sample size –and distribution
 - Species
 - Sample type (s)
 - Chemical (s)
 - New field samples/collections
 - Labs and methods
- Resources and logistics
- Inclusiveness and justifications

Proof of concept: Objectives (to be agreed)



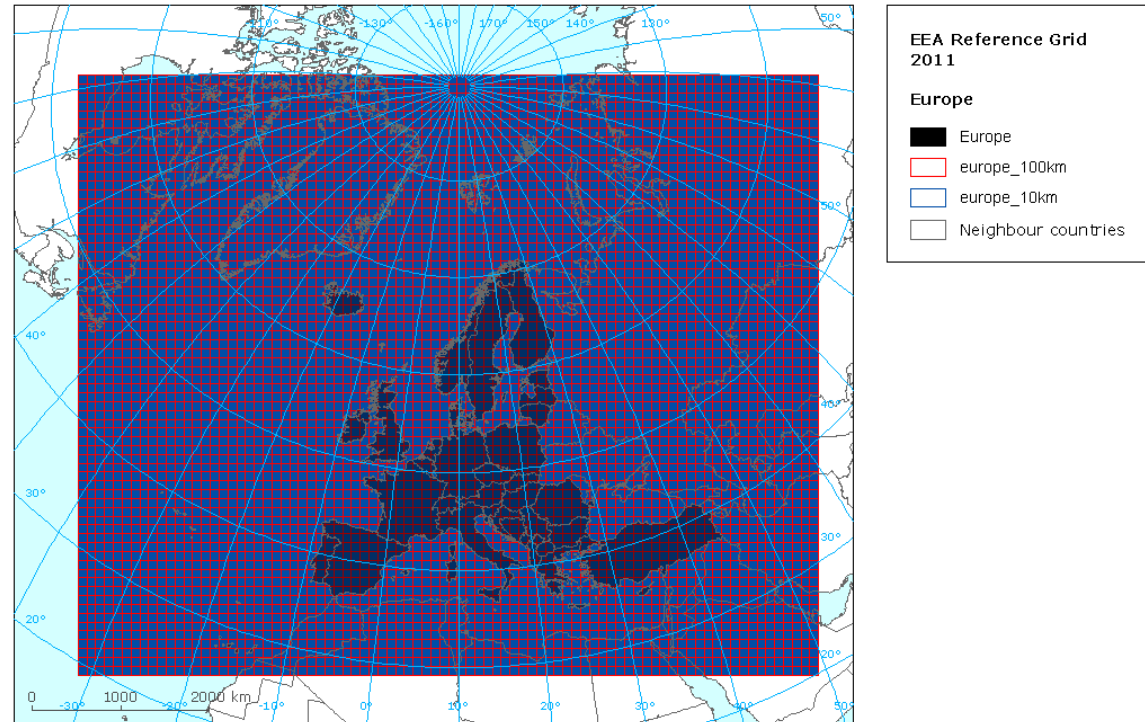
- ✓ Demonstrate spatial variation in exposure to one or more contaminants in one or more species
- ✓ Test the ERBF networks (ERBioMS, ERSpeB and ERSamP) and demonstrate their value to future funders and participants
- ✓ Identify gaps in sources of samples (ERSamP)
- ✓ Identify gaps in storage capacity (ERSpeB)
- ✓ Identify gaps in analytical capability
- ✓ Test pathways of movement for samples and constraints at all stages
- X Demonstrate best species
- X Analyse for all contaminants
- X Demonstrate effects of contaminant(s)

Sample size - Distribution

1 bird per 10,000 km²

1080 birds for Europe / **439** birds for EU

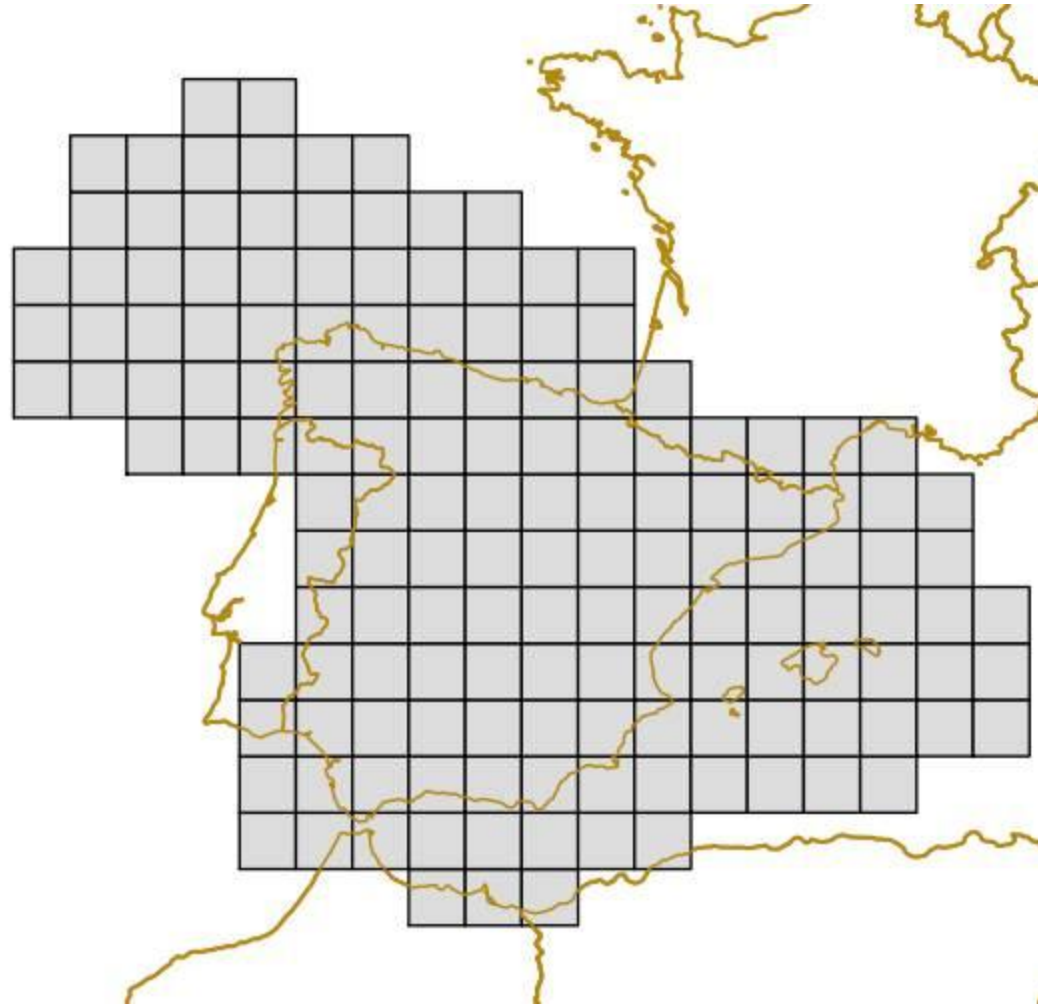
Spain 51,
France 64
UK 24
Germany 36
Sweden 45
...



<https://www.eea.europa.eu/data-and-maps/data/eea-reference-grids-2>

Spain

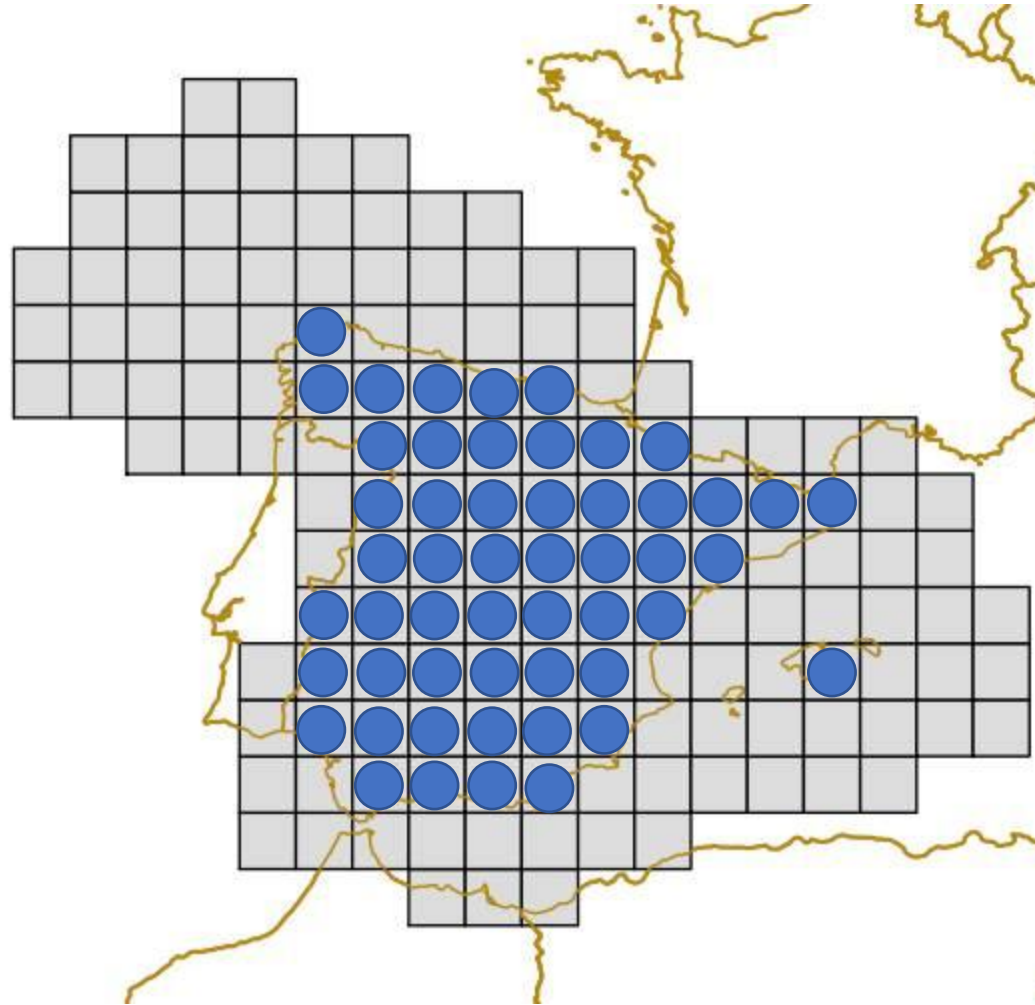
100 × 100 km



<https://www.eea.europa.eu/data-and-maps/data/eea-reference-grids-2>

Spain

Suggest using a grid that is compatible with the 50 x 50 km squares of the EBCC Bird Atlas to maximise available background contextual data



Note the importance of being able to demonstrate visually the coverage of sample collection as it is achieved, and to show remaining gaps to fill

N=52

Species

- Only one species?
- Widely distributed or with close relatives
- Easy to sample
- Samples in banks/collections
- Advantages and limitations of different species
- e.g. Tawny Owl – few nestbox studies in south of range



More ambitious – later stage

Sample type

Initial quick win approach

Active

- Blood
- Eggs
- Pellets?

OR

Passive

- Liver

Road-kills
WRCs
Spec Banks



Chemicals

- Metals: Hg / Pb
 - POPs: DDE, PCB153, PFAS...
 - Pesticide: Rodenticides
- Blood/egg/liver
 - Blood/egg/liver
 - Liver

Suitability of selected species for Hg/Pb and/or rodenticide analyses
e.g. Buteo buteo better than Strix aluco for Pb



Field / Collections

- New samples
- Stored samples (results of Gloria's STSM)
- Banks or collections
- Costs and logistics of sampling and shipping



Labs and Methods

- Different Labs / Only one per chemical
- Interlaboratory study
- Reference sample
- Cost of analyses
- Questionnaire to find out which labs can offer capacity
- How to get results analysed – STSMs?
- Combine with review of existing results – STSMs?



Suggested criteria for initial sample selection

- Fresh or frozen carcasses
- Frozen liver samples (>5 g)
- Known location
- Period 2014-19
- Of these three species: *Falco tinnunculus*; *Buteo buteo*; *Strix aluco*
- Add *Falco peregrinus* to focal species? *Bubo bubo* also suggested?

Agreement form to use samples?

MoA to establish basis for involvement in PoC study?

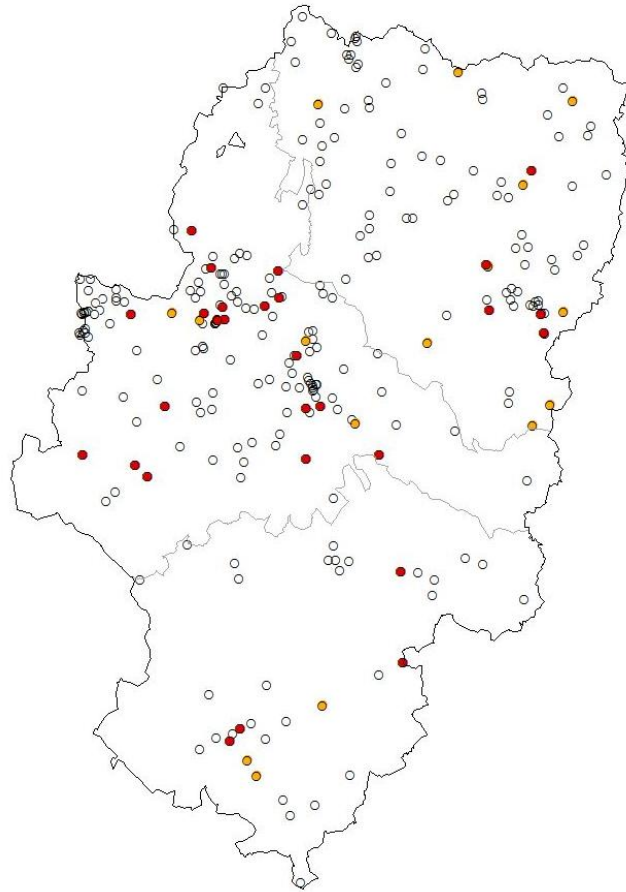
Sample information (their own database or fill this in an Excel file):

- Species (FALTIN/BUTBUT/SRTALU):
- Sample (carcass/liver):
- Sex (M/F):
- Age (1y/Ad):
- Location (Municipality/Country):
- Coordinates:
- Date of death: (MM/YYYY)
- Cause of death:
- Ring number (if ringed):
- Others?

[illegible]

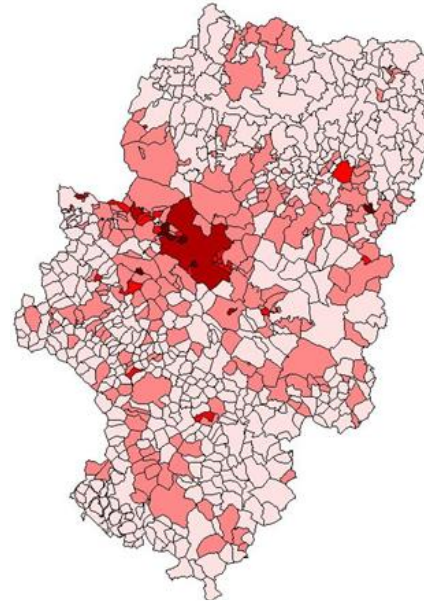
Retrospective compilation of published data (STSM?)

Rodenticides in wildlife from Aragón (NE Spain)

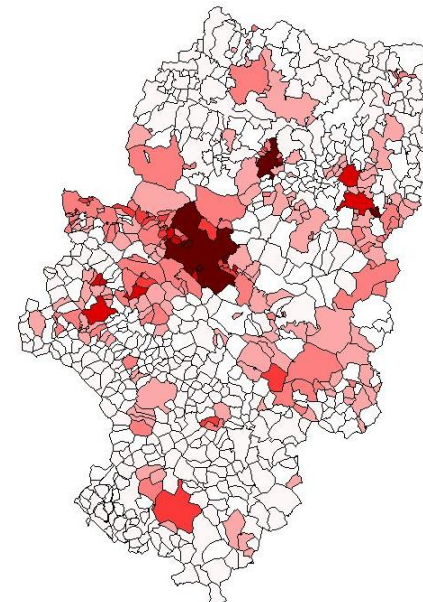
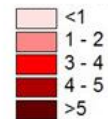


Rodenticides in liver (ng/g)

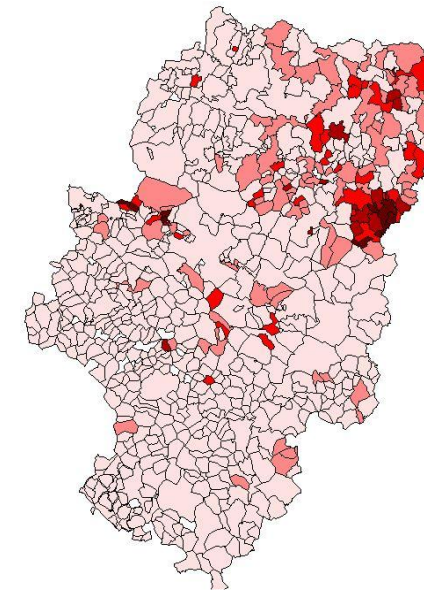
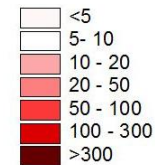
- ND
- 0.1-200
- >200



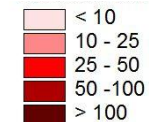
Urban Surface (%)



Human density (habitants/km²)



Cattle density (individuals/km²)



López-Perea, J.J., Camarero, P.R., Sánchez-Barbudo, I.S., Mateo, R. 2019. Urbanization and cattle density are determinants in the exposure to anticoagulant rodenticides of non-target wildlife. Environmental Pollution 244: 801-808.

Things to achieve during our Stirling workshop . . .



- Agree objectives
- Scientific study design (in phases of increasing ambition)
- Agree recommendations for chemical(s), sample type(s), focal species, analytical methods
- Logistics – how to obtain samples
- Logistics – how to get samples analysed and results reported
- Resources – how to get the work done
- Pledges of resource (e.g. lab capacity) and use of STSMs
- Additional sources of funding
- **Inclusiveness and clear justification for design decisions**

Extra slides used before but not currently
included

Optional database for collections/WRC

[illegible]