

Creating distribution maps from monitoring data and casual observations

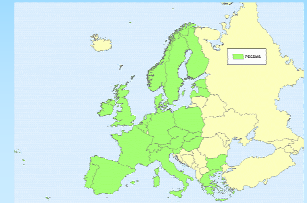
Henk Sierdsema, Caspar Hallmann,
Lluís Brotons, Frédéric Jiguet, Marc Kéry & Stuart Newson

EBCC Spatial Modelling Group (SMOG)



Pan-European Common Bird Monitoring Scheme

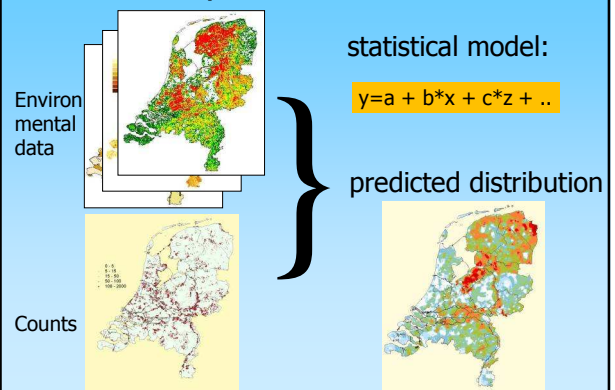
- Combination of the results of national monitoring schemes



Monitoring projects

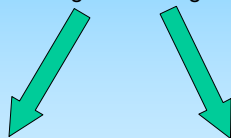
- primarily set up for gathering trend information
- also useful for the generation of distribution patterns
- obtain insight in possible driving forces for changes

Spatial models



EBCC Spatial Modelling Group (SMOG): Pan-European bird mapping initiative

Combining monitoring data



Mapping of distributions

Mapping of population trends

EBCC Spatial Modeling Group

Aim:

facilitate production and use
of
distribution maps and trend maps
from monitoring data

Main initiatives 2005-2011

- Pilot study on farmland birds
 - First pan-European maps
 - Issues to address
 - High Nature Value farmland designation
- SCALES
- TRIM*maps*

Main issues to be addressed

- 1) data access constraints
- 2) spatial coverage & representation
- 3) availability of environmental data
- 4) heterogeneity of the observations
- 5) statistics

Issues to be addressed

- 1) data access constraints
- 2) spatial coverage & representation
- 3) availability of environmental data
- 4) heterogeneity of the observations
- 5) statistics

Issues to address (4):

data heterogeneity

Detectability

number of observed birds (C)

≠

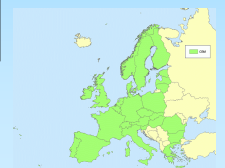
birds present (N)

$$C = N * p$$

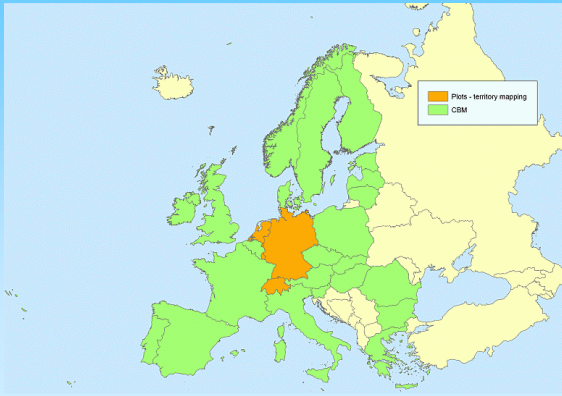
(p = detection probability)

Field methods used by schemes across Europe

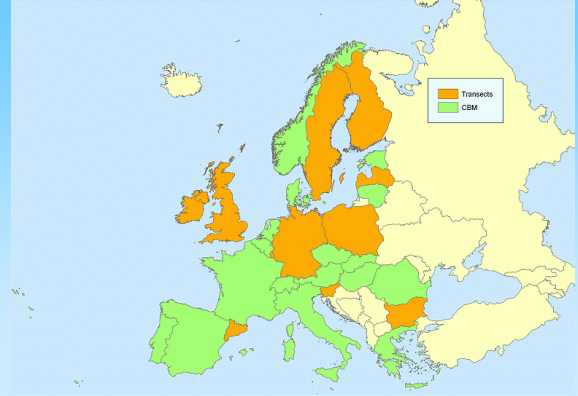
Method	No. schemes
Line transects	11
Point counts	18
Territory mapping	4



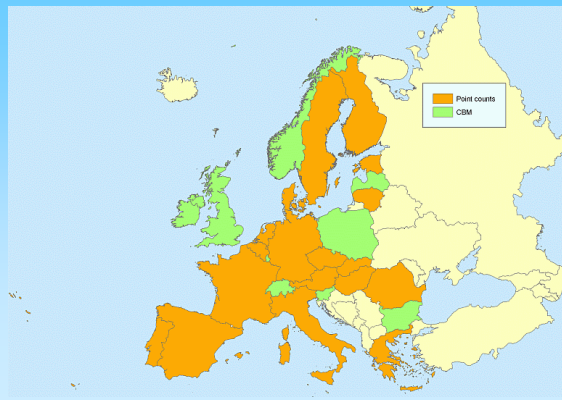
Territory mapping



Transects



Point counts



Proposed solutions

- create maps from one scheme or groups of schemes
- combine different maps ("map mosaicking")
- maps show combinations of relative abundances

How to calibrate between different monitoring methods ?

(some) calibration possibilities

- Two different methods in the same region
- Set of plots with standardized method across Europe
- Multi-scale modelling approach

Calibration

- Two different methods in the same region
- Set of plots with standardized method across Europe
- Multi-scale modelling approach

Multi-scale modelling

- First make international models **with monitoring method as co-variate**
- Then make national maps
- Combine national maps using calibration factor to account for different monitoring methods

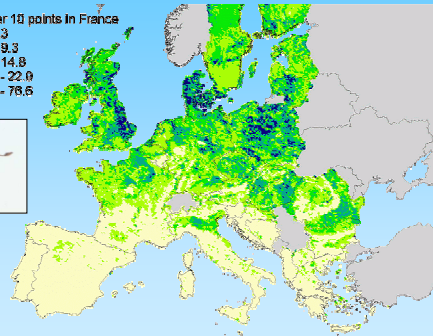
International scale

- International models with monitoring method as co-variate
- Data per sample site is necessary
- Only possible with international co-variables

International scale

Number per 10 points in France

- 0 - 4.3
- 4.3 - 9.3
- 9.3 - 14.8
- 14.8 - 22.9
- 22.9 - 76.6

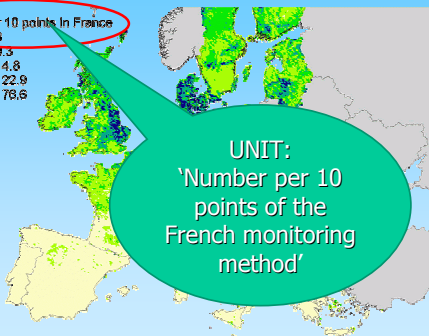


International scale

Number per 10 points in France

- 0 - 4.3
- 4.3 - 9.3
- 9.3 - 14.8
- 14.8 - 22.9
- 22.9 - 76.6

UNIT:
'Number per 10
points of the
French monitoring
method'



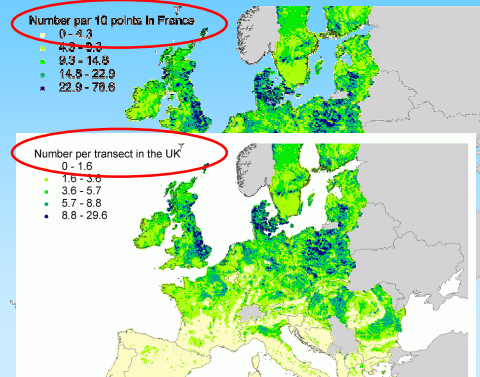
International scale

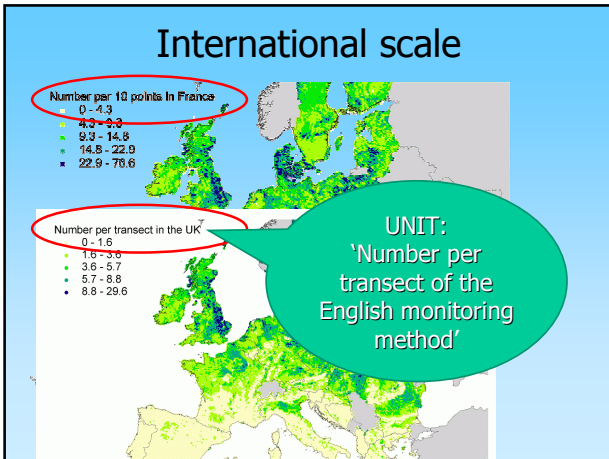
Number per 10 points in France

- 0 - 4.3
- 4.3 - 9.3
- 9.3 - 14.8
- 14.8 - 22.9
- 22.9 - 76.6

Number per transect in the UK

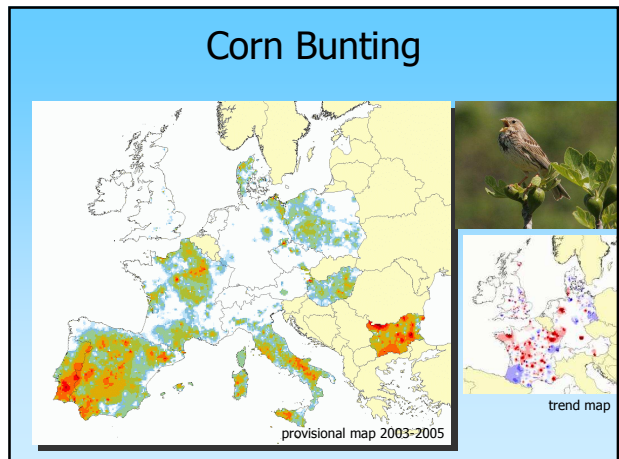
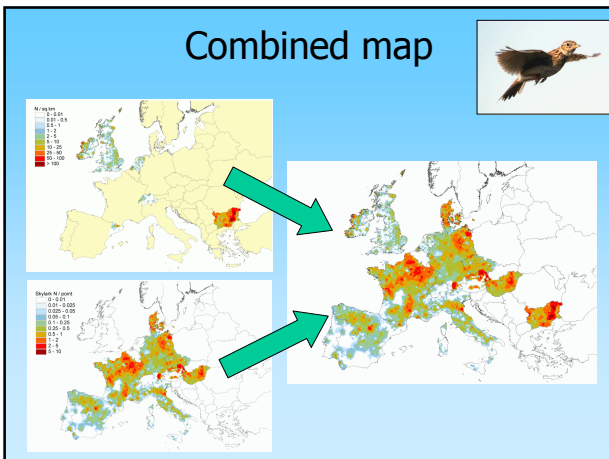
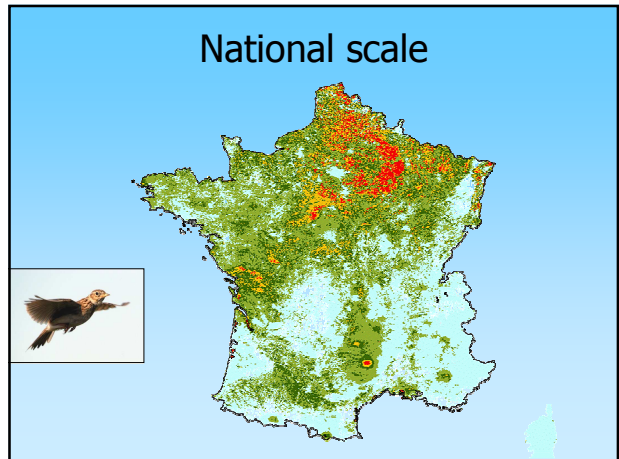
- 0 - 1.6
- 1.6 - 3.6
- 3.6 - 5.7
- 5.7 - 8.8
- 8.8 - 29.6



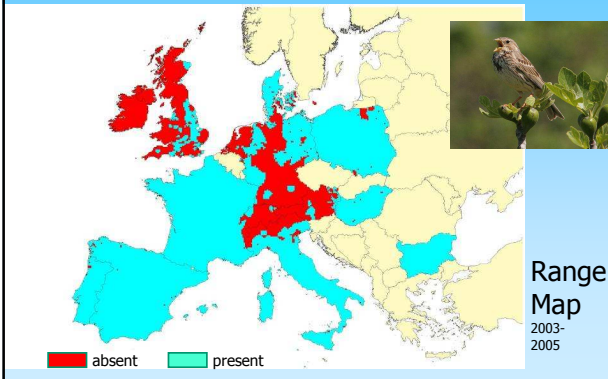


- ### International scale
- Results:
 - International models and maps
 - Calibration factor between monitoring schemes

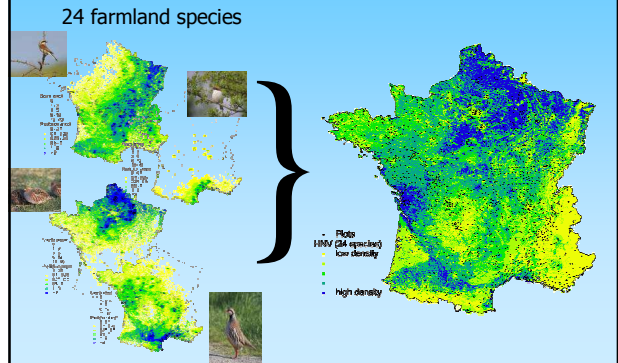
- ### National scale
- Create high-quality map with international and national covariables



Corn Bunting: range map



High Nature Value farmlands



TRIMmaps

TRIMmaps

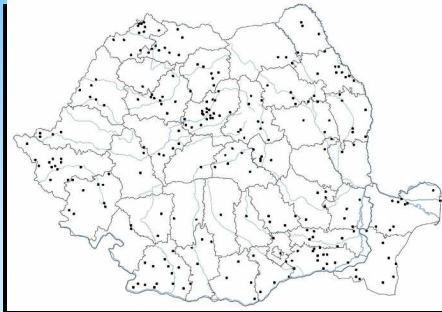
- Facilitate production of maps from monitoring data
- R-programme
- Open source / freeware



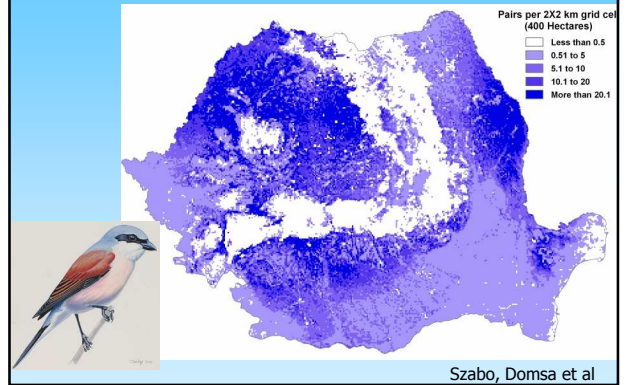
```
25
26
27 Make a TRIMmaps object
28 trimData <- data.TRIMmaps(
29   name="trindata", # name of the data (for saving purposes)
30   outdir="outdir", # name of output-directory
31   plot.dir="plots", # name of plot data
32   OBS_DIR="OBS", # OBS in this case because observations are included in I
33   refarea, # coordinate reference
34   use.maps=FALSE, # Do standard maps
35   Use.maps=TRUE, # Use own maps yes
36   Use.outmaps=getcwd(), # Point to folder covariate maps
37   Use.all.questions=FALSE, # stop asking me which maps I want (FALSE=use all the map
38   add.names=FALSE, # Add names by species/plot comb? (FALSE=no, TRUE=yes)
39   generate.names=FALSE, # ... Yes caution
40   Use.coord=TRUE # The maps are in the same coordinate reference system.
41 )
42
43
44
45
46 #30 offset
47 #coordinates[1]range=100
48 #coordinates[2]range=400
49
50
51 ## Most basic analysis possible
52 # count data
53 # Model f ~ GLM: var: x, y, alt, coarse (p=04), no clim GLM
54
55 trim.glm <- TRIMmaps(
56   TRIMData = trimData,
57   coord.validation=TRUE,
58   #plot.type="response",
59   #int.response=1000000(1000,10000),
60   out.dir=paste(outdir,"glm",sep="\\"),
61 )
```

Applications of TRIMmaps

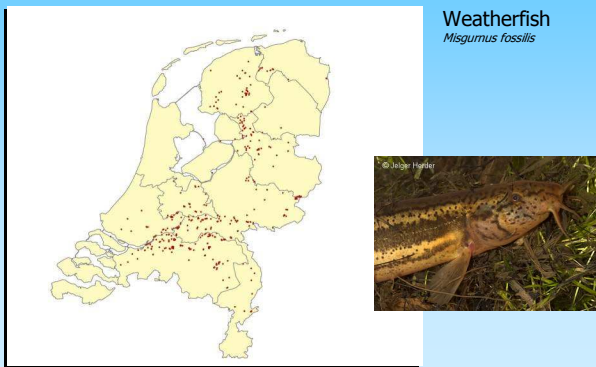
Romania: point counts



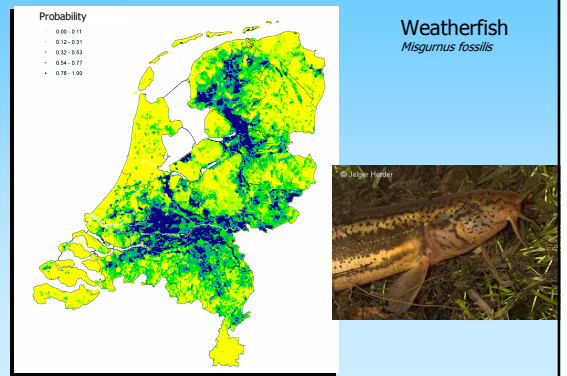
Red-backed Shrike



Casual observations

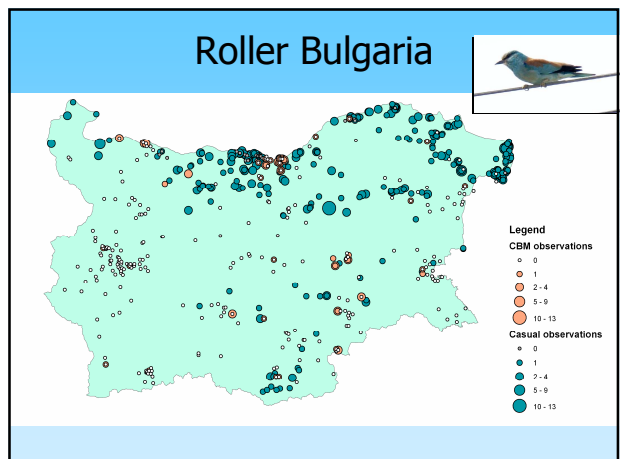


Probability map

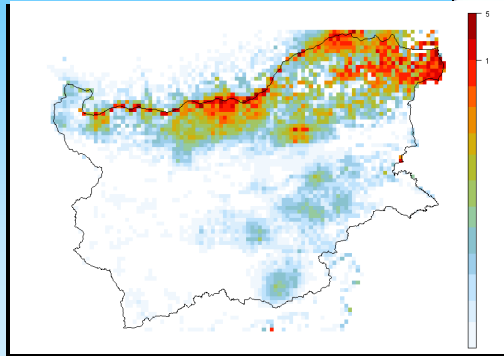


Combining CBM-data and casual observations

Roller Bulgaria



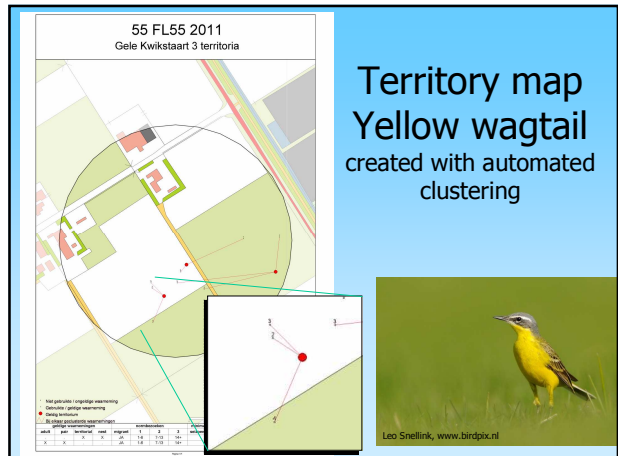
Roller Bulgaria



Inferring territory density maps from point counts: Dutch farmland birds

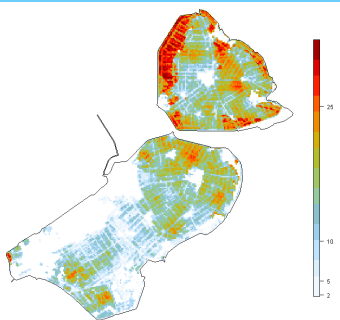
- 5 min point counts
- All observations mapped
- Automated clustering to territories
- Distance function per species
- Real density maps

Observations Yellow wagtail



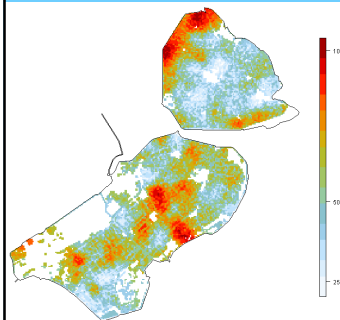
Territory map Yellow wagtail created with automated clustering

Density map Yellow wagtail



Leo Snellink, www.birdpix.nl

Density map farmland birds



More information on TRIMmaps

- Today 17:30 – 19:00
- Main room

Thank you for your attention...

...and special thanks
to all the
organisations and
volunteer fieldworkers
who make this
possible !

