LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère du Développement durable
et des Infrastructures

Département de l'environnement

Monitoring of forest mammals listed in the Annexes IV and V of the Habitat Directive

(except bats)

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Distribution and evolution since 2010:

- **Hazel dormouse,**
- **Wildcat,**
- **Pine marten,**
- **Polecat.**

Marc Moes
GEODATA

Xavier Mestdagh
Lionel L'Hoste
LIST

LUXEMBOURG
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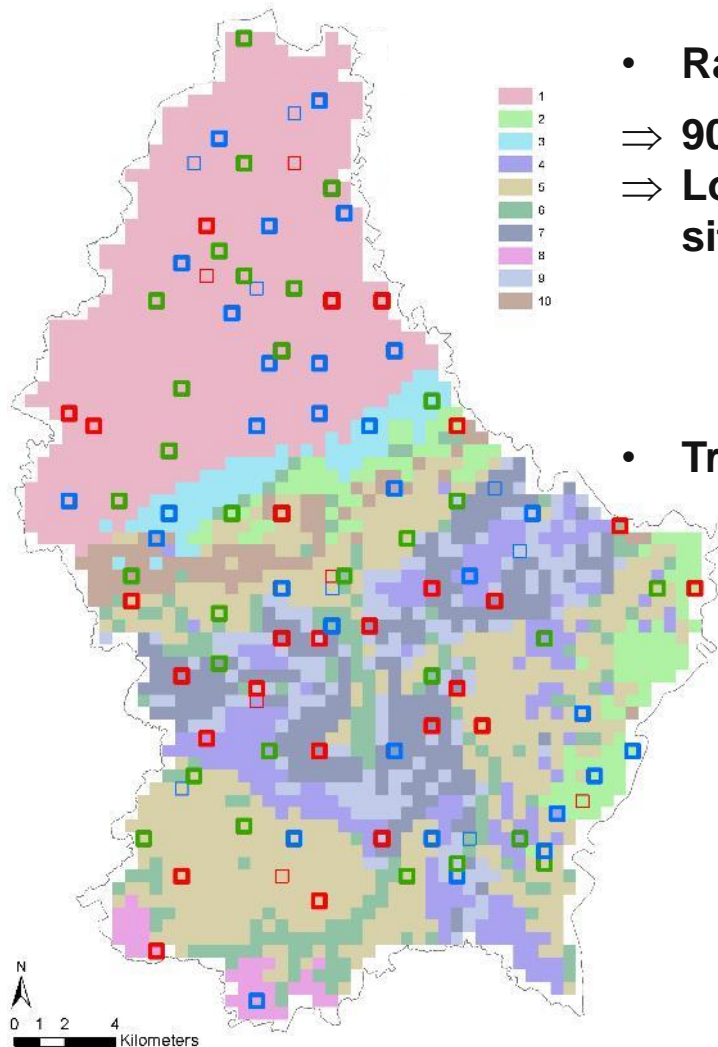AND TECHNOLOGY

LIST

Hazel Dormouse
Muscardinus avellanarius

Hazel Dormouse
Muscardinus avellanarius

Methodology

- **Identification of "potentially" suitable habitats**

- **Random and stratified sampling design**

$\Rightarrow$ **90 squares (1x1 Km) selected**
$\Rightarrow$ **Looking for "summer" nest in 4 "favourable" sites/square during Oct/Nov**

Mainly brambles, shrub covered area and forest edge

- **Triennal sampling procedure**
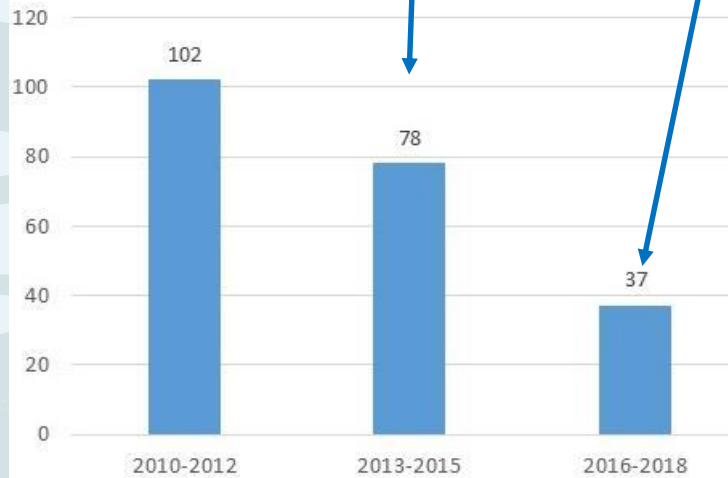
Hazel Dormouse
Muscardinus avellanarius
Results

Number of squares surveyed /year

Number of squares surveyed/cycle

- Since **2010: 102** squares were **surveyed**

- **2017** sampling is still **in progress**

- From **2013 to 2015: repeated survey** for some squares
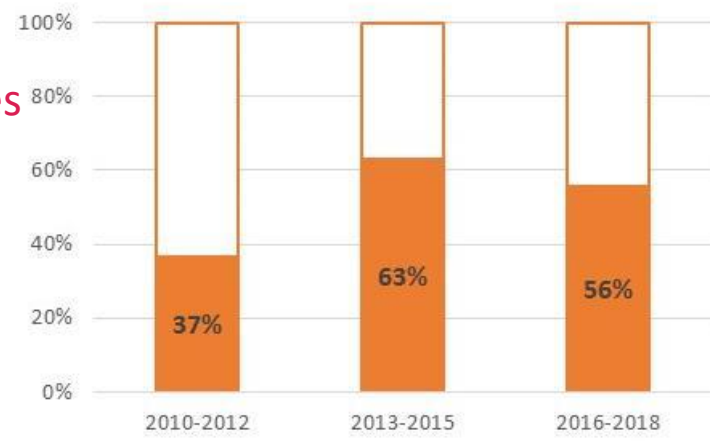
$\Rightarrow$ **1st passage: 1124 sites investigated** so far!
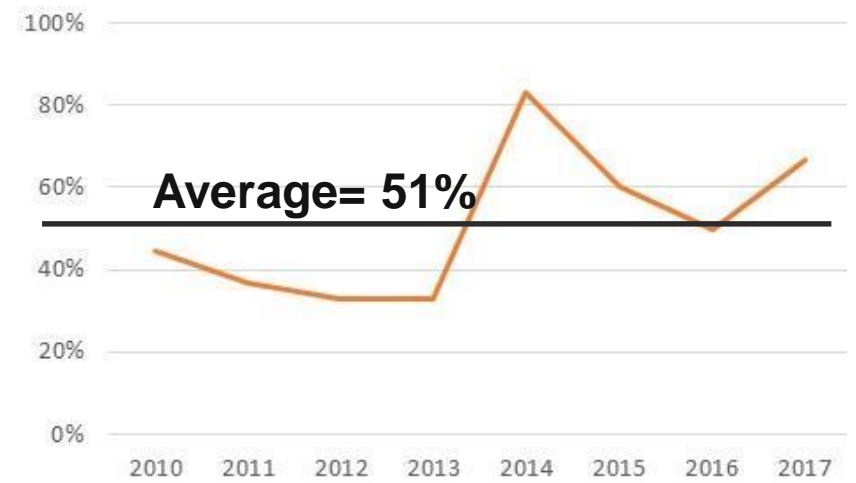
Hazel Dormouse
Muscardinus avellanarius

Results: Sites level (1st passage)

1st passage	2010-2012	2013-2015	2016-2018
Number of **sites** surveyed	(596 +	336 +	192) = 1124 sites
Number of **favourable sites** surveyed	294	269	149
Number of **favourable sites** with proof of **presence**	108	169	83

Proportion of favourable sites with proof of presence

Proportion of favourable sites with proof of presence

Average= 51%

Hazel Dormouse
Muscardinus avellanarius

Results: Squares level - analysis based on the 1st passage

1st passage	2010-2012	2013-2015	2016-2018
Number of **squares** surveyed with **at least one favourable** site	96	78	28
Number of **squares** surveyed with **at least one favourable** site **AND** with proof of **presence**	70	66	26
Proportion of **squares** surveyed with **at least one favourable** site **AND** with proof of **presence**	73%	85%	93%

⇒ **72 squares comparable between 2010-2012 and 2013-2015**

	2010/2012	2013/2015
⬛	✔	✔
🟥	✔	✘
🟩	✘	✔
⬜	✘	✘
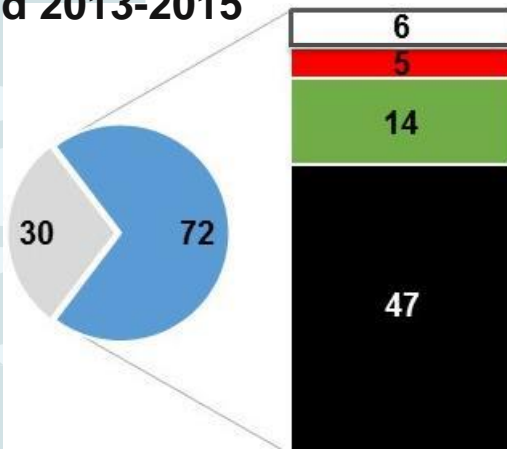
6 — Number of squares without detection

5 ■ Number of squares with lost detection

14 ■ Number of squares with new detection
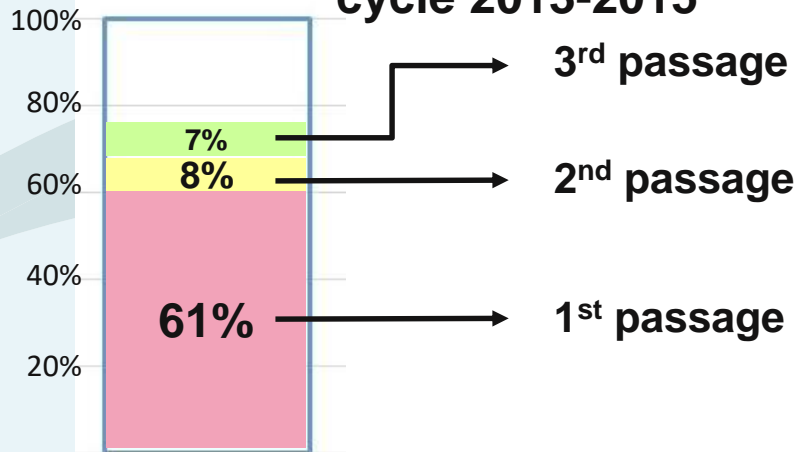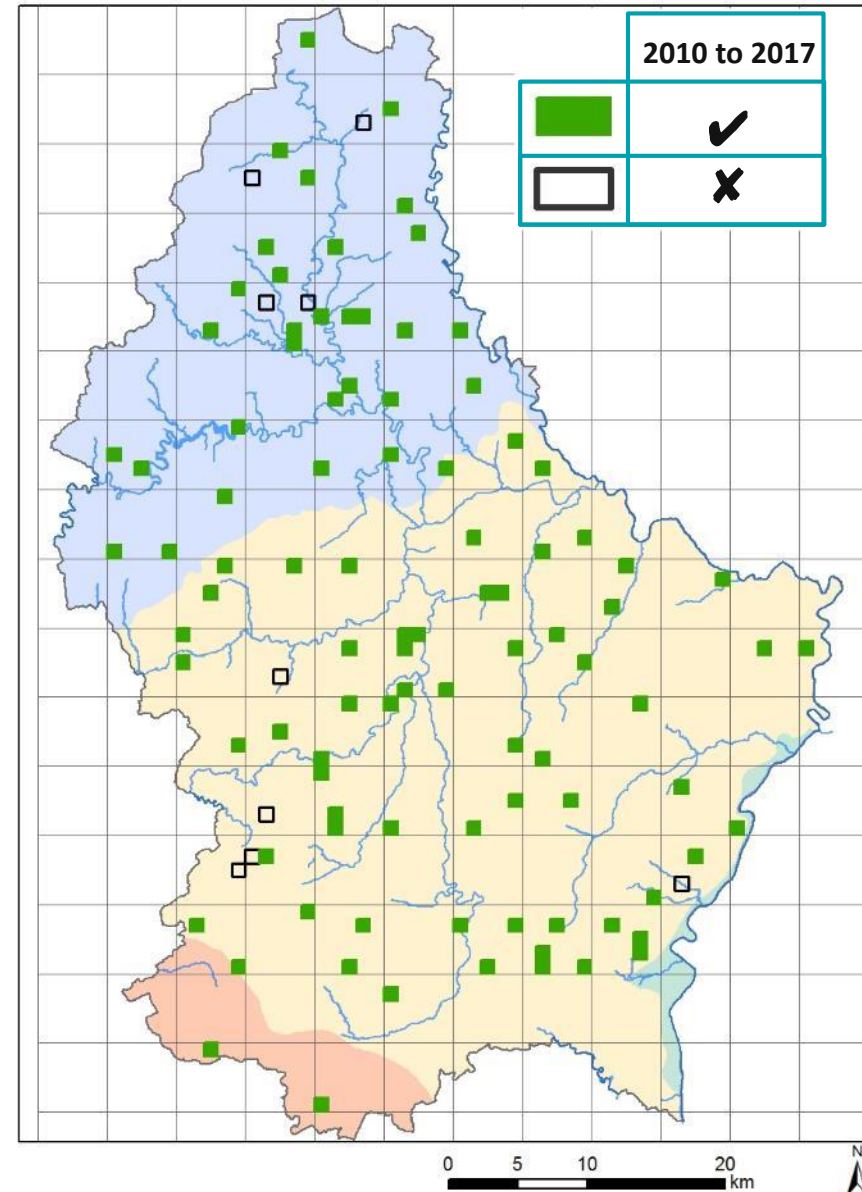
47 ■ Number of squares with detection

30 / 72

0   5   10   20 km

N
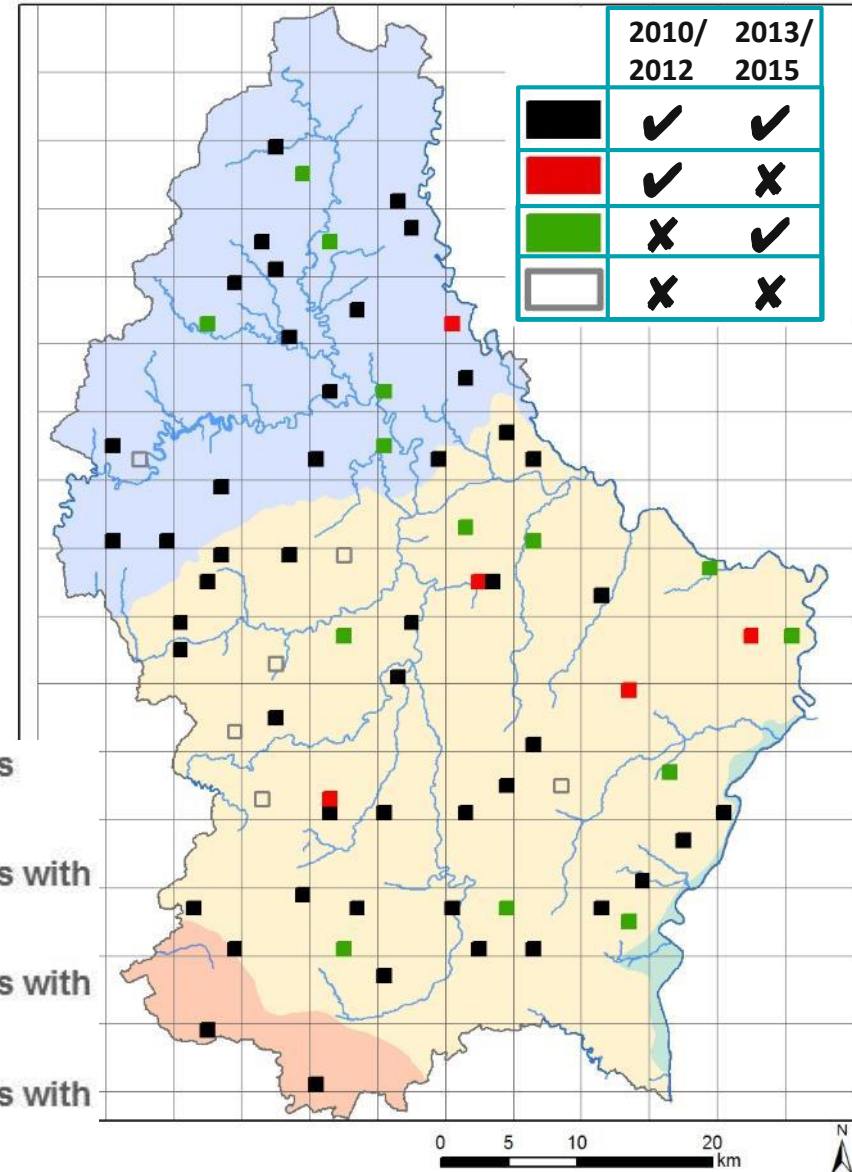
Hazel Dormouse
Muscardinus avellanarius

Results: Success detection

National distribution

**Results from favourable sites :
cycle 2013-2015**

	2010 to 2017
🟩	✔
⬜	✘

- 3ʳᵈ passage
- **7%**
- **8%** → 2ⁿᵈ passage
- **61%** → 1ˢᵗ passage

(chart y-axis: 100%, 80%, 60%, 40%, 20%)

0   5   10   20
km

European wildcat
Felis silvestris silvestris
Pine marten
Martes martes
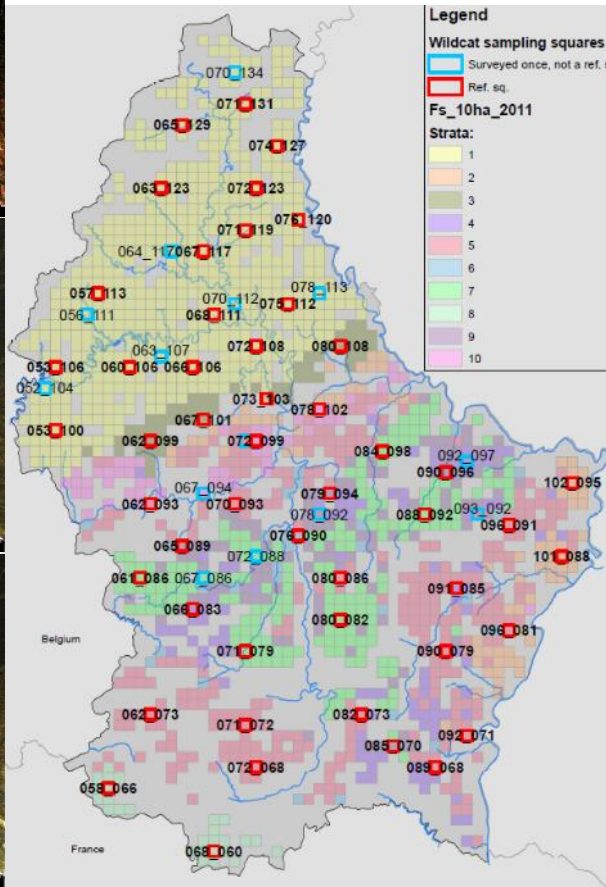**European polecat**
Mustela putorius

European wildcat
Felis silvestris silvestris
Pine marten
Martes martes
European polecat
Mustela putorius

Methodology

Since **2017, combined survey** for the **3 species** using wildlife camera traps and luresticks:

⇒ **4 sites per km2** equipped each with a wildlife **camera trap** and a **lurestick**

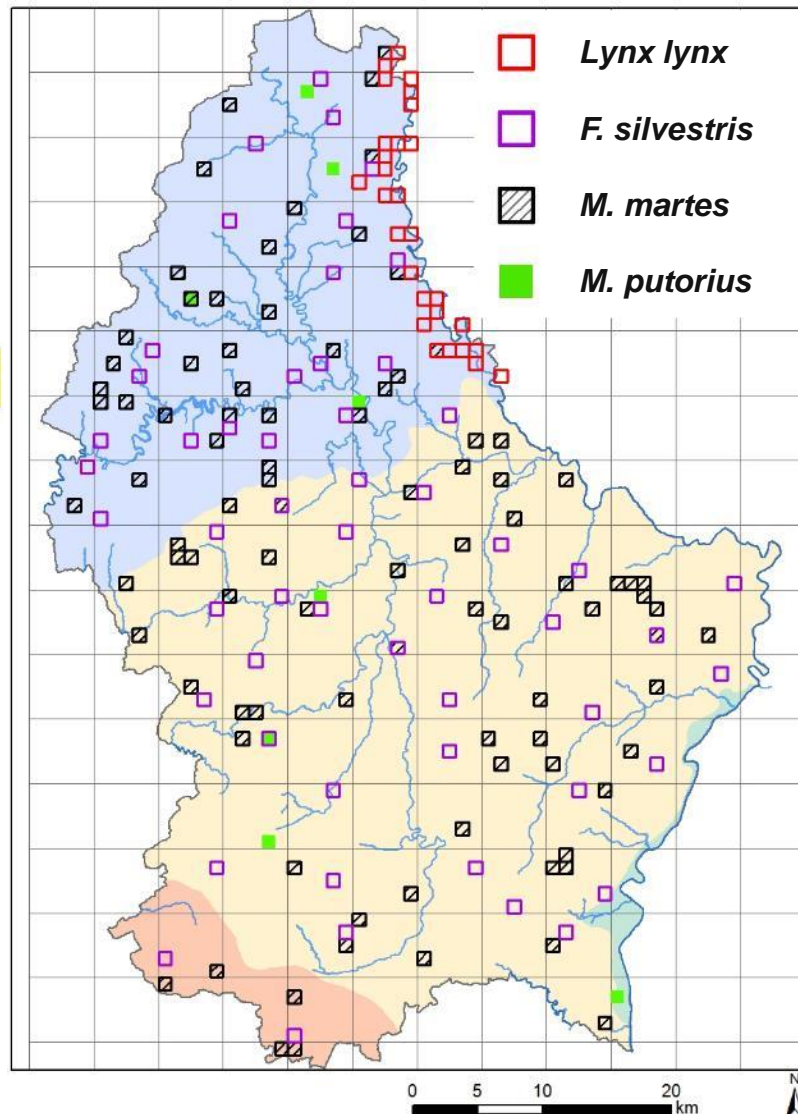⇒ **Lure = valerian tincture** (aiming the Wildcat and Pine marten)
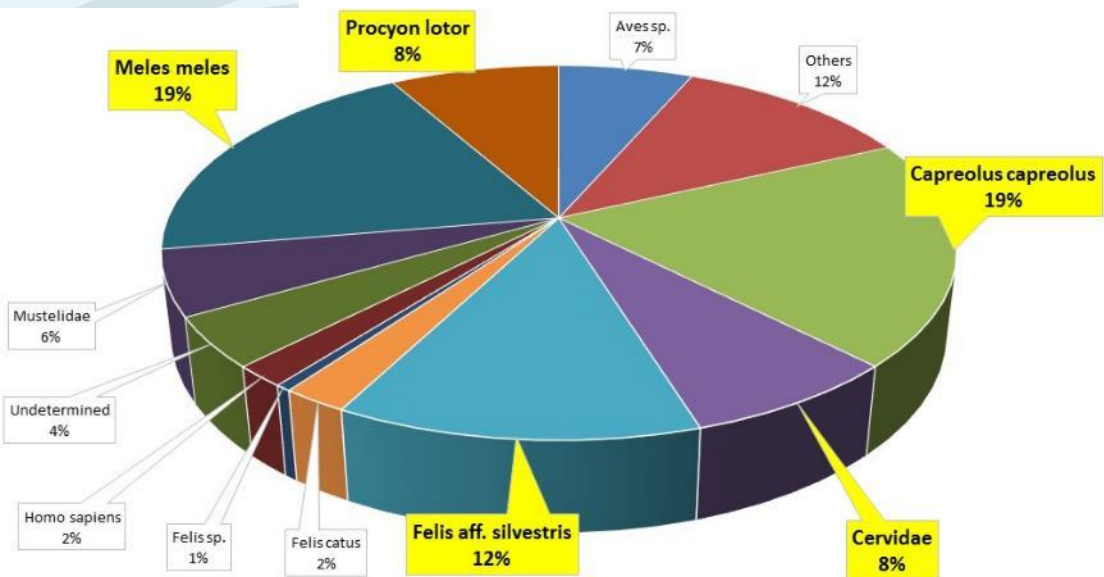
⇒ From **mid January** to **May**

⇒ **Control every 2 weeks** (download of pictures, hair sampling, application of valerian)

⇒ **Genetic analyses of hair samples** (**Wildcat** only)

Results since 2011:

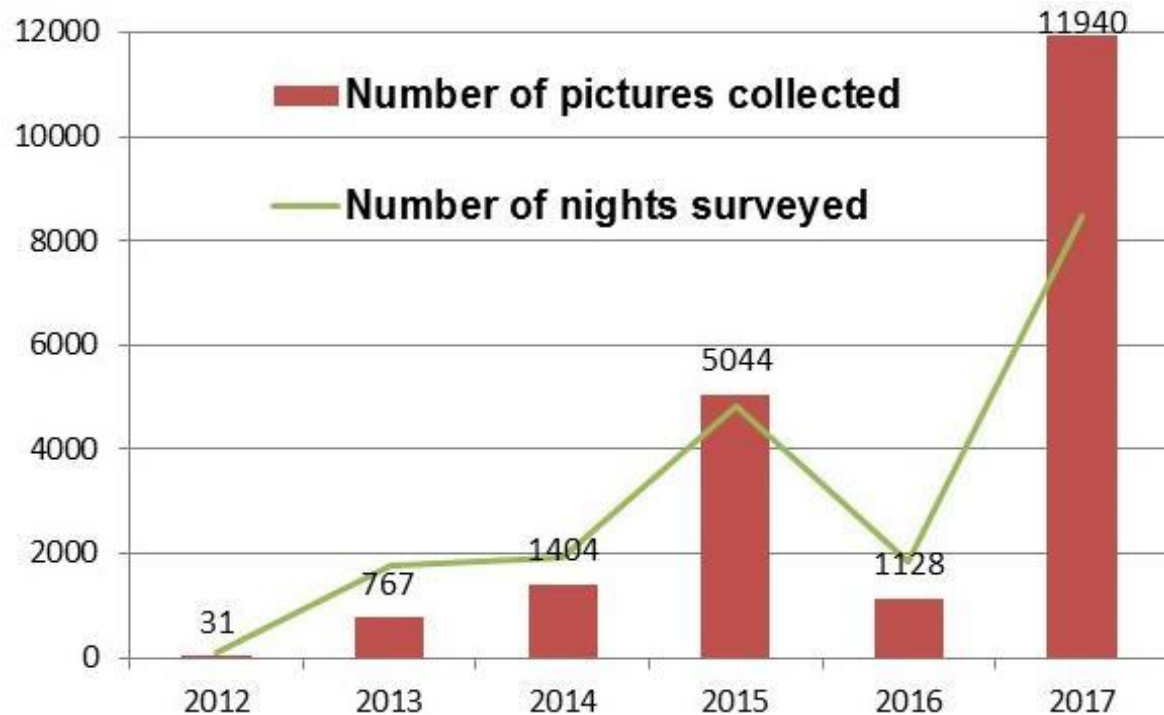## Monitoring network using camera traps

⇒ **39 310** pictures since 2011

⇒ **38** species

Results since 2012:

Based on wildcat survey

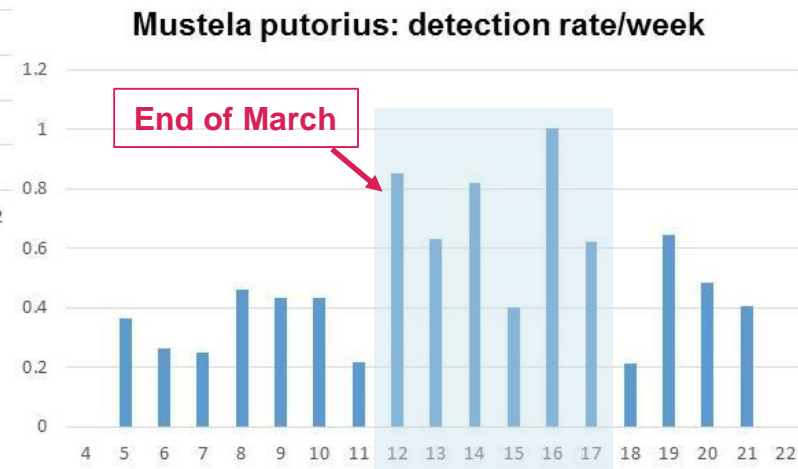| Number of camera traps used | 1 | 21 | 23 | 59 | 23 | 79 |

⇒ **Sampling effort highly increased in 2017 (and for the future)**

European wildcat
Felis aff. silvestris
Pine marten
Martes martes
European polecat
Mustela putorius

Results 2017:
Based on wildcat survey

Detection rate
= 100 x

$$\frac{\sum \text{days (species is observed)}}{\sum \text{days (working camera traps)}}$$

F. aff. Silvestris: detection rate/week

End of April

Martes martes: detection rate/week

Lunar cycle?

Mustela putorius: detection rate/week

End of March
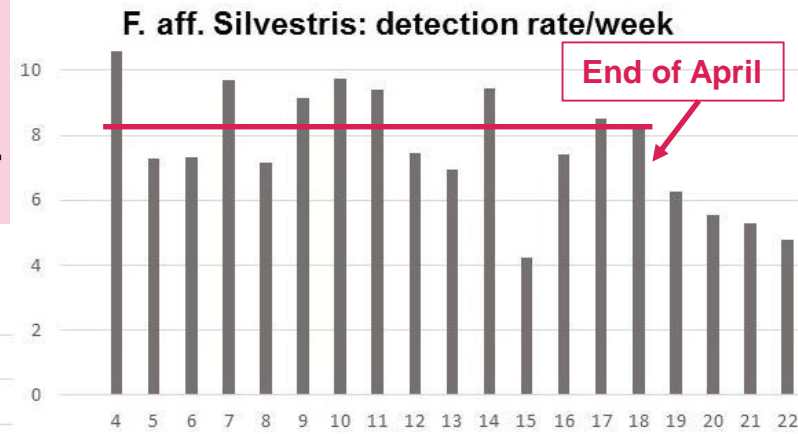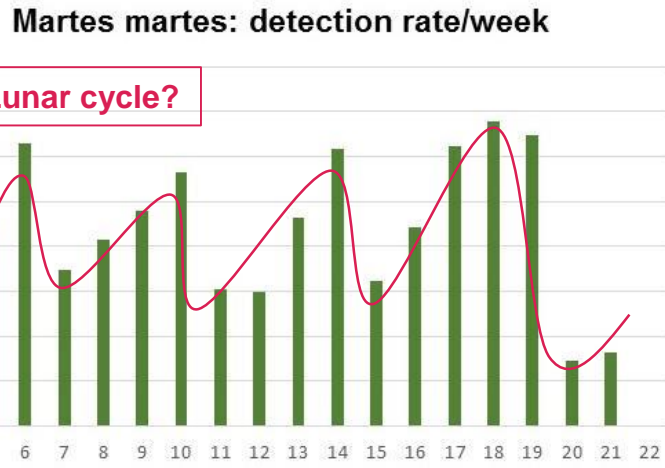
European wildcat
Felis aff. silvestris

Results: Evolution

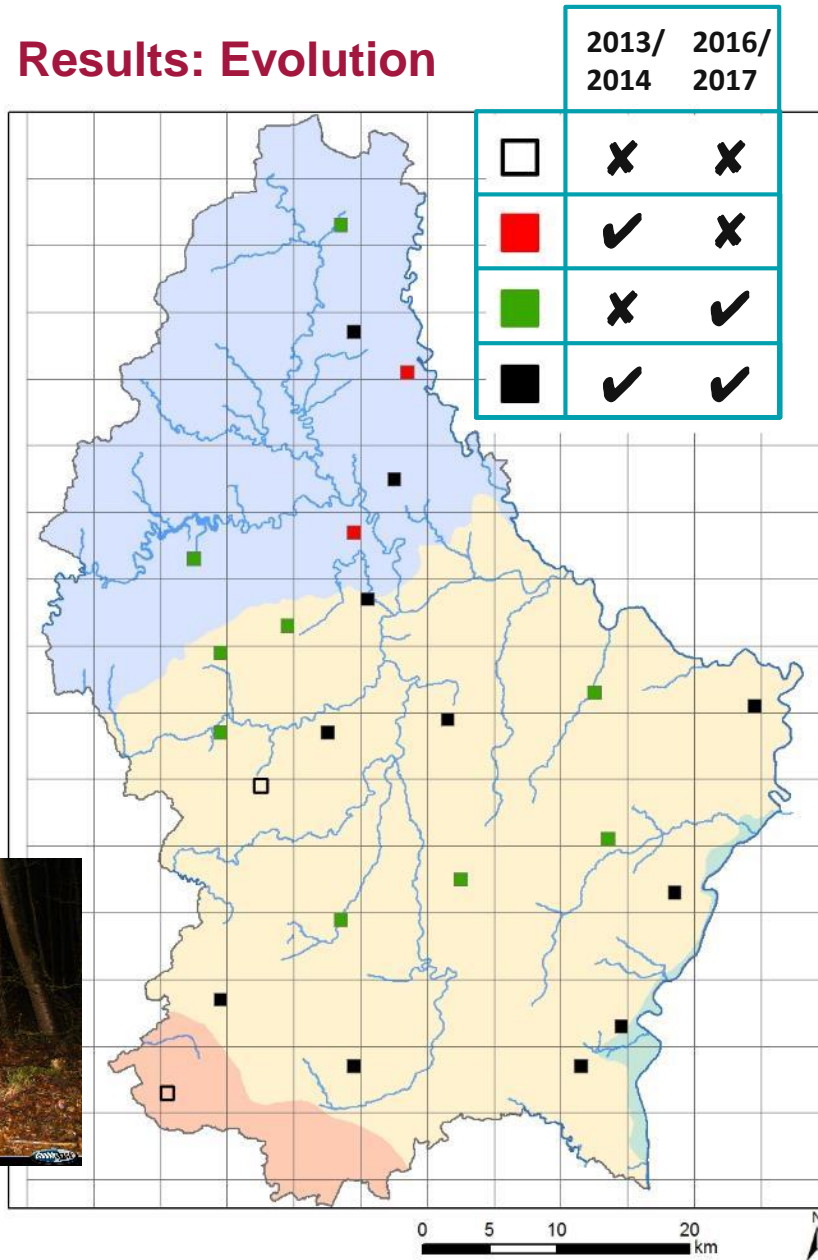|	2013/ 2014	2016/ 2017
☐	✘	✘
🟥	✔	✘
🟩	✘	✔
⬛	✔	✔

Based on wildcat survey

24 squares "comparable" between 2013-2014 and 2016-2017:

⟹ **BUT different brand/type** of camera traps

2187 nights surveyed in **2013-2014**
vs
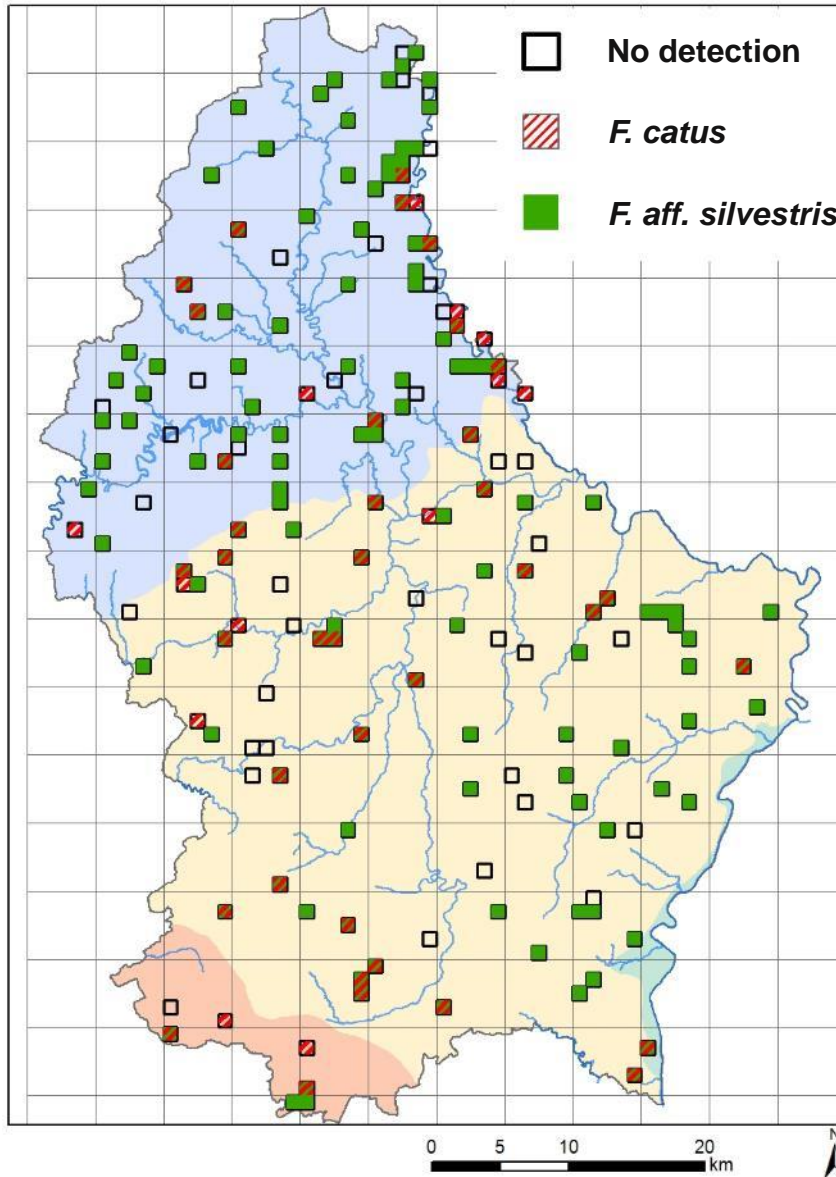**2283** nights surveyed in **2016-2017**

Based on camera traps:
- **2** squares **without detection**
- **2** squares **with lost detection**
- **9** squares **with new detection**
- **11** squares **with detection**

0   5   10   20
km

13

European wildcat
Felis silvestris silvestris

Results: National distribution

Legend:
- ☐ No detection
- ▨ *F. catus*
- ■ *F. aff. silvestris*

Based on <u>ALL</u> survey since 2011

Common **detection** of *F. catus* and *F. aff. Silvestris* in **38 squares!!**

From **179 squares** surveyed, *F. aff. Silvestris* was **detected** in **130 squares**

3/4/2017   10:27 PM   ID:97

Pine marten
Martes martes

Results: Evolution
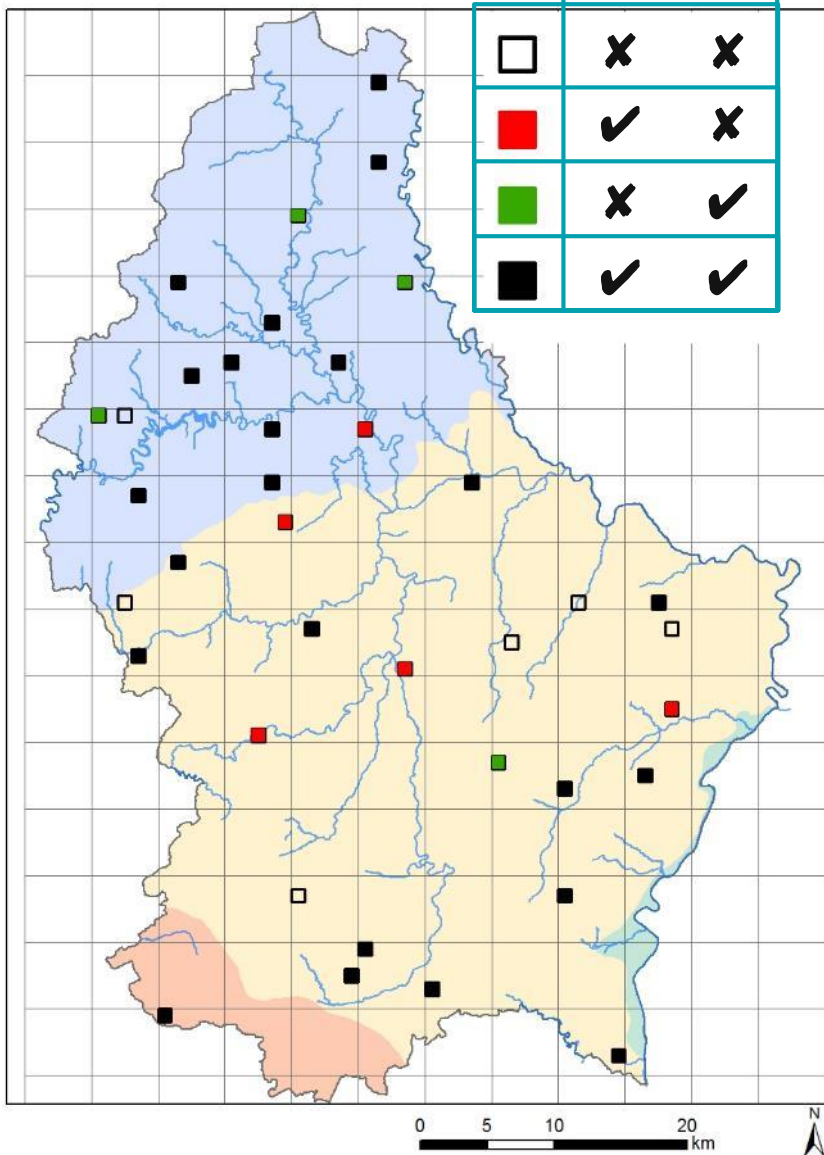
	2011/2013	2014/2016
☐	✘	✘
🟥	✔	✘
🟩	✘	✔
⬛	✔	✔

Based on Pine marten survey

38 squares **"comparable"** between **2011-2013** and **2014-2016**

Based on camera traps:

- **6** squares **without detection**
- **5** squares **with lost detection**
- **4** squares **with new detection**
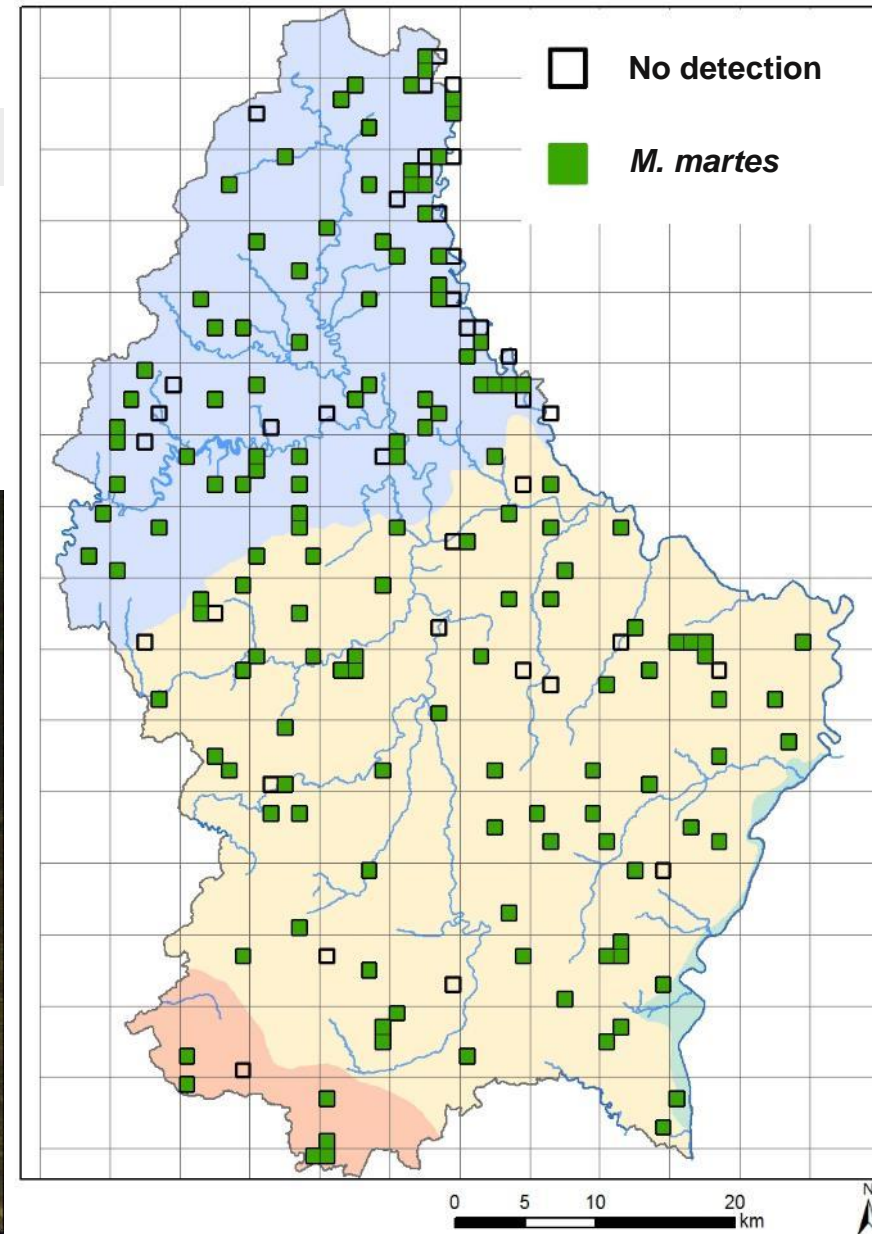- **23** squares **with detection**

Pine marten
Martes martes

Results: National distribution

Based on __ALL__ survey since 2011

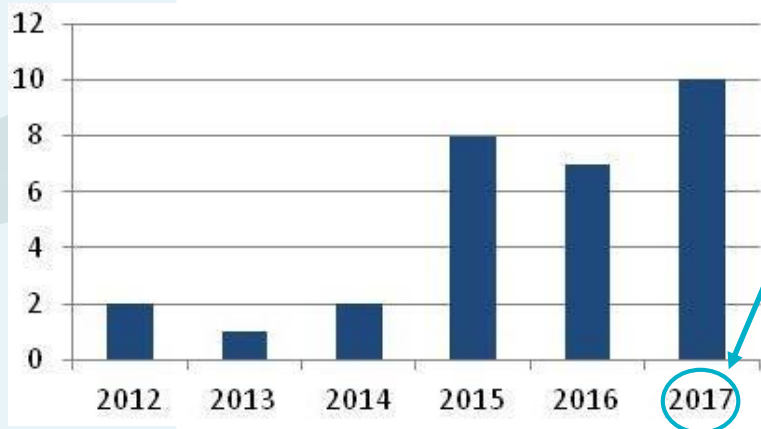From **179 squares** surveyed, *M. martes* was **detected** in **143 squares**

Legend:
- ☐ No detection
- ◼ *M. martes*

0   5   10   20 km

European polecat
Mustela putorius

Results:

Based on __ALL__ survey since 2011

Number of squares with detection/ year

From 20 squares surveyed, detection in 10!!

Number of pictures
- 1 (24 sites)
- 2 - 3 (13 sites)
- 4 - 5 (4 sites)
- 6 - 10 (2 sites)
- 11 - 23 (2 sites)

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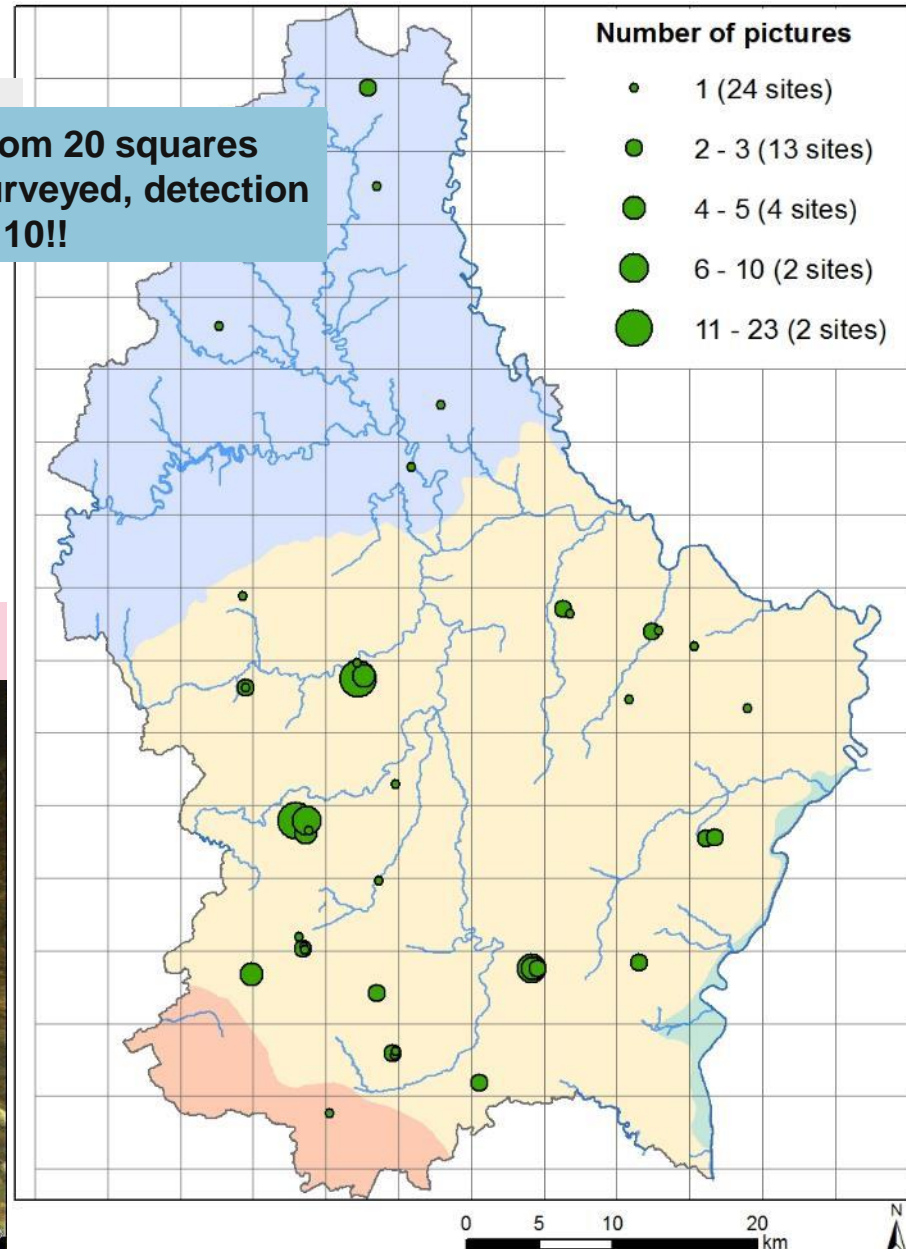
European polecat
Mustela putorius

Results: National distribution

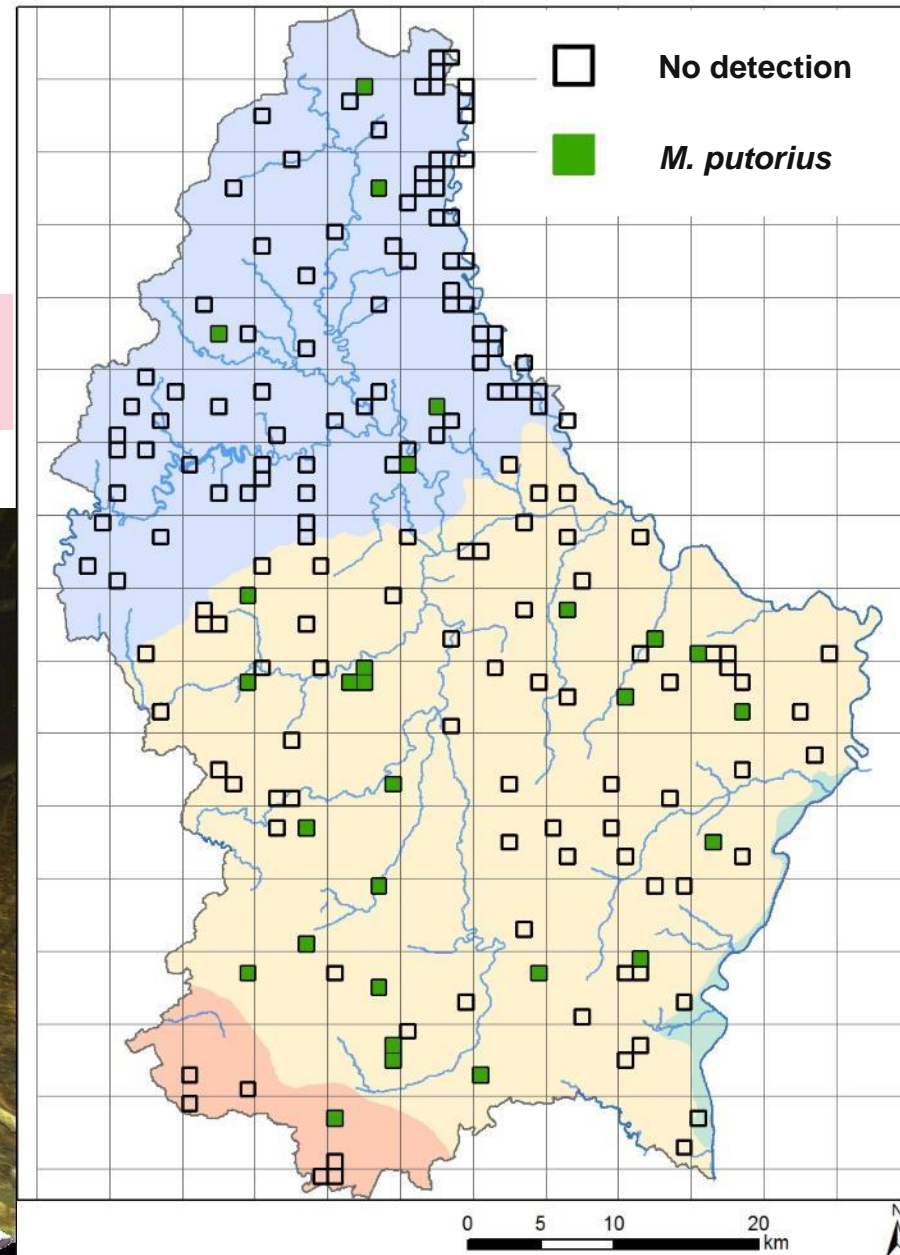**Based on <u>ALL</u> survey since 2011**

From **179 squares** surveyed, *M. putorius* was **detected** in **28 squares**

Legend:
- ☐ No detection
- ■ *M. putorius*

3/20/2006 10:30 PM

European polecat
Mustela putorius

Results:

Based on Polecat survey (2016)

2 phenotypes in Luxembourg:

$\Rightarrow$ **Back mask: forest stream, possible speciation**

$\Rightarrow$ **Observed together in square 066_083**

Raccoon
Procyon lotor

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Results:

Legend:
- □ Squares surveyed
- ■ Presence *P. lotor*
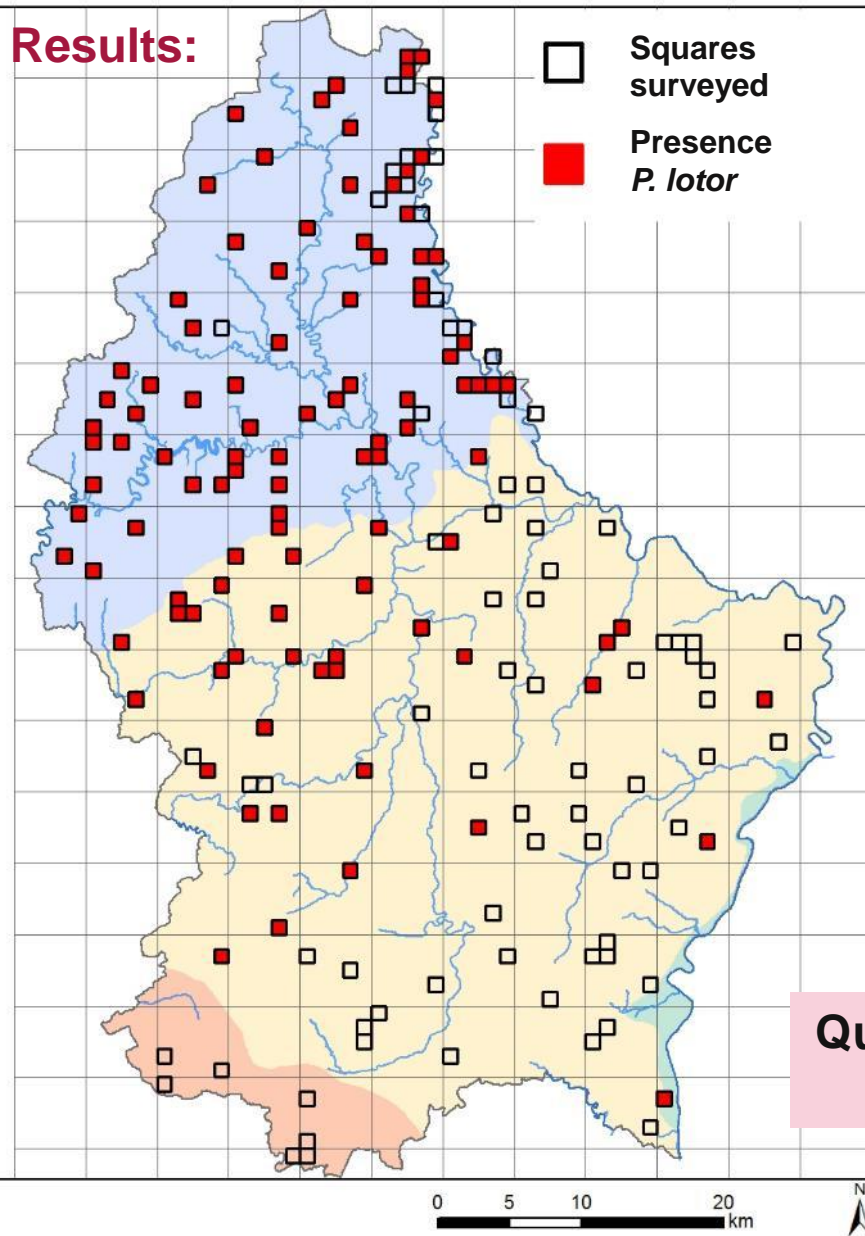
2011
2012
2013
2014
2015
2016
2017

0   5   10   20 km

Based on __ALL__ survey since 2011

From **179 squares** surveyed, *P. lotor* was **detected** in **135 squares**

Quick and worrying expansion of the Raccoon

2017.02.18   01:39:10

Monitoring of forest mammals listed in the Annexes IV and V of the Habitat Directive

(except bats)

Thank you for your attention!!

Current observers:

Marc Moes   Xavier Mestdagh
Alain Dohet
Lionel L'Hoste

GEODATA   LIST