What to do when wolves return? Intentions of livestock owners in Bavaria, Germany

Friederike Riesch[1,✉], M. Möck, P.H. Feindt, M. Zetsche, N. Gerber, S.T.S. van Beeck Calkoen, K. Bojarska, S. Herzog, N. Balkenhol, J. Isselstein

[1] Grassland Science, University of Göttingen, ✉ *friederike.riesch@agr.uni-goettingen.de*

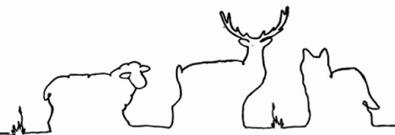# Challenges for pasture-based livestock farming

- Multiple [...] ny
  pasture-[...]
  (e.g. van den Po[...])

  - Low e[...]
  - High la[...]
  - Lack o[...]
  - Challe[...]
  - ...

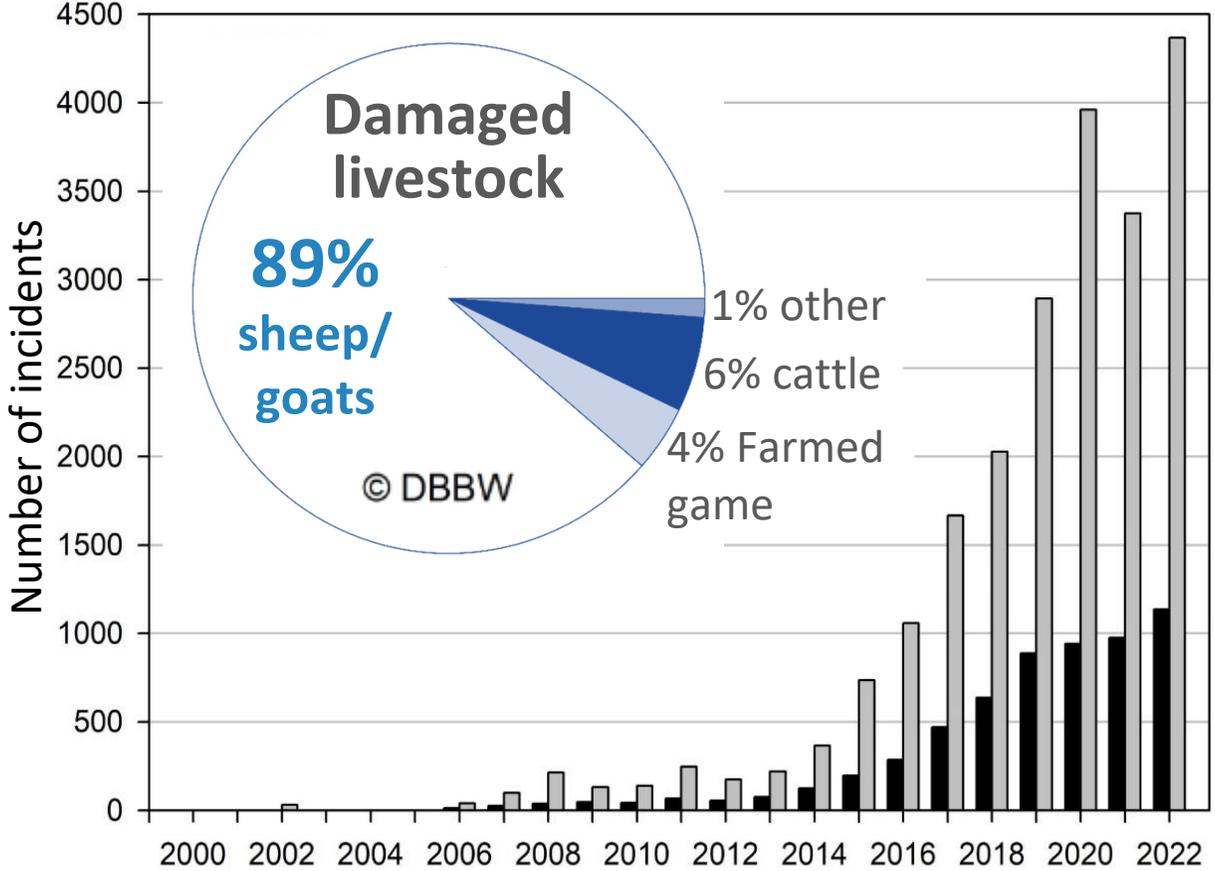Number of sheep in 1000

2.100
2.000
1.900
1.800
1.700
1.600

2020

https://warstein-totallokal.de/2024/03/02/woelfe-in-unserer-region-weidetierhalter-haben-angst-um-ihre-tiere-plakataktion-zum-wolf-soll-sensibilisieren/

https://www.bmel-statistik.de/landwirtschaft/tierhaltung/schafhaltung

Challenges for pasture-based livestock farming

Livestock depredation by wolves in Germany

Damaged livestock
89% sheep/goats
1% other
6% cattle
4% Farmed game
© DBBW

First wolf reproduction in Germany

- 58% – 90% of attacks on unprotected or poorly protected livestock (DBBW 2024, Meier et al. 2024)

- Incidents correlated with population expansion, not rising wolf numbers (Khorozyan & Heurich 2022, Singer et al. 2023)

Research question & hypotheses
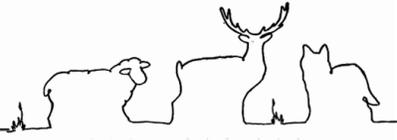
- What drives farmers' intention to implement protection measures?

The Theory of Planned Behaviour
(Ajzen 1991)
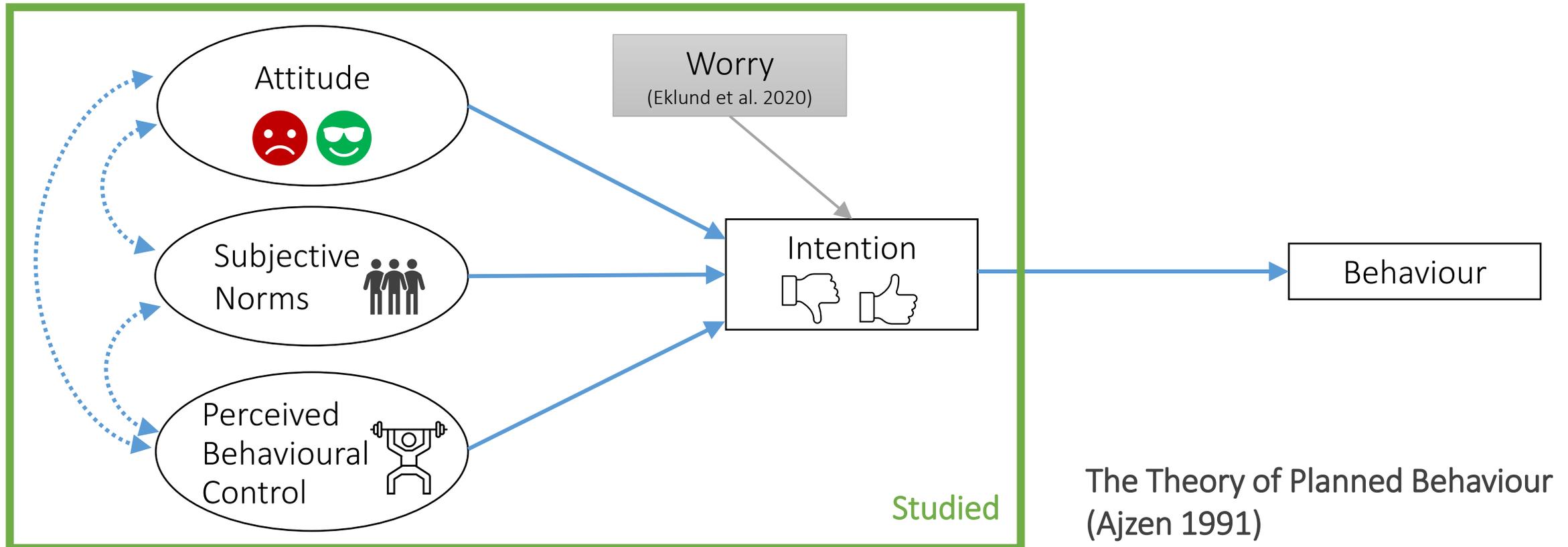
Our approach

- Study area: Bavaria
  - First recolonizing wolf in 2016
  - Eight wolf territories in 2022

- Online questionnaire

- Email invitation to seven livestock owner associations

- 37-days survey period (November/December 2022)

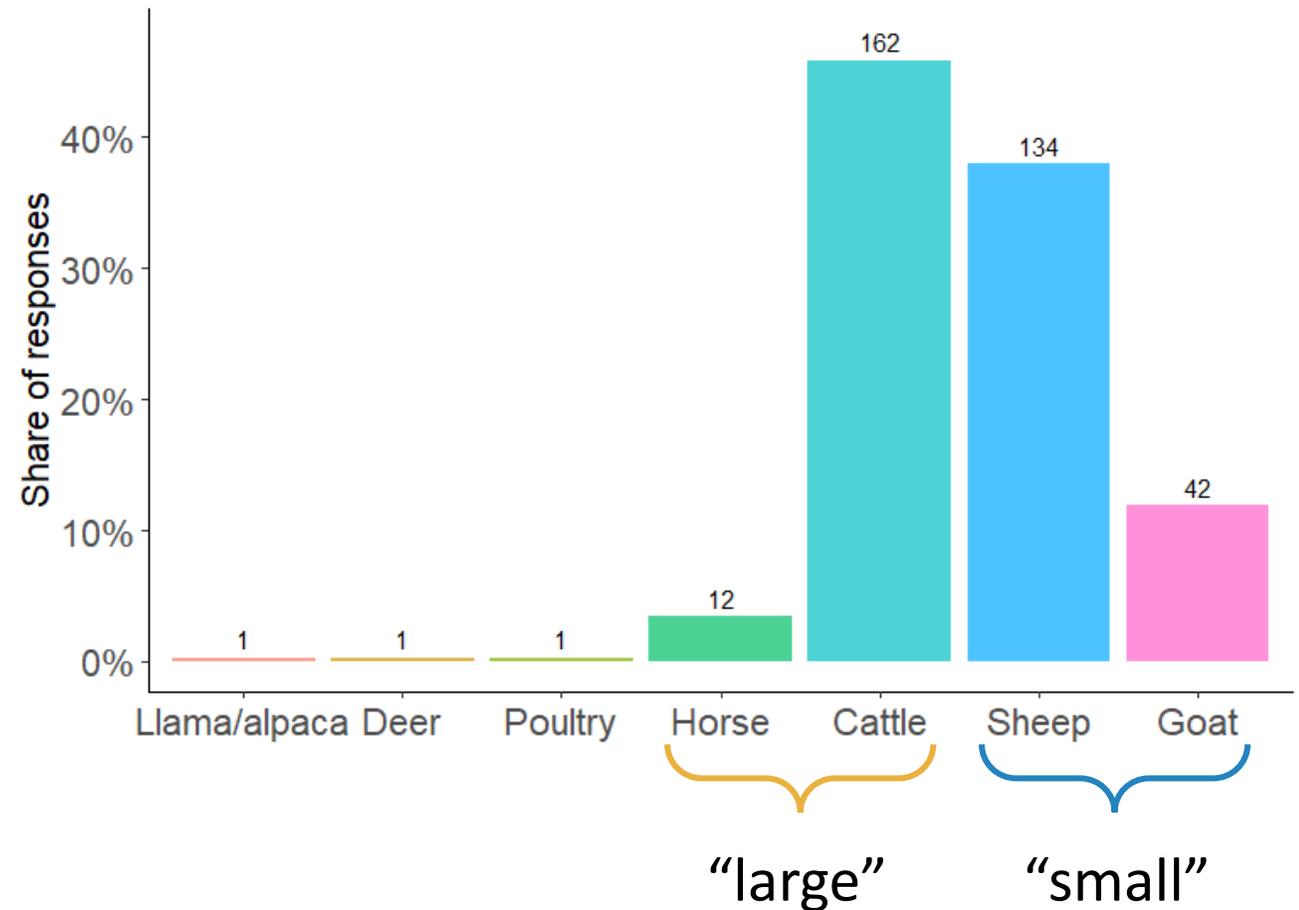 ➤ 353 completed questionnaires
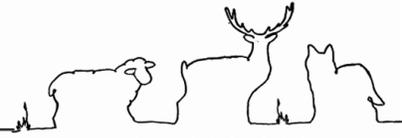
Wolf presence in Germany
2021/22

Bavaria

https://dbb-wolf.de/Wolfsvorkommen/besetzte-Rasterzellen
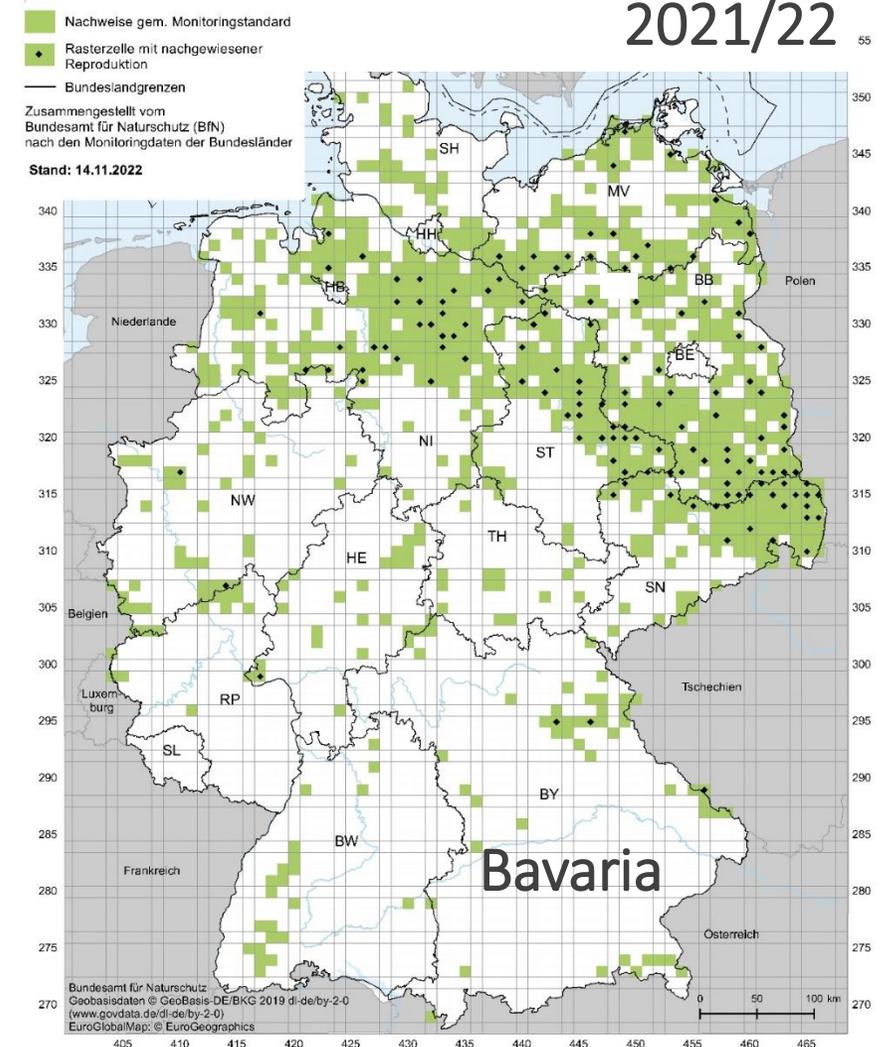
The sample
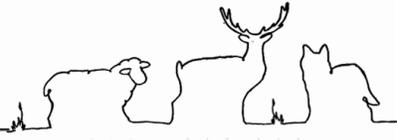
- 72% male respondents

- Age 19-91 years (mean 49 years)

- Pasture area <1 ha – 600 ha (mean 25 ha)

- 64% part-time farms

- 3-12 months grazing period

- 91% grazing day and night

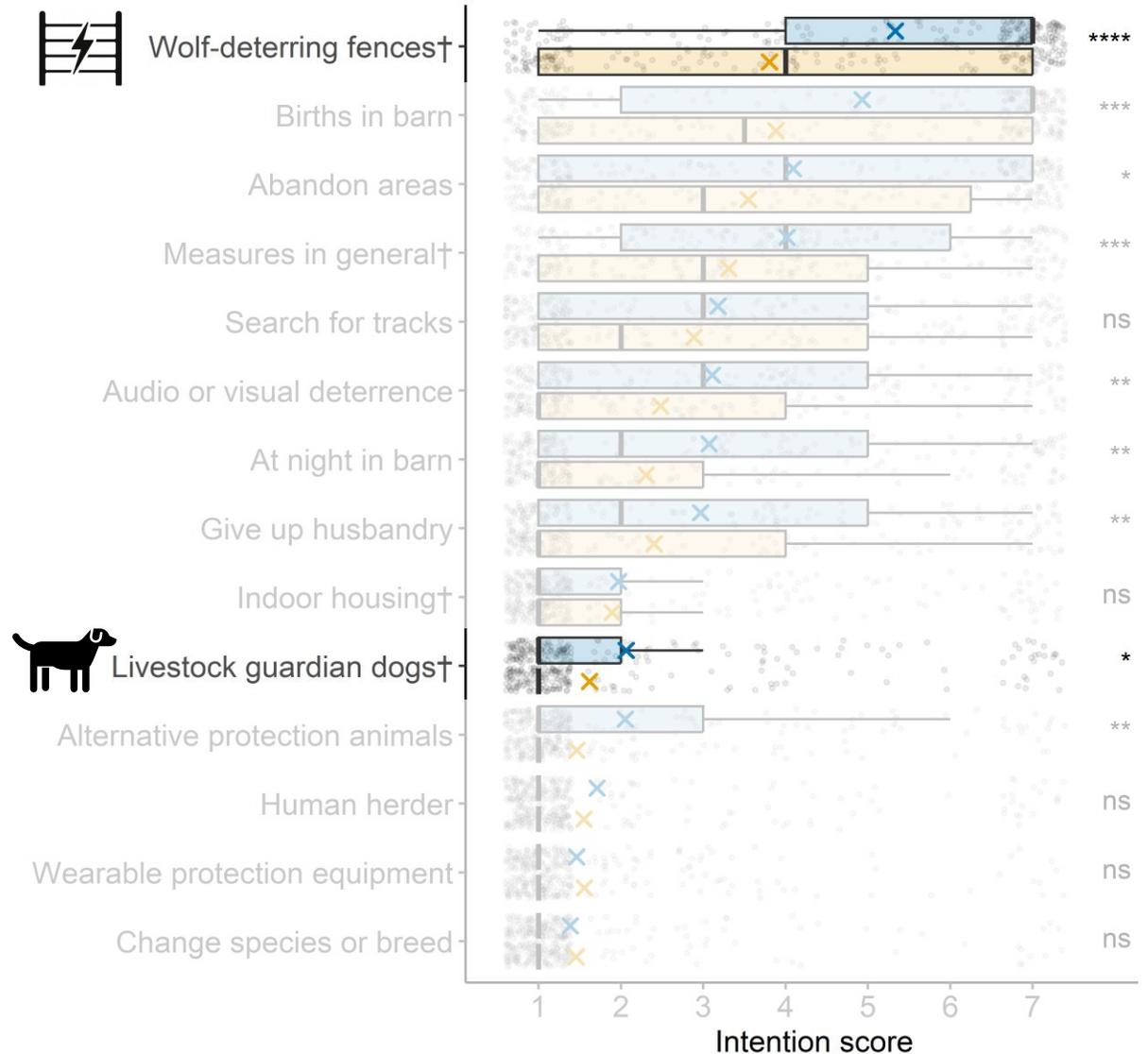- 97% kept subadult stock

Main livestock species

"I intend to take measures to protect my grazing animals from wolves in the next three years."

1 – Not true at all

...

7 – Totally true
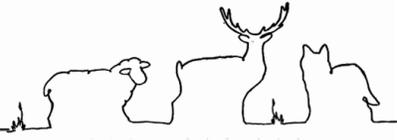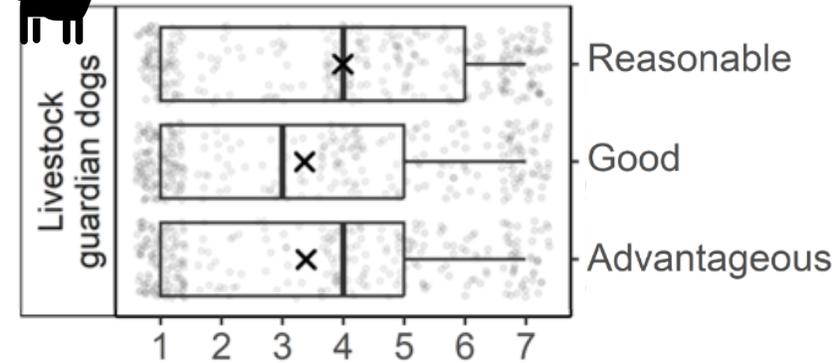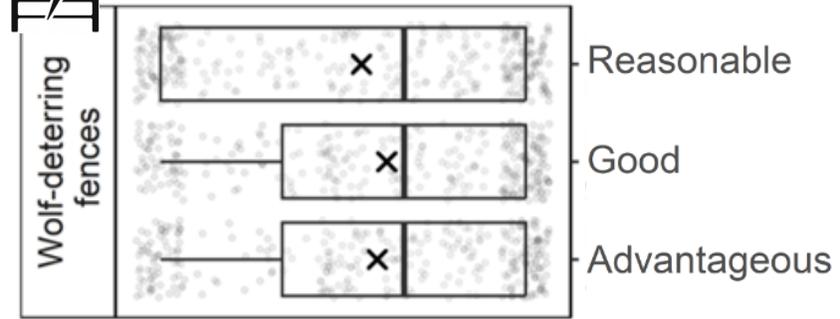
Livestock type

Small
Large

Wilcoxon signed-rank test for differences between owners of small and large livestock (ns: p > 0.05; *: p ≤ 0.05; **: p ≤ 0.01; ***: p ≤ 0.001; ****: p ≤ 0.0001)
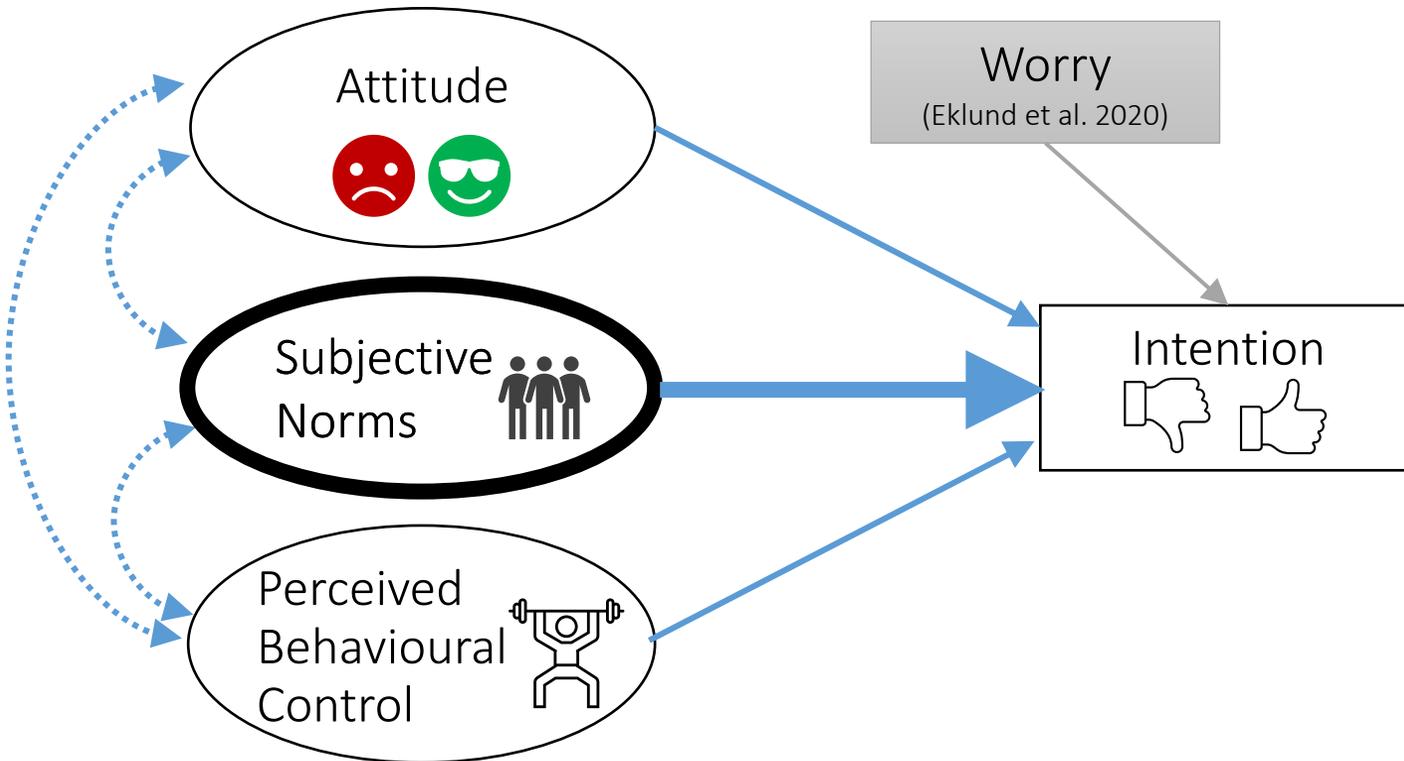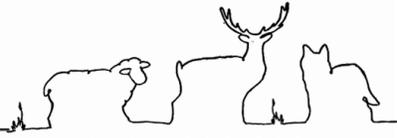
Drivers of Intention

Attitude

Drivers of Intention

- Models explained 45% (fences) and 23% (dogs) of variation in intention

- Worry not important for the intention to use guardian dogs

- Subjective Norms had the strongest effect on intention for both fences and dogs

How to promote livestock protection?

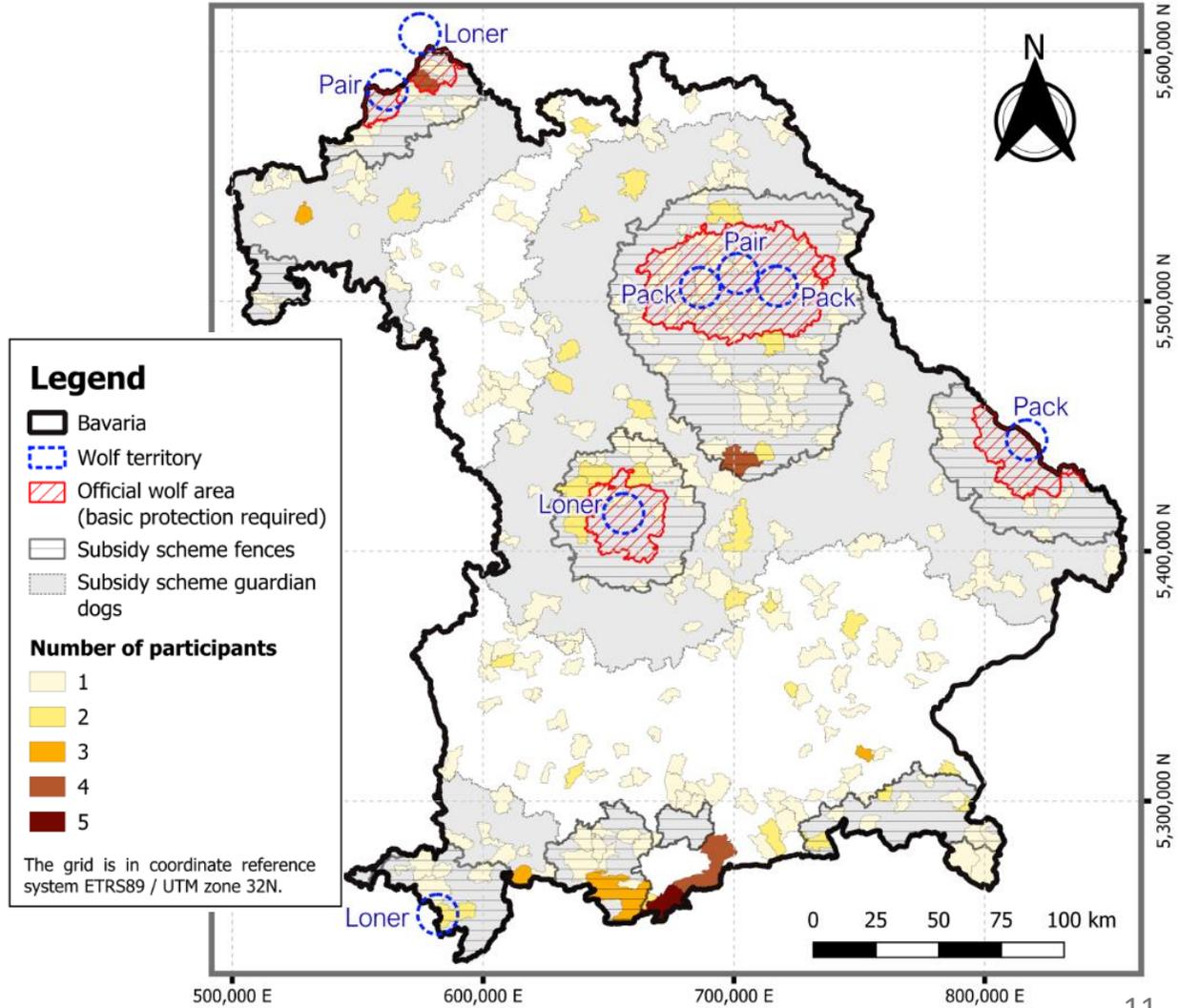- Opportunities to experience examples of successful carnivore-livestock coexistence

Verein Dübener Heide/Axel Mitzka
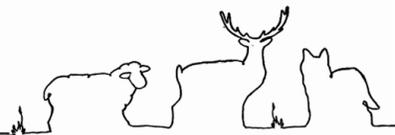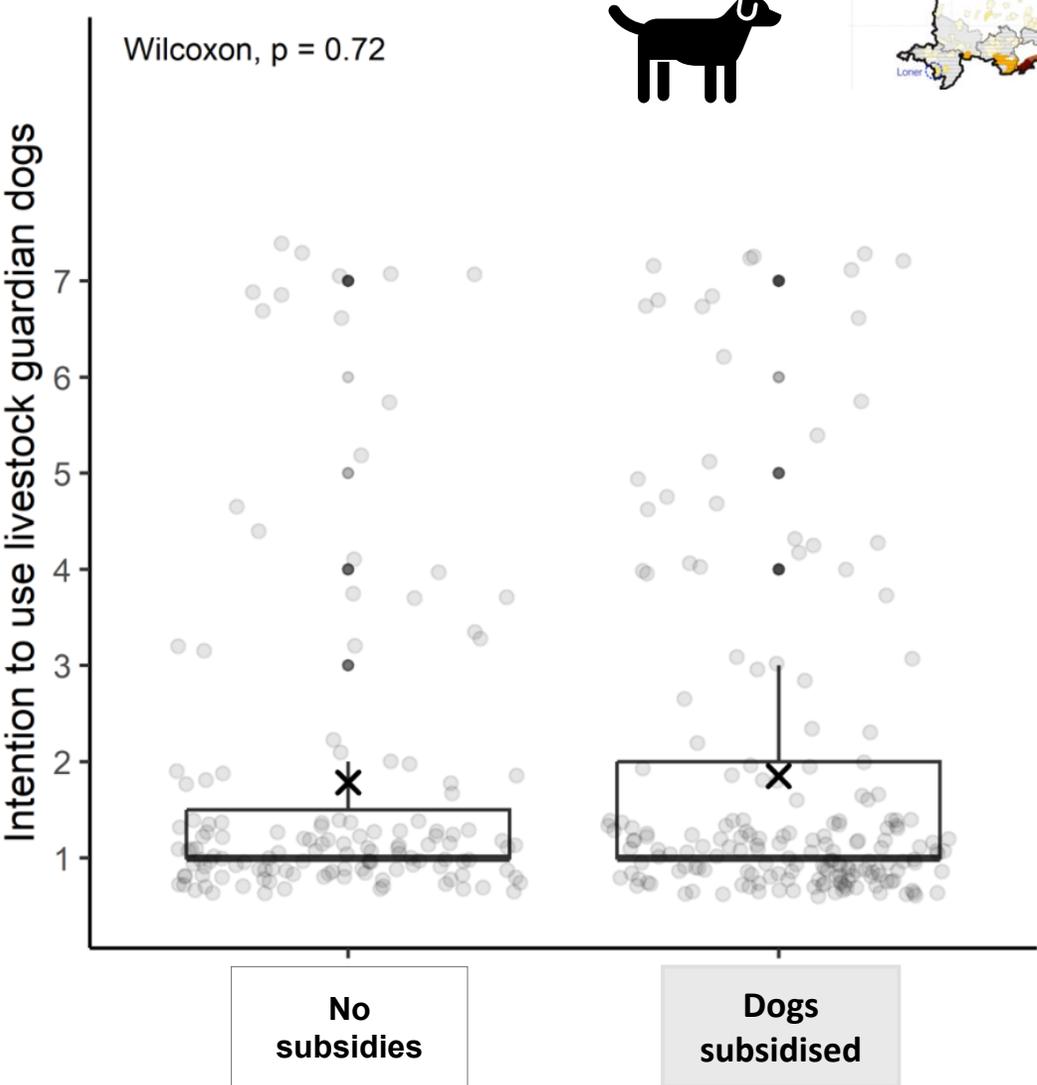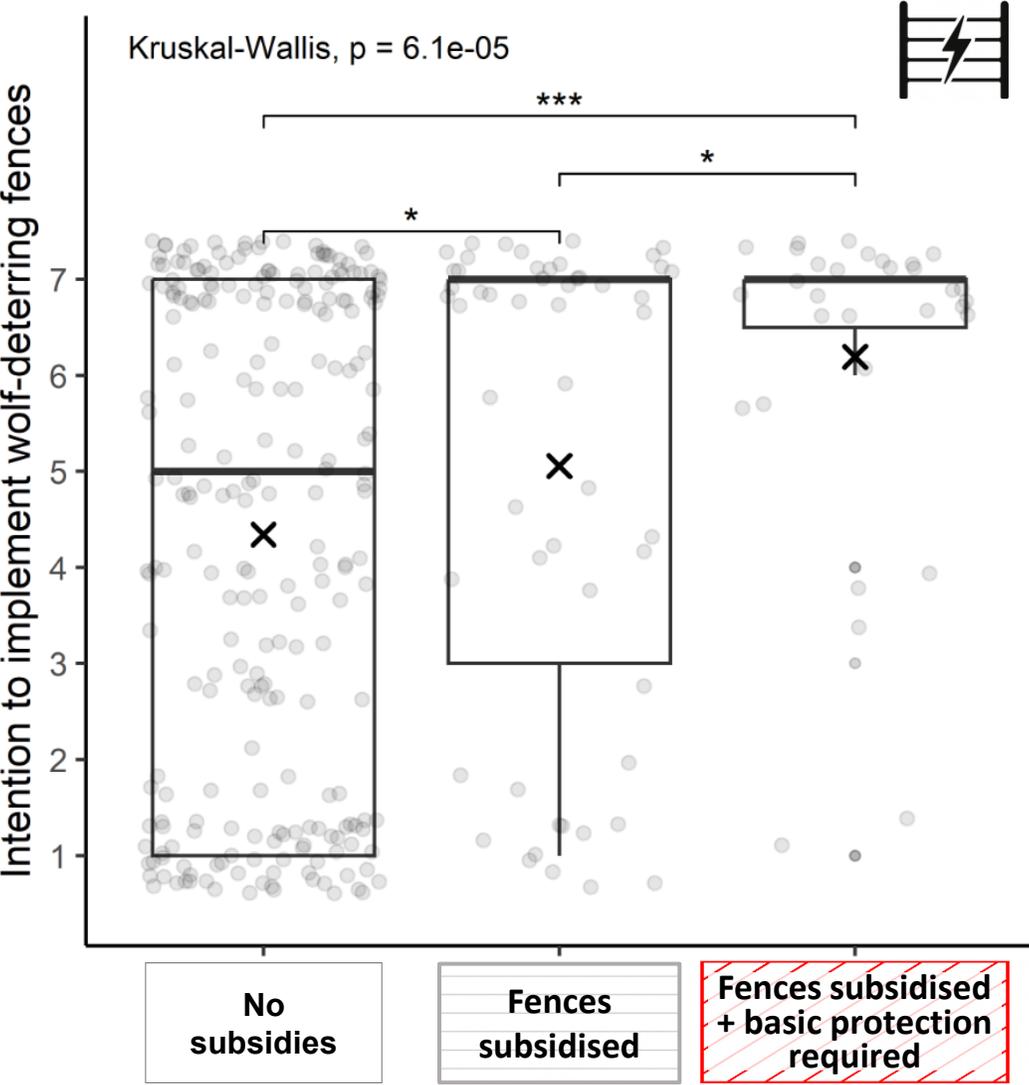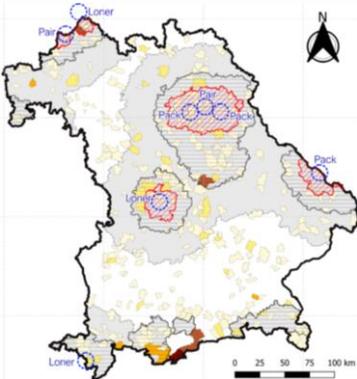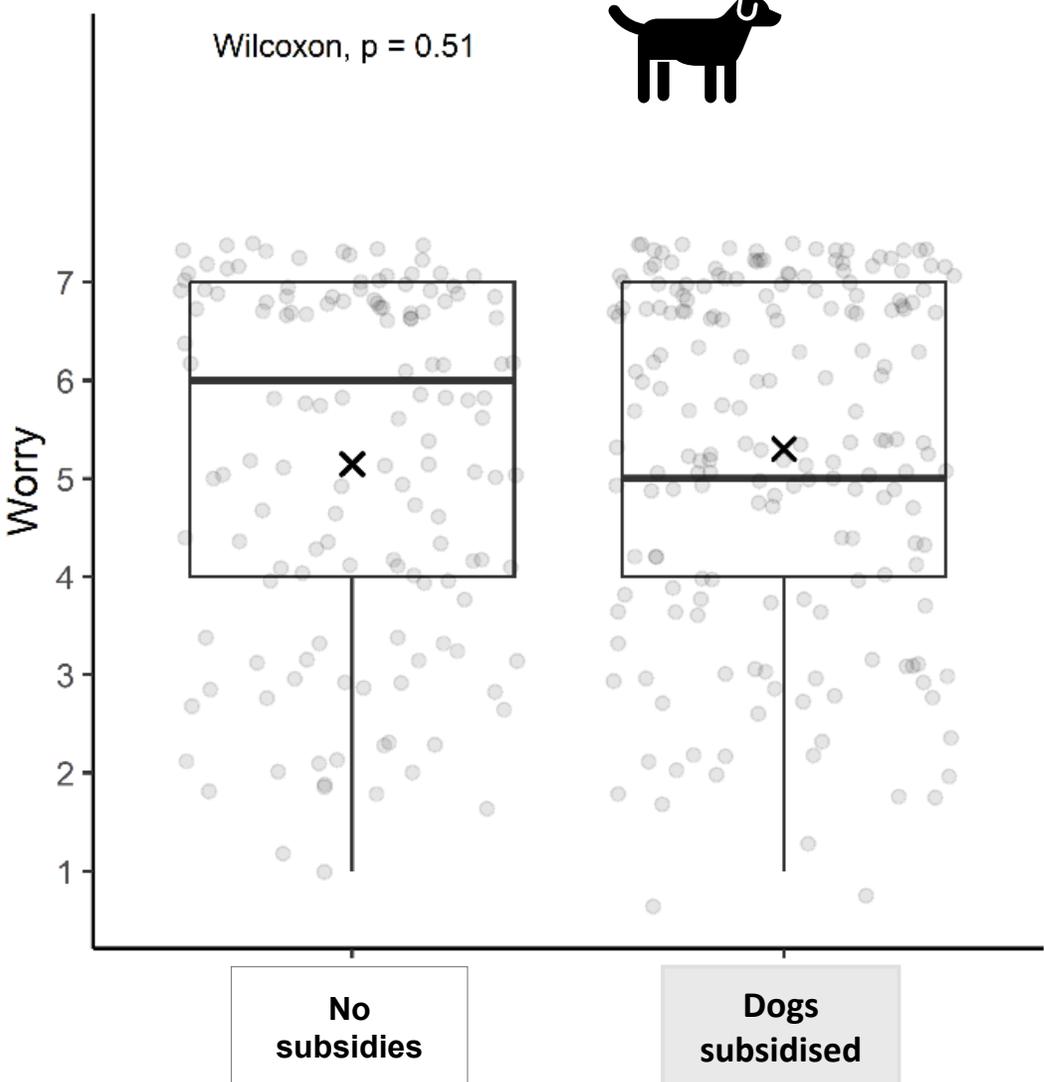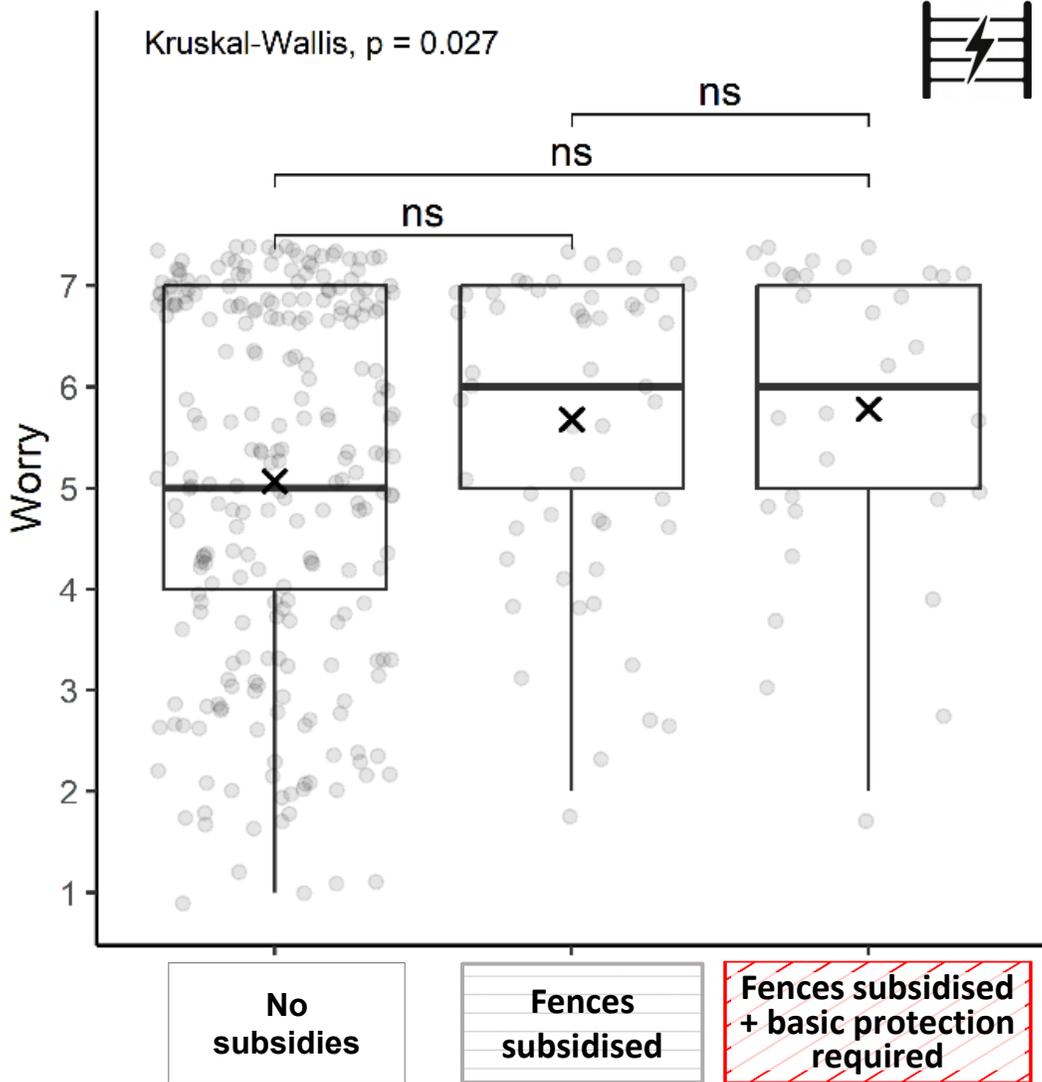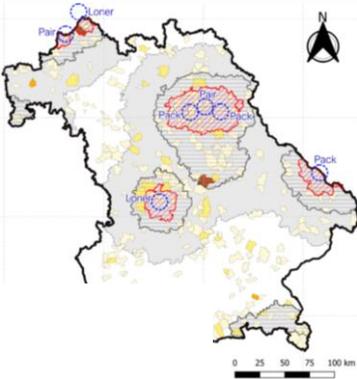

https://lifestockprotect.info/erfolgreiche-webinarreihe-zum-herdenschutz-ueber-1000-teilnehmer/

Subsidy schemes in Bavaria

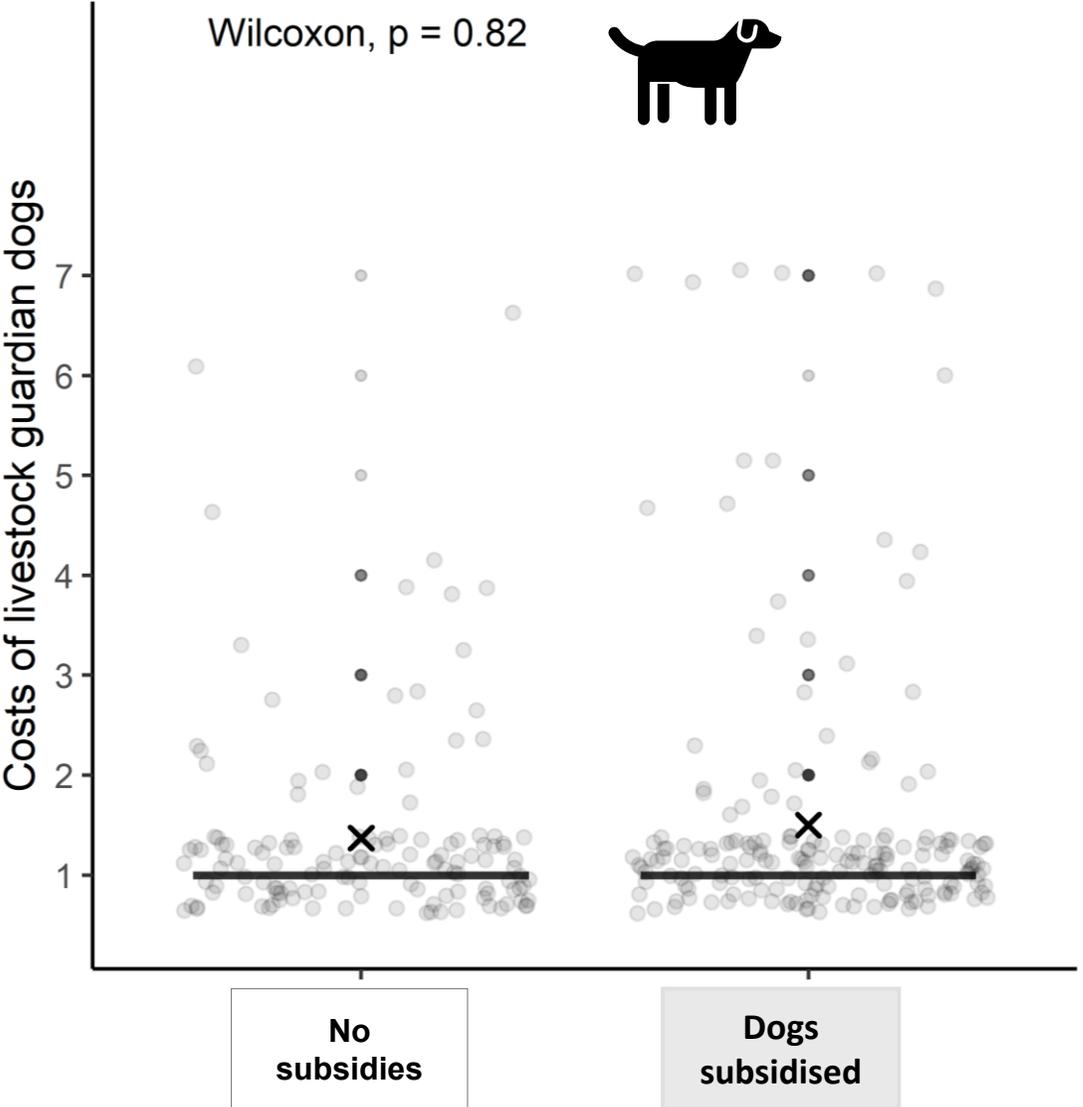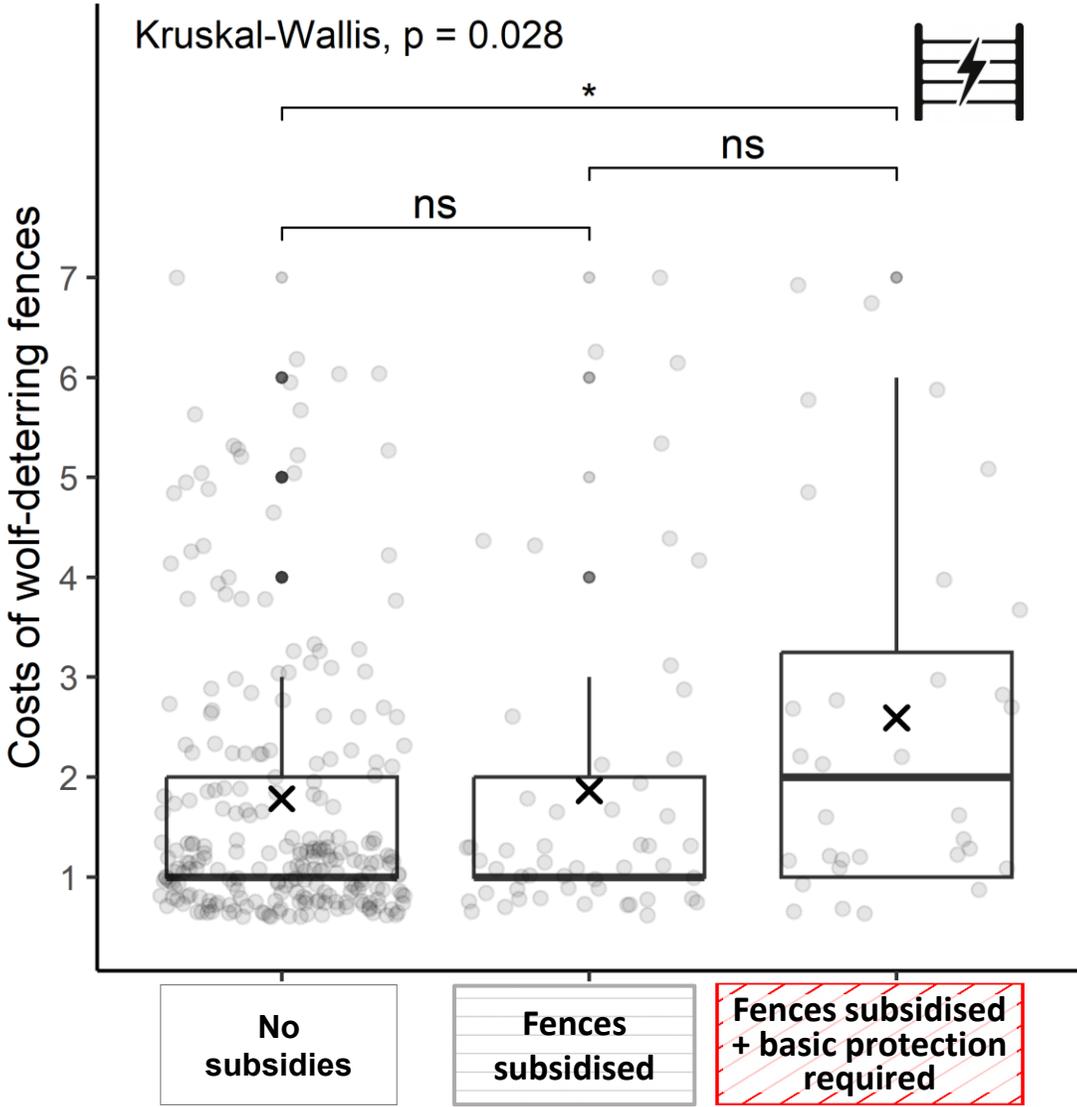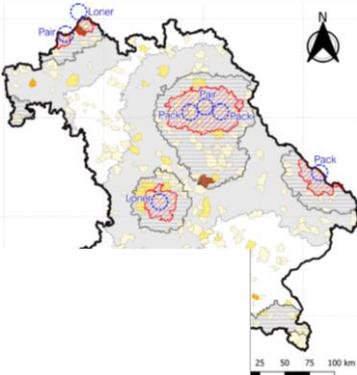# Subsidy schemes & Intention

Subsidy schemes & Worry

Kruskal-Wallis, p = 0.027

Wilcoxon, p = 0.51

No subsidies | Fences subsidised | Fences subsidised + basic protection required
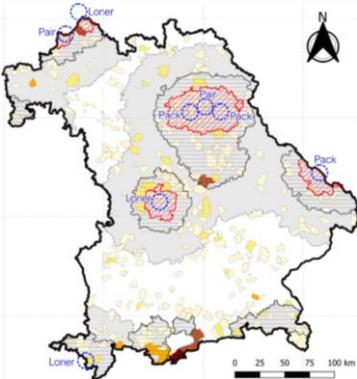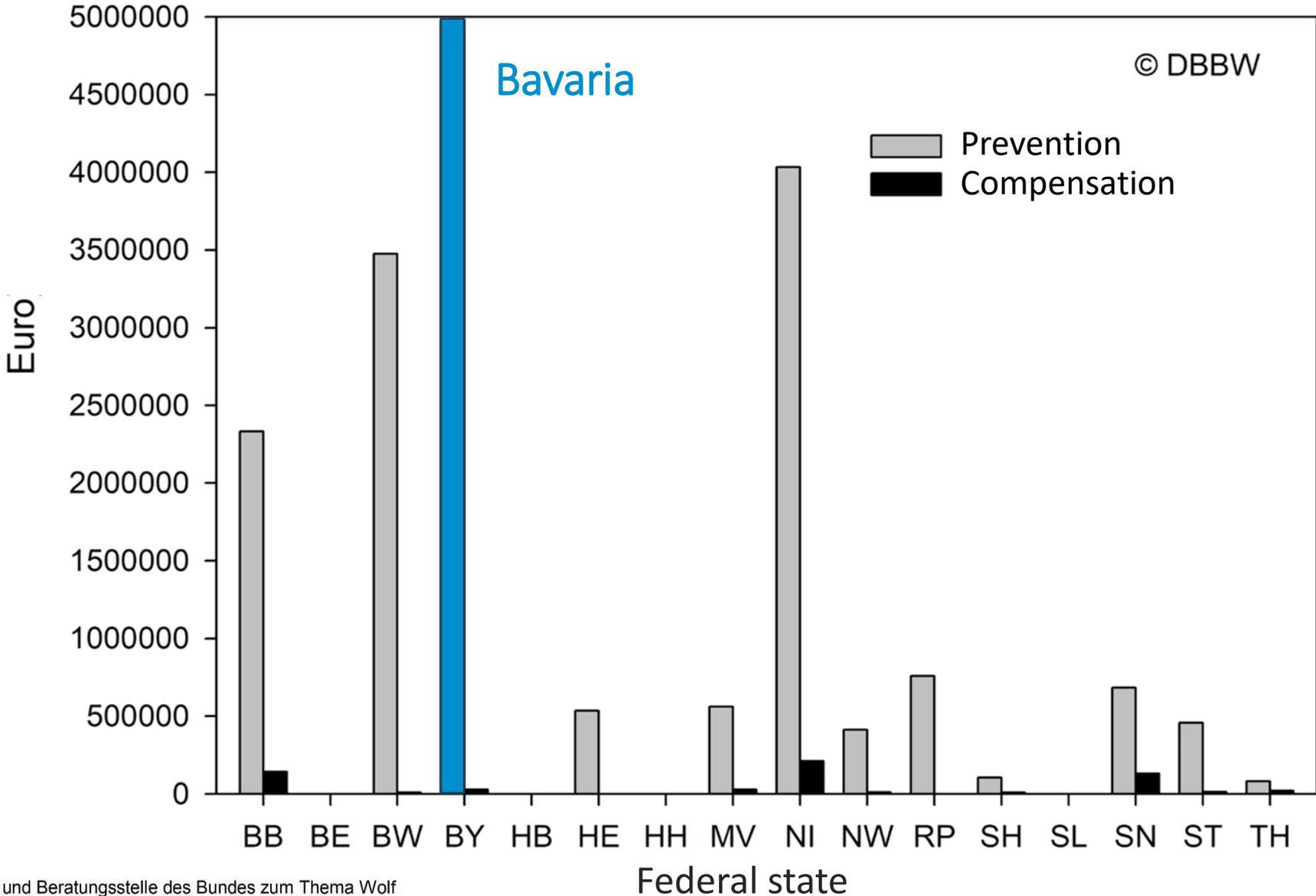
No subsidies | Dogs subsidised

Subsidy schemes & Costs

Subsidy schemes & Other owners

Payments by federal states in 2022

Bavaria

© DBBW

Legend:
- Prevention (grey)
- Compensation (black)

Y-axis: Euro (0 – 5000000)

X-axis: Federal state — BB, BE, BW, BY, HB, HE, HH, MV, NI, NW, RP, SH, SL, SN, ST, TH
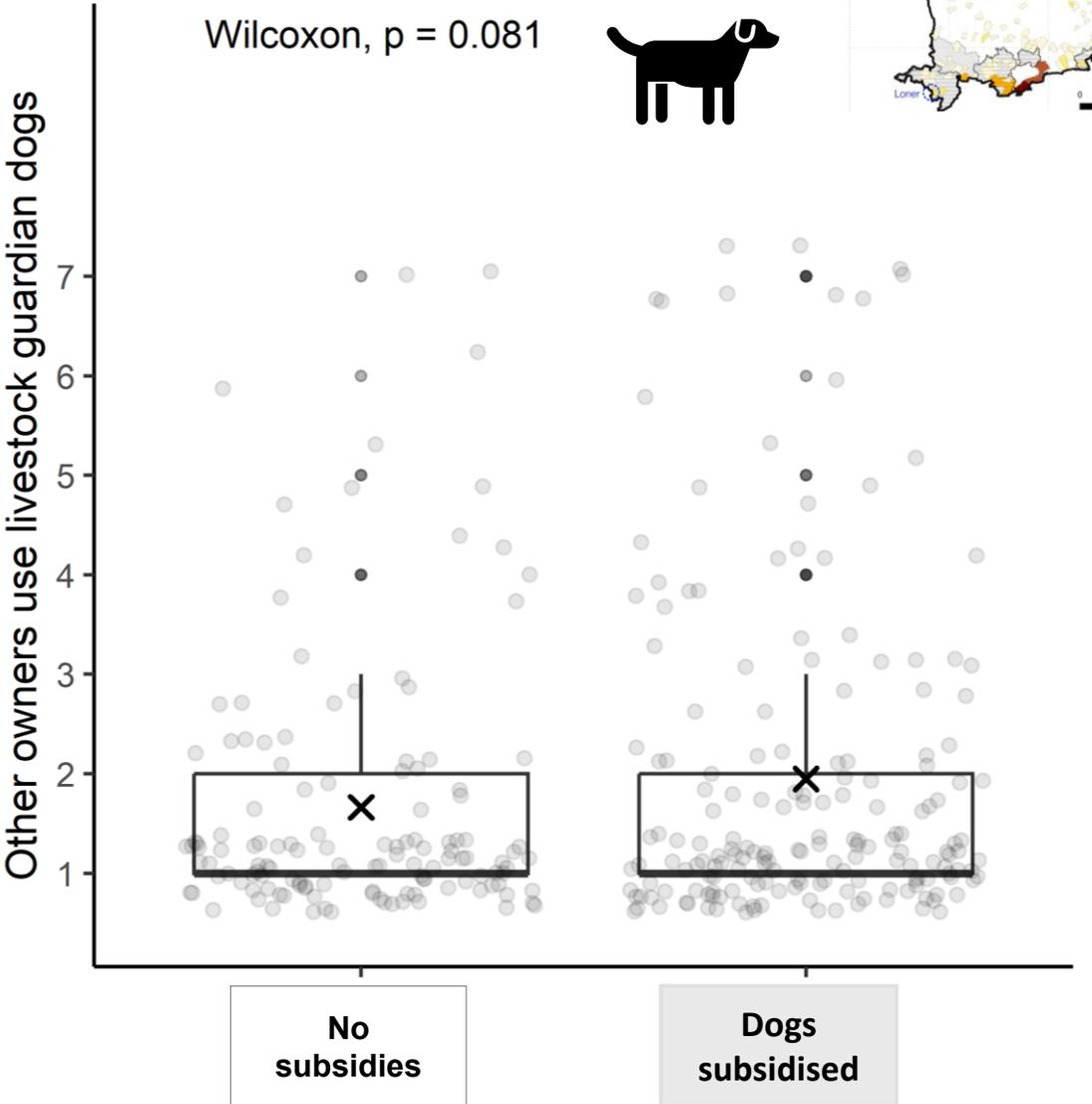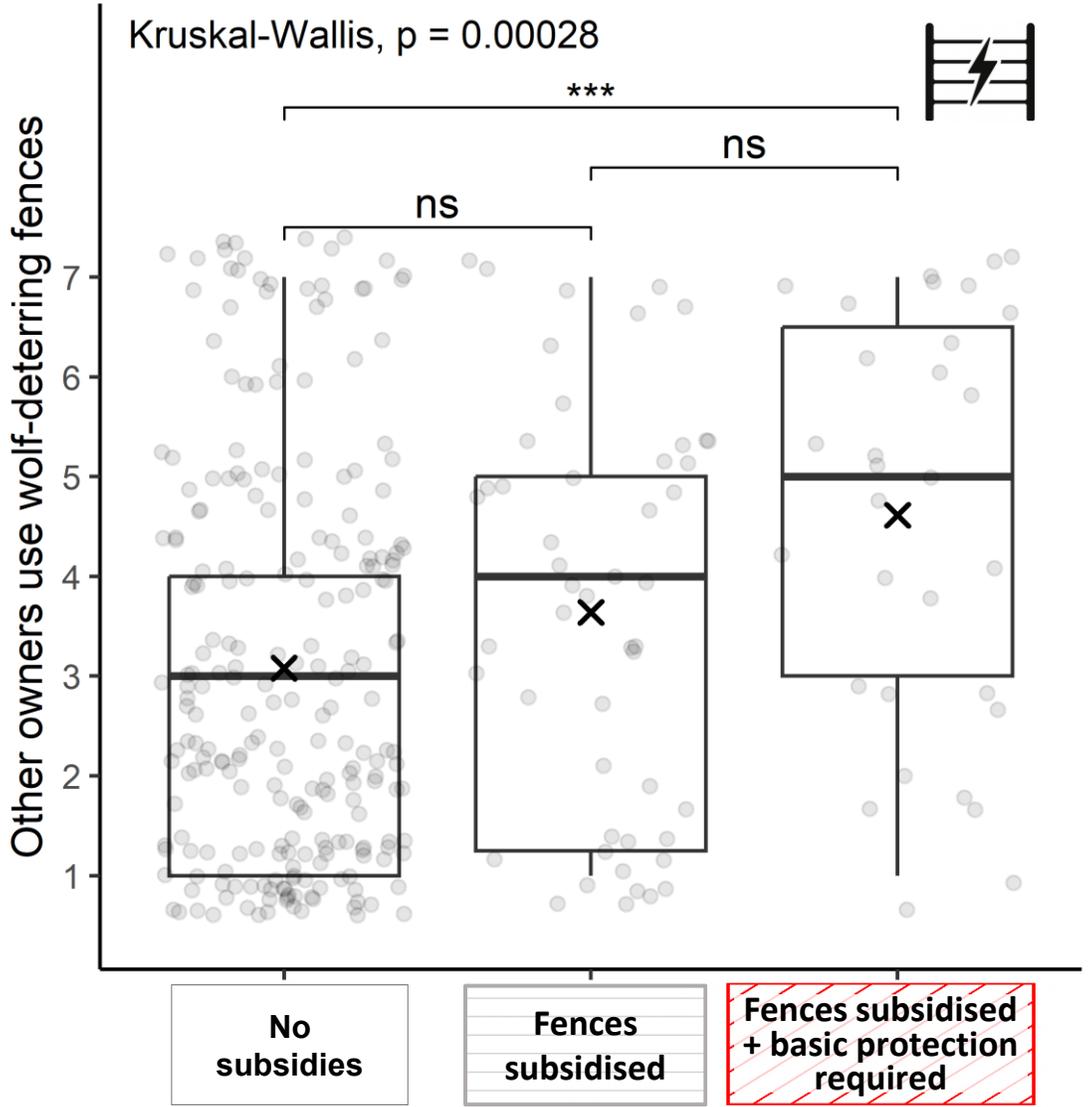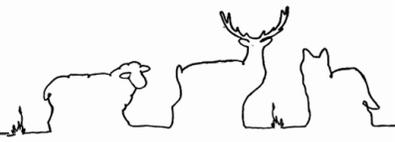
Summary and Conclusions
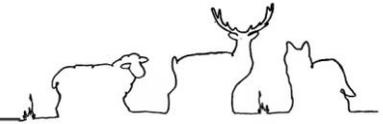
- Perceptions of owners of large and small livestock differed
  - ➢ Practical differences in livestock husbandry should be recognized

- Subjective Norms had the strongest effect on intention
  - ➢ Dissemination of prevention measures via successful farms

- Low Perceived Behavioural Control
  - ➢ Policy measures should provide easily accessible practical and financial support

- Subsidies can be motivating (fences) unless the measure involves mostly non-financial challenges (dogs)

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Eklund, A, Johansson, M, Flykt, A, Andrén, H, Frank, J (2020). Drivers of intervention use to protect domestic animals from large carnivore attacks. *HumDimensWildl* 25(4), 339-354.

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Meier, V, Leitinger, G, Walde, J, & Tasser, E (2024). Wolf-related damage in livestock management: Long-term data analyses in Saxony, Germany. *GlobEcolConserv* 54, e03031.

Riesch, F, Möck, M, Feindt, PH, Balkenhol, N., van Beeck Calkoen, STS, Bojarska, K, Gerber, N, Herzog, S, Zetsche, M, & Isselstein, J (2025). How to reconcile pasture grazing and wolf recolonisation? Perceptions of management options by livestock farmers in Germany. *PeopleNat* 00, 1–17.

Singer, L, Wietlisbach, X, Hickisch, R, Schoell, EM, Leuenberger, C, Van den Broek, A, ... & Wegmann, D (2023). The spatial distribution and temporal trends of livestock damages caused by wolves in Europe. *BiolConserv* 282, 110039.

van den Pol-van Dasselaar, A, Hennessy, D, & Isselstein, J (2020). Grazing of dairy cows in Europe—An in-depth analysis based on the perception of grassland experts. *Sustainability* 12(3), 1098.

Thank you for your attention!

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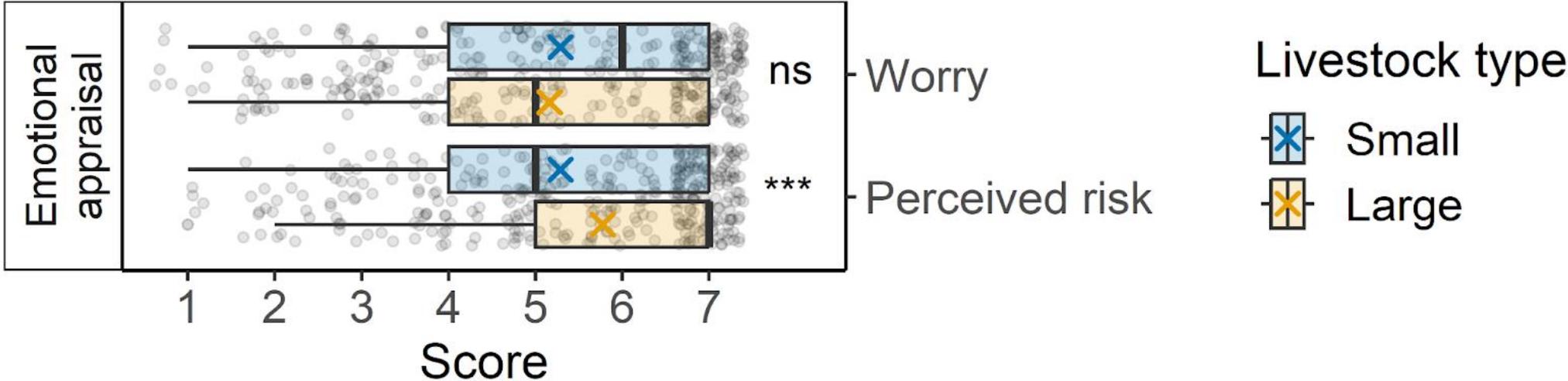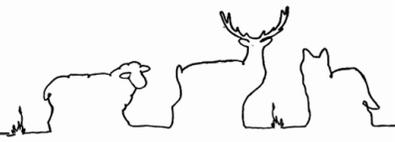
RESEARCH ARTICLE

How to reconcile pasture grazing and wolf recolonisation? Perceptions of management options by livestock farmers in Germany
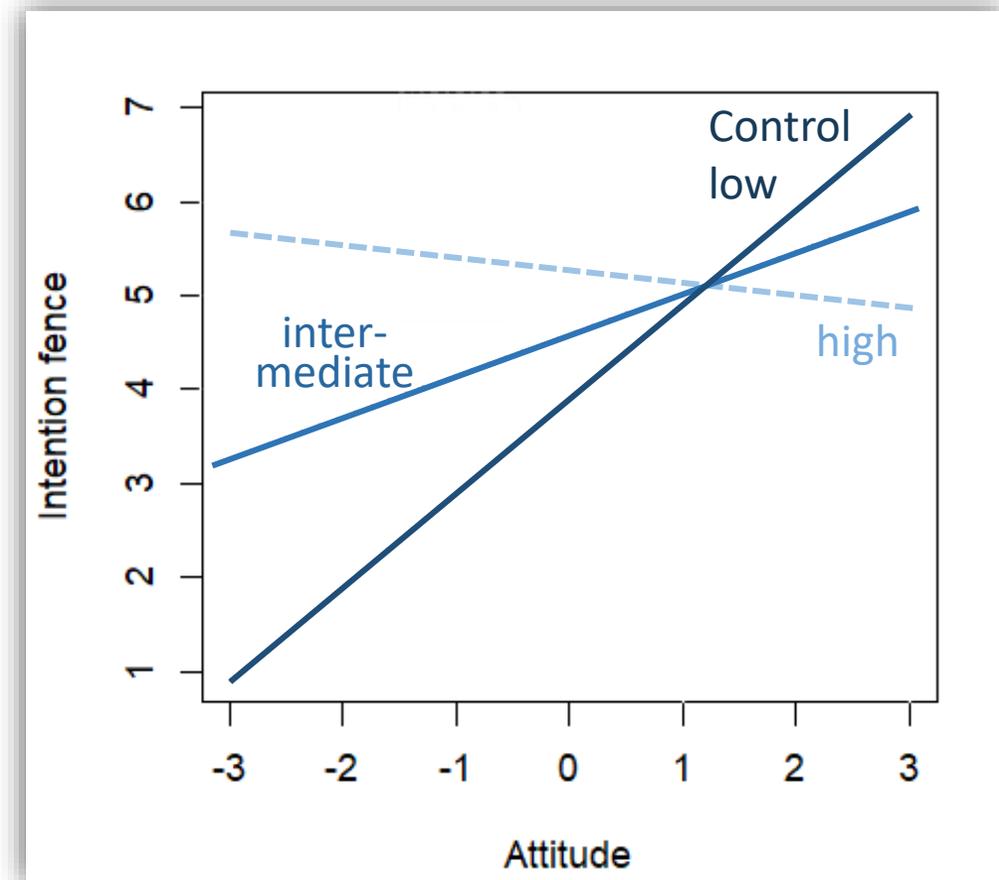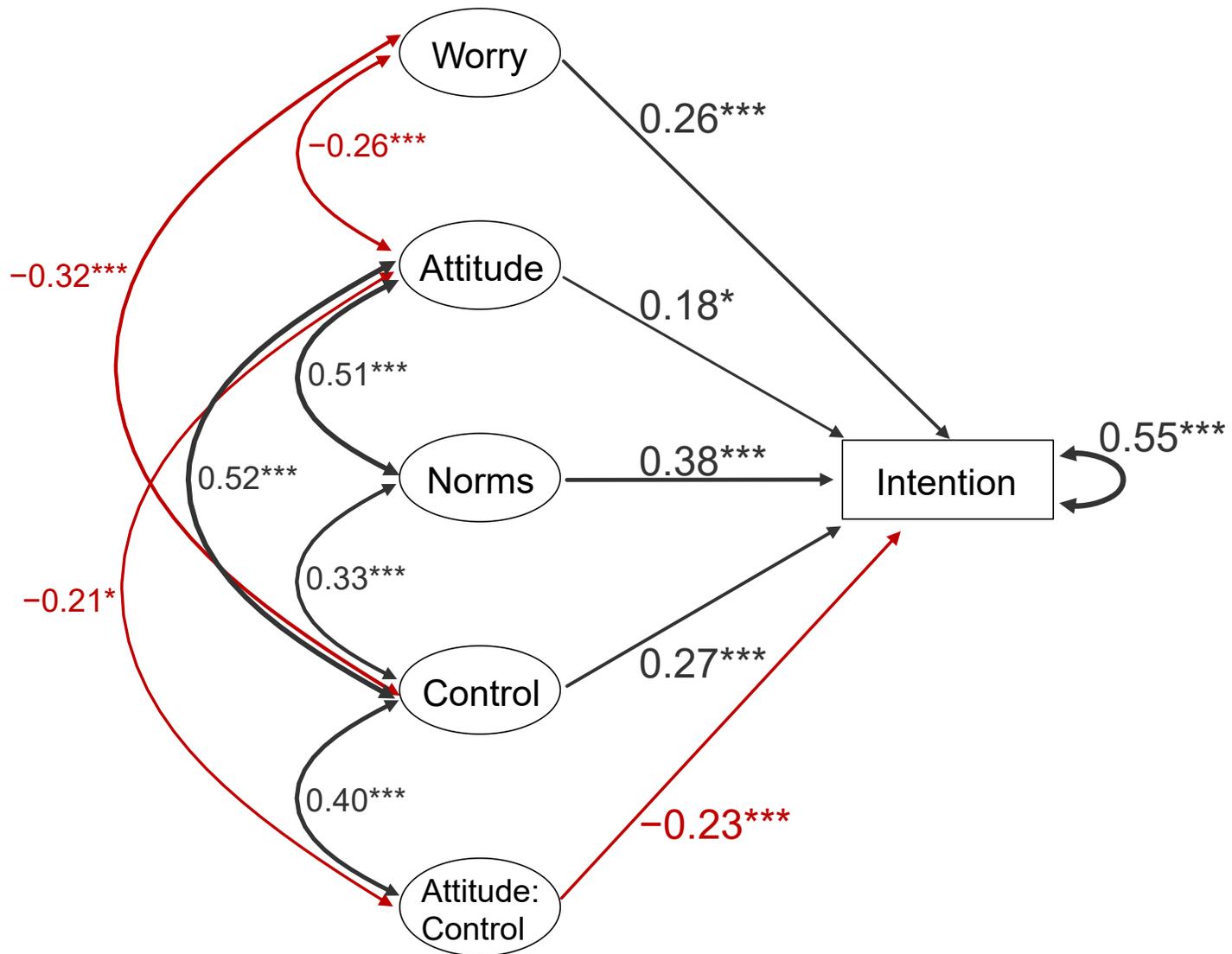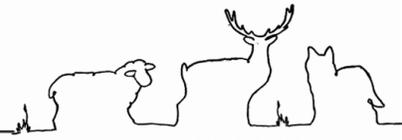
Friederike Riesch[1,2] ⓘ | Malte Möck[3] | Peter H. Feindt[3] | Niko Balkenhol[2,4] |
Suzanne T. S. van Beeck Calkoen[4,5] ⓘ | Katarzyna Bojarska[2,4] ⓘ |
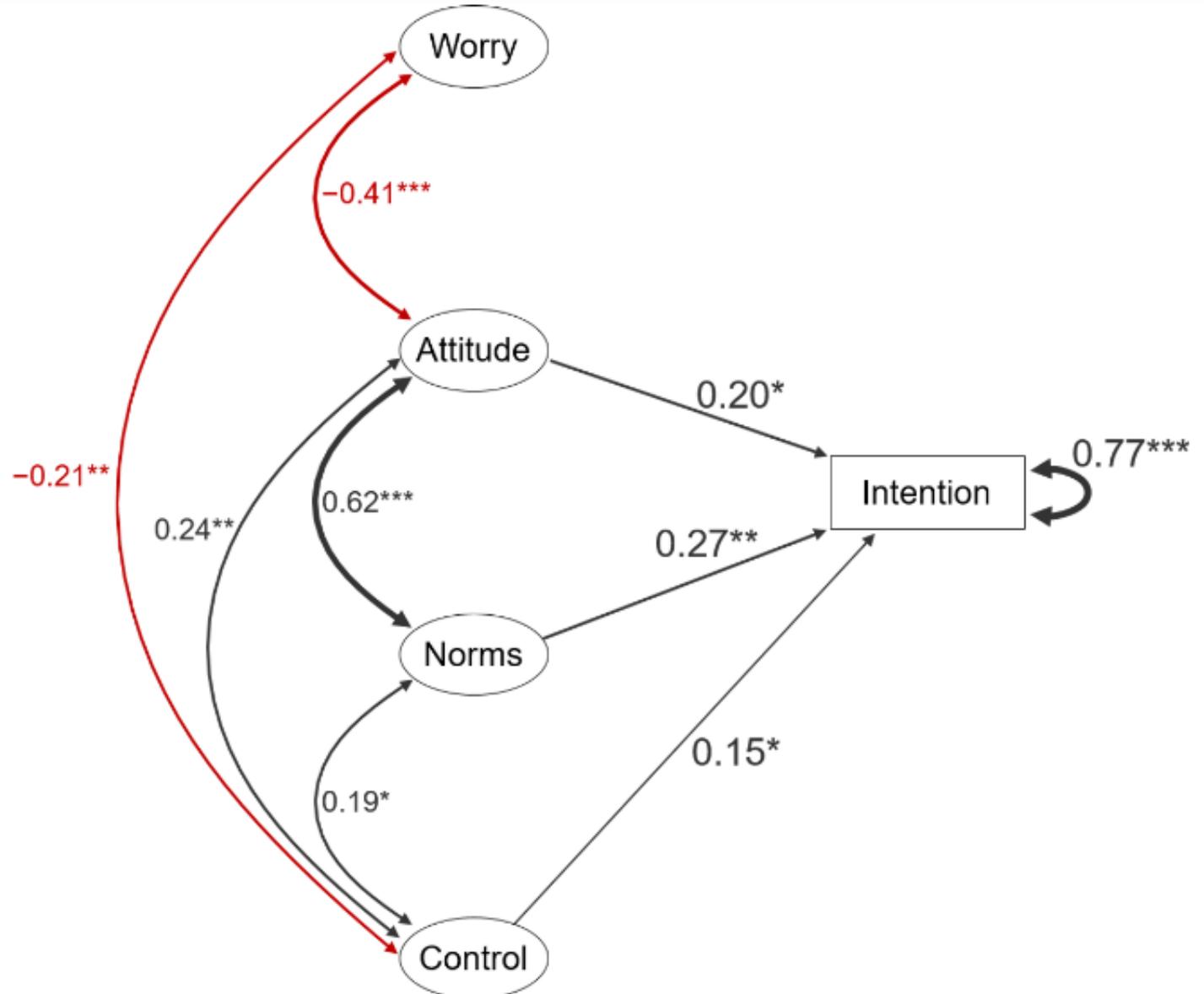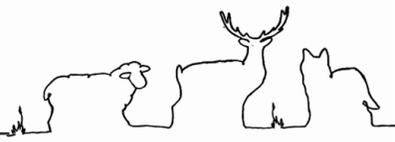Nina Gerber[6] | Sven Herzog[7] | Maria Zetsche[7] | Johannes Isselstein[1,2]

Worry and perceived risk

Wilcoxon signed-rank test for differences between owners of small and large livestock (ns: p > 0.05; *: p ≤ 0.05; **: p ≤ 0.01; ***: p ≤ 0.001; ****: p ≤ 0.0001)
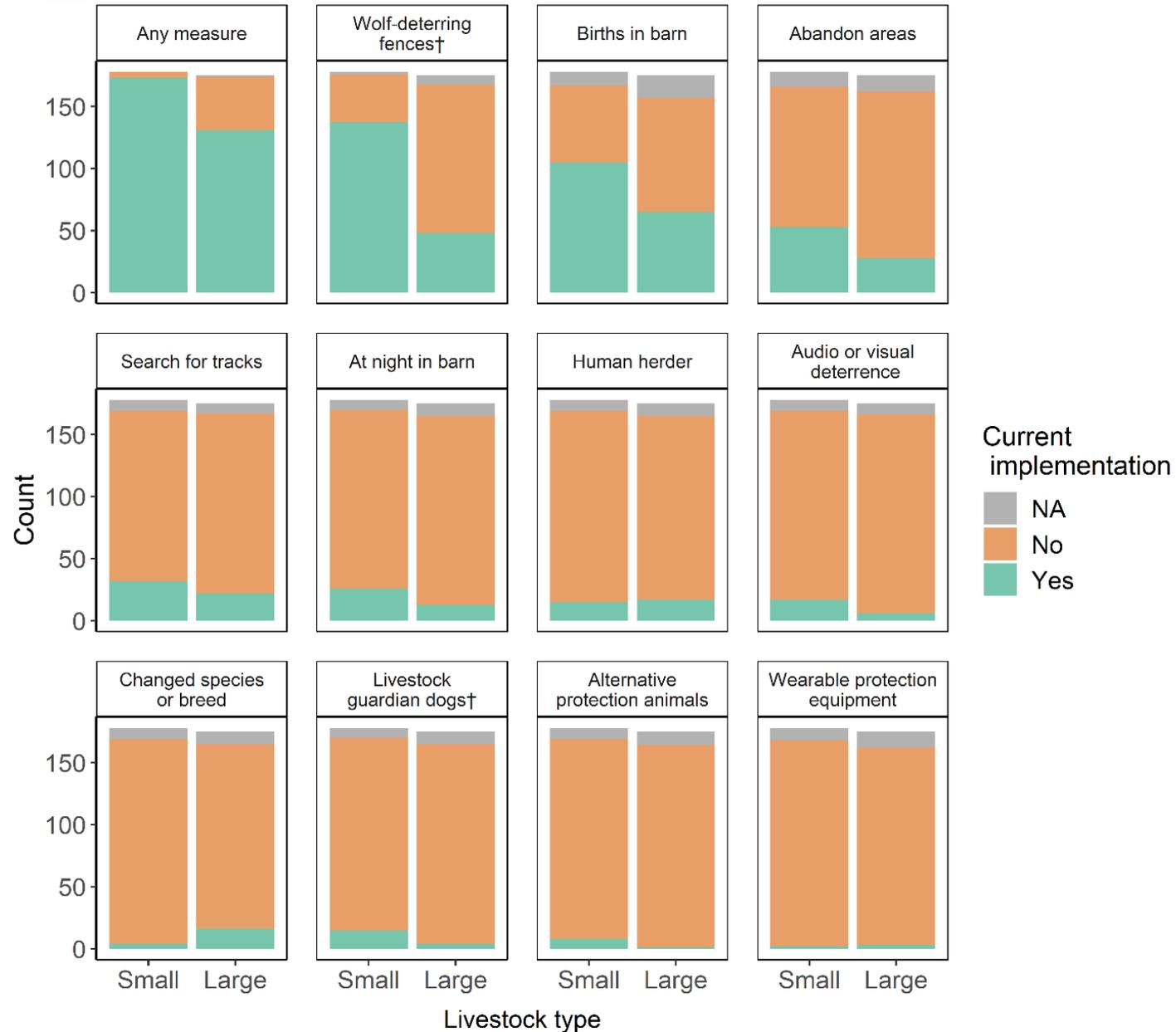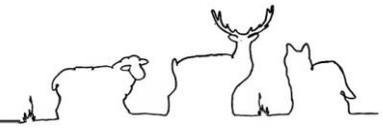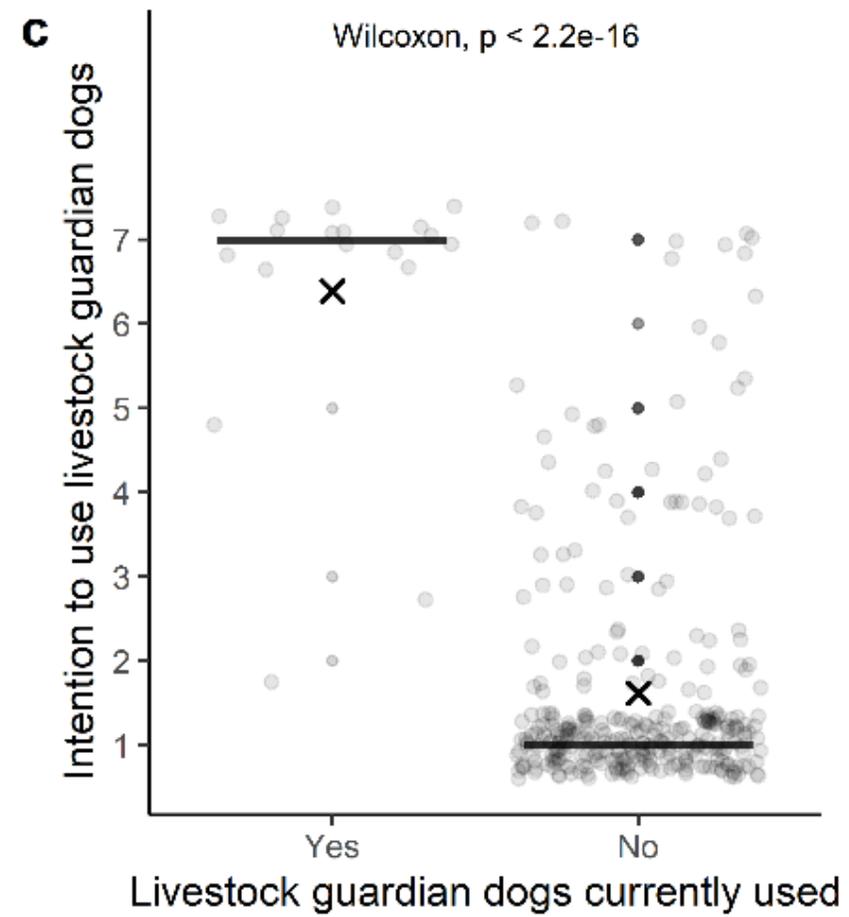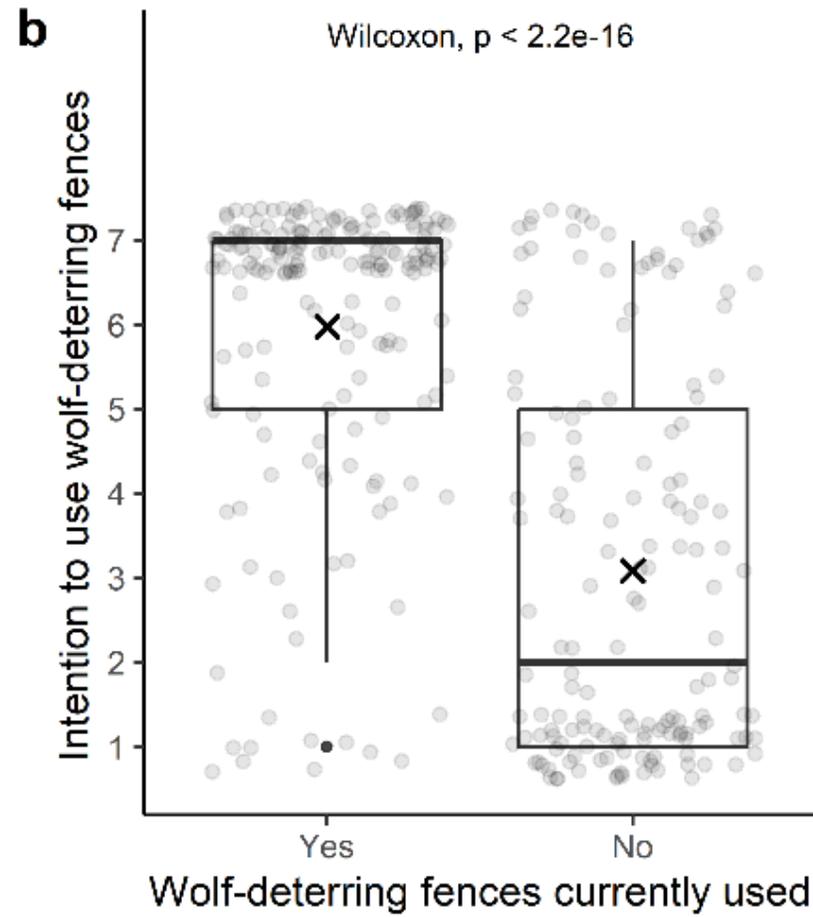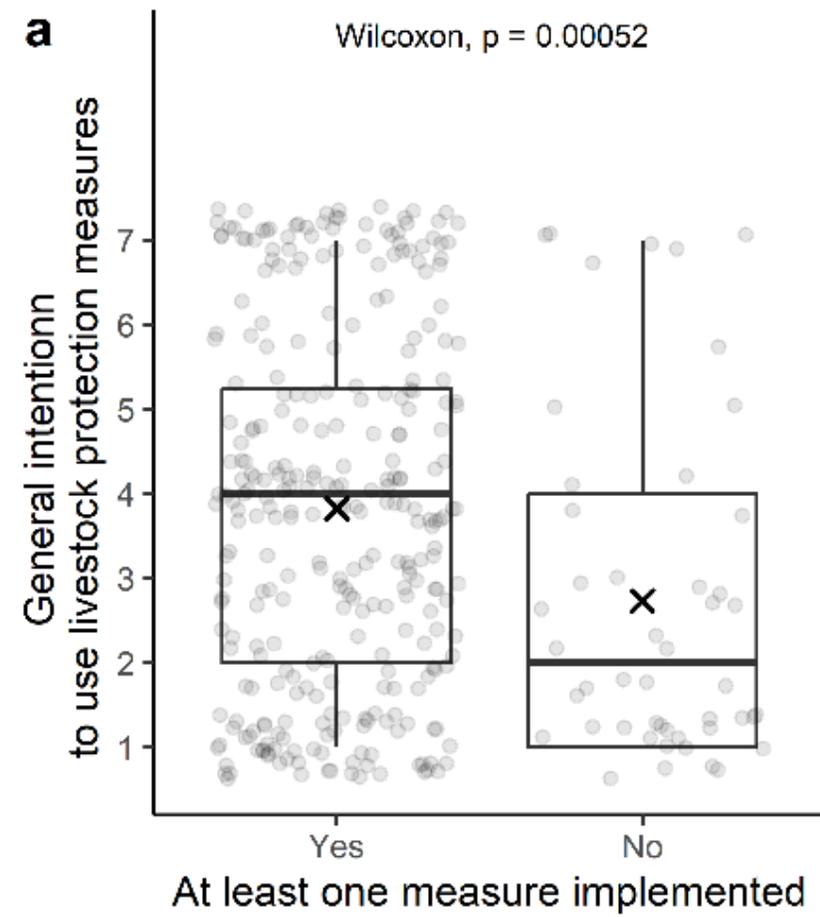
Wolf-deterring fences
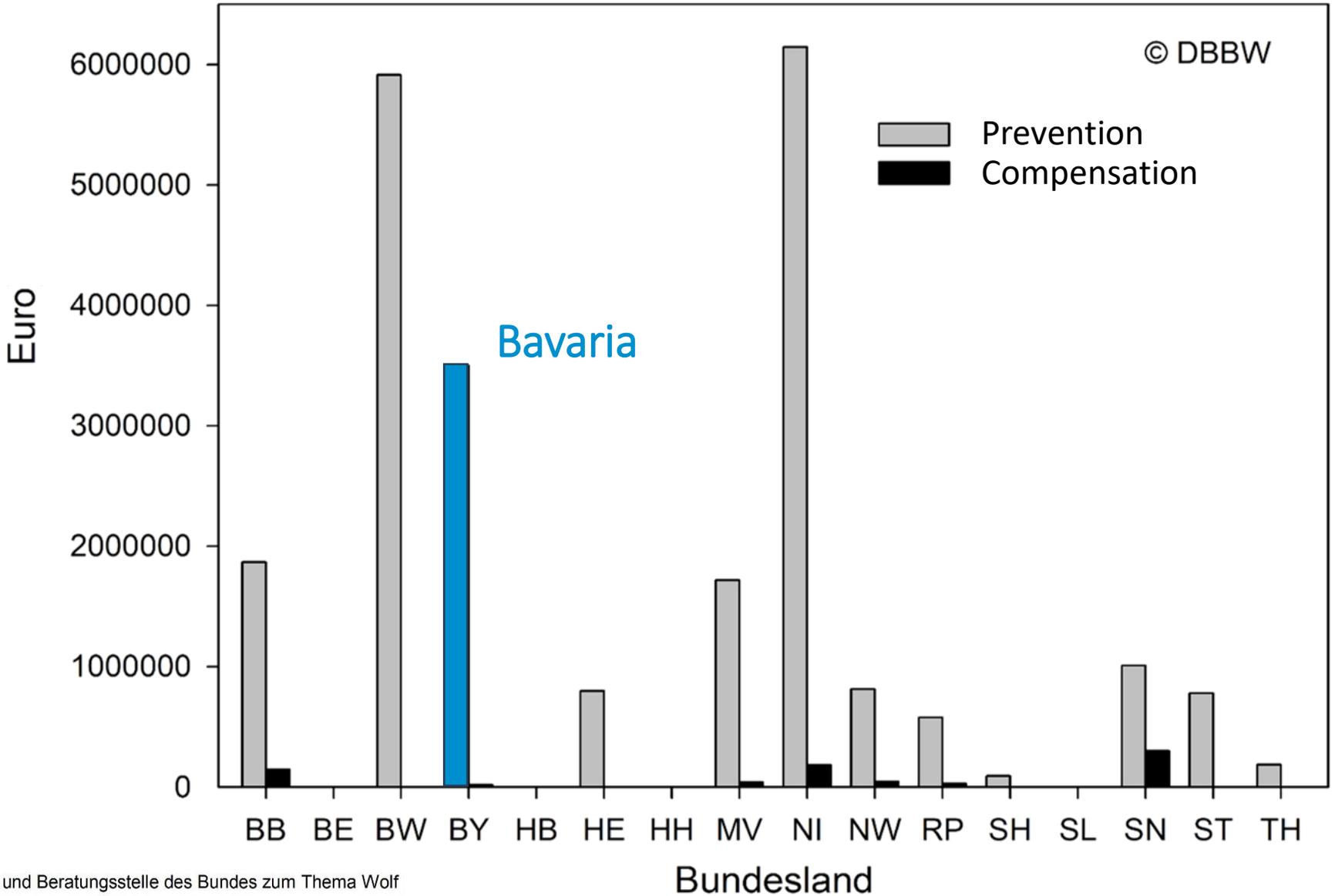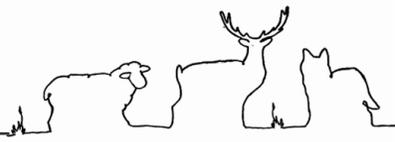
Livestock guardian dogs

Current implementation of protection measures

Current implementation & intention

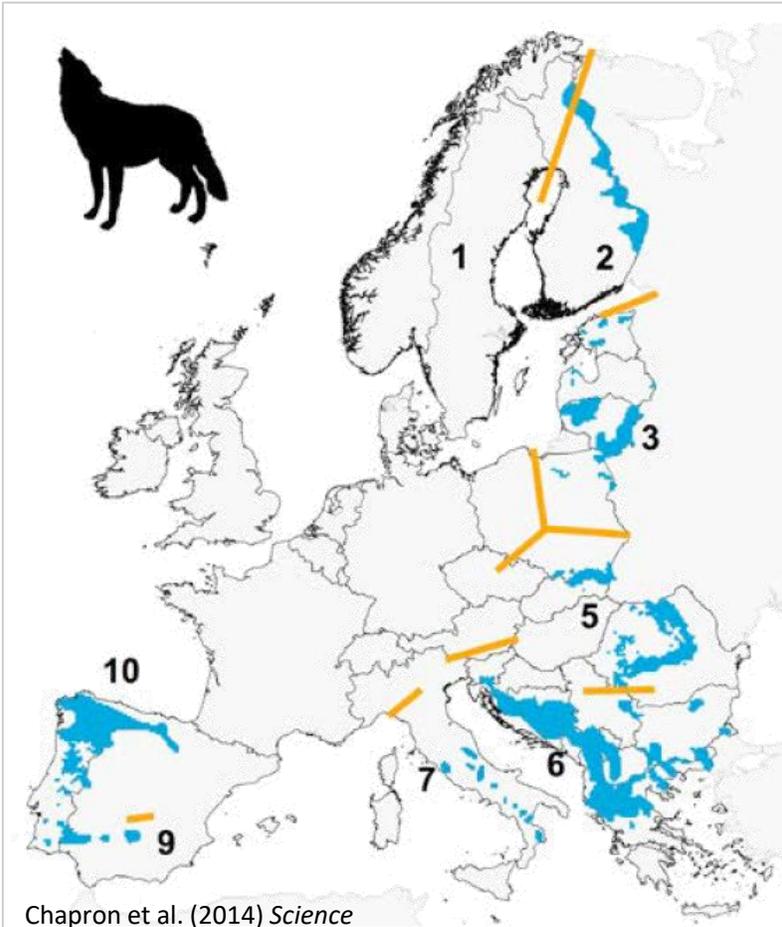# Payments by federal states in 2024

Wolves in Europe

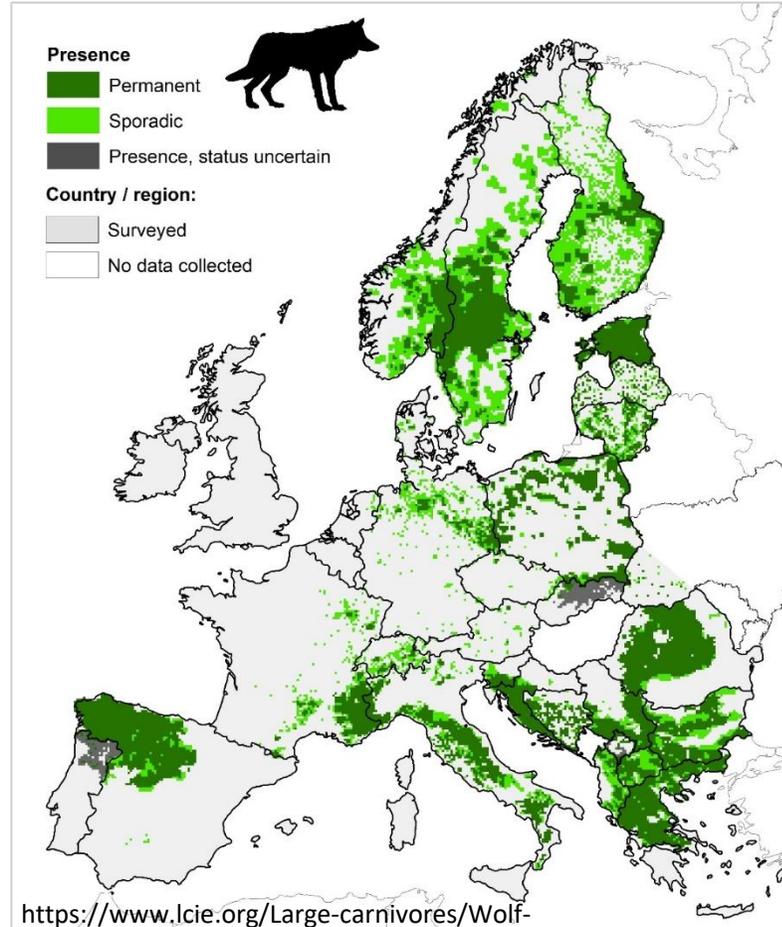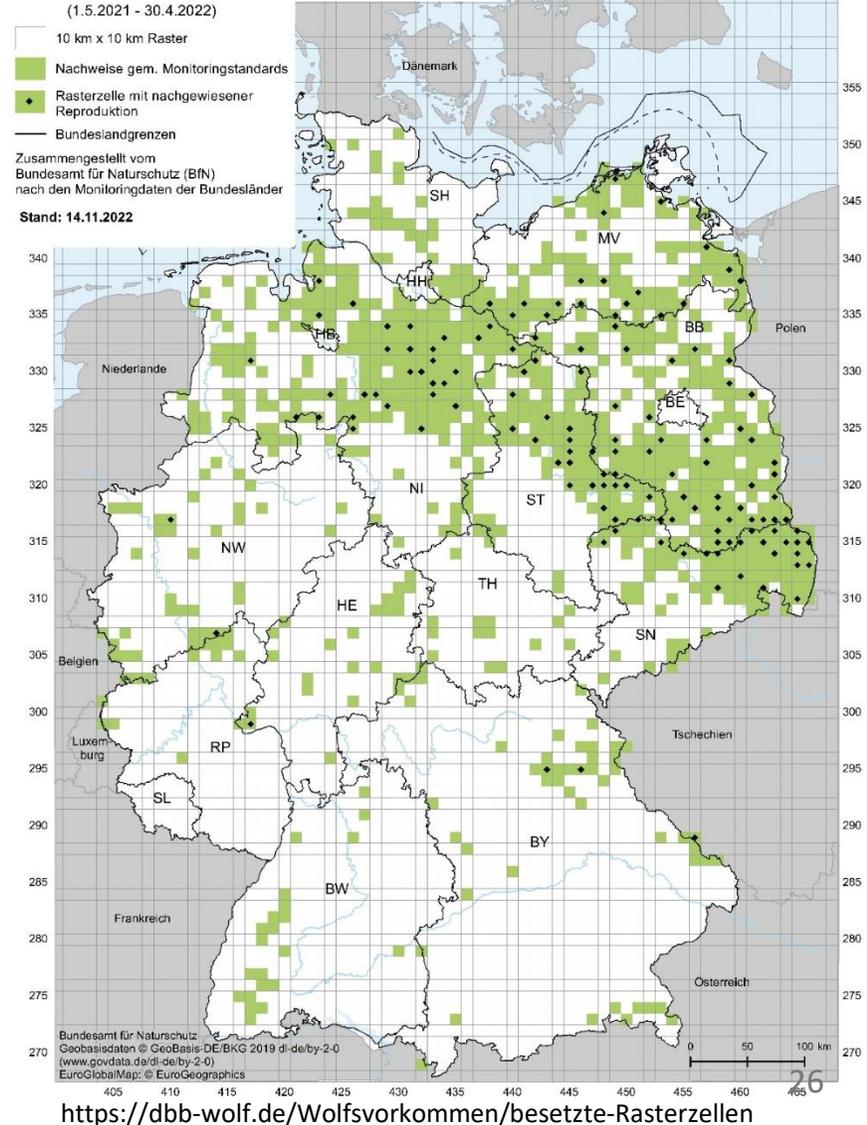## 1950–1970s

Chapron et al. (2014) *Science*

2012–2016

Presence
- Permanent
- Sporadic
- Presence, status uncertain

Country / region:
- Surveyed
- No data collected

https://www.lcie.org/Large-carnivores/Wolf-

Germany 2021/22

(1.5.2021 - 30.4.2022)

- 10 km x 10 km Raster
- Nachweise gem. Monitoringstandards
- Rasterzelle mit nachgewiesener Reproduktion
- Bundeslandgrenzen

Zusammengestellt vom Bundesamt für Naturschutz (BfN) nach den Monitoringdaten der Bundesländer

Stand: 14.11.2022

Bundesamt für Naturschutz
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(www.govdata.de/dl-de/by-2-0)
EuroGlobalMap: © EuroGeographics
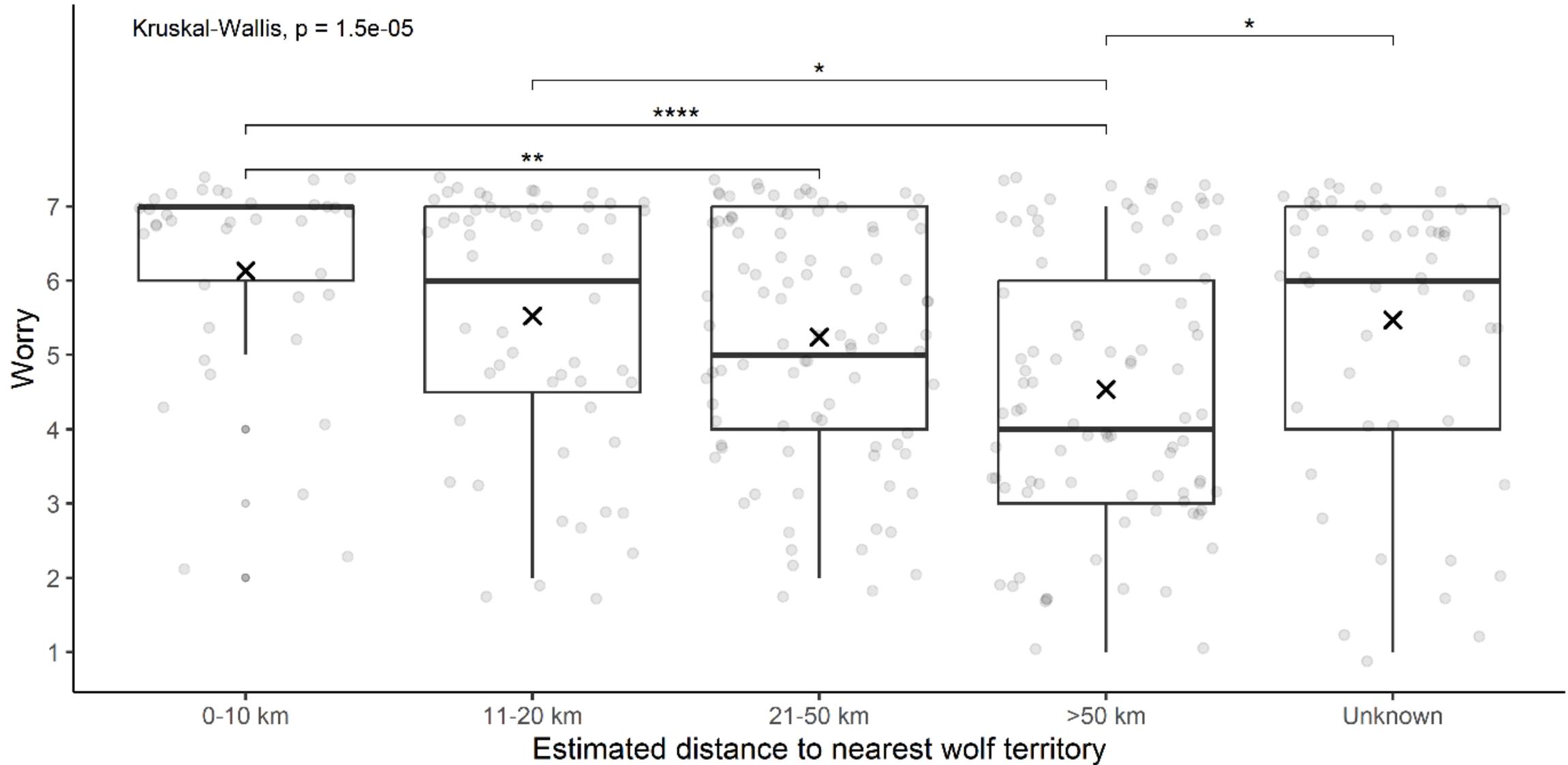
https://dbb-wolf.de/Wolfsvorkommen/besetzte-Rasterzellen

Bern Convention 1979, EU Habitats Directive 1992

Distance to wolf & worry

Subsidy schemes & distance to wolf