



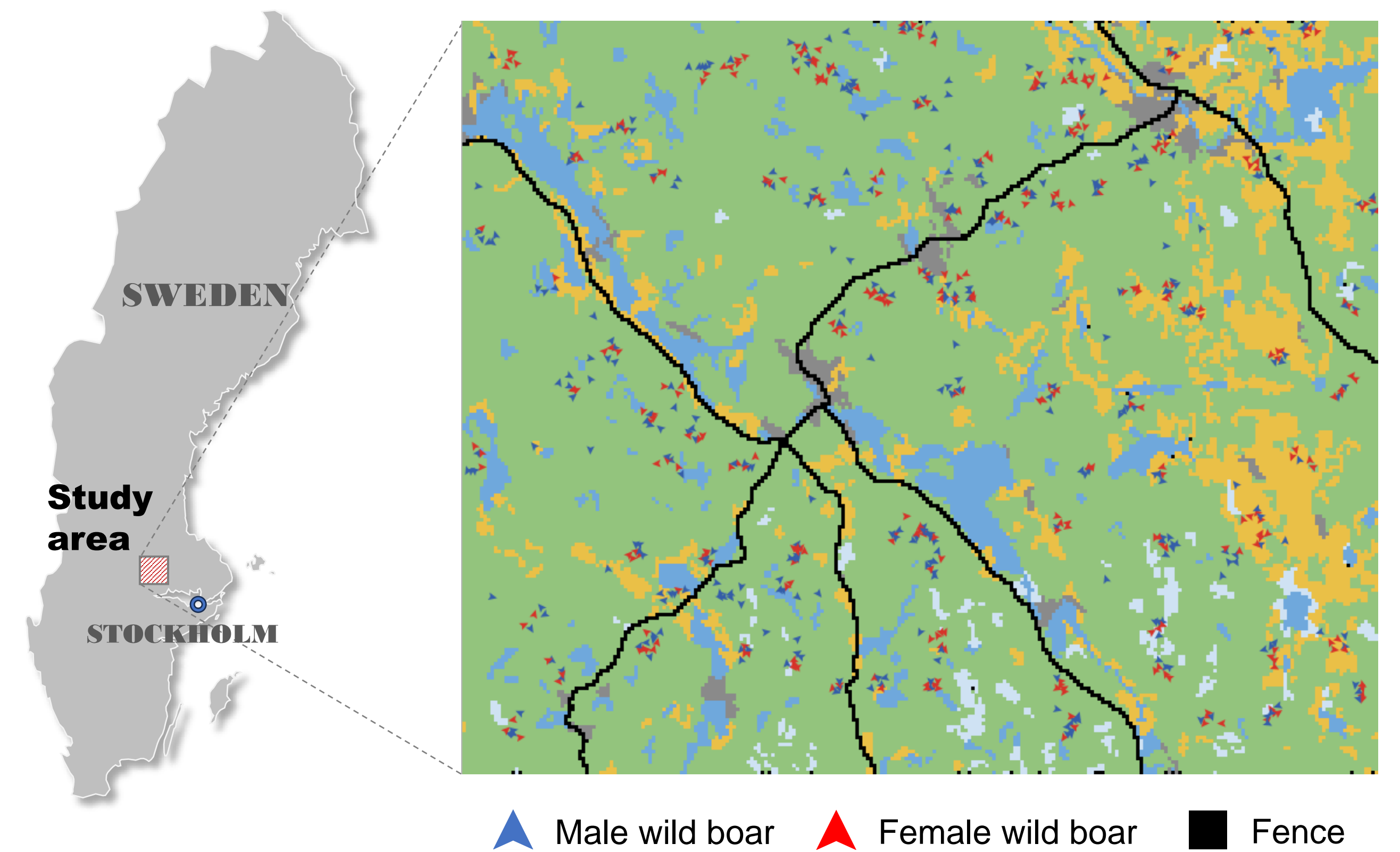
The role of human activities in shaping wild boar movement and African swine fever spread

Wild boars in Sweden

- Wild boars were nearly extinct in Sweden but reestablished from escapees and possible releases in the 1970s–1980s.
- The population now stands at around 300,000.

Agent-based model in Netlogo

- Wild Boars:** Agents with properties like gender, home range, age, pregnancy status, and group ID.
- Patches:** Grid cells with landcover type and fences
- Spatiotemporal scale:** 2D grid (200m × 200m), wild boar movement based on landcover and obstacles. Weekly timesteps; seasons change every 13 weeks.
- Simulation loop**
 - Movement: Varies by age, gender, and group dynamics.
 - Reproduction: Spring breeding based on age and pregnancy status.
 - Death: Age-dependent mortality.
 - Hunting: Weekly hunting based on an annual rate.
 - Data Collection: Tracks wild boar movements and saves results in CSV.



Statistical analysis

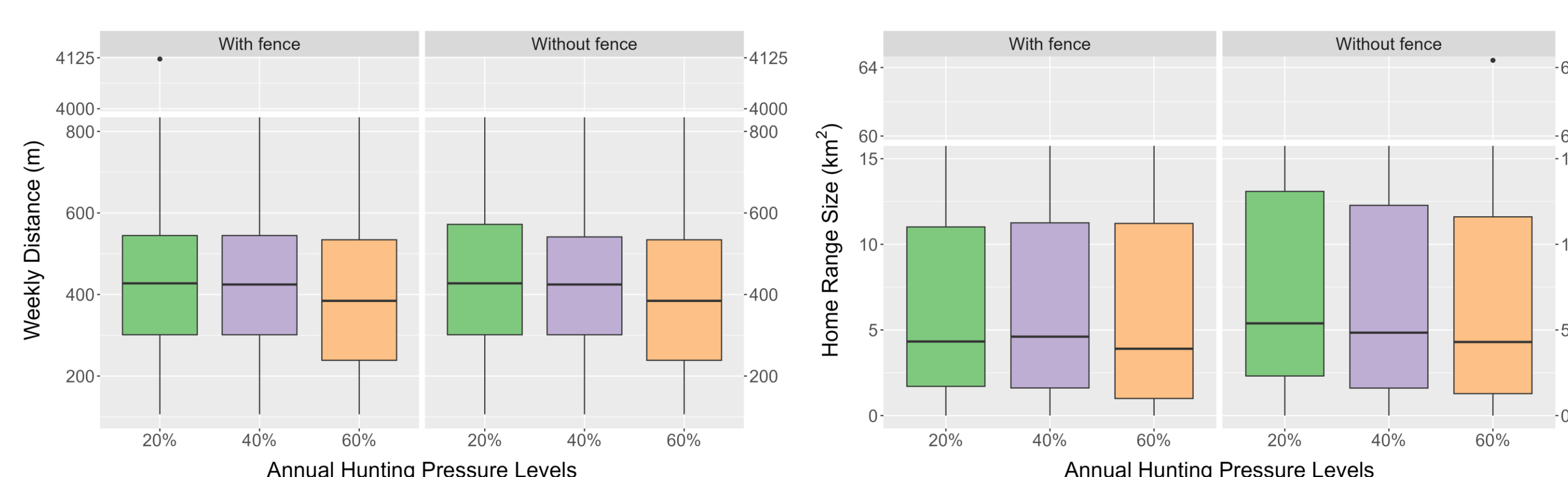
- Assess changes in weekly movement distance and home range size due to fence installation and hunting pressure.
 - t-test – Compare two groups.
 - Wilcoxon test – Non-parametric comparison.
 - ANOVA – Compare multiple groups.

Do Human Activities Redistribute Wild Boar Populations? ☒ Yes.

- Fencing increases population density by limiting movement.
- Higher hunting pressure decreases home range size and restricts movement, potentially concentrating populations.
- These create dense hotspots of wild boars, increasing the likelihood of disease transmission.

Does This Redistribution Increase Spillover Risks? ☒ Yes, but in different ways.

- High hunting pressure leads to localized wild boar clusters, increasing within-group disease transmission.
- Lower hunting pressure results in larger home ranges, spreading disease to new regions, including human settlements and livestock areas.



- ✓ **Fences reduce movement ($p < 0.05$):** The "with fence" group has a smaller weekly movement distance (441.36m) than the "without fence" group (444.16m).
- ✓ **Hunting affects movement ($p < 0.05$):** Higher hunting pressure reduces weekly movement distance (20% = 448.69m, 40% = 441.69m, 60% = 434.44m).
- ✓ **Fences reduce home range ($p < 0.05$):** The "with fence" group has a smaller home range (7.43km²) than the "without fence" group (8.20km²).
- ✓ **Hunting affects home range ($p < 0.05$):** Increased hunting pressure decreases home range size (20% = 8.21km², 40% = 7.76km², 60% = 7.34km²).