
SWEDISH
VETERINARY
AGENCY

ASF in Sweden

Surveillance, and management of the first outbreak

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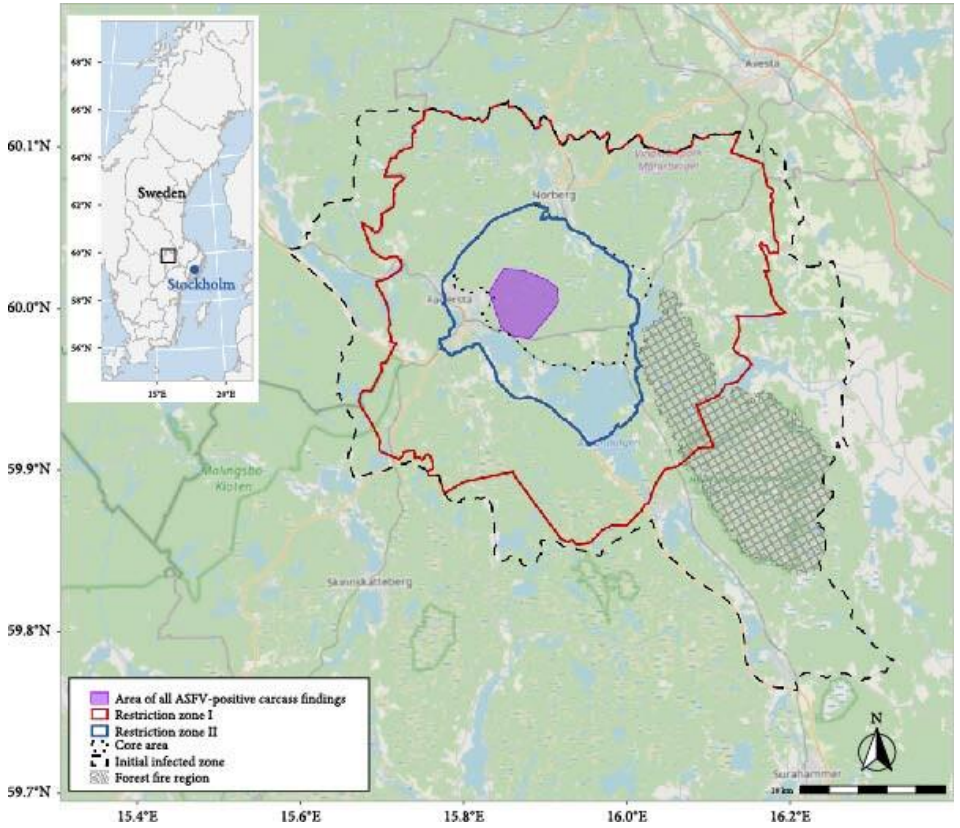

Acknowledgements

Transboundary and Emerging Diseases, 2024

Research Article

First Outbreak of African Swine Fever in Sweden: Local Epidemiology, Surveillance, and Eradication Strategies

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Components for success – in Sweden

Disease knowhow

\+ Surveillance: General and targeted

\+ Collaboration, preparedness, training excercises

= Early detection

\+ Rapid response, adaptable protocol

\+ Collect data for evidence of freedom, and science

= Declared ASF-free status

\+ Continued surveillance, lessons learned to adapt risk assessment

Disease knowhow

SCIENTIFIC OPINION

EFSA Journal

ADOPTED: 18 March 2021

doi: 10.2903/j.efsa.2021.6558

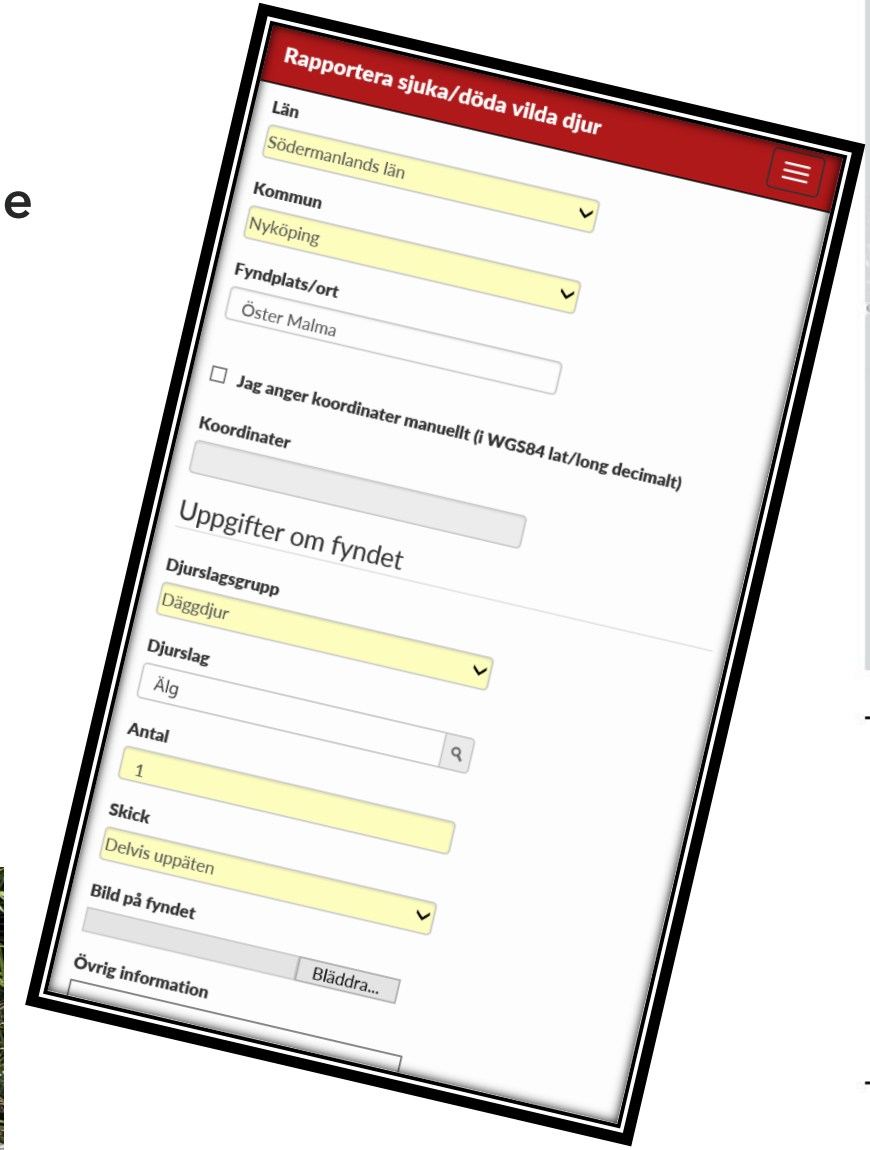
Ability of different matrices to transmit African swine fever virus

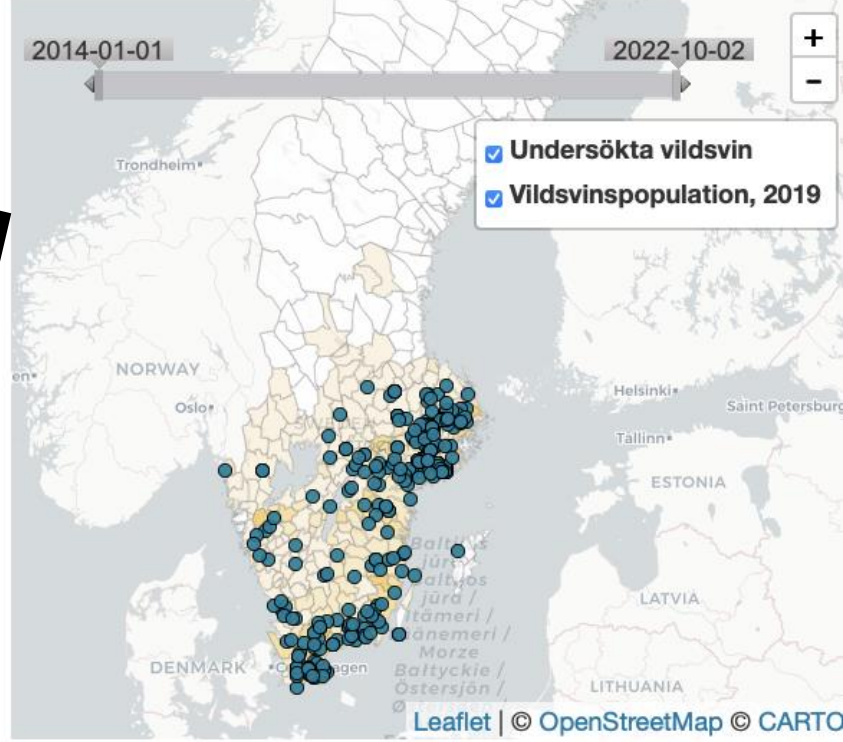
EFSA Panel on Animal Health and Welfare (AHAW),
Soren Saxmose Nielsen, Julio Alvarez, Dominique Joseph Bicout, Paolo Calistri, Elisabetta Canali, Julian Ashley Drewe, Bruno Garin-Bastuji, Jose Luis Gonzales Rojas, Christian Gortázar Schmidt, Mette Herskin, Miguel Ángel Miranda Chueca, Virginie Michel, Barbara Padalino, Paolo Pasquali, Liisa Helena Sihvonen, Hans Spoolder, Karl Stahl, Antonio Velarde, Arvo Viltrop, Christoph Winckler, Anette Boklund, Anette Botner,

- PhD in ASF (Karl Ståhl, Erika Chenais)
- PhD students, ASF studies (Emil Wikström, Linda Ernlund)
- SVA Expert Group on ASF

Surveillance

- reporting dead wildlife online

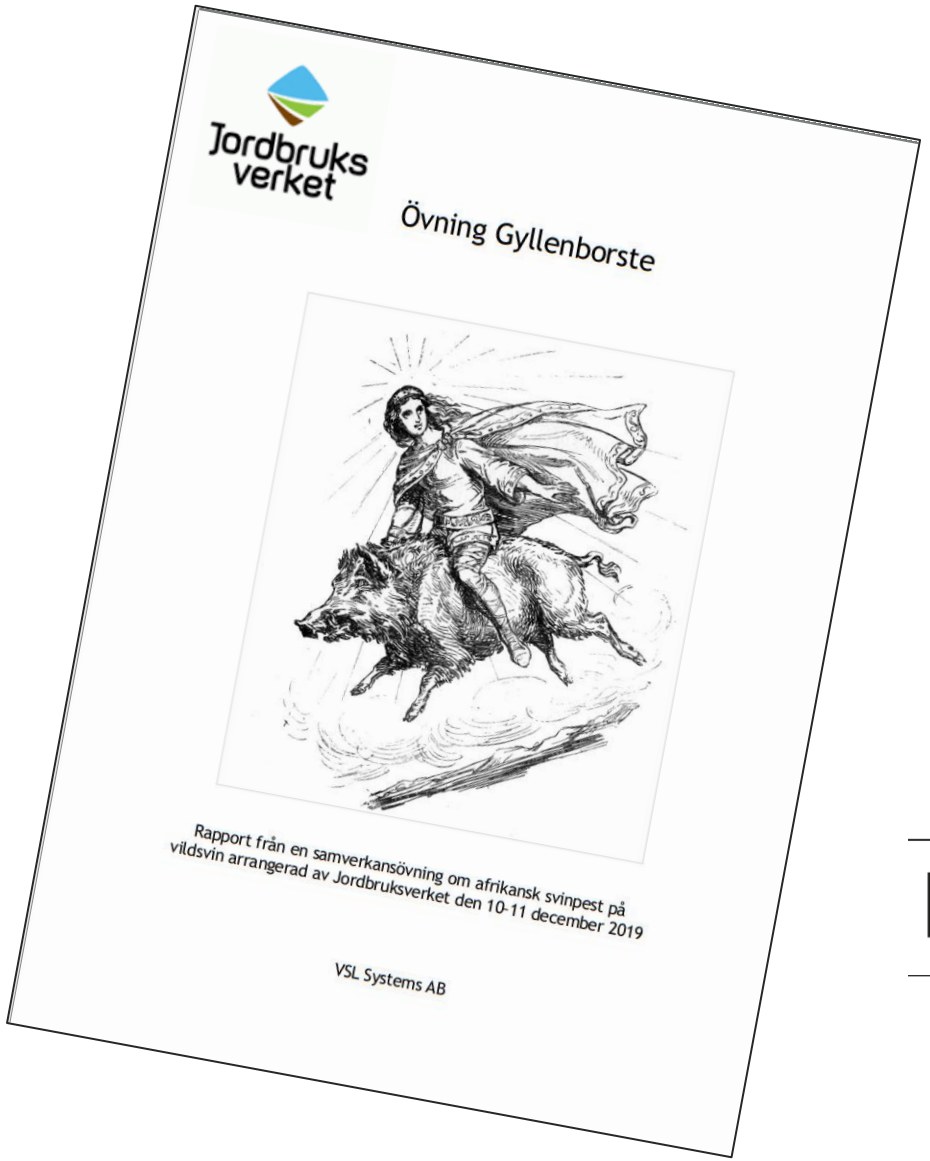




År	Totalt antal undersökta	Saknar koordinater
2014	5	0
2015	17	0
2016	18	3
2017	17	4
2018	13	2
2019	37	1
2020	69	1
2021	62	0
2022	53	1

rapporteravilt.sva.se

Collaboration, preparedness, training excercises



- Multiple authorities, stakeholders,
- Table-top excercise,
- Monthly online updates

Länsstyrelserna

FÖRSVARSMAKTEN

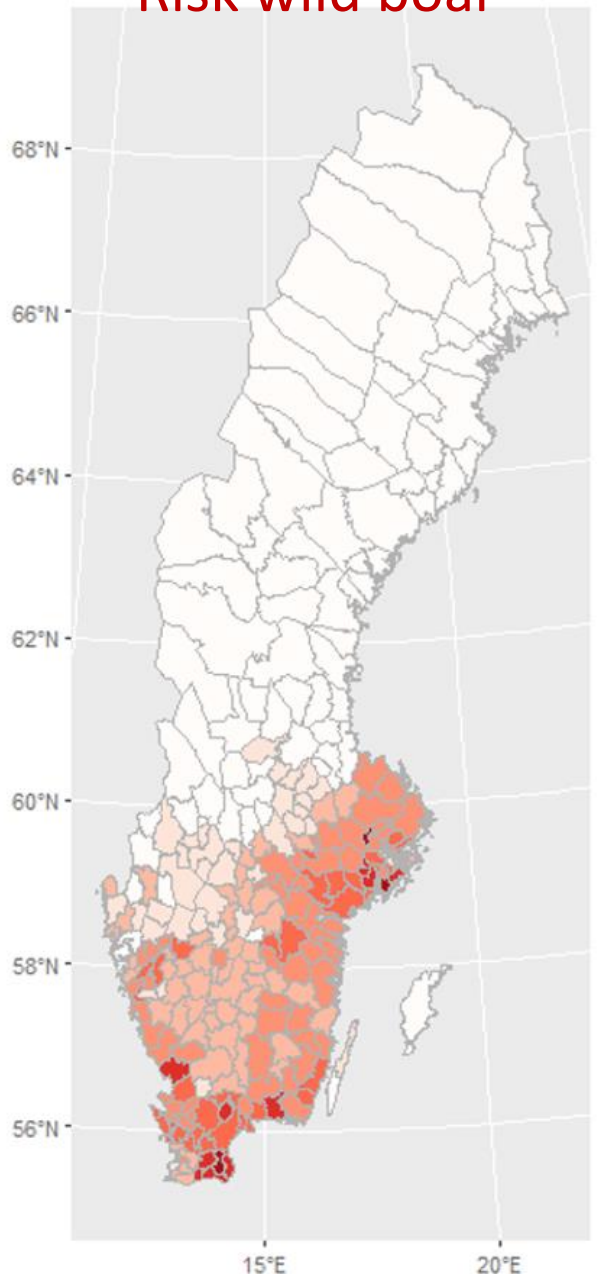
Risk mapping

- Risk based communication
- Risk based surveillance

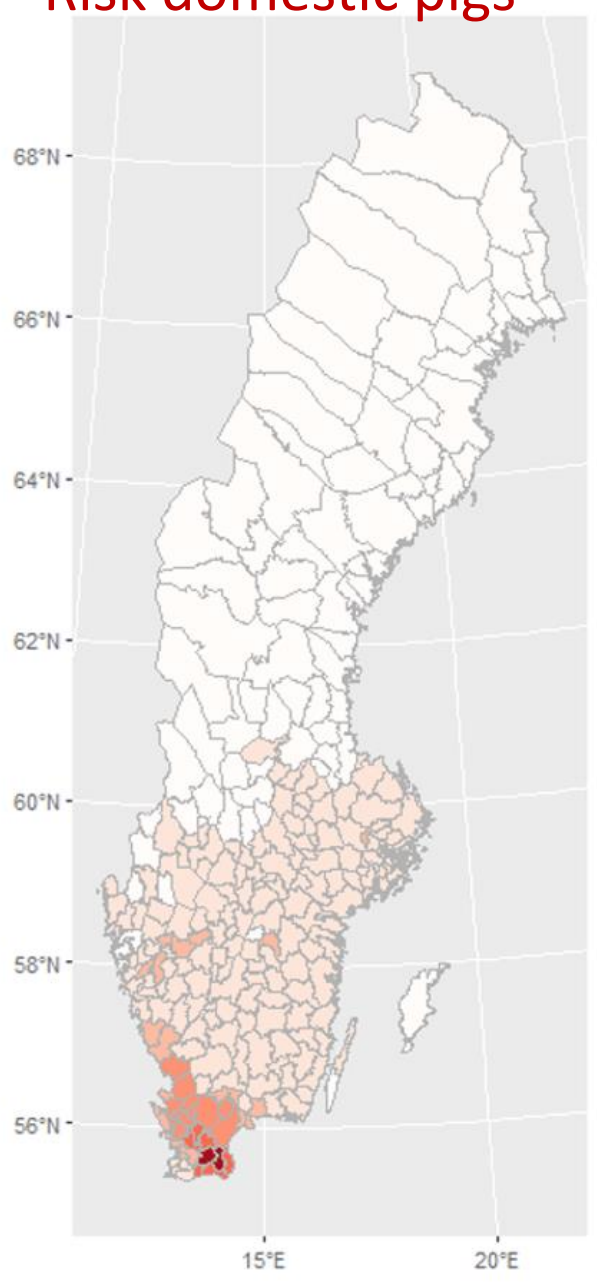
Risk factors :

- Wild boar
- Domestic pigs
- Humans

Risk wild boar

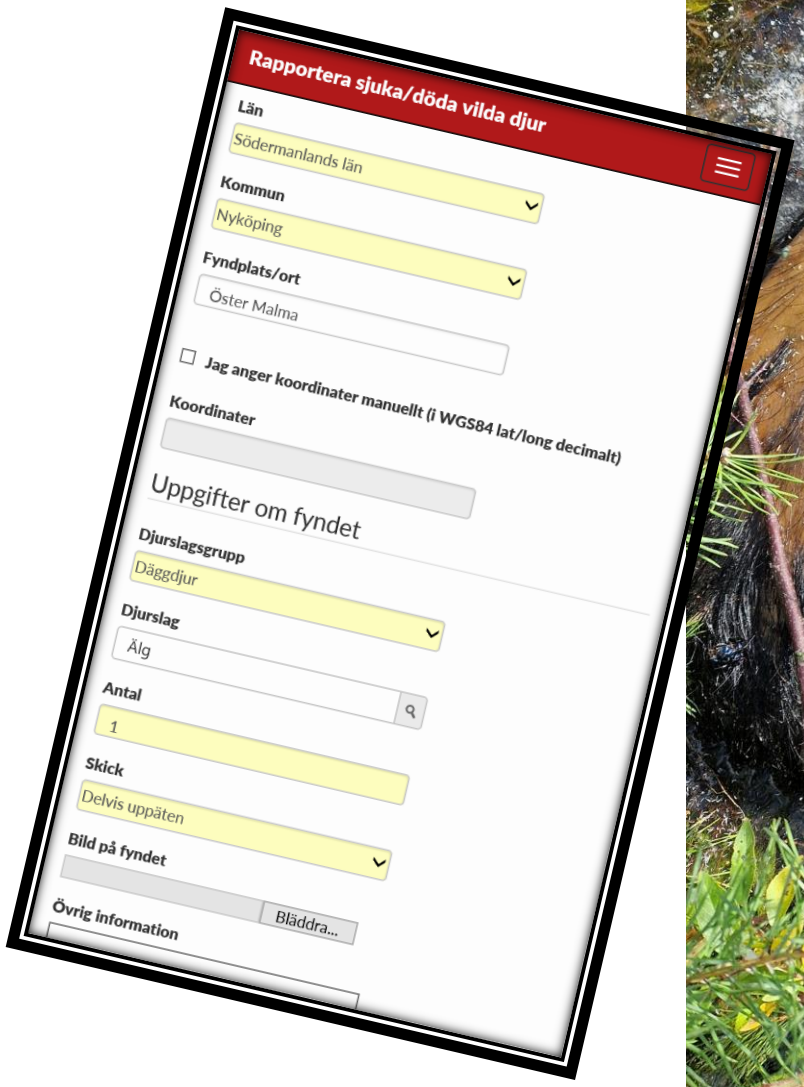


Risk domestic pigs



Communication, risks

Early detection



- 25 August 2023

Early detection: 6th September 2023

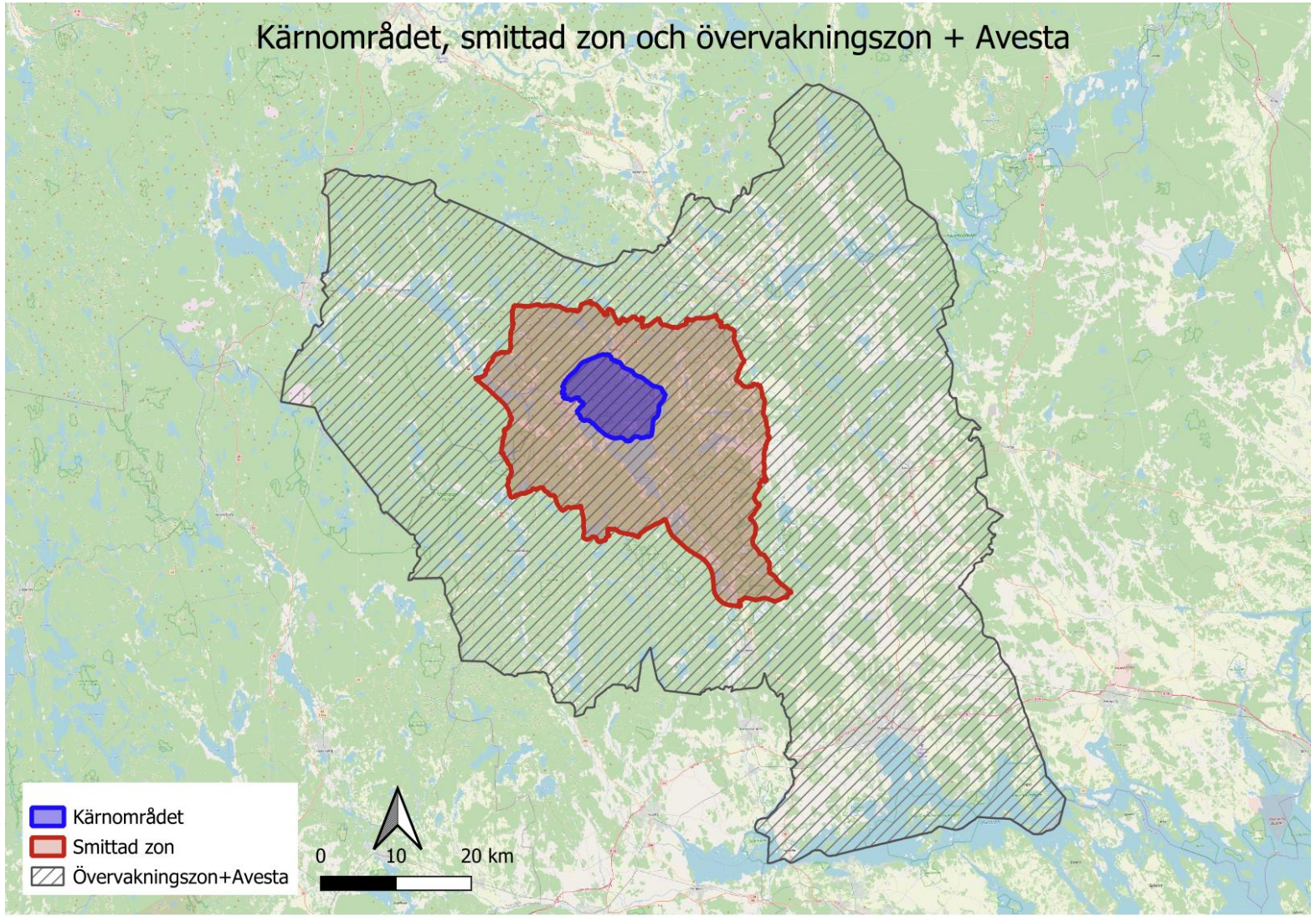
	Event
25-27th August	Three wild boar reported dead
4th September	More reports, map & sample sent to SVA
5th September	Samples arrive at SVA , PCR-test done
6th September	Official date for positive!
	Response

Local knowhow

Fagersta

13 300 inhabitants

SBA zoning, 2023-09-07 and adaption over time



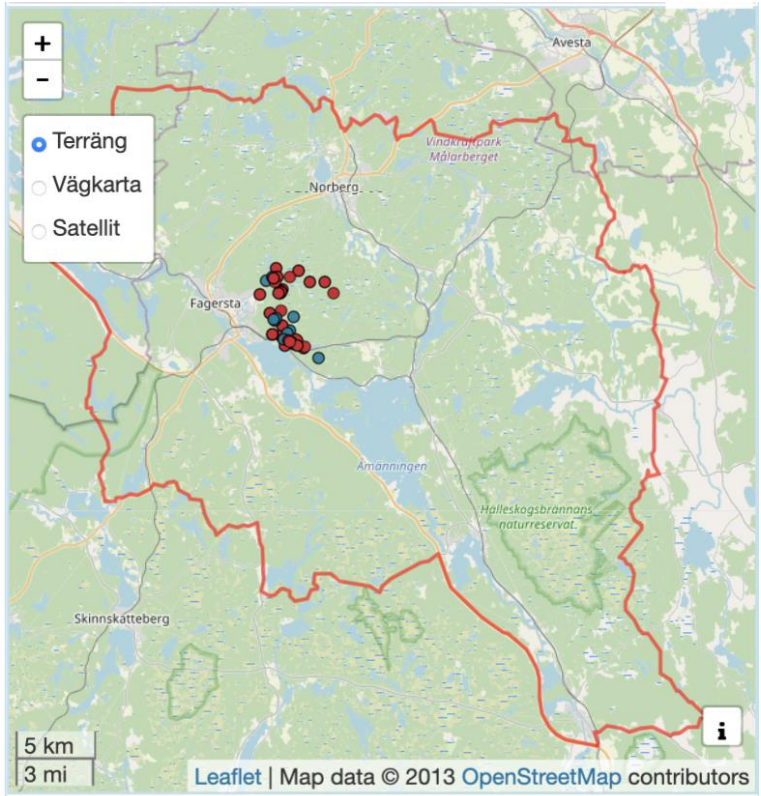
Restrictions

Communication

Hunter involvement

Biosecurity

Positive cases, 2023-09-19



Filtrera kartan

Tidsperiod

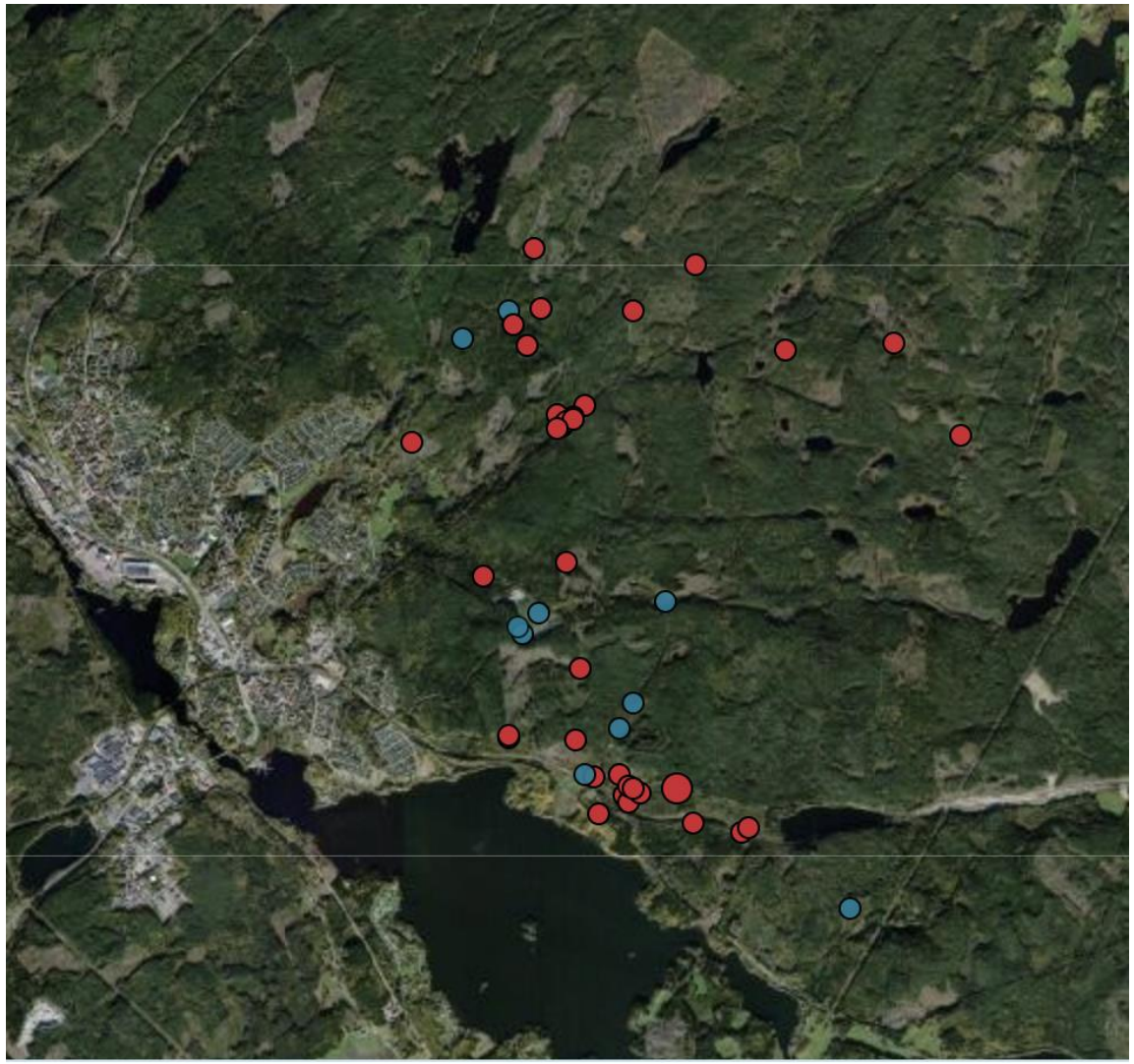
Från: 2023-09-05

Till: 2023-09-19

Visa

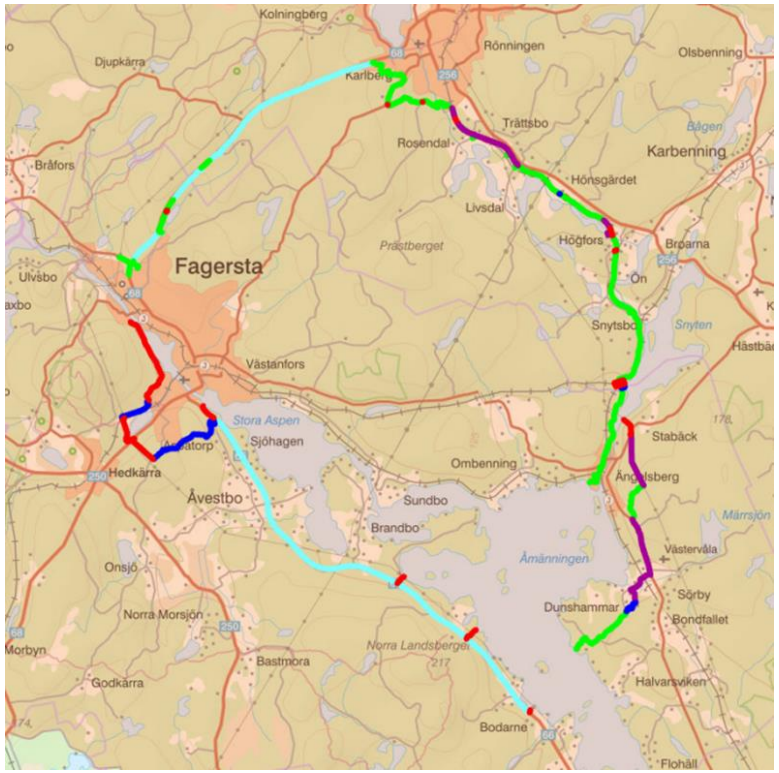
☑ Undersökta vildsvin ☑ Smittad zon

Totalt antal undersökta vildsvin	Påvisade	Ej påvisade
47	37	10



Restrictions

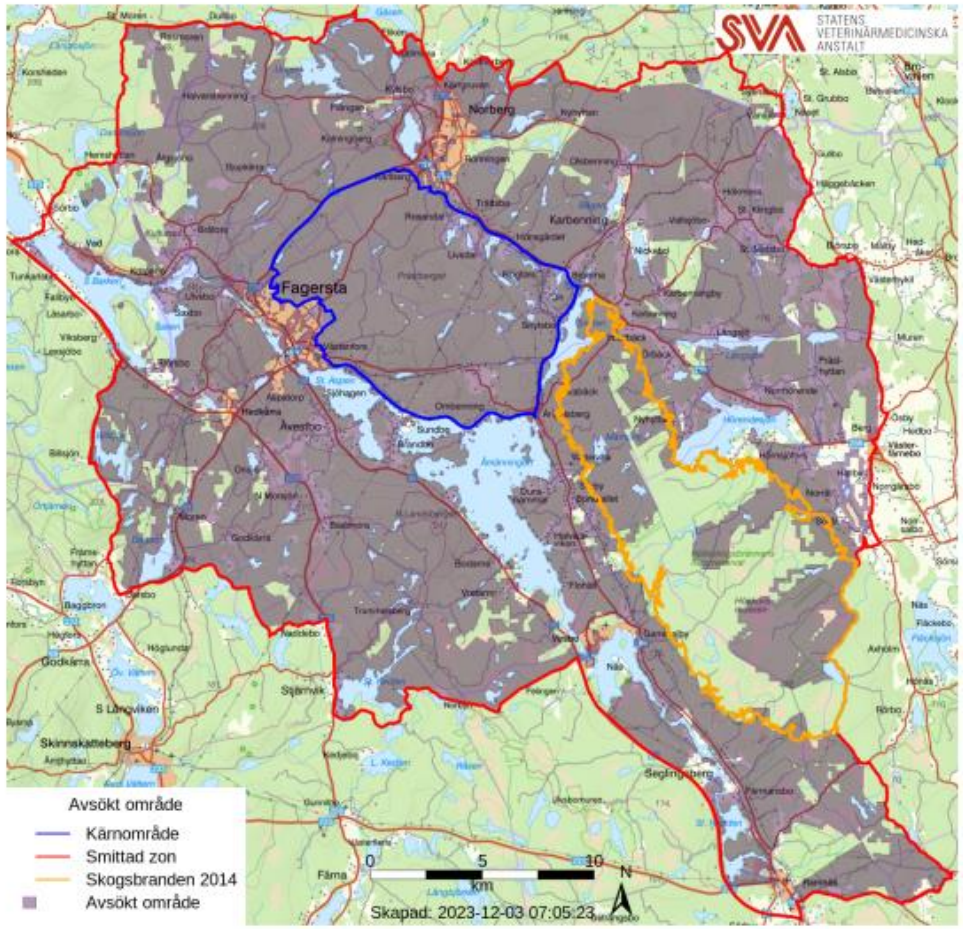
- **Reduce disease spread**
  - Carcass search, removal, destruction
  - Keep wild boar in the infected zone
    - Grains left in the fields
    - Fenced core area

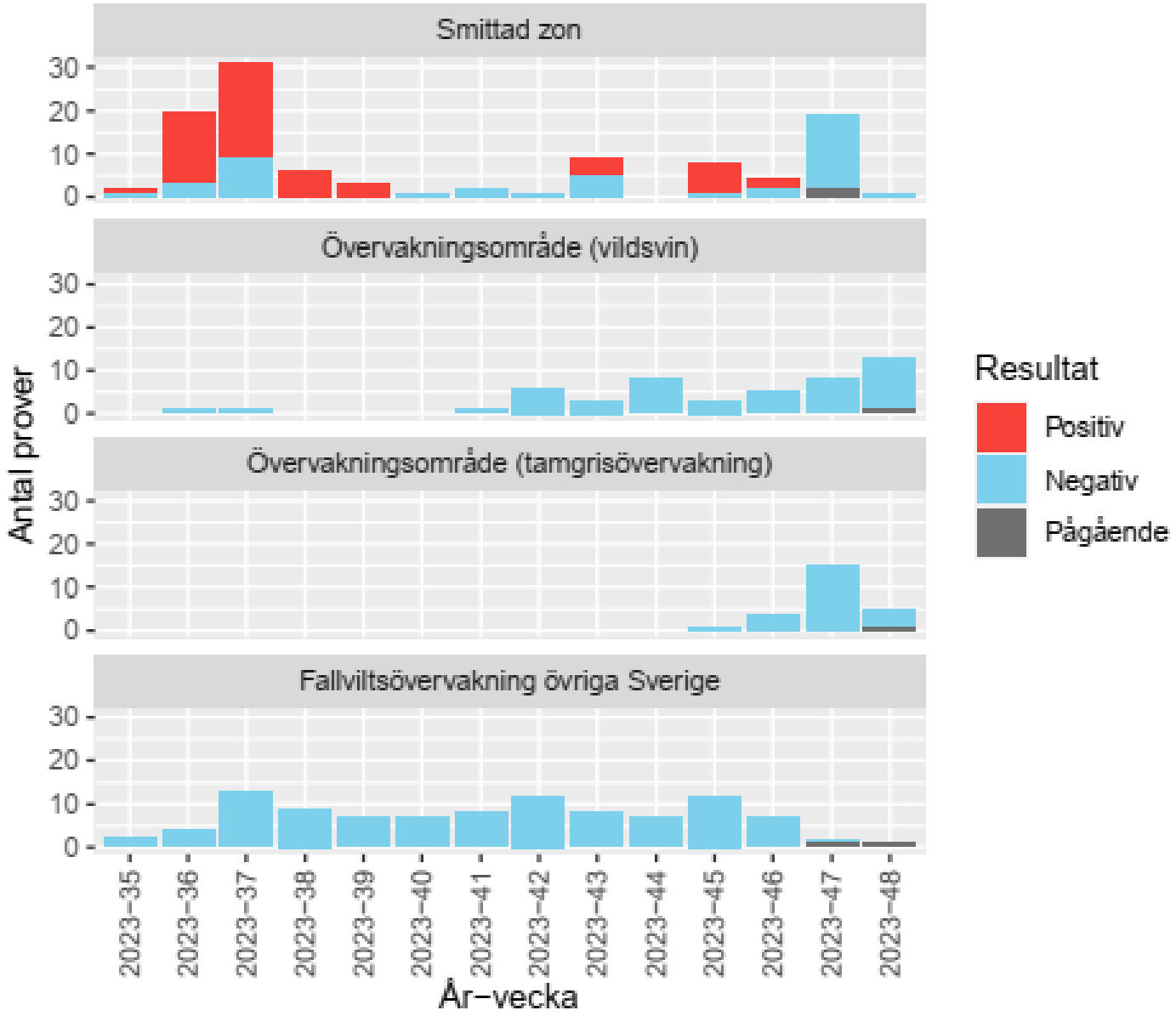


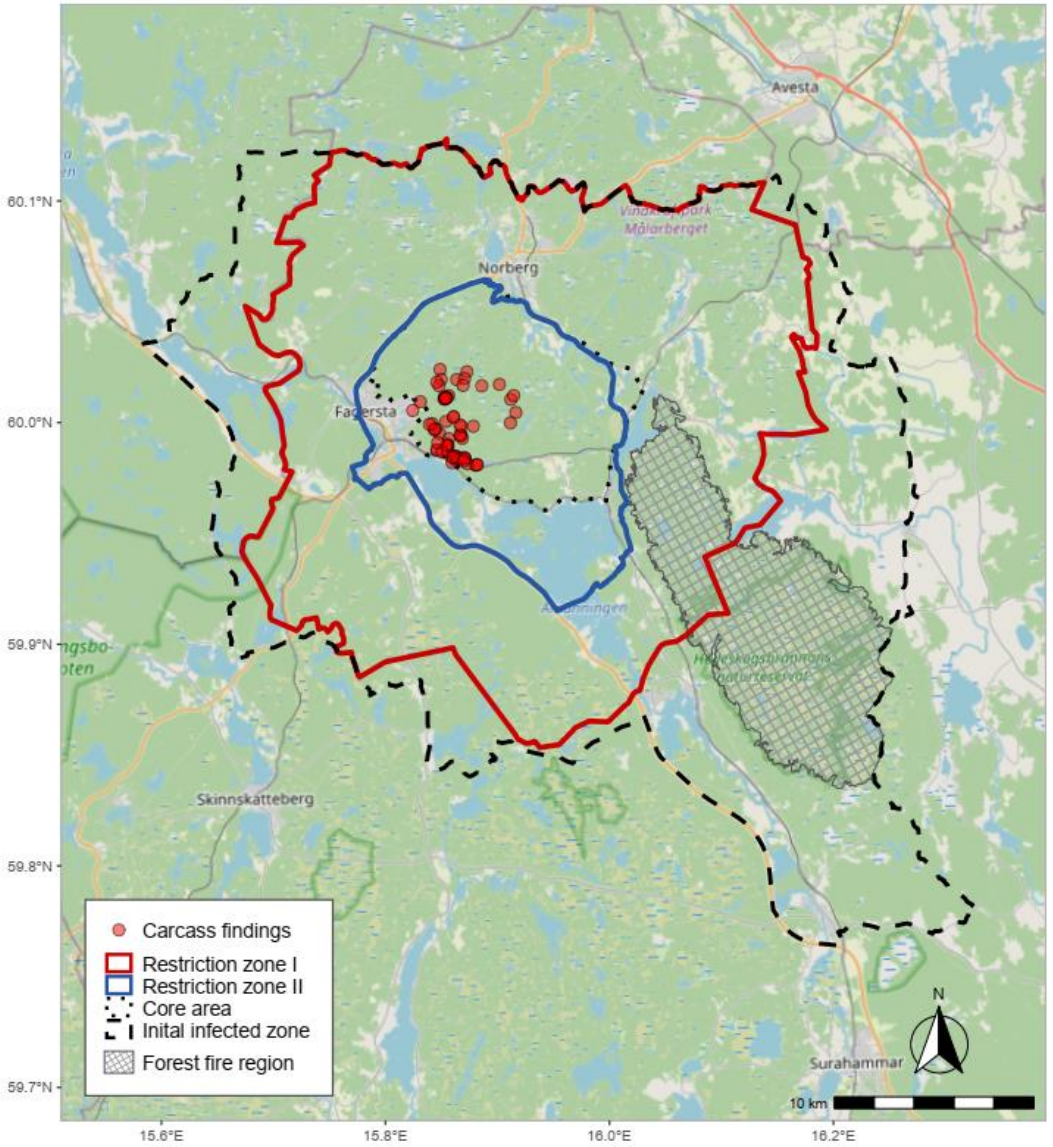
Emptying RZ II

- Baiting, camera traps
- Culling
- Surveillance

Data/IT: Fast track development

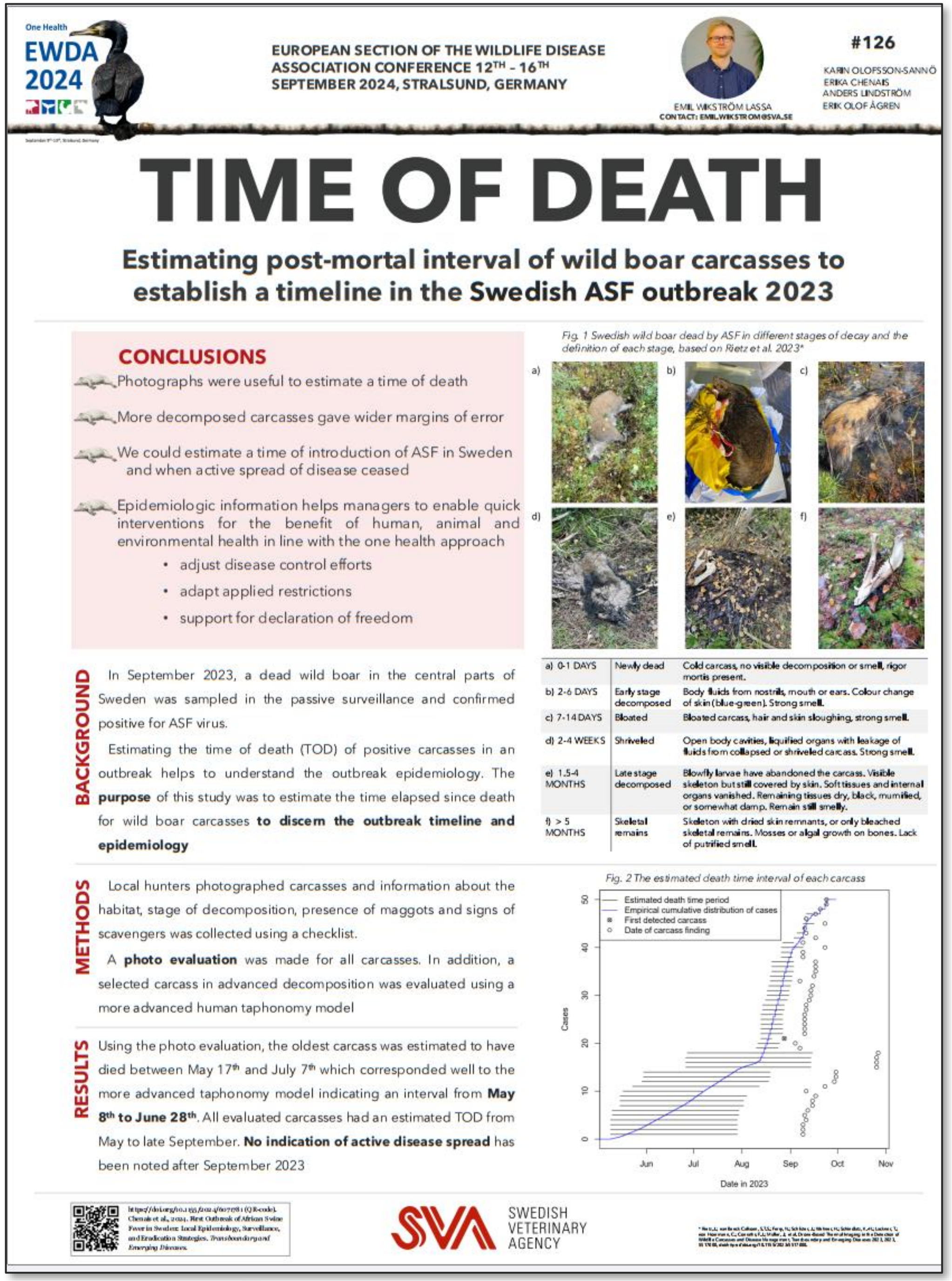






Surveillance results 6 September 2023 - 30 August 2024

Sample category and area	Positive	Negative	In total
Infected zone/RZI and RZII			
Wild boar carcasses	69	55	124
Wild boar killed in traffic	0	10	10
Wild boar culled in RZII and RZI	1	104	105
Wild boar hunted in RZI for consumption	0	11	11
Area of enhanced surveillance			
Wild boar carcasses	0	5	5
Hunted wild boar	0	90	90
Wild boar killed in traffic	0	5	5
Fallen kept porcine animals	0	28	28
Remaining parts of Sweden			
Wild boar carcasses	0	301	301
Clinical suspicions	0	16	16



One Health EWDA 2024

EUROPEAN SECTION OF THE WILDLIFE DISEASE ASSOCIATION CONFERENCE 12TH - 16TH SEPTEMBER 2024, STRALSUND, GERMANY

#126

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TIME OF DEATH

Estimating post-mortal interval of wild boar carcasses to establish a timeline in the Swedish ASF outbreak 2023

CONCLUSIONS

- Photographs were useful to estimate a time of death
- More decomposed carcasses gave wider margins of error
- We could estimate a time of introduction of ASF in Sweden and when active spread of disease ceased
- Epidemiologic information helps managers to enable quick interventions for the benefit of human, animal and environmental health in line with the one health approach
  - adjust disease control efforts
  - adapt applied restrictions
  - support for declaration of freedom

BACKGROUND

In September 2023, a dead wild boar in the central parts of Sweden was sampled in the passive surveillance and confirmed positive for ASF virus.

Estimating the time of death (TOD) of positive carcasses in an outbreak helps to understand the outbreak epidemiology. The **purpose** of this study was to estimate the time elapsed since death for wild boar carcasses **to discern the outbreak timeline and epidemiology**

METHODS

Local hunters photographed carcasses and information about the habitat, stage of decomposition, presence of maggots and signs of scavengers was collected using a checklist.

A **photo evaluation** was made for all carcasses. In addition, a selected carcass in advanced decomposition was evaluated using a more advanced human taphonomy model

RESULTS

Using the photo evaluation, the oldest carcass was estimated to have died between May 17th and July 7th which corresponded well to the more advanced taphonomy model indicating an interval from **May 8th to June 28th**. All evaluated carcasses had an estimated TOD from May to late September. **No indication of active disease spread** has been noted after September 2023

*Fig. 1 Swedish wild boar dead by ASF in different stages of decay and the definition of each stage, based on Rietz et al. 2023**

a) b) c) d) e) f)

a) 0-1 DAYS	Newly dead	Cold carcass, no visible decomposition or smell, rigor mortis present.
b) 2-6 DAYS	Early stage decomposed	Body fluids from nostrils, mouth or ears. Colour change of skin (blue-green). Strong smell.
c) 7-14 DAYS	Bloated	Bloated carcass, hair and skin sloughing, strong smell.
d) 2-4 WEEKS	Shriveled	Open body cavities, liquified organs with leakage of fluids from collapsed or shriveled carcass. Strong smell.
e) 1.5-4 MONTHS	Late stage decomposed	Blowfly larvae have abandoned the carcass. Visible skeleton but still covered by skin. Soft tissues and internal organs vanished. Remaining tissues dry, black, mumified, or somewhat damp. Remain still smelly.
f) > 5 MONTHS	Skeletal remains	Skeleton with dried skin remnants, or only bleached skeletal remains. Mosses or algal growth on bones. Lack of putrified smell.

Fig. 2 The estimated death time interval of each carcass

https://doi.org/10.1155/2024/6077781 (QR-code). Chenais et al., 2024. First Outbreak of African Swine Fever in Sweden: Local Epidemiology, Surveillance, and Eradication Strategies. *Transboundary and Emerging Diseases.*

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Taphonomy study

ASF outbreak timeline

First wild boar ASF-cases died

2023 May-July

First report of dead wild boar to SVA

25 Aug

More reports, total of 6 cadavers

28 Aug

Sample sent to SVA

4 Sep

ASF confirmed

6 Sep

Infected zone established 1,000 km^2

7 Sep

Cadaver search start

9 Sep

Core area established 100 km^2

14 Sep

Last ASF-cases died

Sep

Core area fencing started

12 Oct

Area fenced 148 km^2 Culling started

22 Nov

Restriction zone I and II established, 618 km^2

30 Nov

Culling of last wild boar in RZ II

Winter 2024

Third complete cadaver search of RZ II

May 2024

ASF-free status

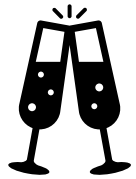
Sep 2024

Summary – Reporting results and conclusions to EU

- Latest death at end of September 2023
- Epidemic curve peaked mid-August to mid-September 2023
- All positive cases within 5 km, all in the core area
- No virus transmission since September 2023
- No wild boar left in the core area since March 2024
- The risk of residual viable virus in the environment in August 2024- **negligible**
- The risk of new cases of ASF in wild boar August 2024 – **negligible**

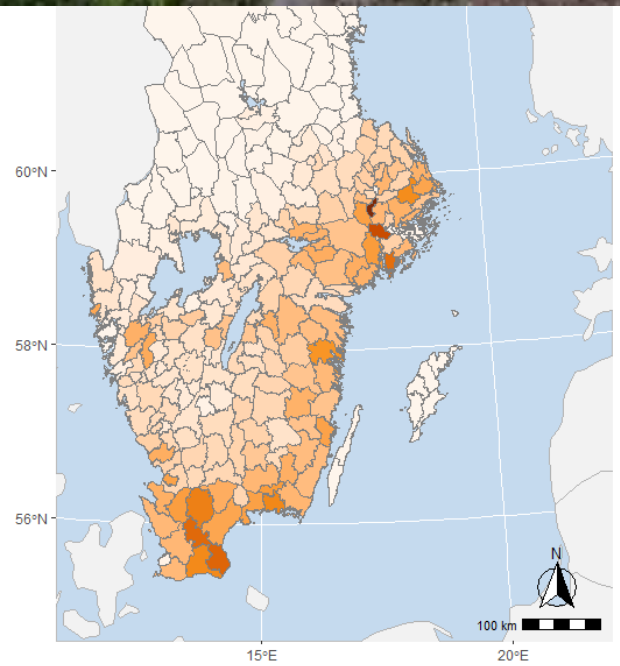
From 25th September 2024

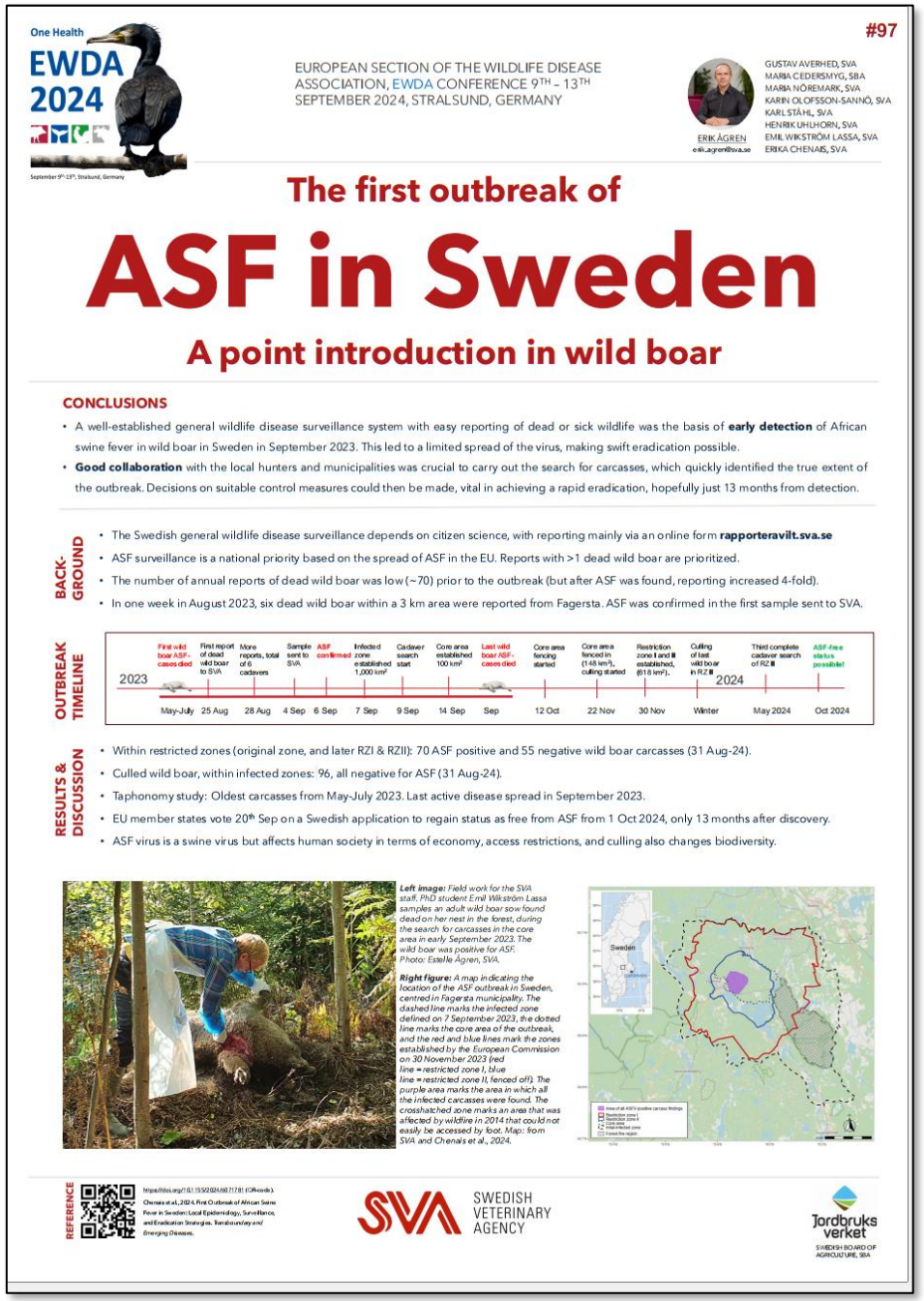
Sweden is again offically free of ASF



Success factors:

- Favourable location
- Point introduction
- We were prepared
  - National collaboration
  - Experiences from previously infected countries
  - Iterative process, development in real-time





One Health
EWDA 2024
September 9th-13th, Stralsund, Germany

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EUROPEAN SECTION OF THE WILDLIFE DISEASE ASSOCIATION, EWDA CONFERENCE 9TH – 13TH SEPTEMBER 2024, STRALSUND, GERMANY

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The first outbreak of

ASF in Sweden

A point introduction in wild boar

CONCLUSIONS

- A well-established general wildlife disease surveillance system with easy reporting of dead or sick wildlife was the basis of **early detection** of African swine fever in wild boar in Sweden in September 2023. This led to a limited spread of the virus, making swift eradication possible.
- **Good collaboration** with the local hunters and municipalities was crucial to carry out the search for carcasses, which quickly identified the true extent of the outbreak. Decisions on suitable control measures could then be made, vital in achieving a rapid eradication, hopefully just 13 months from detection.

BACK-GROUND

- The Swedish general wildlife disease surveillance depends on citizen science, with reporting mainly via an online form **rapporteravilt.sva.se**
- ASF surveillance is a national priority based on the spread of ASF in the EU. Reports with >1 dead wild boar are prioritized.
- The number of annual reports of dead wild boar was low (~70) prior to the outbreak (but after ASF was found, reporting increased 4-fold).
- In one week in August 2023, six dead wild boar within a 3 km area were reported from Fagersta. ASF was confirmed in the first sample sent to SVA.

OUTBREAK TIMELINE

RESULTS & DISCUSSION

- Within restricted zones (original zone, and later RZI & RZII): 70 ASF positive and 55 negative wild boar carcasses (31 Aug-24).
- Culled wild boar, within infected zones: 96, all negative for ASF (31 Aug-24).
- Taphonomy study: Oldest carcasses from May-July 2023. Last active disease spread in September 2023.
- EU member states vote 20th Sep on a Swedish application to regain status as free from ASF from 1 Oct 2024, only 13 months after discovery.
- ASF virus is a swine virus but affects human society in terms of economy, access restrictions, and culling also changes biodiversity.

Left image: *Field work for the SVA staff. PhD student Emil Wikström Lassa samples an adult wild boar sow found dead on her nest in the forest, during the search for carcasses in the core area in early September 2023. The wild boar was positive for ASF. Photo: Estelle Ågren, SVA.*

Right figure: *A map indicating the location of the ASF outbreak in Sweden, centred in Fagersta municipality. The dashed line marks the infected zone defined on 7 September 2023, the dotted line marks the core area of the outbreak, and the red and blue lines mark the zones established by the European Commission on 30 November 2023 (red line = restricted zone I, blue line = restricted zone II, fenced off). The purple area marks the area in which all the infected carcasses were found. The crosshatched zone marks an area that was affected by wildfire in 2014 that could not easily be accessed by foot. Map: from SVA and Chenais et al., 2024.*

REFERENCE
Chenais et al., 2024. First Outbreak of African Swine Fever in Sweden: Local Epidemiology, Surveillance, and Eradication Strategies. Transboundary and Emerging Diseases.

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Jordbruks verket
SWEDISH BOARD OF AGRICULTURE, SVA

Communication

Research Article

First Outbreak of African Swine Fever in Sweden: Local Epidemiology, Surveillance, and Eradication Strategies

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