



World Organisation
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FINAL REPORT 2022-2024



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INTRODUCTION

The project "Enhance capacities on African Swine Fever (ASF) prevention and control at the domestic-wildlife interface through an integrated approach," funded by the World Organization for Animal Health (WOAH), and its Memorandum of Understanding (MOU) with the Government of Lao PDR received approval in 2023. This project has been implemented by the Wildlife Conservation Society (WCS) and Agronomes et Vétérinaires Sans Frontières (AVSF) in partnership with the Provincial and District Agriculture and Forestry Offices. WCS Laos led the implementation of activities under Lot 1: carrying out studies to understand the distribution of wild pigs, their interaction with domestic pigs, and the risk factors for disease spread at the domestic-wildlife interface. AVSF led the implementation of activities under Lot 2: training wildlife rangers and village veterinary workers (VVs) on ASF biosecurity and surveillance on farms, in wildlife, and at the domestic-wildlife interface, as detailed in the service agreement.

This report will present all of the activity outcomes under Lot 1. These activities have been conducted successfully, beginning with writing a literature review of ASF in wild boar, their distribution, and the interface with domestic pigs (Annex 1). This was followed by a field study aimed at characterizing and assessing the spillover risk at the wildlife-livestock interface. Continued conducting the first camera trap (CT) placement in the dry season to capture and quantify interactions and the interface between domestic and wild pigs, and sharing of the outcomes with local communities in the Restitution workshop. Finally, the second CT placement was conducted in the rainy season.

OBJECTIVES

To report the outcomes of the activities under Lot 1:



1. Focus Group Discussions,
March 2023



2. Camera Trap Placement
Round 1 in the dry season,
Nov 2023 - Jan 2024
and
Camera Trap Placement
Round 2 in the rainy season,
Mar 2024 - Jun 2024

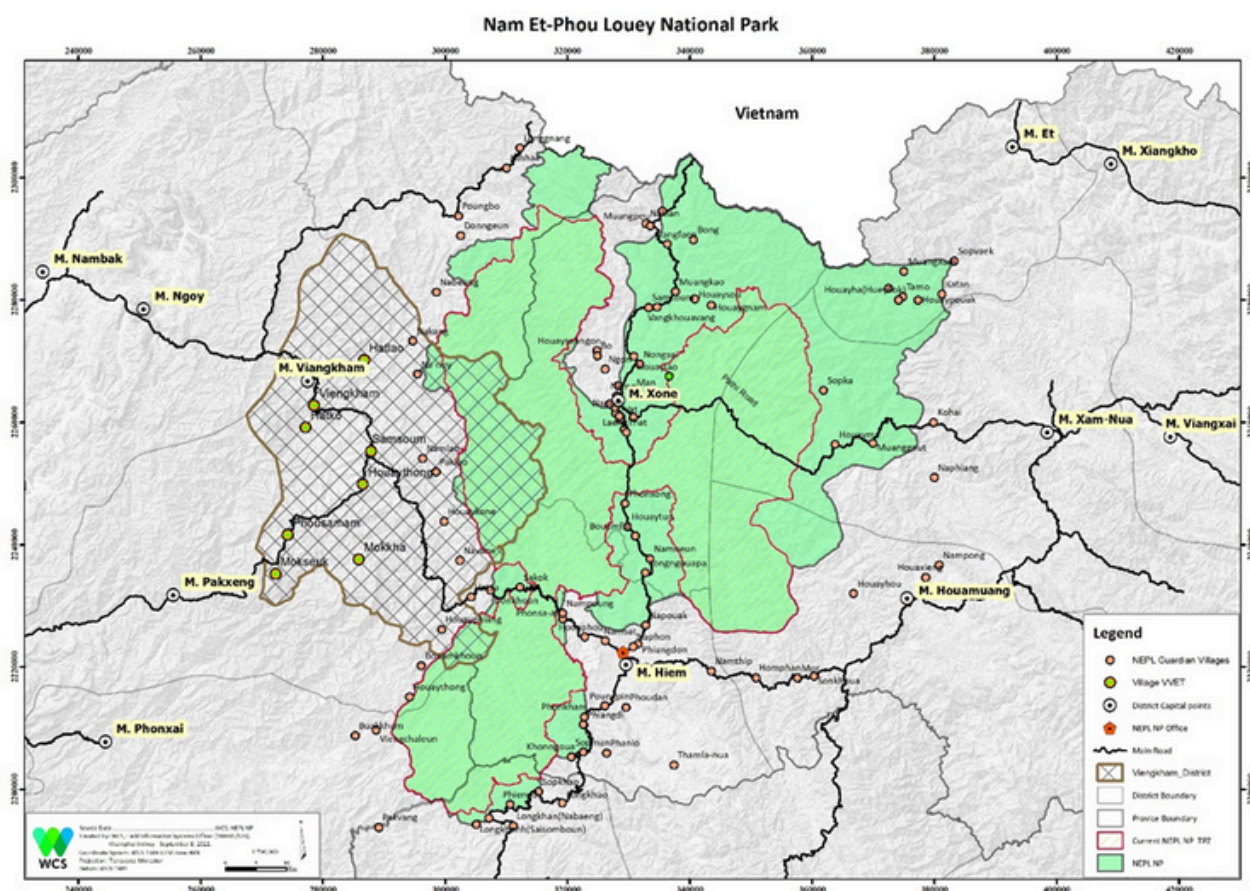


3. Restitution Workshop,
May 2024

ASF SITE ASSESSMENT

Target village selection, 21 - 26 November 2022

The field assessment was realized in 6 villages of Viengkham district, Luang Prabang Province: Viengkham, Navaen, Paklao, NaNoy, Samsoum, and Houaythong. Three out of the 6 villages (Navaen, Paklao, Nanoy) are guardian villages of Nam Et Phou Louey National Park while the others are a bit more distant. Most parts of the 6 villages are mountainous with some surrounded by rice fields and forest.



Map of the project intervention area

Regarding wild boar observations:

- All the villages visited except Viengkham reported observing wild pigs surrounding their agriculture area in the last two years, especially Navaen, Paklao, and Nanoy villages which seem to observe wild boar more frequently than the others.
- Wild pigs were mostly observed around Sanums where livestock are kept and where cassava or corn fields are nearby. Wild pigs were mostly observed during the rainy season (Aug-Sep) with tracks seen commonly and individuals seen sometimes. In Navean, 2 villagers reported seeing a male wild pig standing next to their pig pen containing female domestic pigs.
- Only one village (Navaen) reported observing a dead wild pig in the last two years (2020), which was found close to domestic pigs.
- Navaen, Paklao, Nanoy, and Samsoum villages all reported having had, or have currently, domestic/wild hybrid piglets on their farm with some of the hybrids still present at the village.

Further details can be found in Annex 2.

The conclusions, based on the information from this assessment and WCS biodiversity monitoring staff experiences, are that Navaen, Paklao, and Nanoy villages are best suited for camera trap data collection due to their accessibility, their spatial location relative to wild boar habitat, and the reports of wild pig observations. They also have a history of mass mortalities in pigs due to ASF. These three villages are also appropriate for focus group discussions (FGDs).

FOCUS GROUP DISCUSSIONS

Characterizing and assessing the spillover risk at the wildlife-livestock interface



Location

Location: Five target villages adjacent to Nam Et–Phou Louey National Park (NEPL NP), namely Houaythong, Navaen, Paklao, Samsoum and Nanoy villages (Figure 1), Viengkham District, Luang Prabang province (LPB).

Implemented team

WCS Health team and NEPL biodiversity monitoring/SMART/GIS team, Luang Prabang Provincial Agriculture and Forestry Office (PAFO), and Viengkham District Agriculture and Forestry Office (DAFO).

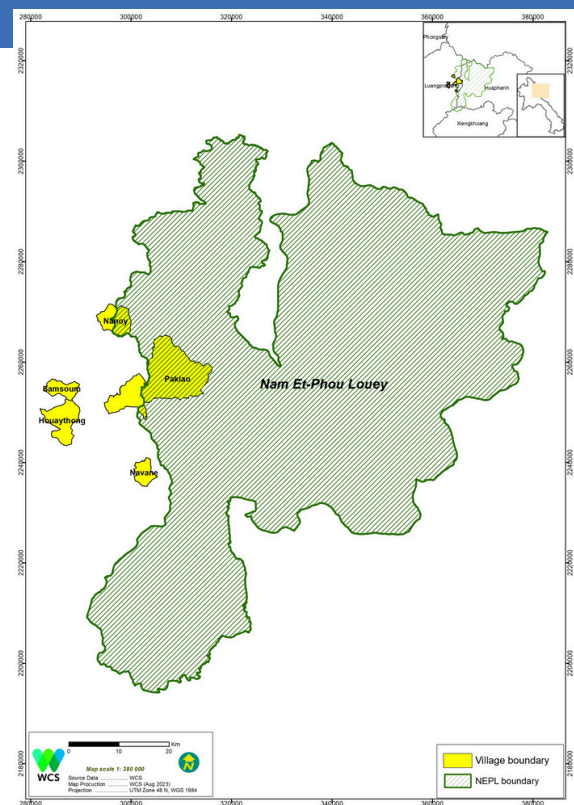


Figure 1: Map of five target villages adjacent to NEPL

Methodology

The team held focus group discussions (FGDs) to assess the risk of pathogen spillover at the domestic pig-wild boar interface in five target villages adjacent to NEPL NP. We utilized a survey form to gather information on wild boar and domestic pig interactions in the district from a cumulative total of 410 households who have raised pigs and to identify locations for camera trap deployment.

Key findings

- Domestic pigs
- Wild boar
- Domestic pig - Wild boar interactions
- Risk factors
- Challenges

The primary focus of these discussions was the risk and potential pathways of transmission of ASF in areas where there is contact between free-ranging or semi-free-ranging domestic pigs and wild boar in these five target villages. From the survey, we found several points of risk exist, which likely contribute to and facilitate the spillover and spread of ASF virus and other pathogens among and between domestic pigs and wild boar, as detailed below and in the Focus Group Discussion full report (Annex 3).



Figure 2: Focus group discussion in the targeted village

Domestic Pigs

- All five villages alternate their pig housing styles between free-ranging and penned enclosure. Most of their pigs were raised at their Sanam which connect to NEPL NP bordering. Their pigs are treated when sick, but no preventative vaccinations for any disease are administered.
- In each village, mass mortality events occurred in their domestic pigs and villagers would slaughter sick pigs and butcher dead pigs to sell or consume which may have contributed to transmission within their respective village, to locations where meat was sold, and also to wild boar ranging nearby. Villages would eventually cease to consume and trade pigs once it became obvious that pigs were dying at an unusually high rate and without knowing the cause. This led, however, to an increase in other behaviors which may have further facilitated transmission to both domestic and wild boar such as improper disposal of carcasses in waterways. Similar high-risk practices were noted in villages located adjacent to NEPL NP in Huaphan Province (Denstedt et al. 2021).
- With mass mortality events, causing dramatic losses at the time ultimately leading to an overall reduction in domestic pig farming, several villagers shifted their livelihoods and investment to alternatives.
- There is a notable absence of reporting, information communication, investigation, or response to mass mortality events in domestic pigs, as has been similarly documented in other provinces in Laos (WCS unpublished data).

Wild Boars

- Wild boar are most commonly seen between August to November, corresponding to crop production and harvest season.
- Wild boars were not directly observed sick or dead by any of the five villages during the 2019 - 2020 ASF outbreak, but anecdotes were heard of dead wild boars in the area.
- Wild boar sightings are reportedly less common around these villages since the ASF outbreak in 2019 - 2020. Several factors may be contributing to this, such as increased hunting pressure. This observed reduction, however, was not reflected in biodiversity monitoring data collected by WCS since that time.

Domestic pig - Wild boar Interactions

- August to November, when domestic pig-wild boar interactions are observed most commonly, may be when risk of disease transmission at the domestic pig-wild boar interface is highest temporally.
- Factors attracting wild boar to domestic pigs include food sources and presence of female domestic pigs.
- Disease transmission potential exists by way of raided crops.
- Domestic pig-wild boar piglets being birthed in nearly all villages confirms direct contact between them either during free-ranging time or through enclosures constructed with minimal barriers. Disease transmission risk through this level of contact is high.

Risk Factors

- **Spatial risks:** Sanams are located within or immediately adjacent to the national park and to crops (a major attractant factor for wild boar).
- **Temporal risks:** August - November, corresponding to crop production and harvest season, brings closer and more frequent wild boar contact.
- **Husbandry risks:** Free-ranging pig rearing is common; pig pens still allow for direct contact with wild boar; domestic pigs are fed potentially-contaminated crops from fields damaged by wild boar; and limited preventative medicine is practiced in livestock.
- **Knowledge risks:** Limited general knowledge on ASF and on safe carcass disposal.
- **Trade risks:** At onset of mass mortality events, domestic pigs are slaughtered and sold/traded locally or further afield. Wild boar are hunted and consumed commonly.
- **Regulatory risks:** Underreporting of pig illness and death; no investigation/response to reports made to government; no regulated/formal carcass disposal action or site designated to do so.

Challenges

- Despite pre-planning visits to villages, focus group discussions are often opportunistic in nature in terms of who is able to participate. There may have been, in some cases, an imbalance in who was participating and able to attend discussions in each village. In some villages most participants were female and caretakers of the home, while many men were out tending to the farm at the time. More community members were able to participate in some villages where in others the numbers of people available to participate were fewer.
- Some information and data may have been lost as other local languages (e.g. Hmong, others) were used occasionally by communities during the discussion.
- Some participants were hesitant to provide complete/accurate information and/or express their opinion in the discussion given the sensitive nature of wildlife conservation and law enforcement around the national park. All villages are located near the park where rangers patrol regularly. This may impact the accuracy and completeness of data gathered here.

In conclusion, spillover/spillback risk reduction interventions targeting these practices, behaviors, perceptions, and responses will not only aid in the prevention of ASF transmission but also in the sharing of other pathogens potentially detrimental to animal health, public health, and community livelihoods.

Map of **five target villages** and **domestic pig - wild boar interface** based on community knowledge

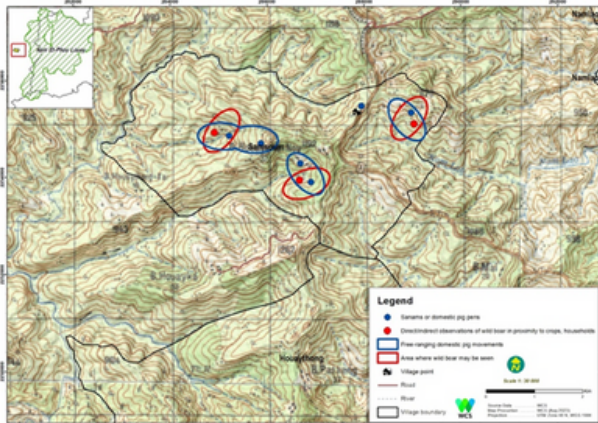


Figure 3: Map of Samsoum village

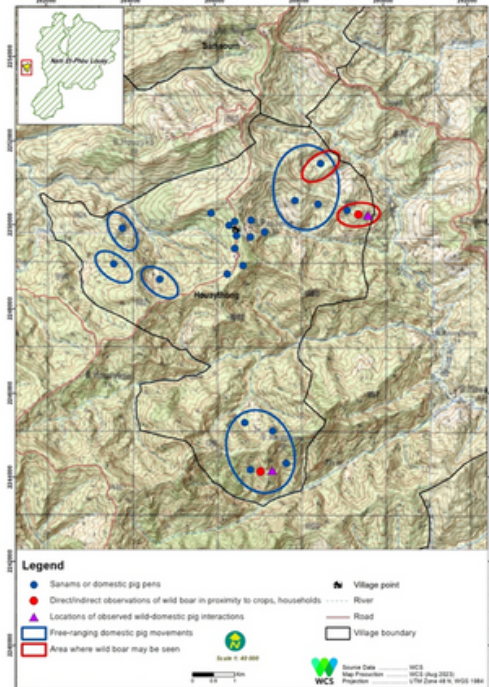


Figure 6: Map of Huaythong village

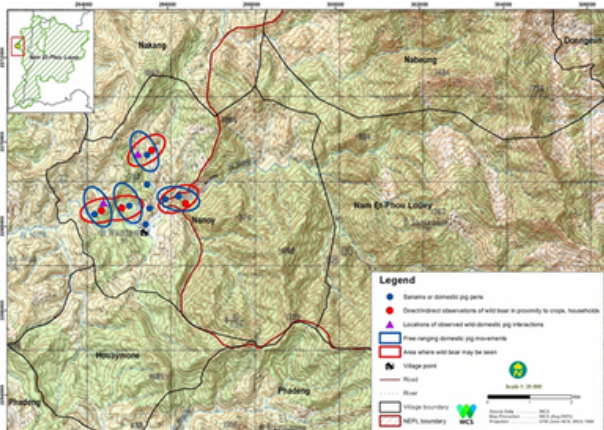


Figure 4: Map of Nanoy village

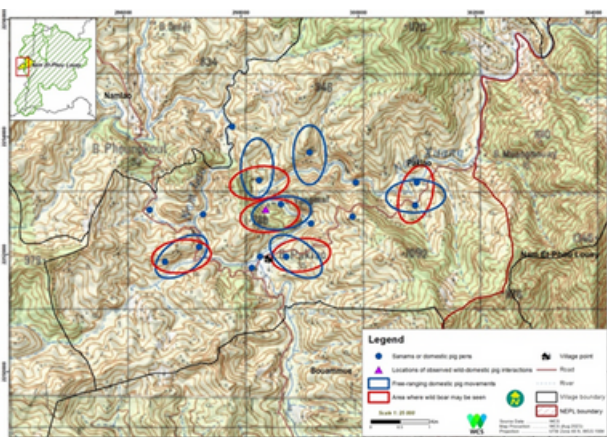


Figure 5: Map of Paklao village

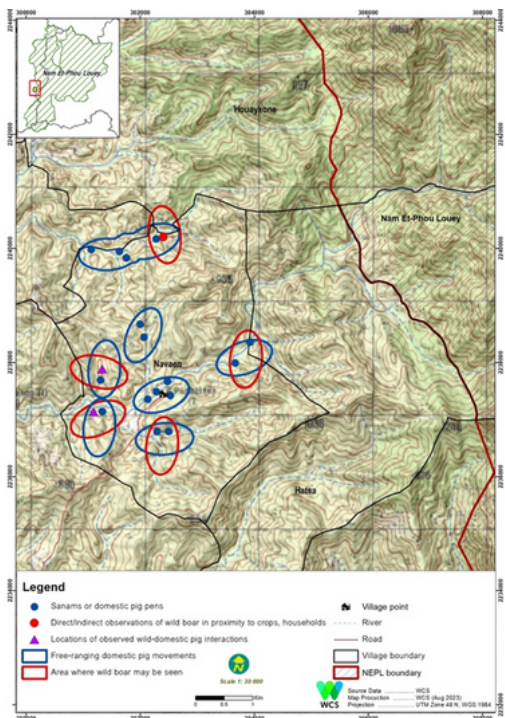


Figure 7: Map of Navaen village

CAMERA TRAP PLACEMENT ROUND 1

Monitoring interactions at the interface between domestic pigs and wild boars in dry season, November 2023-January 2024.



Location

Nanoy, Paklao, and Navaen villages (Figure 1, 4, 5 & 7) were selected based on FGD findings



Implemented Team

WCS Health and NEPL biodiversity monitoring/SMART/GIS team, Luang Prabang Provincial Agriculture and Forestry Office (PAFO), and Viengkham District Agriculture and Forestry Office (DAFO)

Methodology

Camera trap (CT) placement in each target village was determined based on the FGDs outcomes regarding the previous site assessments by WCS Health team and the Biodiversity Monitoring team. Six camera traps were placed in the villagers' sanam, with the cameras operating for approximately 60 days during both the dry and rainy seasons to identify seasonal differences in domestic pig-wild boar interactions. Further details can be found in Annex 4.

Key findings

Paklao village (Figure 5) had the greatest number of CT images capturing both domestic pigs and wild boar in the same locations. Wild boar and domestic pigs were captured coming to the same area in three locations around Paklao village (Figures 8-10). CT 09 captured wild boar and domestic pigs in the same location during the same time of day, but one day apart. CTs placed around Nanoy village (Figure 4) also documented domestic pigs and wild boar frequenting the same locations. Paklao village may have the larger domestic-wild pig interface given these results, however this is based on a small number of images from a limited number of camera trap stations.



Figure 8: CT 09 capturing wild boar (left) at 08:08AM on Nov 18th and domestic pig (right) at 08:05 AM on Nov 19th.



Figure 9: CT 07 capturing wild boar (left) at 02:22 AM on Nov 22nd and domestic pig (right) at 11:40 AM on Dec 8th.



Figure 10: CT 11 capturing wild boar (left) at 16:55 PM on Dec 11th and domestic pig (right) at 13:43 PM on November 8th.

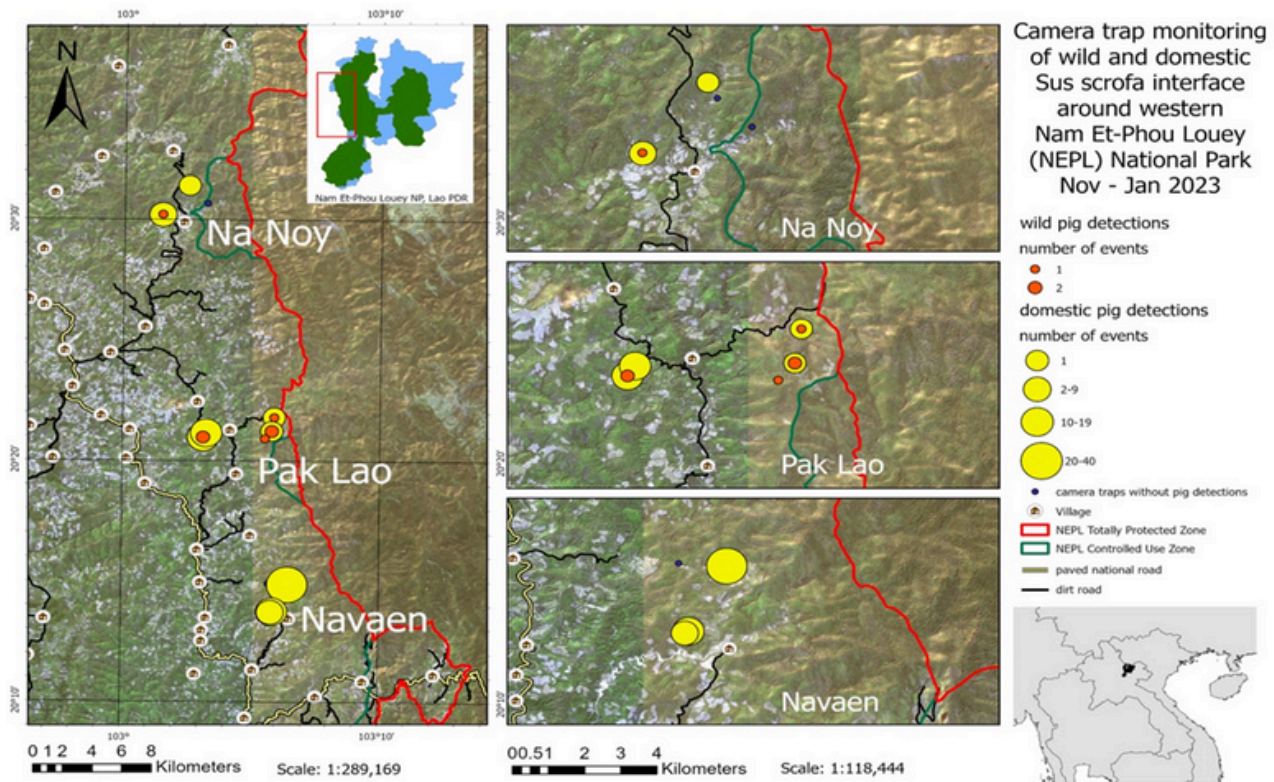
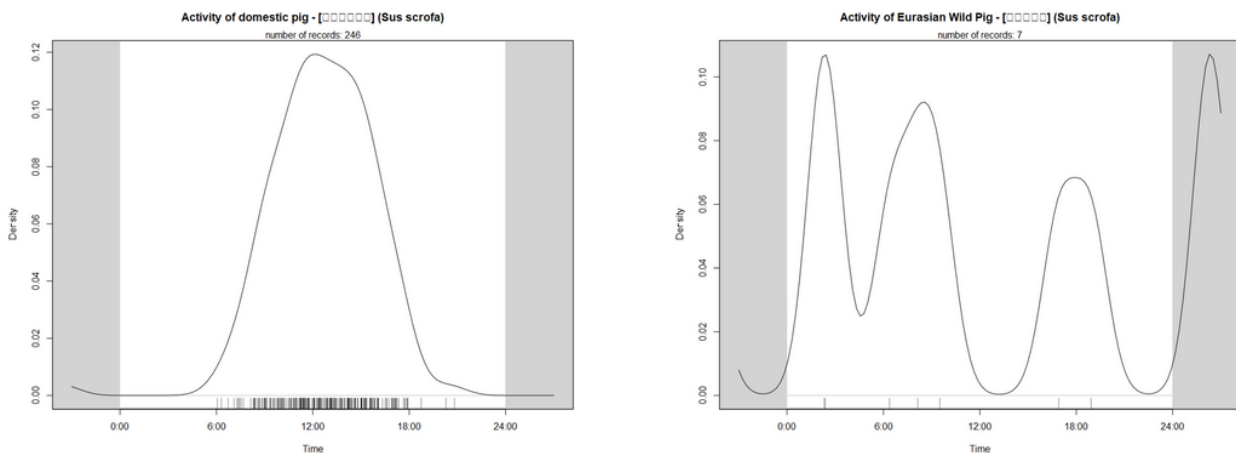


Figure 11: The map of locations where domestic and wild pigs were observed



These results compliment the data gathered from the FGDs to confirm domestic and wild pigs range in the same area facilitating the transmission of ASF virus and other pathogens among and between domestic pigs and wild boar. Other non-target species (both domestic and wild) were observed in the area including cattle, chickens, dogs, rats, Asian golden cat, muntjac, porcupine, dhole, lesser mouse deer, and civet. Dholes were captured in CT images around villages where wild boar were not observed on CTs which may explain, in part, the absence of wild boar at the time.

RESTITUTION WORKSHOP

Sharing the Outcomes of FGDs and Round 1 CT Placement with Local Communities



Location

Naven, Paklao and Nanoy villages in Viengkham District, and Luang Prabang Province.



Implemented Team

WCS Health Team, NEPL SMART/GIS teams, and Agriculture and Forestry office.



Objectives

- To review ASF and the importance of surveillance in both domestic pigs and wild boar in and around their village
- To deliver key findings of the focus group discussions.
- To share the results of the camera trap placement round 1 in the three villages.

Participants

- Navaen village: Total of 72 participants (32 males, 30 females and 10 children)
- Paklao villages; Total of 72 participants (32 males, 25 females and 15 children)
- Nanoy villages: Total of 35 participants (29 males and 06 females)

Activities performed

A presentation was provided by the WCS Health team and NEPL staff who had led the FGDs and camera trap set-up/retrieval in the villages.

For this presentation, we focused on ASF and discussed the importance of disease surveillance in both domestic and wild pigs. Clinical signs, transmission routes, prevention strategies, and reporting procedures for sick or dead wild boar were reviewed. Results of the FGDs were shared as well as some of the results of the first round of camera trap deployment.

At Navaen, the first village presentation, the villagers were mainly interested in the images. During the presentations in Paklao and Nanoy villages, the content was familiar to community members, and they compared the information with their own experiences and previous training in preventing disease outbreaks at the district level.

NEPL staff were keen to support this workshop and the wildlife disease surveillance network in Laos. They would like to continue building the capacity of their staff as key stakeholders to deliver information related to animal disease or human health aspects at the village level. They have worked in the villages for a long time and know the communities well. District level government members and NEPL staff are also familiar with the local/tribal dialects, so villagers often have an easier time understanding them than they do the pronunciation of Lao language by central level people, facilitating effective knowledge transfer.

After the presentation finished, to the communities were able to ask questions. Additional details can be found in Annex 5.



Photos (above): WCS Health and NEPL SMART/GIS present the results of the first round of camera trapping in Naven, Paklao and Nanoy villages.

CAMERA TRAP PLACEMENT ROUND 2

Monitoring interactions at the interface between domestic pigs and wild boars in rainy season, March - June 2024.



Location

Nanoy, Paklao, and Navaen villages (Figure 1, 4, 5 & 7) were selected based on FGD findings



Implemented Team

WCS Health and NEPL biodiversity monitoring/SMART/GIS team, Luang Prabang Provincial Agriculture and Forestry Office (PAFO), and Viengkham District Agriculture and Forestry Office (DAFO)

Methodology

Camera trap (CT) placement in each target village was originally determined prior to Round 1 based on the FGDs outcomes and site assessments by WCS Health team and the Biodiversity Monitoring team. Round 1 took place in the dry season and this round successfully captured wild boar and domestic pigs sharing the same area.

Round 2 took place at the very beginning of the rainy season in approximately the same locations, using identical methods and duration for 60 days. Differences in wild boar and domestic pig activity between the two seasons were analyzed.

Key findings

The camera installation site faced several challenges, including the threat of forest fires and forest clearing due to annual production. Some areas where camera traps were previously set up are now targeted for clearing or were at risk of fires. As such, slight deviation in location was necessary for camera trap locations during Round 2 to avoid this.

During the 60-day period, one camera trap from Navaen Village was destroyed. A camera trap in Paklao village fell but still captured images for a period before it came down. Multiple non-target species were captured in all three target villages such as Muntjac, leopard cat, Asian golden cat, squirrel, porcupine, jungle fowl, and civet (Figure 12). Further details can be found in Annex 6.



Figure 12: Non-target species captured on CT images.

In the second round of camera set-up, only Navaen village captured images of wild boar and domestic pigs in the same CT area. In the other two villages only domestic pigs and another species were captured in the CT images.



Figure 13: Domestic pigs and wild boar seen in the same locations around Navaen village

Domestic and wild pigs were found to enter the same area, but at different times and on different days in Navaen village (Figure 13), with locations depicted in Figure 14 where domestic pigs and wild boar were seen on CT images.

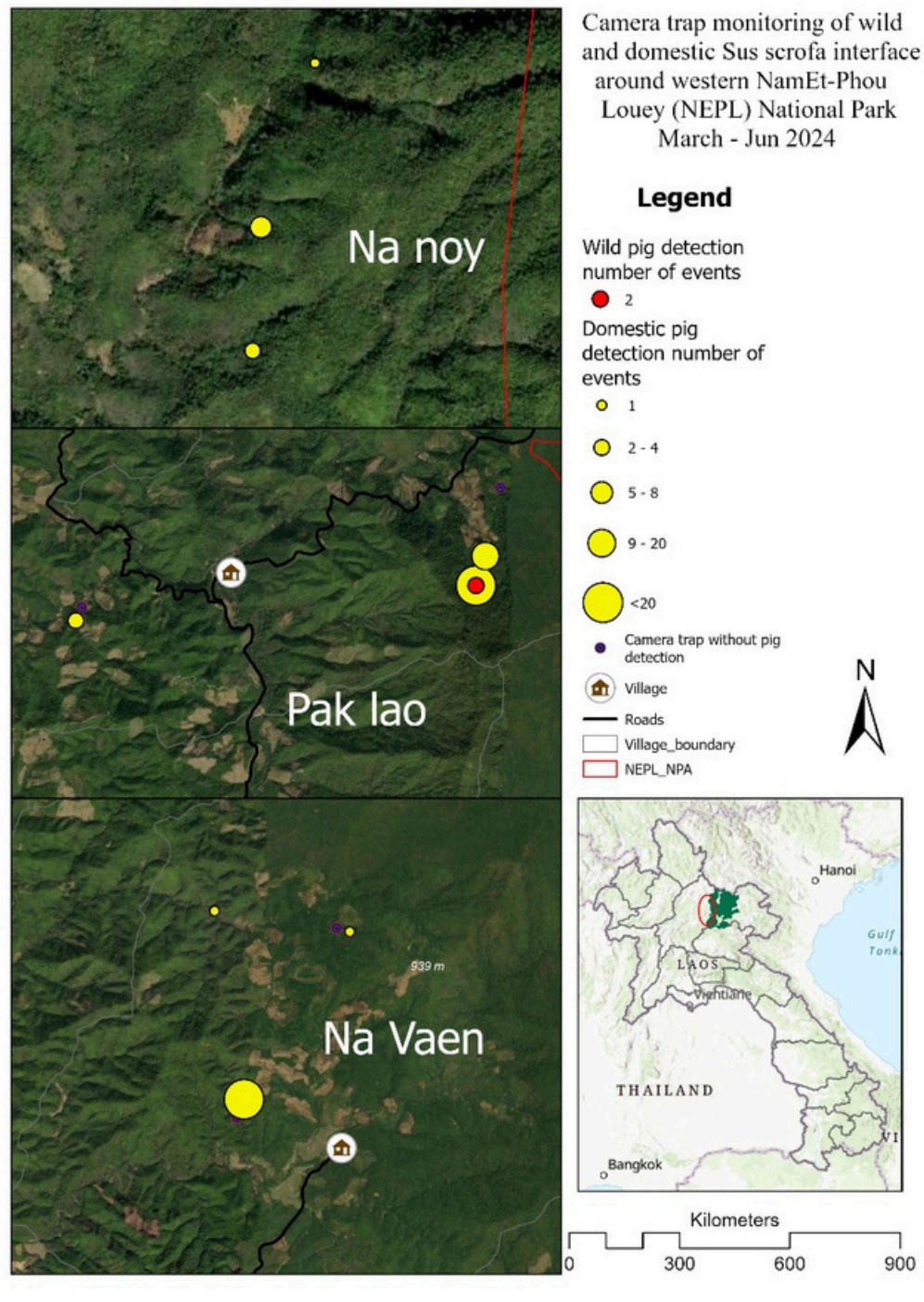
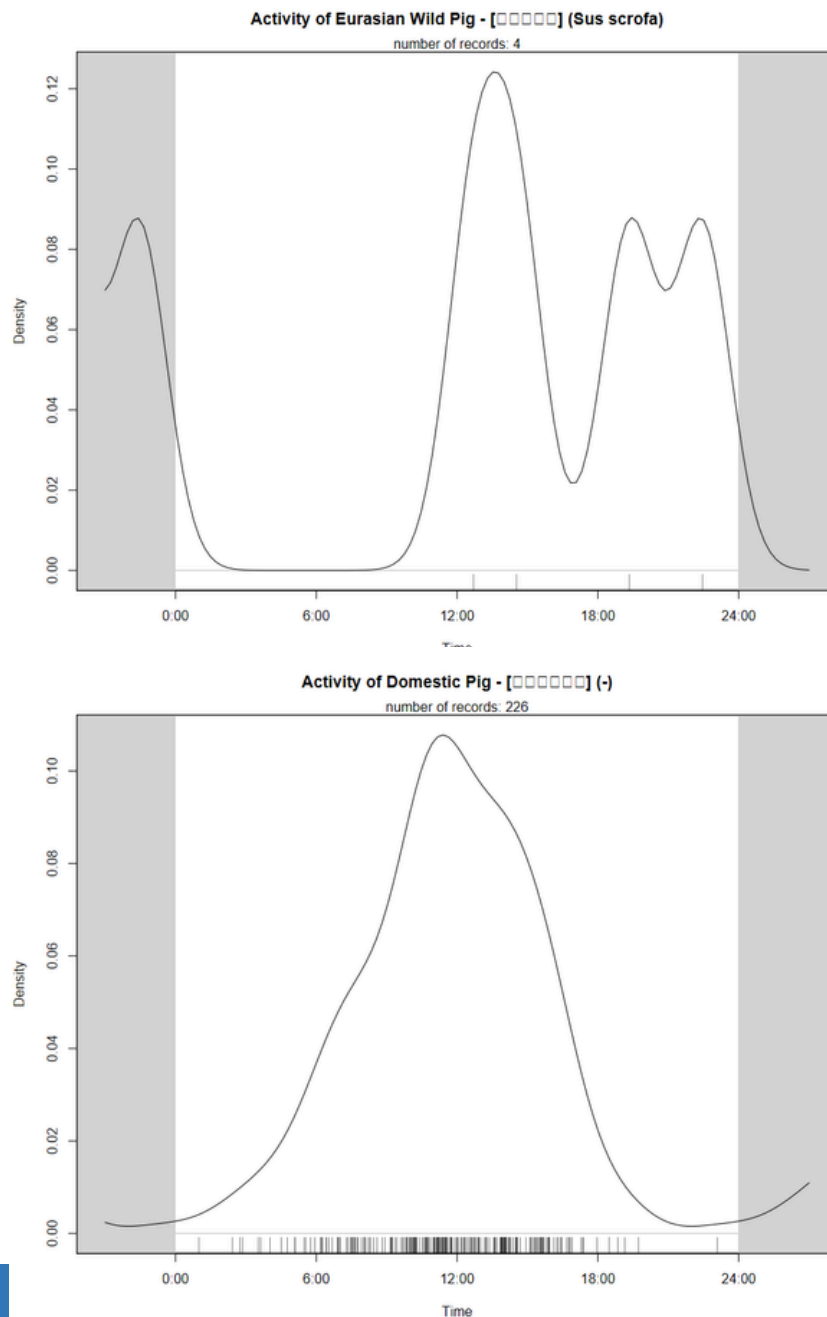


Figure 14: Locations where domestic pigs and wild boar were seen on CT images

During both rounds of camera trapping, domestic pigs ranged out near CT locations with detections peaking mid-day. Wild boar images were captured more sporadically throughout the day and night. The risk of wild boar ranging near domestic pig sanums, therefore, seems to be fairly consistent regardless of time of day.



Conclusion

The results of camera trapping across two seasons compliment the data gathered from the FGDs confirming that domestic and wild pigs range in the same area facilitating the transmission of ASF virus and other pathogens between them. The villages in which they range differed between seasons, and this may be due to several factors such as predators in the area, human activity including land clearing, forest fires, and crop production cycles. Nevertheless, regardless of the season, spillover/spillback risk reduction interventions targeting high-risk practices, behaviors, and perceptions would likely aid in the prevention of ASF transmission but also in the sharing of other pathogens potentially detrimental to animal health, public health, and community livelihoods.