

Updated contemporary distribution of the Pampas cat (*Leopardus munoai*) in Uruguay: evidence from continued monitoring

Distribuição contemporânea atualizada do gato-palheiro (*Leopardus munoai*) no Uruguai: evidências do monitoramento contínuo

Distribución contemporánea actualizada del gato de pajonal (*Leopardus munoai*) en Uruguay: evidencia del monitoreo continuo

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ABSTRACT

The Pampas cat (*Leopardus munoai*) is one of the least-known small wild cats associated with the Pampa biome of southern South America. In Uruguay, knowledge of its distribution has historically been limited by scarce and geographically fragmented records. A recent national assessment based on confirmed evidence obtained between 2022 and 2025 documented contemporary occurrence of the species across seven departments using an integrated framework combining trail-camera monitoring, validated citizen-science observations, and road surveys. Here, we update the documented contemporary distribution of *L. munoai* in Uruguay by incorporating additional confirmed evidence obtained during continued monitoring in 2026 within the Uruguay Small Wild Cat Program – Rock and Pampa. Contemporary occurrence was documented in Paysandú through validated citizen science, in Lavalleja through trail-camera monitoring, and in Rocha through a documented roadkill record. These three departments were not represented in the 2022–2025 contemporary dataset. Additional trail-camera evidence from Florida provided methodologically independent confirmation in a department previously represented by citizen-science evidence. The updated distribution therefore documents contemporary occurrence of *L. munoai* across ten departments of Uruguay: Artigas, Rivera, Salto, Paysandú, Río Negro, Tacuarembó, Durazno, Florida, Lavalleja, and Rocha. This work represents a substantial advance in our understanding of the contemporary distribution of *Leopardus munoai* in Uruguay, achieved through sustained geographic and temporal monitoring and the integration of complementary, independently verifiable sources of information. These findings reinforce the importance of long-term monitoring and validated community participation for progressively

reducing distributional knowledge gaps in cryptic mammals occurring across extensive and heterogeneous landscapes.

Keywords: Pampas cat, *Leopardus munoai*, contemporary distribution, citizen science, trail camera, roadkill, Pampa biome, Uruguay.

RESUMO

O gato-palheiro (*Leopardus munoai*) é um dos pequenos felinos menos conhecidos associados ao bioma Pampa no sul da América do Sul. No Uruguai, o conhecimento sobre sua distribuição tem sido historicamente limitado por registros escassos e geograficamente fragmentados. Uma avaliação nacional recente, baseada em evidências confirmadas obtidas entre 2022 e 2025, documentou a ocorrência contemporânea da espécie em sete departamentos por meio de uma abordagem integrada que combinou câmeras de trilha, observações validadas de ciência cidadã e monitoramento rodoviário. Neste estudo, atualizamos a distribuição contemporânea documentada de *L. munoai* no Uruguai mediante a incorporação de evidências adicionais confirmadas obtidas durante a continuidade do monitoramento em 2026 no âmbito do Uruguay Small Wild Cat Program – Rock and Pampa. A ocorrência contemporânea foi documentada em Paysandú por meio de ciência cidadã validada, em Lavalleja por câmeras de trilha e em Rocha por meio de um registro documentado de atropelamento. Esses três departamentos não estavam representados no conjunto de dados contemporâneo de 2022–2025. Evidência adicional obtida por câmera de trilha em Florida forneceu uma confirmação metodologicamente independente em um departamento previamente representado por ciência cidadã. A distribuição atualizada documenta, portanto, a ocorrência contemporânea de *L. munoai* em dez departamentos do Uruguai: Artigas, Rivera, Salto, Paysandú, Río Negro, Tacuarembó, Durazno, Florida, Lavalleja e Rocha. Este trabalho representa um avanço substancial na compreensão da distribuição contemporânea de *Leopardus munoai* no Uruguai, alcançado por meio de monitoramento geográfico e temporal contínuo e da integração de fontes complementares e independentemente verificáveis de informação. Esses resultados reforçam a importância do monitoramento de longo prazo e da participação comunitária validada para reduzir progressivamente as lacunas de conhecimento sobre a distribuição de mamíferos crípticos que ocorrem em paisagens extensas e heterogêneas.

Palavras-chave: gato-palheiro, *Leopardus munoai*, distribuição contemporânea, ciência cidadã, câmera de trilha, atropelamento, bioma Pampa, Uruguai.

RESUMEN

El gato de pajonal (*Leopardus munoai*) es uno de los pequeños felinos menos conocidos asociados al bioma Pampa del sur de América del Sur. En Uruguay, el conocimiento sobre su distribución ha estado históricamente limitado por registros escasos y geográficamente fragmentados. Una evaluación nacional reciente, basada en evidencia confirmada obtenida entre 2022 y 2025, documentó la presencia contemporánea de la especie en siete departamentos mediante un enfoque integrado que combinó cámaras de rastreo, observaciones validadas de ciencia ciudadana y monitoreo de rutas. En este trabajo actualizamos la distribución contemporánea documentada de *L. munoai* en Uruguay mediante la incorporación de evidencia adicional confirmada obtenida durante la continuidad del monitoreo en 2026 dentro del Uruguay Small Wild Cat Program – Rock and Pampa. La presencia contemporánea fue documentada en Paysandú mediante ciencia ciudadana validada, en Lavalleja mediante cámaras de rastreo y en Rocha mediante un

registro documentado de atropellamiento. Estos tres departamentos no estaban representados en el conjunto de datos contemporáneo de 2022–2025. Evidencia adicional obtenida mediante cámara de rastreo en Florida proporcionó una confirmación metodológicamente independiente en un departamento previamente representado por ciencia ciudadana. La distribución actualizada documenta, por lo tanto, la presencia contemporánea de *L. munoai* en diez departamentos de Uruguay: Artigas, Rivera, Salto, Paysandú, Río Negro, Tacuarembó, Durazno, Florida, Lavalleya y Rocha. Este trabajo representa un avance sustancial en nuestra comprensión de la distribución contemporánea de *Leopardus munoai* en Uruguay, logrado mediante un monitoreo geográfico y temporal sostenido y la integración de fuentes complementarias de información verificables de manera independiente. Estos hallazgos refuerzan la importancia del monitoreo a largo plazo y de la participación comunitaria validada para reducir progresivamente los vacíos de conocimiento sobre la distribución de mamíferos crípticos que habitan paisajes extensos y heterogéneos.

Palabras clave: gato de pajonal, *Leopardus munoai*, distribución contemporánea, ciencia ciudadana, cámaras de rastreo, atropellamiento, bioma Pampa, Uruguay.

1 INTRODUCTION

Small wild cats of the genus *Leopardus* represent an important component of South American carnivore assemblages, yet several species remain poorly known because of their elusive behavior, low encounter rates, and methodological limitations associated with detection (Di Bitetti *et al.* 2010; O’Connell *et al.* 2011). These constraints can result in substantial geographic knowledge gaps, particularly when monitoring is limited in spatial or temporal extent.

The Pampas cat complex has undergone substantial taxonomic revision, revealing previously underestimated diversity within the genus *Leopardus* (García-Perea 1994; Nascimento *et al.* 2021). *Leopardus munoai* is associated primarily with the Pampa biome of Uruguay, southern Brazil, and adjacent regions (Nascimento *et al.* 2021). This recognition emphasized the importance of revisiting historical information and generating contemporary evidence capable of refining knowledge of the species' geographic occurrence.

In Uruguay, available information on *L. munoai* has historically been scarce and geographically fragmented, relying largely on historical records and limited contemporary evidence (Ximénez 1961; González & Martínez-Lanfranco 2010; Turcatti Oviedo & Sanderson 2026). This scarcity has generated considerable uncertainty

regarding the species' current distribution and complicated assessments of its conservation status at the national scale (Soutullo *et al.* 2013).

The increasing application of trail cameras has improved the capacity to document elusive terrestrial mammals and generate independently verifiable evidence of occurrence (Tobler *et al.* 2008; O'Connell *et al.* 2011; Burton *et al.* 2015). Road monitoring and documented wildlife mortality can provide complementary distributional information (Teixeira *et al.* 2013; Santos *et al.* 2017). Recent studies in Uruguay have similarly demonstrated the value of trail-camera surveys for documenting terrestrial mammal communities and small wild cats in grassland-dominated environments (Turcatti Oviedo 2025; Turcatti Oviedo *et al.* 2025).

Broad-scale monitoring of *L. munoai* presents an additional challenge because potentially suitable environments are distributed across extensive landscapes, much of which is privately managed and used for production. Continuous systematic sampling throughout the potential national range of a cryptic species is therefore logistically difficult. Under these conditions, complementary information provided by rural residents, landowners, and local observers can substantially increase geographic and temporal surveillance when observations are adequately documented and subjected to rigorous validation.

Within this context, the Uruguay Small Wild Cat Program – Rock and Pampa established a monitoring framework integrating systematic field surveys with direct engagement of rural communities, landowners, and local collaborators (Turcatti Oviedo & Sanderson 2026). Outreach activities have accompanied field monitoring to increase recognition of small wild cats and establish mechanisms through which potential observations can be documented, communicated, and subsequently evaluated.

Community-derived observations are incorporated into the scientific dataset only when photographic, video, or other verifiable evidence allows reliable species identification. Citizen science is therefore treated as a complementary source of distributional information rather than as a substitute for structured ecological sampling.

Turcatti Oviedo and Sanderson (2026) applied this integrated framework to confirmed evidence obtained between 2022 and 2025, documenting contemporary occurrence of *L. munoai* across seven departments and establishing a national-scale distributional baseline. Validated community-derived observations made a substantial contribution to geographic coverage, although differences in effort, spatial and temporal

coverage, and observation processes among methods mean that their relative contributions should not be interpreted as formal comparisons of detection efficiency.

Following completion of the 2022–2025 assessment, systematic and collaborative monitoring continued during 2026 and generated confirmed evidence from additional regions of Uruguay.

Reducing these distributional knowledge gaps has both theoretical and practical relevance. From a scientific perspective, a more comprehensive contemporary distributional baseline provides the empirical foundation for subsequent assessments of habitat relationships, connectivity, occupancy, threats, and conservation status. From an applied perspective, documenting confirmed occurrence in previously unrepresented regions can improve the geographic targeting of monitoring and conservation actions, while strengthening collaboration with landowners and rural communities across productive landscapes. Continued updating of the national distributional baseline therefore directly links new knowledge of *L. munoai* with evidence-based conservation planning in Uruguay.

Here, we update the documented contemporary distribution of *L. munoai* in Uruguay based on this new evidence. Specifically, we aim to: (1) incorporate confirmed contemporary occurrence from departments not represented in the 2022–2025 assessment; (2) provide an updated national-scale representation of the documented distribution of the species; and (3) discuss the contribution and interpretative scope of sustained systematic and collaborative monitoring for reducing geographic knowledge gaps in a poorly known and cryptic felid.

2 MATERIALS AND METHODS

2.1 STUDY AREA

The study encompasses Uruguay, located within the temperate grassland region of southeastern South America and forming part of the broader Pampa biome. The national landscape is dominated by open environments, particularly natural and semi-natural grasslands, embedded within heterogeneous matrices that include livestock production systems, agricultural areas, wetlands, shrublands, riparian forests, forestry plantations, and urban infrastructure (Bilenca & Miñarro 2004; Modernel *et al.* 2016).

A substantial proportion of natural and semi-natural environments occurs within productive landscapes. Monitoring grassland-associated mammals at a national scale therefore requires approaches capable of extending geographic surveillance beyond formally protected areas and individual intensive study sites.

The present study represents a temporal continuation of the national monitoring framework described by Turcatti Oviedo and Sanderson (2026). The previously published contemporary dataset covered the period 2022–2025, whereas the additional evidence incorporated into the present assessment was obtained during 2026.

2.2 MONITORING FRAMEWORK

The general framework described by Turcatti Oviedo and Sanderson (2026) was maintained, integrating structured trail-camera monitoring, validated citizen-science observations, and documented wildlife mortality.

Sampling effort was spatially heterogeneous and was not designed as a uniform national probability sample. Because effort, geographic and temporal coverage, and observation processes differed among evidence sources, their relative contributions to the confirmed records were not interpreted as formal measures of comparative detection efficiency.

2.2.1 Trail-camera monitoring

Trail cameras were deployed in natural and productive landscapes at locations selected according to habitat characteristics and evidence of terrestrial mammal activity, including wildlife trails, habitat edges, grassland environments, and other sites considered suitable for detecting medium-sized terrestrial mammals.

Camera placement followed the general principles applied in previous mammal-monitoring studies using remotely triggered cameras (Tobler *et al.* 2008; O’Connell *et al.* 2011; Burton *et al.* 2015) and the monitoring framework previously applied to *L. munoai* in Uruguay (Turcatti Oviedo & Sanderson 2026).

During 2026, trail-camera evidence confirmed contemporary occurrence of *L. munoai* in Florida and Lavalleja departments.

2.2.2 Citizen science and collaborative monitoring

Potential observations reported by rural residents, landowners, local collaborators, and other observers were evaluated prior to inclusion in the dataset.

Only observations supported by photographic, video, or other verifiable material sufficient for reliable species identification were accepted as confirmed evidence.

During 2026, validated citizen-science evidence confirmed contemporary occurrence of *L. munoai* in Paysandú Department.

2.2.3 Documented roadkill

Documented wildlife roadkill was considered an additional source of contemporary occurrence information. Roadkill records can provide independent evidence of species presence while simultaneously identifying vehicle collisions as a potential source of anthropogenic mortality (Teixeira *et al.* 2013; Santos *et al.* 2017).

During 2026, a documented roadkill record of *L. munoai* confirmed contemporary occurrence in Rocha Department.

This event is used exclusively as distributional evidence. A single documented mortality event provides no basis for estimating roadkill frequency, mortality risk, or population-level effects.

2.3 CONTEMPORARY DISTRIBUTIONAL BASELINE

For the purposes of this study, contemporary distribution refers to geographic occurrence supported by confirmed evidence obtained during the 2022–2026 monitoring period.

The distribution reported by Turcatti Oviedo and Sanderson (2026) was used as the baseline for comparison. That assessment documented *L. munoai* in seven departments between 2022 and 2025: Artigas, Rivera, Salto, Río Negro, Tacuarembó, Durazno, and Florida.

The present assessment incorporates evidence obtained during 2026 from Paysandú, Florida, Lavalleja, and Rocha.

Paysandú, Lavalleja, and Rocha were not represented in the previous contemporary dataset and are therefore considered newly represented departments within the updated distribution.

Florida was already represented in the 2022–2025 assessment through citizen-science evidence. The 2026 trail-camera detection is consequently treated as methodologically independent confirmation of contemporary occurrence rather than as an addition to departmental coverage.

The terms **new evidence** and **newly represented department** refer exclusively to novelty relative to the 2022–2025 contemporary dataset and do not imply the first historical occurrence of the species within those departments.

2.4 SPECIES IDENTIFICATION

Identification of *Leopardus munoai* was based on external morphological characteristics visible in photographic or video documentation, including pelage pattern, body proportions, limb markings, tail characteristics, and other diagnostic traits described for the Pampas cat complex (García-Perea 1994; Nascimento *et al.* 2021).

Only evidence for which species identification could be established with sufficient confidence was incorporated into the updated contemporary distribution.

2.5 SPATIAL RESOLUTION AND SENSITIVE DATA

Precise geographic coordinates are not disclosed.

This follows the precautionary approach adopted in the previous assessment (Turcatti Oviedo & Sanderson 2026). Confirmed occurrences include records from private properties and other sensitive localities, and disclosure of precise geographic information could compromise landowner confidentiality or increase risks of unauthorized access, disturbance, or persecution.

Occurrence is therefore presented at departmental scale. This spatial resolution is sufficient for updating the documented national distribution while minimizing risks associated with disclosure of sensitive locality information.

2.6 SCOPE OF INFERENCE

The objective of the present study is explicitly distributional. The available evidence is used to document contemporary occurrence and update the geographic extent over which the presence of *L. munoai* has been empirically confirmed.

The study was not designed to estimate population size, density, demographic trends, colonization, or formal occupancy probabilities. Non-detection in departments not currently represented in the contemporary dataset should likewise not be interpreted as evidence of absence.

2.7 ETHICAL CONSIDERATIONS

This study was based exclusively on non-invasive observational evidence. Trail-camera monitoring did not involve capture, handling, restraint, marking, biological sampling, collection, or experimental manipulation of live animals. Citizen-science records consisted of voluntarily provided photographic or video documentation and did not involve animal experimentation or intervention. Roadkill evidence was obtained from animals found deceased and did not result from any procedure conducted as part of this study. Consequently, no animal-use procedures requiring an institutional animal ethics protocol were conducted in this research, and an animal ethics approval number was not applicable to the methods employed.

3 RESULTS

3.1 CONTEMPORARY DISTRIBUTIONAL BASELINE

The 2022–2025 assessment documented confirmed contemporary occurrence of *Leopardus munoai* in seven departments of Uruguay: Artigas, Rivera, Salto, Río Negro, Tacuarembó, Durazno, and Florida (Turcatti Oviedo & Sanderson 2026).

This distribution constitutes the contemporary baseline against which evidence obtained during 2026 was evaluated.

3.2 UPDATED CONTEMPORARY DISTRIBUTION

Confirmed evidence obtained during 2026 documented contemporary occurrence of *L. munoai* in Paysandú, Florida, Lavalleja, and Rocha.

Paysandú, Lavalleja, and Rocha were not represented in the 2022–2025 contemporary dataset and therefore add three departments to the documented contemporary distribution.

Occurrence in Paysandú was established through validated citizen-science evidence, in Lavalleja through trail-camera monitoring, and in Rocha through a documented roadkill record.

Florida, already represented in the previous assessment through citizen-science evidence, was independently confirmed during 2026 using trail-camera monitoring.

Following incorporation of the 2026 evidence, the documented contemporary distribution of *L. munoai* encompasses ten departments of Uruguay: Artigas, Rivera, Salto, Paysandú, Río Negro, Tacuarembó, Durazno, Florida, Lavalleja, and Rocha.

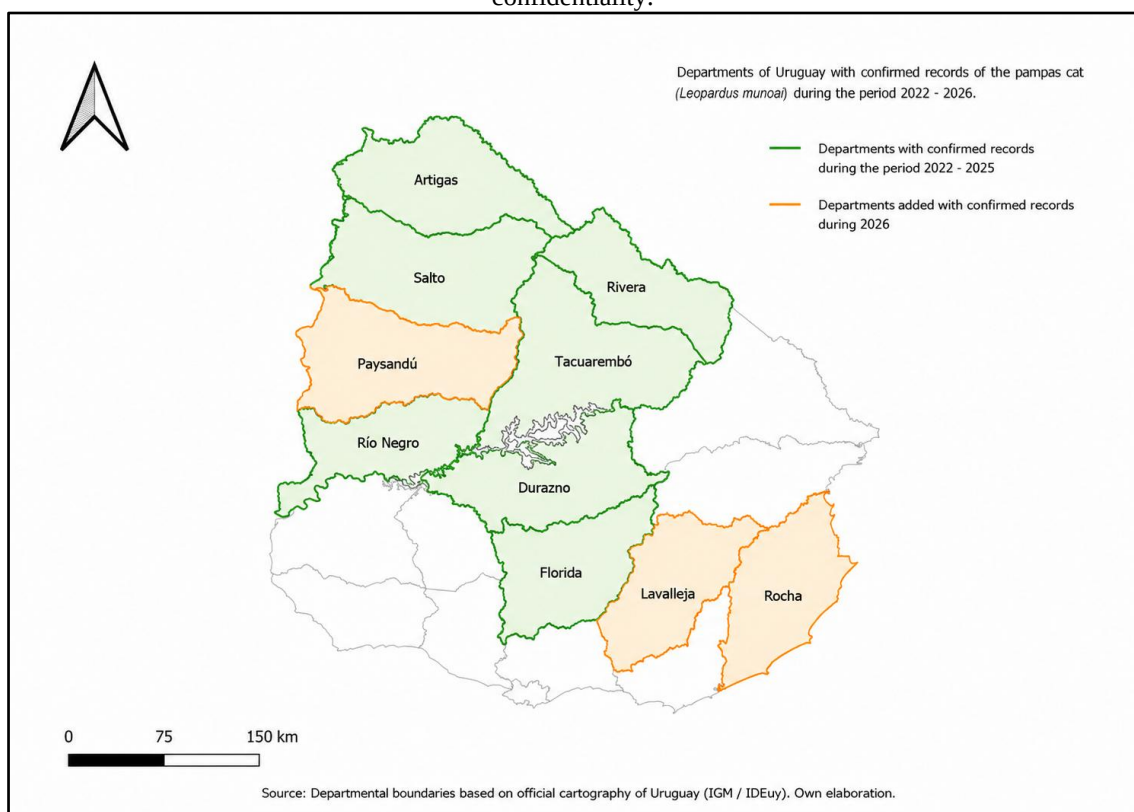
The new evidence extends confirmed departmental coverage westward to Paysandú and into southeastern Uruguay through Lavalleja and Rocha.

Table 1. Contemporary distributional evidence for *Leopardus munoai* incorporated during 2026 relative to the 2022–2025 assessment.

Department	Evidence source	Representation in 2022–2025 dataset	Contribution to updated distribution
Paysandú	Validated citizen science	Not represented	Newly represented department
Florida	Trail camera	Represented through citizen science	Methodologically independent confirmation
Lavalleja	Trail camera	Not represented	Newly represented department
Rocha	Documented roadkill	Not represented	Newly represented department

Source: Authors

Figure 1. Updated documented contemporary distribution of the Pampas cat (*Leopardus munoai*) in Uruguay based on confirmed evidence obtained between 2022 and 2026. Departments outlined in green were represented in the 2022–2025 assessment (Turcatti Oviedo & Sanderson 2026), whereas departments outlined in orange were newly represented by confirmed evidence obtained during 2026. Exact localities are intentionally omitted to protect sensitive occurrence information and landowner confidentiality.



Source: Authors

4 DISCUSSION

4.1 UPDATING THE CONTEMPORARY DISTRIBUTION OF *LEOPARDUS MUNOAI* IN URUGUAY

Continued monitoring during 2026 substantially refines the contemporary distributional framework available for *Leopardus munoai* in Uruguay. Relative to the seven-department baseline established for 2022–2025 (Turcatti Oviedo & Sanderson 2026), confirmed evidence from Paysandú, Lavalleja, and Rocha increases departmental coverage to ten.

The principal contribution is geographic rather than numerical: individual observations provide the evidence for occurrence, but the result of the study is a broader empirical representation of the species' current geographic occurrence.

This distinction is particularly important when studying cryptic and infrequently detected species. Distributional knowledge reflects both the underlying biological distribution and the observation process through which occurrence is documented. Restricted geographic coverage, limited monitoring duration, imperfect detection, and uneven observer distribution can all result in incomplete representations of species occurrence (O'Connell *et al.* 2011; Burton *et al.* 2015).

Accordingly, the updated distribution provides an increasingly comprehensive empirical representation of the contemporary occurrence of *L. munoai* in Uruguay.

4.2 SUSTAINED MONITORING AND REDUCTION OF GEOGRAPHIC KNOWLEDGE GAPS

The progressive improvement in knowledge of *L. munoai* in Uruguay illustrates the importance of sustained monitoring for species characterized by low encounter rates.

Historically, information on the species was based on scarce and geographically fragmented evidence (Ximénez 1961; González & Martínez-Lanfranco 2010). More recently, the development of a dedicated monitoring framework through the Uruguay Small Wild Cat Program – Rock and Pampa has combined systematic field surveys with geographically distributed collaborative observations (Turcatti Oviedo & Sanderson 2026).

The importance of continuity becomes particularly evident when consecutive monitoring periods are considered together. Sampling continued after completion of the previous assessment and subsequently generated verifiable evidence from regions that had remained undocumented in the contemporary dataset.

For elusive species, sustained monitoring across consecutive periods increases the opportunity to document occurrence in regions that remain poorly represented by existing evidence (O'Connell *et al.* 2011; Burton *et al.* 2015).

4.3 COMMUNITY PARTICIPATION AS A COMPONENT OF DISTRIBUTIONAL MONITORING

An important component of the monitoring framework has been the direct involvement of rural residents, landowners, and local collaborators.

Potential habitat for *L. munoai* occurs across extensive landscapes in which permanent systematic sampling at all potentially occupied sites would be logistically difficult. The program has therefore complemented field monitoring with outreach and direct communication intended to improve recognition of small wild cats and facilitate the documentation and reporting of potential observations.

From a scientific perspective, the relevance of this process lies in its capacity to increase the geographic and temporal extent of the observation network.

An incidental encounter can contribute reliable distributional information when the observation is adequately documented, communicated through an established reporting pathway, and subsequently validated.

The previous national assessment demonstrated the substantial contribution of validated community-derived observations to geographic coverage (Turcatti Oviedo & Sanderson 2026). The Paysandú evidence presented here provides an additional example of how collaborative monitoring can document contemporary occurrence in regions not represented by systematic field detections.

Because sampling effort, geographic and temporal coverage, observer distribution, and detection processes differed among methods, their relative contributions to the confirmed records should not be interpreted as a formal ranking of comparative detection efficiency.

The principal value of community participation in this context is therefore **complementarity and increased geographic surveillance**, rather than replacement of structured ecological monitoring.

4.4 COMPLEMENTARITY OF EVIDENCE SOURCES

The updated distribution illustrates the value of integrating different sources of verifiable evidence.

The 2026 update relied on all three evidence streams: validated citizen science, trail-camera monitoring, and documented roadkill. Florida additionally illustrates how independent methods can corroborate occurrence within a department already represented in the contemporary dataset.

Trail cameras provide structured and independently verifiable evidence at defined sampling locations (Tobler *et al.* 2008; O'Connell *et al.* 2011; Burton *et al.* 2015). Validated community observations can extend geographic and temporal coverage beyond fixed monitoring sites. Documented roadkill can provide additional evidence of occurrence while also identifying vehicle collisions as a potential source of anthropogenic mortality (Teixeira *et al.* 2013; Santos *et al.* 2017).

For broad-scale distributional assessments of cryptic mammals, integration of complementary evidence sources can therefore reduce dependence on any single observation process and progressively improve geographic knowledge.

4.5 INCREASING DOCUMENTATION VERSUS CHANGING POPULATIONS

The expansion of confirmed contemporary occurrence from seven to ten departments substantially improves the empirical representation of *L. munoai* across Uruguay. This broader geographic coverage provides new information on regions that were not represented in the previous contemporary assessment and strengthens the national distributional baseline for the species.

Although the previous assessment documented consistently low detection rates across complementary monitoring approaches (Turcatti Oviedo & Sanderson 2026), the present study was designed primarily to update geographic occurrence rather than reassess population size or abundance. Accordingly, the transition from seven to ten

departments is interpreted as improved distributional knowledge and should not, by itself, be considered evidence of population increase or recent biological range expansion.

Increased monitoring duration, broader geographic coverage, expansion of collaborative networks, improved species recognition, and more effective documentation and validation can all increase the probability of detecting a species that was already present. The occurrence evidence analyzed here therefore provides a stronger contemporary distributional baseline, while questions concerning demographic trajectory, reproductive success, connectivity, and long-term viability remain important priorities for future research.

Likewise, continued monitoring of departments not currently represented in the dataset will be important for further refining the national distribution of the species.

4.6 CONSERVATION IMPLICATIONS

The updated contemporary distribution of *Leopardus munoai* provides a stronger empirical basis for conservation planning in Uruguay. The incorporation of confirmed occurrence from additional departments extends the geographic framework within which conservation priorities, monitoring strategies, and potential threats to the species can be evaluated.

The distribution documented here also reinforces the importance of considering *L. munoai* conservation beyond formally protected areas. Much of the Uruguayan Pampa consists of productive landscapes where native and semi-natural grasslands coexist with livestock production and other land uses (Bilenca & Miñarro 2004; Modernel *et al.* 2016). Conservation strategies for the species therefore depend not only on protected areas but also on the persistence and connectivity of suitable habitats within privately managed landscapes.

The documented roadkill in Rocha further highlights road infrastructure as a potential source of mortality that warrants continued attention. Although a single event does not allow assessment of the magnitude of this threat, its documentation identifies an additional factor that should be considered in future monitoring and threat assessments.

Together, the updated distribution and the expanding monitoring network provide a stronger geographic basis for prioritizing conservation attention across private and productive landscapes and for strengthening collaborative conservation actions with landowners and rural communities throughout the Uruguayan Pampa.

4.7 INTERPRETATIVE SCOPE AND FUTURE DIRECTIONS

The updated distribution established here provides a national-scale foundation for the next phase of research on *Leopardus munoai* in Uruguay. Continued broad-scale monitoring, complemented where feasible by standardized repeated sampling, could support more detailed analyses of habitat relationships, detection probability, landscape connectivity, productive land use, road infrastructure, and other factors potentially influencing the occurrence of the species.

As geographic knowledge continues to improve, research priorities can progressively move from documenting where *L. munoai* occurs toward understanding the ecological and demographic processes that influence its persistence across the Uruguayan Pampa.

5 CONCLUSION

Continued monitoring during 2026 provides a substantial update to the documented contemporary distribution of the Pampas cat (*Leopardus munoai*) in Uruguay. Confirmed evidence from Paysandú, Lavalleja, and Rocha increases departmental coverage from seven to ten, while trail-camera evidence from Florida provides methodologically independent confirmation in a department previously represented by citizen science.

The principal contribution of this study is geographic rather than numerical. The new evidence provides previously unavailable contemporary information from three departments that were not represented in the previous national assessment. As a result, the empirical representation of the species' occurrence in Uruguay is now substantially more geographically comprehensive, providing a stronger basis for understanding its national distribution and for identifying regions where ecological and conservation attention should be prioritized.

These findings also demonstrate the value of sustained field monitoring, validated community participation, and complementary evidence sources for documenting cryptic and poorly known species across extensive and heterogeneous landscapes. From a practical and societal perspective, the updated distribution can support the geographic prioritization of monitoring and conservation actions, strengthen collaboration with landowners and rural communities, and improve recognition of areas where potential

threats and habitat conditions require further attention. From an academic perspective, the study establishes an expanded contemporary baseline that can support future research on habitat relationships, landscape connectivity, road mortality, occupancy, and population status.

The main interpretative limitations of the present assessment are the heterogeneous sampling effort among evidence sources and the spatial resolution adopted to protect sensitive localities and landowner confidentiality. These characteristics do not compromise the primary distributional objective of the study, but define the spatial and inferential scale at which the results should be interpreted. Future research can build directly on this expanded baseline through continued broad-scale monitoring and, where feasible, standardized repeated sampling and more detailed approaches aimed at evaluating detection probability, habitat relationships, connectivity, threats, and demographic processes.

Overall, this study represents an important advance in the contemporary knowledge of *L. munoai* in Uruguay. By documenting confirmed occurrence in regions that were not represented in the previous assessment, it adds essential and previously unavailable information to the national distributional framework and reinforces the importance of maintaining long-term monitoring to progressively strengthen the scientific basis for the conservation of the species across the Uruguayan Pampa.

REFERENCES

BILENCA, D. N.; MIÑARRO, F. **Identificación de áreas valiosas de pastizal (AVPs) en las Pampas y Campos de Argentina, Uruguay y sur de Brasil**. Buenos Aires: Fundación Vida Silvestre Argentina, 2004.

BURTON, A. C. *et al.* Wildlife camera trapping: A review and recommendations for linking surveys to ecological processes. **Journal of Applied Ecology**, v. 52, n. 3, p. 675-685, 2015. DOI: <https://doi.org/10.1111/1365-2664.12432>.

DI BITETTI, M. S. *et al.* Niche partitioning and species coexistence in a Neotropical felid assemblage. **Acta Oecologica**, v. 36, n. 4, p. 403-412, 2010. DOI: <https://doi.org/10.1016/j.actao.2010.04.001>.

GARCÍA-PEREA, R. The Pampas cat group (genus *Lynchailurus* Severtzov, 1858) (Carnivora, Felidae): A systematic and biogeographic review. **American Museum Novitates**, n. 3096, p. 1-36, 1994.

GONZÁLEZ, E. M.; MARTÍNEZ-LANFRANCO, J. A. **Mamíferos de Uruguay**: Guía de campo e introducción a su estudio y conservación. Montevideo: Museo Nacional de Historia Natural; Vida Silvestre Uruguay; Ediciones de la Banda Oriental, 2010.

MODERNEI, P. *et al.* Land use change and ecosystem service provision in Pampas and Campos grasslands of southern South America. **Environmental Research Letters**, v. 11, n. 11, art. 113002, 2016. DOI: <https://doi.org/10.1088/1748-9326/11/11/113002>.

NASCIMENTO, F. O. D.; CHENG, J.; FEIJÓ, A. Taxonomic revision of the Pampas cat *Leopardus colocola* complex (Carnivora: Felidae): An integrative approach. **Zoological Journal of the Linnean Society**, v. 191, n. 2, p. 575-611, 2021. DOI: <https://doi.org/10.1093/zoolinnean/zlaa043>.

O'CONNELL, A. F.; NICHOLS, J. D.; KARANTH, K. U. (Ed.). **Camera Traps in Animal Ecology**: Methods and Analyses. Tokyo: Springer, 2011. DOI: <https://doi.org/10.1007/978-4-431-99495-4>.

SANTOS, R. A. L. *et al.* Assessing the consistency of hotspot and hot-moment patterns of wildlife road mortality over time. **Perspectives in Ecology and Conservation**, v. 15, n. 1, p. 56-60, 2017. DOI: <https://doi.org/10.1016/j.pecon.2017.03.003>.

SOUTULLO, Á.; CLAVIJO, C.; MARTÍNEZ-LANFRANCO, J. A. (Ed.). **Especies prioritarias para la conservación en Uruguay**: Vertebrados, moluscos continentales y plantas vasculares. Montevideo: SNAP/DINAMA/MVOTMA; DICYT/MEC, 2013. 222 p.

TEIXEIRA, F. Z. *et al.* Are road-kill hotspots coincident among different vertebrate groups? **Oecologia Australis**, v. 17, n. 1, p. 36-47, 2013. DOI: <https://doi.org/10.4257/oeco.2013.1701.04>.

TOBLER, M. W. *et al.* An evaluation of camera traps for inventorying large- and medium-sized terrestrial rainforest mammals. **Animal Conservation**, v. 11, n. 3, p. 169-178, 2008. DOI: <https://doi.org/10.1111/j.1469-1795.2008.00169.x>.

TURCATTI OVIEDO, S. Terrestrial mammal community of the protected landscape Valle del Lunarejo: a camera trap-based study. **Brazilian Journal of Animal and Environmental Research**, v. 8, n. 1, e78107, 2025. DOI: <https://doi.org/10.34188/bjaerv8n1-114>.

TURCATTI OVIEDO, S.; QUINTANA, I. M. H.; DAMBORIARENA, F. A. R. Small wild cats in the Uruguayan Pampa biome: records from Valle del Lunarejo. **Brazilian Journal of Animal and Environmental Research**, v. 8, n. 3, e81742, 2025. DOI: <https://doi.org/10.34188/bjaerv8n3-058>.

TURCATTI OVIEDO, S.; SANDERSON, J. Updated distribution and new records of the Pampas cat (*Leopardus munoai*) in Uruguay. **Brazilian Journal of Animal and Environmental Research**, v. 9, n. 1, e85310, 2026. DOI: <https://doi.org/10.34188/bjaerv9n1-024>.

XIMÉNEZ, A. Nueva subespecie del gato pajero del Uruguay, *Felis colocola munoai* n. ssp. **Comunicaciones Zoológicas del Museo de Historia Natural de Montevideo**, v. 5, n. 88, p. 1-8, 1961.