

Updated distribution and new records of the Pampas cat (*Leopardus munoai*) in Uruguay

Distribuição atualizada e novos registros do gato-palheiro (*Leopardus munoai*) no Uruguai

Distribución actualizada y nuevos registros del gato de pajonal (*Leopardus munoai*) en Uruguay

DOI: 10.34188/bjaerv9n1-024

Submitted: Dec 2nd, 2025

Approved: Dec 25th, 2025

Santiago Turcatti Oviedo

Master of Science in Biological Sciences / Uruguay Small Wild Cat Program
Rock and Pampa. Uruguay
E-mail: santiagoturcatti@gmail.com

Jim Sanderson

PhD in Ecology and Wildlife Conservation
Small Wild Cat Conservation Foundation (SWCCF) USA
E-mail: gato_andino@yahoo.com

ABSTRACT

The Pampas cat (*Leopardus munoai*) is one of the most cryptic and least known small felids in the Southern Cone, primarily associated with open environments of the Pampa biome (García-Perea 1994; Nascimento et al. 2021). In Uruguay, knowledge of its distribution has historically been limited, based on scarce and mostly old records, with a lack of confirmed evidence for more than a decade (Ximénez 1975; González & Martínez-Lanfranco 2010).

Here, we present new confirmed records of *L. munoai* obtained between 2022 and 2025 within the framework of the Uruguay Small Wild Cat Program - Rock and Pampa, using an integrated approach that combined systematic trail camera monitoring, citizen science records, and road surveys. The cumulative effort generated verifiable and updated evidence of the species' presence across different regions of the Uruguayan Pampa biome.

Our findings demonstrate the current persistence of *L. munoai* in Uruguay, primarily associated with natural grasslands. Despite broad spatial coverage, detection rates remained consistently low across all survey methods, reflecting a very small population size. Overall, these results support a classification of the species as Critically Endangered at the national level and underscore the importance of long-term, multi-source monitoring for assessing the status of cryptic and low-density mammals.

Keywords: trail camera, citizen science, road surveys, small wild cat, Pampa biome.

RESUMO

O gato palheiro (*Leopardus munoai*) é um dos pequenos felinos mais crípticos e menos conhecidos do Cone Sul, associado principalmente a ambientes abertos do bioma Pampa (García-Perea 1994; Nascimento et al. 2021). No Uruguai, o conhecimento sobre sua distribuição tem sido historicamente limitado, baseado em registros escassos e majoritariamente antigos, com ausência

de evidências confirmadas por mais de uma década (Ximénez 1975; González & Martínez-Lanfranco 2010).

Neste estudo, apresentamos novos registros confirmados de *L. munoai* obtidos entre 2022 e 2025 no âmbito do projeto Uruguay Small Wild Cat Program - Rock and Pampa, por meio de uma abordagem integrada que combinou monitoramento sistemático com câmeras de trilha, registros de ciência cidadã e monitoramento em rodovias. O esforço acumulado gerou evidências verificáveis e atualizadas sobre a presença da espécie em diferentes regiões do bioma Pampa uruguaio.

Nossos resultados demonstram a persistência atual de *L. munoai* no Uruguai, principalmente associada a campos naturais. Apesar da ampla cobertura espacial alcançada, as taxas de detecção permaneceram consistentemente baixas em todos os métodos de amostragem, refletindo um tamanho populacional muito reduzido. De modo geral, esses resultados sustentam uma classificação da espécie como Criticamente Ameaçada em nível nacional e ressaltam a importância do monitoramento de longo prazo e do uso de múltiplas fontes de dados para avaliar o status de mamíferos crípticos e de baixa densidade populacional.

Palavras-chave: câmeras de trilha, ciência cidadã, monitoramento em rodovias, pequenos felinos, bioma Pampa.

RESUMEN

El gato de pajonal (*Leopardus munoai*) es uno de los pequeños felinos más crípticos y menos conocidos del Cono Sur, asociado principalmente a ambientes abiertos del bioma Pampa (García-Perea 1994; Nascimento et al. 2021). En Uruguay, el conocimiento sobre su distribución ha sido históricamente limitado, basado en registros escasos y mayormente antiguos, con una ausencia de evidencias confirmadas durante más de una década (Ximénez 1975; González & Martínez-Lanfranco 2010).

En este trabajo se presentan nuevos registros confirmados de *L. munoai* obtenidos entre 2022 y 2025 en el marco del proyecto Uruguay Small Wild Cat Program - Rock and Pampa, mediante un enfoque integrado que combinó monitoreo sistemático con cámaras de rastreo, registros de ciencia ciudadana y monitoreo de rutas. El esfuerzo acumulado generó evidencia verificable y actualizada sobre la presencia de la especie en diferentes regiones del bioma Pampa uruguayo.

Nuestros resultados demuestran la persistencia actual de *L. munoai* en Uruguay, principalmente asociada a pastizales naturales. A pesar de la amplia cobertura espacial alcanzada, las tasas de detección se mantuvieron consistentemente bajas en todos los métodos de muestreo, lo que refleja un tamaño poblacional muy reducido. En conjunto, estos resultados sustentan una clasificación de la especie como En Peligro Crítico a nivel nacional y resaltan la importancia del monitoreo a largo plazo y del uso de múltiples fuentes de datos para evaluar el estado de mamíferos crípticos y de baja densidad poblacional.

Palabras clave: cámaras de rastreo, ciencia ciudadana, monitoreo de rutas, pequeños felinos, bioma Pampa.

1 INTRODUCTION

Small wild cats of the genus *Leopardus* play an important ecological role as mesocarnivore predators in open and forested ecosystems of South America (Di Bitetti et al. 2010, Ripple et al. 2014). However, their study is often constrained by elusive behavior, low population densities, and methodological challenges related to detectability (Karanth & Nichols 2002, O'Connell et al. 2011).

The “Pampas cat” complex has been the subject of several taxonomic revisions that revealed an underestimated diversity within the genus *Leopardus* (García-Perea 1994, Trigo et al. 2013). Recently, *Leopardus munoai* was recognized as a valid species, with a distribution mainly associated with the Pampa biome of southern Brazil, Uruguay, and adjacent regions (Nascimento et al. 2021). This taxonomic redefinition highlighted the need to reassess historical records and update the available information on its distribution.

In Uruguay, records of *L. munoai* have traditionally been scarce and fragmented, based primarily on old observations and indirect references (Ximénez 1975, González & Martínez-Lanfranco 2010). The absence of confirmed records for more than ten years generated uncertainty regarding its current presence in the country and hindered its inclusion in national conservation assessments (Soutullo et al. 2013).

In this context, the use of trail cameras, citizen science, and systematic road surveys has become established as complementary tools for detecting cryptic mammals, allowing an expansion of spatial and temporal survey coverage (O’Connell et al. 2011, Burton et al. 2015, Teixeira et al. 2013). Recent studies in Uruguay have demonstrated the value of these integrated approaches for improving knowledge on the distribution of medium- and large-sized mammals in productive landscapes (Turcatti Oviedo 2025a, Turcatti Oviedo et al. 2025b).

Here, we update the known distribution of the Pampas cat (*Leopardus munoai*) in Uruguay based on new confirmed records obtained between 2022 and 2025, and we discuss the implications of these findings for the species’ conservation.

2 MATERIALS AND METHODS

Study area

The study area encompassed the Uruguayan territory, with a particular focus on regions within the Pampa biome, where the Pampas cat (*Leopardus munoai*) is expected to occur. Uruguay is characterized by a predominance of open landscapes, including extensive natural grasslands, rangelands, and other open habitats, embedded within a heterogeneous productive matrix (Bilenca 2004, Modernel et al. 2016).

Within this national context, records were obtained mainly from northern and north-central Uruguay, encompassing multiple departments where suitable grassland habitats persist. These environments represent the southern portion of the Pampa biome and include a mosaic of natural and semi-natural open habitats that provide favorable conditions for grassland-associated mammal species.

This broad geographic approach allowed the integration of data collected across different regions of the country, facilitating an updated assessment of the current distribution of *L. munoai* in Uruguay and reducing potential spatial biases associated with localized or site-specific surveys.

Record collection

Records of *Leopardus munoai* were obtained between 2022 and 2025 within the framework of the Uruguay Small Wild Cat Program - Rock and Pampa, using an integrated approach that included:

Trail camera monitoring, using fixed stations installed along wildlife trails, edges of natural habitats, and areas showing signs of mammal activity, following standardized protocols (Tobler et al. 2008, O'Connell et al. 2011).

Citizen science, based on documented reports provided by rural residents and collaborators, validated through photographic evidence or other verifiable material.

Road surveys, consisting of systematic monitoring of wildlife roadkill (Teixeira et al. 2013, Santos et al. 2017).

Species identification

Identification of *L. munoai* was based on morphological characteristics visible in photographic records, including coat patterns, body proportions, and diagnostic traits described for the species (García-Perea 1994, Nascimento et al. 2021).

Data sensitivity and spatial resolution

Precise geographic coordinates of confirmed records are not disclosed in this study. This decision was taken deliberately due to ethical and conservation considerations. All records were obtained on private properties, and revealing exact locations could compromise landowner confidentiality.

Additionally, *Leopardus munoai* is a cryptic and poorly known species with low detectability and potential vulnerability to persecution or retaliation, particularly in productive landscapes where carnivores may be perceived as threats. The primary objective of this study is to contribute to the conservation of the species, and minimizing any risk of disturbance, persecution, or illegal actions against individuals or their habitats was considered paramount.

For these reasons, records are presented at the departmental scale, which is sufficient to update the known distribution of the species in Uruguay while ensuring the protection of both the

species and the private lands where detections occurred. This approach is consistent with ethical standards commonly applied in studies involving sensitive species and locations.

3 RESULTS

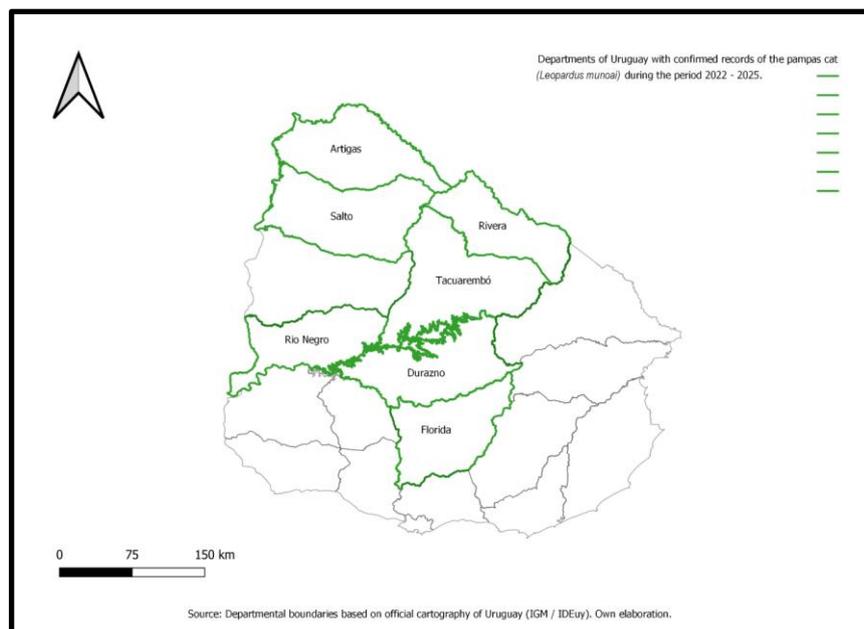
Multiple confirmed records of *Leopardus munoai* were obtained between 2022 and 2025, representing the first systematic evidence of the species in Uruguay in more than a decade. Records were obtained through an integrated approach that included trail camera monitoring, validated citizen science reports, and road surveys.

Records were distributed across seven departments of the country, mainly in northern and north-central Uruguay (Table 1, Figure 1). Most detections occurred in natural grassland environments, both in areas with low levels of human intervention and in productive landscapes dominated by open habitats. In several sites, *L. munoai* was recorded in sympatry with other small wild cats of the genus *Leopardus*, such as *L. geoffroyi* and *L. wiedii*, a pattern previously documented for the region (Di Bitetti et al. 2010, Nascimento et al. 2021).

Considering the total number of records (n = 11), citizen science accounted for 63.6% of all confirmed records, while trail camera records and road surveys each contributed 18.2% of the records. These percentages reflect the relative contribution of each methodology to species detection at the departmental scale, considering each method–department occurrence as a unit of record.

These records allowed an update of the known distribution of the species in Uruguay, confirming its presence in regions previously lacking recent records.

Figure 1. Departments of Uruguay with confirmed records of the Pampas cat (*Leopardus munoai*) during the period 2022–2025.



Source: Prepared by the authors (2026).

Table 1. Confirmed records of the Pampas cat (*Leopardus munoai*) in Uruguay by department and recording method (2022–2025). CC = Citizen science, RS = Road survey, TC = Trail camera.

Department	Recording methods
Artigas, Rivera	CC, RS, TC
Durazno, Florida, Río Negro, Salto, Tacuarembó	CC

Source: Prepared by the authors (2026).

4 DISCUSSION

The new records presented here provide robust and updated evidence confirming the current persistence of the Pampas cat (*Leopardus munoai*) in Uruguay after more than a decade without systematic confirmations. The detection of the species across seven departments offers the first empirical basis for evaluating its conservation status at the national scale. Taken together, these findings indicate that persistently low detection rates, despite extensive survey effort, reflect a very small population size and support a classification of the species as Critically Endangered at the national level. The decision to withhold precise locality data reflects a precautionary approach that prioritizes species protection and landowner confidentiality over spatial precision.

The association of *L. munoai* with natural grassland environments embedded within productive landscapes is consistent with patterns reported across the broader Pampa biome. Records obtained both in areas with comparatively low human intervention and in modified open landscapes suggest some ecological tolerance to land-use mosaics, however, the repeated linkage to grassland structure indicates that the availability and quality of native grasslands likely remain important for the species. This reinforces the ecological relevance of conserving native grassland remnants within agricultural matrices, particularly for grassland-associated carnivores.

The frequent detection of *L. munoai* in sympatry with other small wild cats such as *L. geoffroyi* and *L. wiedii* is consistent with the coexistence documented for *Leopardus* assemblages in southern South America. Such coexistence may be facilitated by niche segregation across spatial, temporal, and trophic axes, but the specific mechanisms remain poorly documented for *L. munoai* in Uruguay. Future studies that combine trail camera datasets with complementary ecological approaches would help clarify interspecific interactions and improve understanding of community-level dynamics in open landscapes.

From a methodological perspective, this study underscores the value of integrating complementary detection approaches when surveying cryptic and low-density carnivores at broad spatial scales. Citizen science accounted for the majority of confirmed records (63.6%), highlighting the contribution of local participation for detecting elusive species across extensive areas. Trail cameras and road surveys each contributed 18.2% of the records, providing independent and verifiable evidence that improved spatial coverage and strengthened record validation. In open and

heterogeneous environments such as the Uruguayan Pampa, this multi-source design reduces reliance on any single method and offers a more resilient framework for updating distributional knowledge.

Overall, the updated distribution presented here offers a stronger empirical baseline for subsequent assessments of *L. munoai* in Uruguay. The confirmation of records across multiple regions highlights a broader spatial occurrence than previously documented and emphasizes the importance of continued monitoring in productive grassland landscapes to refine distributional limits and support future ecological analyses.

5 CONCLUSION

This study provides a robust assessment of the current occurrence and conservation status of the Pampas cat (*Leopardus munoai*) in Uruguay based on confirmed records collected between 2022 and 2025. Although the species is confirmed to persist across multiple regions of the country, consistently low detection rates observed despite extensive and complementary survey effort reflect very small population sizes and support a classification of the species as Critically Endangered at the national level, providing an essential empirical basis for conservation assessments and decision-making in open ecosystems.

The results are relevant to society because they highlight the conservation importance of natural grasslands within working landscapes and demonstrate that meaningful biodiversity information can be generated through collaboration with rural communities and landowners. In practical terms, this reinforces the role of participatory monitoring as a tool for coexistence and conservation in human-dominated environments.

From an academic perspective, this work demonstrates that combining complementary methodologies can generate robust distributional evidence for cryptic and low-density species at broad spatial scales. The integrated framework applied here is transferable to other elusive mammals and comparable grassland-dominated systems where detectability represents a major limitation.

Some limitations should be acknowledged. The number of confirmed records is limited, and spatial resolution was intentionally coarse to ensure ethical standards, species protection and data sensitivity. These constraints limit fine-scale analyses but do not affect the main objective of updating the species' distribution at the national level.

Future research should prioritize standardized long-term monitoring, expand geographic coverage, and incorporate ecological, behavioral, and molecular approaches to improve understanding of habitat use, activity patterns, and ecological interactions of *L. munoai*. Such efforts

will be critical to support evidence-based conservation planning and to refine monitoring and management priorities in the Uruguayan Pampa.

REFERENCES

- Bilenca, D. (2004). Identificación de áreas valiosas de pastizal en las pampas y campos de Argentina, Uruguay y sur de Brasil (AVPs). Fundación Vida Silvestre Argentina.
- Burton, A. C., Neilson, E., Moreira, D., Ladle, A., Steenweg, R., Fisher, J. T., & Boutin, S. (2015). Wildlife camera trapping: A review and recommendations for linking surveys to ecological processes. *Journal of Applied Ecology*, 52(3), 675–685.
- Di Bitetti, M. S., De Angelo, C. D., Di Blanco, Y. E., & Paviolo, A. (2010). Niche partitioning and species coexistence in a Neotropical felid assemblage. *Acta Oecologica*, 36(4), 403–412.
- García-Perea, R. (1994). The Pampas cat group (genus *Lynchailurus* Severtzov, 1858) (Carnivora, Felidae): A systematic and biogeographic review. *American Museum Novitates*, 3096, 1–36.
- González, E. M., & Martínez-Lanfranco, J. A. (2010). Mamíferos de Uruguay: Guía de campo e introducción a su estudio y conservación. Museo Nacional de Historia Natural, Vida Silvestre Uruguay, Ediciones de la Banda Oriental.
- Modernel, P., Rossing, W. A. H., Corbeels, M., Dogliotti, S., Picasso, V., & Tiftonell, P. (2016). Land use change and ecosystem service provision in Pampas and Campos grasslands of southern South America.
- Nascimento, F. O. D., Cheng, J., & Feijó, A. (2021). Taxonomic revision of the pampas cat *Leopardus colocola* complex (Carnivora: Felidae): An integrative approach. *Zoological Journal of the Linnean Society*, 191(2), 575–611.
- O'Connell, A. F., Nichols, J. D., & Karanth, K. U. (2011). *Camera traps in animal ecology: Methods and analyses*. Springer.
- Santos, R. A. L., Ascensão, F., Ribeiro, M. L., Bager, A., Santos-Reis, M., & Aguiar, L. M. (2017). Assessing the consistency of hotspot and hot-moment patterns of wildlife road mortality over time. *Perspectives in Ecology and Conservation*, 15(1), 56–60.
- Soutullo, Á., Clavijo, C., & Martínez-Lanfranco, J. A. (Eds.). (2013). *Especies prioritarias para la conservación en Uruguay: Vertebrados, moluscos continentales y plantas vasculares*. Sistema Nacional de Áreas Protegidas, Dirección Nacional de Medio Ambiente, Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente, Dirección de Ciencia y Tecnología, Ministerio de Educación y Cultura.
- Teixeira, F. Z., Coelho, I. P., Esperandio, I. B., Oliveira, N. R., Peter, F. P., Dornelles, S. S., & Kindel, A. (2013). Are road-kill hotspots coincident among different vertebrate groups? *Oecologia Australis*, 17(1), 36–47.
- Tobler, M. W., Carrillo-Percegui, S. E., Leite Pitman, R., Mares, R., & Powell, G. (2008). An evaluation of camera traps for inventorying large- and medium-sized terrestrial rainforest mammals. *Animal Conservation*, 11(3), 169–178.
- Turcatti Oviedo, S. 2025a. Terrestrial mammal community of the protected landscape Valle del Lunarejo: a camera trap-based study. *Brazilian Journal of Animal and Environmental Research*, 8(1), e78107 . <https://doi.org/10.34188/bjaerv8n1-114>

Turcatti Oviedo, S., Quintana, I. M. H., & Damboriarena, F. A. R. (2025). Small wild cats in the uruguayan pampa biome: records from Valle del Lunarejo. *Brazilian Journal of Animal and Environmental Research*, 8(3), e81742. <https://doi.org/10.34188/bjaerv8n3-058>

Ximénez, A. (1975). Notas sobre mamíferos del Uruguay. *Comunicaciones Zoológicas del Museo Nacional de Historia Natural de Montevideo*. Retrieved from <https://www.mnhn.gub.uy/innovaportal/v/12406/12/mecweb/comunicaciones-zoologicas?3colid=3092&breadid=3092>.