

New records of the kodkod (*Leopardus guigna tigrillo*) and the Pampas cat (*Leopardus colocola*) in Valparaíso region, Chile

Nuevos registros de la güiña (*Leopardus guigna tigrillo*) y el gato colocolo (*Leopardus colocola*) en la región de Valparaíso, Chile

BYRON CRISTIAN GUZMÁN MARÍN^{1*}, JULIO C. HERNÁNDEZ-HERNÁNDEZ¹, AND NATIVIDAD OLMOS DE AGUILERA-DÍAZ¹

¹Fundación Coordinación de Felinos Silvestres. General Bustamante 1015. Ñuñoa, Región Metropolitana, Chile. E-mail: b.guzman.marin@outlook.com (BCGM); biol.julio@gmail.com (JCH-H); natividadoda@gmail.com (NOdeA-D).

*Corresponding author

The kodkod, *Leopardus guigna tigrillo* and the Pampas cat, *Leopardus colocola* are two of the most elusive and cryptic species of wild cats in the Neotropical region. The few existing studies for both species suggested that their distribution is restricted almost entirely to large areas of native forest. Both species are classified within some category of extinction risk. As part of the citizen science projects, new records were obtained from the kodkod and the pampas cat in the central zone of Chile. In addition, to corroborate these records, previous records of both species were consulted in the available literature and databases. The site where the kodkod was sighted is an urban and beach area, with small strips of scrub, secondary native forest and forest plantations. The records of the Pampas cat were presented on roads, putting his integrity at risk. The records of both species were presented in sites with threats, where it is possible that due to the fragmentation of their habitats, they are forced to move to look for food resources where they did not before. Likewise, we highlight the importance of the vegetation fragments as biological corridors for these and other species that require large areas of continuous habitat, which is why it is necessary to prioritize the conservation of these sites in the region. It is essential to carry out more research in the region to know both species threats and population density.

Key words: Activity; Felidae; habitat quality; human landscape perturbation.

La güiña, *Leopardus guigna tigrillo* y el gato colocolo, *Leopardus colocola* son dos de las especies de felinos silvestres más escurridizas y crípticas de la región Neotropical. Los pocos estudios existentes para ambas especies sugieren que su distribución está restringida casi en su totalidad a grandes extensiones de bosque nativo. A ambas especies se les cataloga dentro de alguna categoría de riesgo de extinción. Como parte de los proyectos de ciencia ciudadana se obtuvieron nuevos registros de la güiña y del gato colocolo en la zona central de Chile. Además, para corroborar estos reportes se consultaron los registros previos de ambas especies en la literatura disponible y bases de datos. El sitio donde fue avistada la güiña es una zona urbana y de playa, con pequeñas franjas de matorral, bosque nativo secundario y plantaciones forestales. Los registros del gato colocolo se presentaron en carreteras, poniendo en riesgo su integridad. Los registros de ambas especies se presentaron en sitios con ciertas amenazas, en donde es posible que debido a la fragmentación de sus hábitats se vean obligados a desplazarse a buscar recursos alimenticios en donde antes no lo hacían. Asimismo, resaltamos la importancia de los fragmentos de vegetación como corredores biológicos para estas y otras especies en la región, que requieren de grandes áreas de hábitat continuo, por lo que es necesario priorizar la conservación de estos sitios en la región. Es indispensable realizar más investigaciones en la región con el fin de conocer las amenazas y la densidad poblacional de ambas especies.

Palabras clave: Actividad; calidad de hábitat; Felidae; perturbación del paisaje.

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In Chile there are two genera of wild felids, distributed throughout the national territory ([Iriarte et al. 2013](#)). The genus *Leopardus* is the most diversified and includes 4 species (*L. colocola*, *L. geoffroyi*, *L. jacobita* and *L. guigna*; [Johnson et al. 2005](#); [Iriarte 2008](#)). The kodkod *L. guigna* (Molina 1782) and the Pampas cat *L. colocola* (Molina 1782) are among the least know felids in South America.

The kodkod has the smallest distribution of all South American wild cats, restricted to central and southern Chile and marginally in adjacent border areas of south-west Argentina, from sea level up to 2,500 m ([Lucherini et al. 2000](#); [Sanderson et al. 2002](#); [Napolitano et al. 2014](#)). Two subspecies are recognized based on morphological and genetic data, *L. guigna*

tigrillo, endemic to Chile, and *L. guigna guigna* ([Napolitano et al. 2012](#)). The Pampas cat has a wide geographical distribution in South America, ranging from Ecuador to the Argentinean Patagonia and from east to west from Brazil to Chile, from sea level up to 1,800 m ([Nowell and Jackson 1996](#)). Its taxonomy has been subject to conflicting classifications over the years. It has recently been proposed that *L. colocola* comprise 5 distinct species ([Do Nascimento et al. 2020](#)), which would place the records documented here as belonging to the species *L. colocola*, whose distribution covers central Chile, particularly in the western slope of the Andes. This classification has also been recognized in the updated list of living mammals of Chile ([D'Elía et al. 2020](#)).

Like most small cats, the kodkod and the Pampas cat are naturally cryptic species, rare and live in places where detection and tracking are difficult (Macdonald et al. 2010). The kodkod are closely associated with native Mediterranean forests and temperate rainforests, vegetation cover being a key ecological requirement for the species (Schüttler et al. 2017). The few studies published on the kodkod have suggested that the species is almost exclusively restricted to native *Nothofagus* forest (Acosta-Jamett and Simonetti 2004) and that it has been negatively affected by conversion of this forest to exotic pine plantations (Acosta-Jamett et al. 2003; Acosta-Jamett and Simonetti 2004). Regarding the Pampas cat, their preferred environment is open grassland and humid forest, but they are equally comfortable in the mountainous Andes (García-Perea 1994; Parera 2002; Iriarte 2008).

Currently, the kodkod is categorized as vulnerable by the International Union for Conservation of Nature (IUCN), due to its restricted distribution and ecological requirements that make it especially fragile in the face of growing habitat loss and fragmentation (Napolitano et al. 2015). On the other hand, the Pampas cat is considered near threatened as habitat conversion and destruction may cause the population to decline in the future (Lucherini et al. 2016).

Here, we present the first confirmed records of the Pampas cat and the second of the kodkod in the Puchuncaví commune, in the region of Valparaíso, Chile, which increases knowledge of their presence and distribution in the country.

As part of the citizen science projects "Yo cuido al gato güiña" and "Proyecto *Leopardus colocola*", we report a new record of the kodkod (*L. guigna tigrillo*) and two of the Pampas cat (*L. colocola*) in the Puchuncaví commune, Valparaíso province, Chile. The records were sent to the Foundation email address by citizens interested in sharing their records through both projects. In addition, to corroborate previous records of both species in the region, we consulted the available published literature and databases of the Global Biodiversity Information Facility (<https://www.gbif.org>), corresponding to available records dating from 1922 - 2021 (Figure 1). It is important to point out that the Valparaíso region is characterized by ecosystems that maintain a high level of biodiversity and endemism, which has led the region to be classified as a biodiversity hotspot (Arroyo et al. 1999; Myers et al. 2000).

The record of the kodkod was obtained on August 30, 2019 at 14:23 hr (32° 39' 26.96" S, 71° 26' 36.01" W). The felid was recorded by a local citizen while walking on the rocks on the beach, which when he realized that he was recorded did not show any reaction, slowly entering between the rocks.

The kodkod was identified based on the common morphological characteristics of the species: the coat is buff or gray-brown coat and is heavily marked with rounded, blackish spots on both the upper and lower parts, the tail has blackish rings (Nowak 1999; Figure 2A). The vegetation

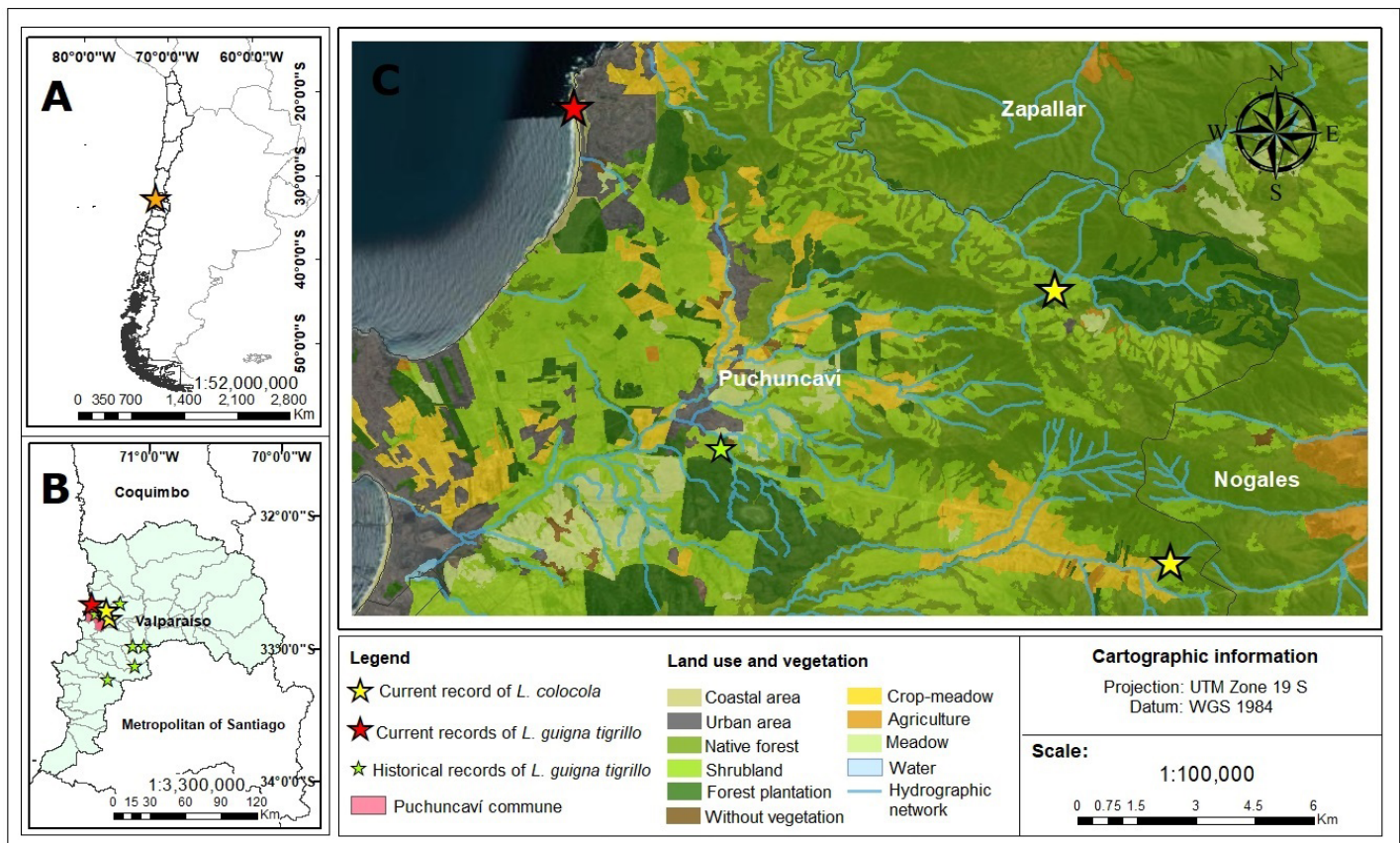


Figure 1. Geographic location of the records of *Leopardus guigna tigrillo* and *Leopardus colocola* in the Puchuncaví commune, Valparaíso region, Chile. A) Central Chile; B) historical records in the Valparaíso region.

of the site corresponds to coastal Mediterranean sclerophyllous forest composed of *Peumus boldus* and *Schinus latifolius*. However, the kodkod was sighted in an urban and beach area, with small strips of shrubland, secondary native forest and forest plantations, with a rocky-sandy substrate (Luebert and Plissock 2006).

The first record of the Pampas cat was obtained on August 15, 2019 at 7:45 hr (32° 45' 41.1" S, 71° 18' 25.5" W) on the F-20 Nogales-Puchuncaví route. The felid was photographed by a citizen who was on his way home with the help of his cell phone (Figure 2B). It should be noted that the felid was found lying by the side of the road and was not injured, although it is presumed that it could have been run over. Subsequently, the Agricultural and Livestock Service (SAG) was notified and went to the site to carry out the rescue; however, we were informed that he died two days later, with no further information on the felid. The surrounding vegetation of the recording site hosts a native forest with endemic species such as the northern tayú (*Archidasyphyllum excelsum*), northern acorn (*Beilschmiedia miersii*) and naranjillo (*Citronella mucronata*; Looser 1950; Armesto and Pickett 1985).

The second record was obtained on August 13, 2021 at 17:20 hr (32° 41' 56.50" S, 71° 20' 0.20" W). The felid was photographed by a citizen of the town of La Canela with the help of a camera when he was traveling in his vehicle on the F-126 route. The felid was moving along the road (Figure 2C), then moved towards the shore where it remained motionless among the vegetation (Figure 2D). Subsequently, he slowly retreated into the bushes.

The vegetation on the sighting site is open shrub-steppe landscape, associated with sclerophyllous shrubs such as litre (*Lithraea caustica*), molle (*Schinus latifolius*) and quillay (*Quillaja saponaria*; Flores et al. 2011). Both felids recorded had the common characteristics of the species: long hairs on the body, an erectile spinal crest slightly darker than ground colour, transverse dark stripes on the throat, markings on the flanks, legs with transverse dark stripes in the proximal portion, ears more pointed and tail relatively shorter than other South American felids (Eisenberg and Redford 1999; Sunquist and Sunquist 2002).

It has been mentioned that both the kodkod and the Pampas cat require an extensive home range, 2.5 - 2.88 km² and 11.5 - 55.3 km², respectively (Sunquist and Sunquist 2002; Iriarte and Jaksic 2012). In both species, their presence in different habitats has been related. In the case of the kodkod, its preference for native forests over exotic plantations has been demonstrated, indicating that this would be due to its predatory strategies and habitat use (Acosta-Jamett and Simonetti 2004). However, we document the first record of a kodkod on the beach, representing an unusual sighting of this species. It is possible that due to habitat fragmentation pressure, the kodkod is forced to look for food resources where it did not before. For example, in Guatemala, the first record of *Herpailurus*

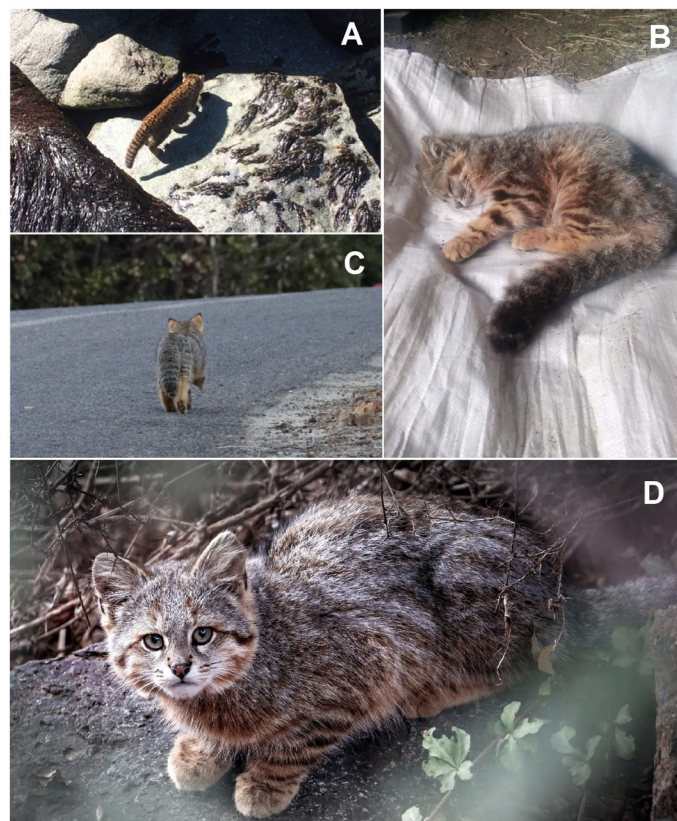


Figure 2. A) Record of the kodkod, *Leopardus guigna tigrillo*, on the southern beach of the town of Maitencillo; B) record of the Pampas cat, *Leopardus colocola*, on route F-20 Nogales-Puchuncaví; C) record of the Pampas cat, *L. colocola* moving along route F-126, north of the town La Canela; D) record of the Pampas cat, *Leopardus colocola* among the vegetation in the town La Canela.

yagouaroundi swimming was documented, attributed to foraging at the site of the record, which is particularly vulnerable due to its high rate of deforestation (Escobar-Anleu et al. 2020).

The current record of the kodkod is the second for the Puchuncaví commune, 10.5 km away in a straight line from the first record, which was obtained through camera-traps in Fundo El Pangué in 2017 (Quiroz et al. 2019; Figure 1). Regional findings of the kodkod are scarce, in addition, it presents empty areas in the north of its distribution (Acosta-Jammet et al. 2003), where it has been reported to inhabit isolated patches of vegetation (Quiroz et al. 2019), although it is not uncommon to observe it in meadows and near human settlements (Silva-Rodríguez et al. 2007), such as the present record.

The Pampas cat's presence has been documented in different habitats, such as forest plantations, vineyards, hydrophilic and deciduous forest, coastal desert and Andean steppe (Castro-Pastene et al. 2021). The present records are the first for the Puchuncaví commune, 17 km away in a straight line from the nearest record, obtained in 2020 by camera-trap on land belonging to the Pontificia Universidad Católica de Valparaíso, La Palma sector, Quillota commune (PUCV 2020).

It is worth noting that we reported an injured Pampas cat on the side of the road and another moving on the road,

a situation that has led to the trampling of this and other species on the roads of Chile and that has been reported in various electronic media, where the most shared species and with the highest number of comments are the Pampas cat and the kodkod (Araya *et al.* 2021). In addition to habitat loss and degradation, there are a series of threats that affect the kodkod and the Pampas cat at the records sites, such as the introduction of domestic species, which can be reservoirs of vectors or disease-causing agents, as well as competition and attacks on both felids (Silva-Rodríguez *et al.* 2007; Napolitano *et al.* 2020). Likewise, both species are considered harmful for some people because they sometimes feed on poultry, which causes people to reject these felids (Sanderson *et al.* 2002; Espinosa *et al.* 2014).

However, it has also been mentioned that both species can adapt to fragmented landscapes dominated by humans, using small forest fragments and vegetation corridors within the agricultural matrix to move through the landscape (Gálvez *et al.* 2013). More information is needed to understand whether the records of both felids in disturbed areas are associated with movements between patches of native vegetation or regular use.

In conclusion, it is essential to have updated information on these species distribution to develop a conservation plan. It is also essential to carry out more research in the region in order to know the threats and their population density, so that they can form the basis for implementing monitoring and conservation strategies.

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