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Reptiles of the Auca Mahuida natural protected area, Argentina

María Victoria BRIZIO[1,3,4,*], Ignacio MINOLI[2], Daniel Roberto PÉREZ[1] & Luciano Javier AVILA[3]

[1]Universidad Nacional del Comahue, Facultad de Ciencias del Ambiente y la Salud, LARREA (Laboratorio de Rehabilitación y Restauración de Ecosistemas Áridos y semiáridos), Buenos Aires 1400, 8300, Neuquén, Neuquén, Argentina. [2]Instituto de Biología Subtropical. Universidad Nacional de Misiones – CONICET, Bertoni 85, 3370, Puerto Iguazú, Misiones, Argentina. [3]Instituto Patagónico para el Estudio de los Ecosistemas Continentales (IPEEC-CONICET), Boulevard Almirante G. Brown 2915, 9120, Puerto Madryn, Chubut, Argentina. [4]Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Godoy Cruz 2290, 1425, Buenos Aires, Buenos Aires, Argentina. *Corresponding author: mvictoria.brizio@gmail.com

Abstract: Reptiles are among the most threatened vertebrates worldwide. Habitat loss and fragmentation, human overexploitation, introduced invasive species, emerging diseases, environmental pollution, and global warming severely increase the risk of extinction and population decline of this taxon. A key strategy for protecting reptiles' biodiversity has been the creation and maintenance of protected areas. The focus of this work is on the Auca Mahuida natural protected area (AM), located in northern Patagonia Argentina. Here, we provide a checklist of reptiles' species found along five years of field surveys made within the AM' current limits. The effectiveness of the sampling effort was estimated and extrapolated based on rarefaction curves shown as the sample completeness curve. We recorded within AM' boundaries a total of 16 species of reptiles, 14 species of lizards, and two species of snakes. In relation to the completeness of our sampling, AM was well-represented in our surveys (0.98 sample coverage). Regarding the results of this work, we can highlight the following reptile species as endemic to the region: *Liolaemus crandalli*, *L. cyaneinotatus*, *L. sitesi*, *Phymaturus sitesi*, and *P. timi*, indicating that the AM might indeed be isolated for many species, and that makes these environments vulnerable and vital for conservation.

Keywords: biogeographic island, conservation planning, endemic species, Patagonia, reptiles' inventory

Resumen: Reptiles del área natural protegida Auca Mahuida, Argentina. Los reptiles se encuentran entre los vertebrados más amenazados de todo el mundo. La pérdida y fragmentación del hábitat, la sobreexplotación humana, la introducción de especies invasoras, las enfermedades emergentes, la contaminación ambiental y el calentamiento global aumentan gravemente el riesgo de extinción y disminución de las poblaciones de este taxón. Una estrategia clave para proteger la biodiversidad de los reptiles ha sido la creación y mantenimiento de áreas protegidas. El foco de este trabajo es el área natural protegida Auca Mahuida (AM), ubicada en el norte de la Patagonia Argentina. Aquí, proporcionamos un inventario de las especies de reptiles encontradas a lo largo de cinco años de estudios de campo realizados dentro de los límites actuales de AM. La eficacia del esfuerzo de muestreo se estimó y extrapoló en función de las curvas de rarefacción que se muestran como la curva de completitud de la muestra. Registramos dentro de los límites de AM un total de 16 especies de reptiles, 14 especies de lagartijas y dos especies de serpientes. En relación a la completitud de nuestro muestreo, AM estuvo bien representado (cobertura de muestra de 0,98). En cuanto a los resultados de este trabajo, podemos destacar las siguientes especies de reptiles como endémicas de la región: *Liolaemus crandalli*, *L. cyaneinotatus*, *L. sitesi*, *Phymaturus sitesi* y *P. timi*, lo que indicaría que el AM podría estar aislado para muchas especies, y eso hace que estos ambientes sean vulnerables y vitales para la conservación.

Palabras claves: isla biogeográfica, planificación de la conservación, especies endémicas, Patagonia, inventario de reptiles

INTRODUCTION

Reptiles are among the most threatened vertebrates worldwide (Todd *et al.*, 2010; Whittaker *et al.*, 2013). Habitat loss and fragmentation, human overexploitation, introduced invasive species, emerging diseases, environmental pollution and global warming, severely increase the risk of extinction and population decline of this taxon (Böhm *et al.*, 2016; Bosch *et al.*, 2007; Sinervo *et al.*, 2010). Habitat loss and fragmentation is considered to be the leading cause of reptile declines (Gardner *et al.*, 2007).

A key strategy for protecting reptiles' biodiversity from declining has been the creation and maintenance of protected areas (Chape *et al.*, 2008; Ervin, 2003). Protected areas have long been regarded as an important tool for maintaining habitat integrity and species diversity (Brooks *et al.*, 2004; Butchart *et al.*, 2010; Rodrigues *et al.*, 2004), covering more than 14.9 % per cent of the planet's land surface (UNEP-WCMC *et al.*, 2018).

The success of protected areas has generally been evaluated using measures in terms of their species diversity, or coverage of endemic and threatened species (Rodrigues *et al.*, 2004), assuming that protected areas provide effective protection once established (Geldmann *et al.*, 2013). Unfortunately, this is not the case of the Auca Mahuida natural protected area.

Regarding the Auca Mahuida natural protected area (AM), we highlight that it is an area of great interest for conservation, because is one of the last ones in the country that hold a large number of guanacos (*Lama guanicoe* Müller, 1776), and harbor some very interesting plant endemisms (Martínez Carretero, 2004). Additionally, it was worldwide renowned several years ago when palaeontologists discovered a high number of dinosaur nests with embryos inside and outside the protected area (Chiappe & Coria, 2004). On the AM, the activities that produce the greatest habitat fragmentation and biodiversity loss are overgrazing and the activities related to oil and gas extraction-production. As a result of the land clearance originated for the exploration and exploitation of oil and gas, by the year 2003 the reserve was divided into 793 fragmented habitats with an area of 1.3 km^2 each (Fiori & Zalba, 2003).

Reptiles' inventories can provide material for analyses of biogeographic and phylogenetic patterns and thus provide essential data for decision-making regarding the prioritization of areas for biodiversity conservation (e.g., De Oliveira *et al.*, 2014; França & Venâncio, 2010). Here, we provide a checklist of reptiles' species found along five years of field surveys made within the AM' current limits.

MATERIALS AND METHODS

Study Area

The AM is located in the Neuquén Province (Argentina), between 37° 30' - 38 ° 10' south latitude and 68° 30' - 69 ° 15' west longitude covering 77,000 hectares. This is a Multiple Use Reserve with provincial jurisdiction. The AM is included in the Southern Volcanic Zone of the Andes (SVZ), with a total length of 1,421 km straight. Topographically, the altitudinal ranges vary from 223 m.a.s.l. until 2,258 m.a.s.l., being the highest peak the Auca Mahuida volcano (Martínez & Kutschker, 2011; Völker *et al.*, 2011; Fig. 1).

The Monte and Patagónica phytogeographical provinces converge on the AM, and combined with the changing altitude of the terrain and through a time scale, formed distinguishable sectors with a particular and characteristic biota. Therefore, the vegetation becomes typical of the southwestern region of the Monte in the lower slopes and of the Patagonian above 1,200 or 1,500 m.s.n.m. (Long, 2000; Oyarzabal *et al.*, 2018). Intense geological processes of the past, including glaciations and great volcanic activity, changed the relief within Patagonian phytogeographical province, thus originating the Payunia district with its own characteristics. These processes created particular ecological conditions that might explain the significant number of endemisms and supports the assessment to consider Payunia as a high valuable biogeographical and speciation area (Martínez Carretero, 2004; Oyarzabal *et al.*, 2018). Within the AM, the Patagonian phytogeographical province is represented only by the Payunia district.

In the protected area, the average annual rainfall is 140 - 60 mm (Martínez Carretero, 2004). The hydric deficit of this reserve is the highest of the region (600 mm), and the potential evapotranspiration values range from 700 to 750 mm. The winds are intense and can reach speeds of 80 km/h (Morello *et al.*, 2012).

To compose the list of reptiles' species in the region, we used data from expeditions conducted from 2007 to 2011 and from the material deposited in the herpetological collection LJAMM-CNP of the Instituto Patagónico para el Estudio de los Ecosistemas Continentales (IPEEC-CONICET).

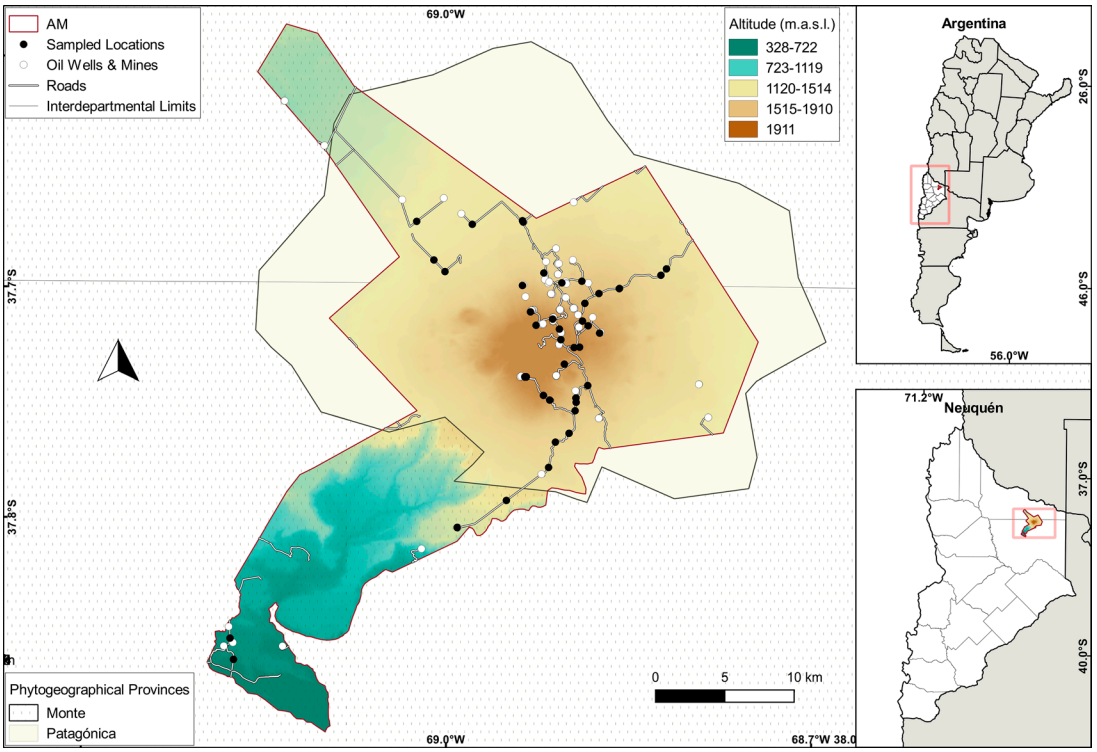

Fig. 1. Auca Mahuida natural protected area in Neuquén Province, Argentina. Black dots represent the location sampled for reptiles and white dots represent oil wells and mines.

Data collection

We conducted 10 expeditions in spring and summer seasons, comprised in 18 days of field work for the following years: 2007 (February 21th), 2008 (March 7th and 28th; September 26th), 2009 (January 23th; November 14th and 15th; December 4th), 2010 (November 9th to 11th; December 14th and 16th), and 2011 (March 5th and 6th; November 25th to 27th). To conduct field explorations, we selected spatial sampling points at different altitudes, according to the access possibilities by roads. At each sampling point, a two-person team did transects runs along representative habitats (each one between 1 to 3 km, usually between 8:30 to 20:00 hs, with a combination of visual encounter surveys, road raiding and active search methodology depending on type of habitat, season and climatic conditions), representing at least 220 field hours/person. We selected 42 locations within the AM. We photographed wild animals and for locality confirmation we used voucher specimens deposited in the LJAMM-CNP collection (Table 1). Also, we use information obtained from original description of endemic species and previous works in the AM.

The effectiveness of the sampling effort was *estimated* and extrapolated based on rarefaction curves shown as the sample completeness curve, using the R package "iNEXT". We also used the "iNEXT" package to calculate the effective number of rarefy species for richness (q=0), for Shannon diversity (q=1) and for Simpson diversity (q=2).

RESULTS

We recorded within AM' boundaries a total of 16 species of reptiles, 14 species of lizards: Leiosauridae (n=2 spp.), Liolaemidae (n=10 spp.), Phyllodactylidae (n=1 sp.), Teiidae (n=1 sp.), and two species of snakes: Dipsadidae (n=1 sp.) and Viperidae (n=1 sp.; Tab. 1, 2; Fig. 2).

Regarding the effectiveness of the sampling effort, the sample completeness curve was close to reach an asymptote (0.98 sample coverage; Fig. 3). The estimated richness showed the possible occurrence of 16.5 ± 1.02 species in the area (q=0), indicating that our sample effort was capable to detect at least 97 % of the species (n=16). In addition, Shannon (q=1) and Simpson (q=2) diversity index were 12.7 ± 1.01 and 10.6 ± 1.1 respectively.

Fig. 2. Species of reptiles from de Auca Mahuida natural protected area in Neuquén Province, Argentina. A, *Liolaemus austromendocinus*; B, *L. crandalli*; C, *L. cyaneinotatus*; D, *L. darwinii*; E, *L. gracilis*; F, *L. grosseorum*; G, *L. mapuche*; H, *L. sitesi*; I, *Diplolaemus sexcinctus*; J, *Leiosaurus bellii*; K, *Phymaturus timi*; L, *P. sitesi*; M, *Homonota darwini darwini*; N, *Aurivela longicauda*; O, *Philodryas trilineata*; P, *Bothrops ammodytoides*.

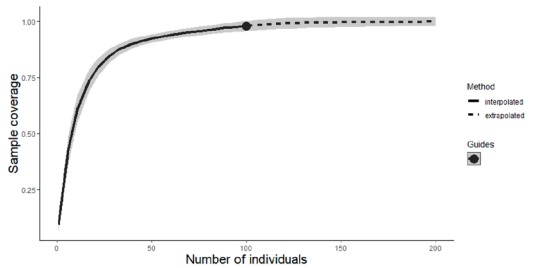

Fig. 3. Sample completeness curve based on number of individuals of the Auca Mahuida natural protected area. The interpolate curve is represented by a continuous line and the extrapolate curve is represented by a dotted line.

We could observe that the majority of the species fall under the category of Least Concern (IUCN red list) and Not Threatened (AHA) (Table 2). Only two species fall into the category of Vulnerable (AHA), *Phymaturus timi* Hibbard, Nenda & Lobo, 2019 and *P. sitesi* Avila, Pérez, Perez & Morando, 2011 (Tab. 1).

DISCUSSION

In relation to the completeness of our sampling, AM was well represented in our surveys. Inside the limits of the AM, the Payunia distric environments (withing the Patagonian phytogeographical province) are essential for the subsistence of many species, including the genus *Phymaturus*, declared vulnerable, and with two species cited for this work. Regarding the results of this work, we can highlight the following reptile species as endemic to the region: *Liolaemus crandalli* (Avila *et al.*, 2015), *L. cyaneinotatus* (Martinez *et al.*, 2011), *L. sitesi* (Avila *et al.*, 2013), *Phymaturus sitesi* (Avila *et al.*, 2011) and *P. timi* (Hibbard *et al.*, 2019), indicating that the AM might indeed be isolated for many species (Hibbard *et al.*, 2019) and that makes these environments vulnerable and vital for conservation.

Reviewing previous bibliography of the Monte province, additional species were absent in our sampling: *Amphisbaena angustifrons plumbea* Gray, 1872 (Montero, 2016), *Liolaemus cuyanus* Cei & Scolaro, 1980 (Medina *et al.*, 2012),

Table 1. Voucher specimens deposited in the LJAMM-CNP collection, each number is the collection number with geographic coordinates and elevation data.

N° LJAMM-CNP	Species	Altitude (m a.s.l.)	Latitude	Longitude
5703	*Liolaemus darwinii*	994	- 37°41'40,1"	- 69°07'20"
7795	*Liolaemus darwinii*	998	- 37°40'54,1"	- 69°06'55,8"
7801	*Liolaemus darwinii*	555	- 37°54'21,1"	- 69°10'24,6"
7802	*Liolaemus darwinii*	555	- 37°54'21,1"	- 69°10'24,6"
7803	*Liolaemus gracilis*	555	- 37°54'21,1"	- 69°10'24,6"
8233	*Philodryas trilineata*	922	- 37°45'36"	- 69°08'05"
8264	*Homonota darwinii*	1560	- 37°42'06,7"	- 68°51'28,8"
10349	*Liolaemus austromendocinus*	1348	- 37°41'35,6"	- 68°49'26,9"
10358	*Liolaemus cyaneinotatus*	1348	- 37°41'35,6"	- 68°49'26,9"
10359	*Liolaemus austromendocinus*	1332	- 37°41'20,6"	- 68°49'10,6"
10367	*Phymaturus sitesi*	1757	- 37°43'23,3"	- 68°53'17,7"
10369	*Phymaturus timi*	1757	- 37°43'23,3"	- 68°53'17,7"
10370	*Liolaemus crandalli*	1757	- 37°43'23,3"	- 68°53'17,7"
10375	*Liolaemus cyaneinotatus*	1332	- 37°41'20,6"	- 68°49'10,6"
10389	*Liolaemus cyaneinotatus*	1757	- 37°43'23,3"	- 68°53'17,7"
10460	*Phymaturus timi*	1841	- 37°44'07,0"	- 68°54'21,3"
10464	*Phymaturus sitesi*	1841	- 37°44'07,0"	- 68°54'21,3"
10470	*Liolaemus crandalli*	1841	- 37°44'07,0"	- 68°54'21,3"
10473	*Liolaemus cyaneinotatus*	1841	- 37°44'07,0"	- 68°54'21,3"
10474	*Homonota darwinii*	1841	- 37°44'07,0"	- 68°54'21,3"
10551	*Liolaemus cyaneinotatus*	1983	- 37°43'33,3"	- 68°55'34,5"
10553	*Liolaemus crandalli*	1757	- 37°43'23,3"	- 68°53'17,7"
10557	*Phymaturus timi*	1757	- 37°43'23,3"	- 68°53'17,7"
10559	*Phymaturus timi*	1983	- 37°43'33,3"	- 68°55'34,5"
10561	*Phymaturus sitesi*	1983	- 37°43'33,3"	- 68°55'34,5"
10562	*Liolaemus austromendocinus*	1332	- 37°41'20,6"	- 68°49'10,6"
10565	*Homonota darwinii*	1332	- 37°41'20,6"	- 68°49'10,6"
10566	*Liolaemus sitesi*	1332	- 37°41'20,6"	- 68°49'10,6"
10567	*Homonota darwinii*	1332	- 37°41'20,6"	- 68°49'10,6"
11021	*Liolaemus sitesi*	1533	- 37°42'07,2"	- 68°51'29,5"
11675	*Phymaturus timi*	1596	- 37°42'18,7"	- 68°52'29,3"
12157	*Phymaturus sitesi*	1560	- 37°42'06,7"	- 68°51'28,8"
12158	*Liolaemus crandalli*	1560	- 37°42'06,7"	- 68°51'28,8"
12189	*Phymaturus sitesi*	1560	- 37°42'06,7"	- 68°51'28,8"
12191	*Homonota darwinii*	1560	- 37°42'06,7"	- 68°51'28,8"
12212	*Liolaemus sitesi*	1560	- 37°42'06,7"	- 68°51'28,8"
12215	*Phymaturus timi*	1560	- 37°42'06,7"	- 68°51'28,8"
12218	*Liolaemus crandalli*	1560	- 37°42'06,7"	- 68°51'28,8"
12227	*Liolaemus cyaneinotatus*	1560	- 37°42'06,7"	- 68°51'28,8"
12295	*Liolaemus crandalli*	1851	- 37°43'01,9"	- 68°55'50,9"
12297	*Phymaturus sitesi*	1851	- 37°43'01,9"	- 68°55'50,9"
12299	*Liolaemus crandalli*	1873	- 37°43'18,8"	- 68°54'45,5"
12300	*Liolaemus sitesi*	1873	- 37°43'18,8"	- 68°54'45,5"
12302	*Liolaemus crandalli*	1935	- 37°44'25,5"	- 68°53'42,4"
12303	*Liolaemus crandalli*	1935	- 37°44'25,5"	- 68°53'42,4"
12304	*Liolaemus crandalli*	1935	- 37°44'25,5"	- 68°53'42,4"
12305	*Liolaemus sitesi*	1935	- 37°44'25,5"	- 68°53'42,4"
12307	*Liolaemus cyaneinotatus*	1935	- 37°44'25,5"	- 68°53'42,4"
12308	*Phymaturus timi*	1935	- 37°46'33,2"	- 68°53'36,1"
12311	*Phymaturus sitesi*	1935	- 37°46'33,2"	- 68°53'36,1"
12313	*Liolaemus cyaneinotatus*	1935	- 37°46'33,2"	- 68°53'36,1"
12314	*Liolaemus darwinii*	1209	- 37°40'09,8"	- 68°47'49,4"
12315	*Liolaemus darwinii*	1209	- 37°40'09,8"	- 68°47'49,4"
12316	*Liolaemus darwinii*	1209	- 37°40'09,8"	- 68°47'49,4"
12317	*Liolaemus darwinii*	1209	- 37°40'09,8"	- 68°47'49,4"
12318	*Liolaemus darwinii*	1209	- 37°40'09,8"	- 68°47'49,4"
12319	*Liolaemus cyaneinotatus*	1209	- 37°40'09,8"	- 68°47'49,4"
12320	*Liolaemus cyaneinotatus*	1209	- 37°40'09,8"	- 68°47'49,4"
12321	*Liolaemus cyaneinotatus*	1209	- 37°40'09,8"	- 68°47'49,4"

12328	*Liolaemus sitesi*	1560	- 37°42’06,7”	- 68°51’28,8”
12431	*Liolaemus austromendocinus*	330	- 37°56’35”	- 69°10’27,8”
13376	*Liolaemus austromendocinus*	1486	- 37°47’45,8”	- 68º53’56,9”
13378	*Liolaemus cyaneinotatus*	1486	- 37°47’45,8”	- 68°53’56,9”
13382	*Liolaemus sitesi*	1486	- 37°47’45,8”	- 68º53’56,9”
13383	*Liolaemus cyaneinotatus*	1777	- 37°46’28”	- 68°54’54”
13386	*Liolaemus elongatus*	1958	- 37°45’34,1”	- 68°56’07,4”
13388	*Liolaemus elongatus*	1587	- 37°46’23,1”	- 68º53’36,8”
13390	*Phymaturus timi*	1587	- 37°46’23,1”	- 68º53’36,8”
13397	*Liolaemus austromendocinus*	1479	- 37°41’30,6”	- 68°55’11,6”
13399	*Liolaemus cyaneinotatus*	1479	- 37°41’30,6”	- 68°55’11,6”
13401	*Liolaemus crandalli*	1659	- 37°42’41,8”	- 68°53’10,7”
13402	*Phymaturus sitesi*	1659	- 37°42’41,8”	- 68°53’10,7”
13403	*Diplolaemus sexcinctus*	1784	- 37°43’34,3”	- 68°53’01”
13404	*Liolaemus crandalli*	1781	- 37°43’51,6”	- 68°52’27,2”
13405	*Diplolaemus sexcinctus*	1781	- 37°43’51,6”	- 68°52’27,2”
13406	*Liolaemus darwinii*	1043	- 37°51’26,6”	- 68°59’26,8”
13408	*Liolaemus cyaneinotatus*	1252	- 37°39’32”	- 68°56’12,5”
13409	*Liolaemus darwinii*	1252	- 37°39’32”	- 68°56’12,5”
13411	*Liolaemus mapuche*	1252	- 37°39’32”	- 68°56’12,5”
13416	*Aurivela longicauda*	1228	-37°39’37,3”	- 68°58’42,4”
13417	*Liolaemus gracilis*	1228	- 37°39’37,3”	- 68°58’42,4”
13418	*Liolaemus grosseorum*	1228	- 37°39’37,3”	- 68°58’42,4”
13419	*Liolaemus darwinii*	1228	- 37°39’37,3”	- 68°58’42,4”
13423	*Bothrops ammodytoides*	1139	- 37°39’30,4”	- 69°01’26,1”
13428	*Liolaemus darwinii*	970	- 37°38’27,7”	- 69°06’34,8”
13970	*Philodryas trilineata*	922	- 37°45’36,6”	- 69°08’05,1”
13974	*Liolaemus austromendocinus*	1560	- 37°42’06,7”	- 68°51’28,8”
13976	*Liolaemus crandalli*	1560	- 37°42’06,7”	- 68°51’28,8”
13977	*Bothrops ammodytoides*	1560	- 37°42’06,7”	- 68°51’28,8”
14220	*Philodryas trilineata*	406	- 37°55’45,1”	- 69º10’37,9”
14229	*Diplolaemus sexcinctus*	1791	- 37°44’24,6”	- 68°53’26,2”
14231	*Liolaemus austromendocinus*	1432	- 37°48’06,6”	- 68°54’37,1”
14234	*Liolaemus sitesi*	1366	- 37°49’06”	- 68º54’57,2”
14235	*Liolaemus cyaneinotatus*	1366	- 37°49’06”	- 68º54’57,2”
14236	*Liolaemus sitesi*	1366	- 37°49’06”	- 68°54’57,2”
14237	*Liolaemus darwinii*	1177	- 37°50’23,4”	- 68º57’01,6”
14238	*Liolaemus crandalli*	1557	- 37°46’53”	- 68°53’39,1”
14241	*Liolaemus sitesi*	1843	- 37°45’04,4”	- 68º54’10,9”
14242	*Liolaemus crandalli*	1843	- 37°45’04,4”	- 68°54’10,9”
14246	*Liolaemus gracilis*	1157	- 37°37’47,4”	- 68°53’33,1”
14247	*Liolaemus darwinii*	1157	- 37°37’47,4”	- 68°53’33,1”
14345	*Homonota darwinii*	1087	- 37°47’59,8”	- 68º46’06,9”
14556	*Liolaemus darwinii*	1192	- 37°39’41,7”	- 68°48’14,5”
14565	*Liolaemus crandalli*	1954	- 37°45’34,1”	- 68°56’03,2”
14567	*Diplolaemus sexcinctus*	1954	- 37°45’34,1”	- 68º56’03,2”
14568	*Homonota darwinii*	1864	- 37°46’17,0”	- 68°55’12,6”
14569	*Diplolaemus sexcinctus*	1669	- 37°45’53,8”	- 68º53’02,0”
14570	*Liolaemus austromendocinus*	1550	- 37°41’53,7”	- 68°54’18,6”
14573	*Liolaemus sitesi*	1610	- 37°42’00”	- 68°56’14,7”
14575	*Liolaemus austromendocinus*	1610	- 37°42’00”	- 68°56’14,7”
14578	*Liolaemus mapuche*	1262	- 37°39’28,8”	- 68°56’14,7”
14579	*Liolaemus gracilis*	1262	- 37°39’28,8”	- 68°56’14,7”
14580	*Liolaemus cyaneinotatus*	1576	- 37°41’49,9”	- 68°53’19,7”
14581	*Liolaemus sitesi*	1576	- 37°41’49,9”	- 68°53’19,7”
14582	*Liolaemus crandalli*	1576	- 37°41’49,9”	- 68°53’19,7”
14583	*Diplolaemus sexcinctus*	1932	- 37°43’42,2”	- 68°54’25,7”
14584	*Liolaemus gracilis*	1292	- 37°41’27,5”	- 69°00’02,8”
14586	*Aurivela longicauda*	1292	- 37°41’27,5”	- 69°00’02,8”
14587	*Homonota darwinii*	1292	- 37°41’27,5”	- 69°00’02,8”
14588	*Liolaemus grosseorum*	1292	- 37°41’27,5”	- 69°00’02,8”
14591	*Leiosaurus bellii*	1256	- 37°41’00,2”	- 69°00’35,4”

Table 2. Checklist of reptiles with their respective conservation status according to IUCN red list (International Union for Conservation of Nature, 2020): LC (Least Concern), ND (No Data), DD (Data Deficient) and to AHA (Asociación Herpetológica Argentina, 2012): NT (Not Threatened), VU (Vulnerable), ND (No data), IK (Insufficiently Known).

	UICN (2020)	**AHA (2012)**
Order Squamata		
Suborder Sauria		
Family Leiosauridae		
Diplolaemus sexcinctus Cei, Scolaro & Videla, 2003	LC	NT
Leiosaurus bellii Duméril & Bibron, 1837	LC	NT
Family Liolaemidae		
Liolaemus austromendocinus Cei, 1974	LC	NT
Liolaemus crandalli Avila, Medina, Perez, Sites & Morando, 2015	ND	ND
Liolaemus cyaneinotatus Martinez, Avila, Perez, Pérez, Sites & Morando, 2011	DD	IK
Liolaemus darwinii (Bell, 1843)	LC	NT
Liolaemus gracilis (Bell, 1843)	LC	NT
Liolaemus grosseorum Etheridge, 2001	LC	NT
Liolaemus mapuche Abdala, 2002	LC	NT
Liolaemus sitesi Avila, Olave, Perez, Pérez & Morando, 2013	LC	ND
Phymaturus timi Hibbard, Nando & Lobo, 2019	LC	VU
Phymaturus sitesi Avila, Pérez, Perez & Morando, 2011	LC	VU
Family Phyllodactylidae		
Homonota darwini darwini Boulenger, 1885	LC	NT
Family Teiidae		
Aurivela longicauda (Bell, 1843)	LC	NT
Suborder Serpentes		
Family Dipsadidae		
Philodryas trilineata (Burmeister, 1861)	LC	NT
Family Viperidae		
Bothrops ammodytoides Leybold, 1873	LC	NT

L. goetschi Muller & Hellmich, 1938 (Nori *et al.*, 2010), *Erythrolamprus sagittifer*, (Jan, 1863) (Cei, 1986), *Chelonoidis chilensis* (Gray, 1870) (Oriozabala *et al.*, 2017) and *Salvator rufescens* (Gunther, 1871) (Roig *et al.*, 2009). This may be due to the presence of a hard-to-reach canyon, with no available roads at the south-east portion of the AM, which comprises almost all of the Monte phytogeographical province. For these reasons, the sampled locations were mostly found in the Patagonian phytogeographical province.

Despite having worked with data whose field collections were carried out more than ten years ago, to date no new field works and conservation measures have been implemented in the protected area. On the contrary, the anthropic activities within them have been increasing along with the Argentina's oil drilling boom.

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ETHICAL STANDARDS

All collections were made within the framework of the collection permit n° 0155/11, granted by Dirección of Áreas Protegidas of Neuquén province. The specimens' collection was made under the Guidelines for use of live amphibians and reptiles in field and laboratory research, second edition, revised by the Herpetological Animal Care and Use Comitte (HACC) of the American Society of Ichthyologists and Herpetologists (2004) and the AVMA Guidelines for the Euthanasia of Animals: 2020 Edition. These guidelines follow by the Institutional Animal Care and Use Comitte (IACUC).

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