

Mammalia, Carnivora, Otariidae, *Arctocephalus galapagoensis* Heller, 1904: First continental record for Costa Rica

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ABSTRACT: This is the first record of *Arctocephalus galapagoensis* for the mainland coast of Costa Rica, which is outside the geographical distribution of this species about 1,300 km from its type locality. Changes in environmental conditions during El Niño events might be responsible for a higher incidence of these sightings. The presence of a moderate El Niño along the central and eastern equatorial Pacific Ocean during this month coincides with the occurrence of the fur seal in Costa Rican coasts. No photo record had ever been registered before for this country.

The genus *Arctocephalus* consists of eight species of fur seals (Berta 2009). The Galápagos fur seal, *Arctocephalus galapagoensis* Heller, 1904, is endemic to the Galápagos Islands and is distributed mainly on islands with rocky shores adjacent to intense upwelling areas (Reeves *et al.* 1992; Salazar 2002). These fur seals are the smallest and the least sexually dimorphic otariid species (Jefferson *et al.* 2008), and are well adapted to equatorial climatic conditions (Repenning *et al.* 1971; Trillmich 1984; Reeves *et al.* 1992).

The population of the Galapagos fur seal appears to be fluctuating and population size is decreasing markedly compared to the 1970's (Alava and Salazar 2006), and current abundance is estimated to be around 10,000-15,000 animals. Due to its limited distribution, fluctuating (unstable) population size, and marked decline in the last 30 years (greater than 50 %) the Galápagos fur seal should be classified as Endangered, based on the IUCN Red List categories (Aurióles and Trillmich 2008).

Its presence outside the Galapagos archipelago is known only from a few records of vagrant individuals that arrived on the coasts of South and Central America (Felix *et al.* 2007). Montoya (2008) suggested that *A. galapagoensis* may have visited a Costa Rican oceanic island, based on John Coulter's annotations from the 1800's. However, no photo record had ever been registered before for this country.

Here we report the first record of *A. galapagoensis* for the mainland coast of Costa Rica, which is outside the geographical distribution of this species about 1,300 km from its type locality (Figure 1). The individual had an underfur layer in its pelage, a short pointed snout and relatively small body size (details in next section).

The fur seal was observed on December 29, 2009 at Estero Guerra within the Sierpe River mouth (08°47'17" N, 83°36'59" W) (Figures 1 C-D). This is an estuarine area

with strong currents in the mouth of the river. Mangroves dominate the muddy-sandy habitat. The animal was a female, and it was not directly measured or weighed, however, it was handled in a box whose length, width and height were 100 cm, 65 cm and 35 cm, respectively. The fur seal was again seen during the same morning (at 10:00 h), close to a fresh water stream. The animal looked weak, passive and non-aggressive. The individual was rescued by MINAET (Ministry of Environment, Energy and Telecommunications) local personnel. No DNA sampling was conducted. People from MINAET adapted an area in the marine water, in which they put ice and live bait. The bait was ballyhoo and the individual ate it. In the next morning, December 30th, the animal was released near Punta Burica (8°2'38" N, 82°54'35" W).

There was a second sighting with photographic evidence of the same species six days before, on December 23th at Dominicalito Beach (09°13'36" N, 83°50'40" W). This is a beach with a rocky shore line, sandy gaps and waves battering the coast. A fur seal was seen during the morning sunbathing, sleeping, and avoiding capture (06:00 h) (Figures 1 A-B). This site had similar features of *A. galapagoensis* habitat.

Another possible sighting was made by fishermen on December 18th at Isla Caballo. This is a continental island, less than 5 km from the mainland and within the Gulf of Nicoya (09°58'56" N, 84°57'40" W). The island presents rocky and muddy shores within estuarine dynamics. The fur seal was seen by fishermen swimming near the island during the morning (08:00 h).

These three sightings were recorded within a period of 13 days along the Pacific Coast of Costa Rica, apparently heading south (Figure 2).

It has been previously confirmed that the Galapagos fur seals are capable of traveling far beyond the archipelago limits, reaching the Ecuador mainland and further north to



FIGURE 1. *Arctocephalus galapagoensis* in Costa Rica. A-B Dominicalito Beach, C-D Estero Guerra, where it was rescued (Photos by A: La Nacion, B: APSD, C-D: C. Mora).

Central American coasts (Félix *et al.* 2001, 2007). Changes in environmental conditions during El Niño events might be responsible for a higher incidence of these extra-limital sightings (Félix *et al.* 2001; 2007; Capella *et al.* 2002), where low prey availability acts as the ecological force driving such large-scale movements (Félix *et al.* 2001; 2007). According to NOAA (2010), positive anomalies of sea surface temperatures (SST) exceeding +2 °C were present along the central and eastern equatorial Pacific Ocean during 2009, confirming the presence of a moderate El Niño that lasted until the first trimester of 2010. This extreme warm event coincides with the occurrence of the fur seal in Costa Rican coast.

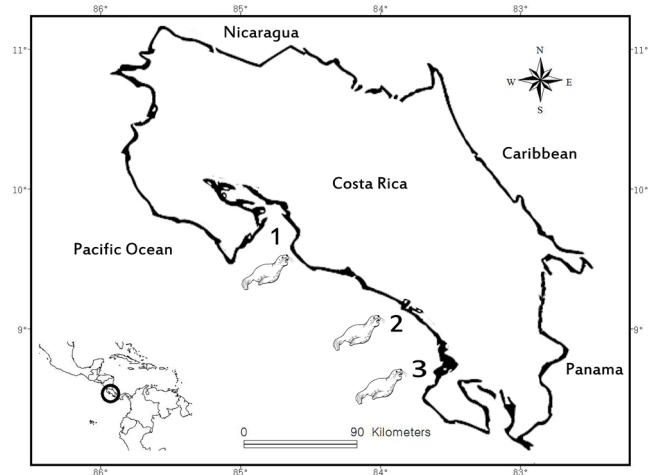


FIGURE 2. Map showing the coastal encounters with *A. galapagoensis* in the Pacific coast of Costa Rica, 2009. Fur seal sightings records: 1= Isla Caballo (09°58'56" N, 84°57'40" W), December 18th; 2 = Dominicalito Beach (09°13'36" N, 83°50'40" W), December 23rd; 3 = Estero Guerra (08°47'17" N, 83°36'59" W), December 29th.

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LITERATURE CITED

- Alava, J.J. and S. Salazar. 2006. Status and conservation of Otariids in Ecuador and the Galápagos Islands; p. 495-520 In A.W. Trites, S. K. Atkinson, D. P. DeMaster, L. W. Fritz, T. S. Gelatt, L. D. Rea and K. M. Wynne (ed.). *Sea Lions of the World*. Fairbanks: Alaska Sea Grant College Program.
- Aurioles, D. and F. Trillmich. 2008. *Arctocephalus galapagoensis*. In IUCN 2009. *IUCN Red List of Threatened Species. Version 2009.2*. Electronic Database accessible at <http://www.iucnredlist.org>. Captured on 05 January 2010.
- Berta, A. 2009. Pinnipedia, Overview; p. 878-885 In W.F. Perrin, B. Wursig and J.G.M. Thewissen (ed.). *Encyclopedia of Marine Mammals*. San Diego: Academic Press.
- Capella, J.J., L. Flórez-González, P. Falk-Fernández and D.M. Palacios. 2002. Regular appearance of otariid pinnipeds along the Colombian Pacific coast. *Aquatic Mammals* 28: 67-72.
- Félix, F., G. Lento, J. Davis, B. Haase and D. Chiliza. 2001. El lobo fino de Galápagos *Arctocephalus galapagoensis* (Pinnipedia, Otariidae) en la costa continental de Ecuador, primeros registros confirmados mediante análisis morfológicos y genéticos. *Estudios Oceanográficos* 20: 63-68.
- Félix, F., P. Jiménez, J. Falconi and O. Echeverri. 2007. New records and first birds of the Galápagos fur seal, *Arctocephalus galapagoensis* (Heller, 1904), from the mainland coast of Ecuador. *Revista de Biología Marina y Oceanografía* 42: 77-82.

- Heller, E. 1904. Mammals of the Galapagos Archipelago, exclusive of the Cetacea. *Proceedings of the Californian Academy of Science* 3(3): 233-250.
- Jefferson, T.A., M.A. Webber and R.L. Pitman. 2008. *Marine mammals of the world. A comprehensive guide to their identification*. San Diego: Elsevier. 573 p.
- Montoya, M. 2008. La presencia de otáridos (Carnivora: Otariidae) en la Isla del Coco, Costa Rica. *Revista de Biología Tropical* 56(2): 151-158.
- NOAA. 2010. *Climate Prediction Center. ENSO Alert System Status: El Niño Advisory. El Niño/Southern oscillation (ENSO) Diagnostic Discussion*. Electronic Database Accessible at http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.pdf. National Centers for Environmental Prediction NOAA/National Weather Service Camp Springs, Maryland, USA. Captured on 07 January 2010.
- Reeves, R.R., B.S. Stewart and S. Leatherwood. 1992. *The Sierra Club Handbook of Seals and Sirenians*. San Francisco: Sierra Club Books. 359 p.
- Repenning, C.A., S.R. Peterson and C.L. Hubbs. 1971. Contributions to the systematics of the southern fur seal, with particular reference to the Juan Fernandez and Guadalupe species. *Antarctic Research Series* 18: 1-34.
- Salazar, S. 2002. Lobo marino y lobo peletero; p. 267-290 In: E. Danulat and J.E. Graham (ed.). *Reserva Marina de Galápagos. Línea de Base de la Biodiversidad*. Ecuador: Parque Nacional Galápagos & Fundación Charles Darwin.
- Trillmich, F. 1984. Natural history of the Galapagos fur seal (*Arctocephalus galapagoensis* Heller); p. 212-223 In R. Perry (ed.). *Key Environments: Galapagos*. Oxford: Pergamon Press.

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