

## MORTALITY AND INJURIES OF OLOG'S GULL (*LARUS ATLANTICUS*) INDIVIDUALS ASSOCIATED WITH SPORT FISHING ACTIVITIES IN MAR CHIQUITA COASTAL LAGOON, BUENOS AIRES PROVINCE

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**ABSTRACT.**— The Olog's Gull (*Larus atlanticus*) is an endemic species of the Atlantic coasts of southern South America and is considered vulnerable to extinction. Olog's Gull individuals of different age classes die in Mar Chiquita coastal lagoon, Buenos Aires Province, while interacting with sport fisheries. Due to its restricted distributional range and their scarce populations, a slight increase in mortality rates may easily affect populations of this species by altering survival rates of all or particular age classes. The evaluation of this impact and the proposal of mitigation measures (also comprising an educational component) are essential for the conservation of this species in non-breeding grounds.

**KEY WORDS:** *conservation, Larus atlanticus, mortality, Olog's Gull, sport fishing activities.*

**RESUMEN.** MORTALIDAD Y HERIDAS DE INDIVIDUOS DE GAVIOTA CANGREJERA (*LARUS ATLANTICUS*) ASOCIADOS A ACTIVIDADES DE PESCA DEPORTIVA EN LA LAGUNA COSTERA DE MAR CHIQUITA, PROVINCIA DE BUENOS AIRES.— La Gaviota Cangrejera (*Larus atlanticus*) es una especie endémica de la costa atlántica del sur de América del Sur y posee un status de Vulnerable. En la laguna costera de Mar Chiquita, provincia de Buenos Aires, se hallaron individuos de diferentes clases de edades muertos a causa de la ingesta de artes de pesca deportiva. Debido al reducido número poblacional y de colonias reproductivas de la especie, pequeños incrementos de mortalidad por causas no naturales podrían tener efectos importantes sobre la tasa de supervivencia de una o todas las clases de edad. Es indispensable evaluar este impacto y proponer medidas de mitigación (incluyendo componentes educativos) para la conservación de esta especie en los sitios de invernada.

**PALABRAS CLAVE:** *conservación, Gaviota Cangrejera, Larus atlanticus, mortalidad, pesca deportiva.*

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The association of seabirds with fishing activities can induce changes in the species' foraging behaviour and produce chronic and long term negative effects, not only on the actual species interacting with fisheries, but also on others occurring in the vicinity through predator-prey relationships (Giaccardi and Yorio 2004, Yorio et al. 2005). Fishing activities also pose a short-term threat to seabirds due to the incidental mortality associated with this interaction. Seabirds die due to the consumption of fishing-related items (e.g., hooks, fishing lines), as well as entanglement and collisions with fishing gear and vessels (Croxall 1998, Tasker et al. 2000, González-Zeballos and Yorio 2006). Most gull species are

well known as generalist feeders, foraging in a wide range of habitats, using diverse feeding methods, and feeding on a great variety of prey (Burger 1988) including, in many cases, food derived from human activities (Götmark 1984, Silva Rodríguez et al. 2005).

The Olog's Gull (*Larus atlanticus*) is an endemic species of the Atlantic coasts of southern South America and is considered vulnerable to extinction by the International Union for the Conservation of Nature (IUCN). The species has an estimated population of 4000–5000 pairs breeding in 14 colonies in the Bahía Blanca estuary and Bahía Anegada, south Buenos Aires Province, and Bahía Melo and Caleta Malaspina, north of Golfo San

Jorge, Chubut Province (BirdLife International 2009). Given that part of the population migrates north to Uruguay and occasionally to southern Brazil during the non-breeding season (Burger and Gochfeld 1996, Pacheco 2009), this species has been included in Appendix I of the International Convention for Migratory Species.

The Olog's Gull has a specialized feeding habit, preying mainly on crabs (Copello and Favero 2001, Delhey et al. 2001, Berón 2003, 2009, Herrera et al. 2005). However, in non-breeding habitats along the shores of Northern Argentina, the species' trophic spectrum is composed, apart from two grapsid crabs, by other items taken in association with sea and land-based commercial fishing activities (Martínez et al. 2000, Berón 2009, JP Seco Pon, pers. com.). Moreover, in these habitats Olog's Gull has also been observed associated with sport-fishing activities making use of different by-products, including discarded bait, fish innards, small fish and other non target species (Martínez et al. 2000, Berón 2009). This association can be observed both in adult breeders and non-breeders (i.e., juvenile and subadult birds younger than four years old), but is most intense in one year old juvenile birds that often remain in winter quarters after adults migrate south towards breeding areas.

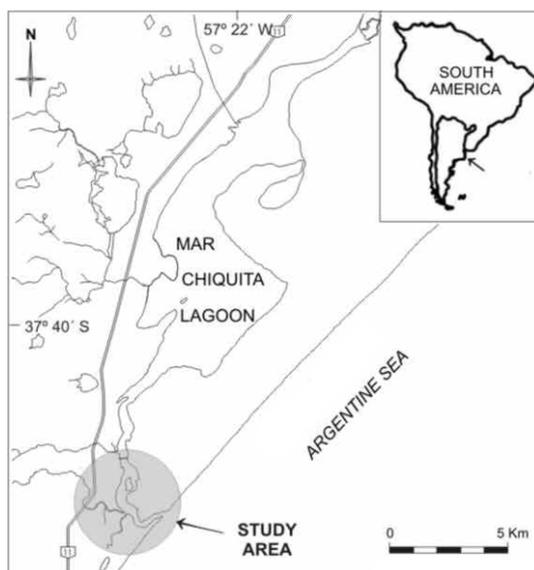


Figure 1. Study area at Mar Chiquita coastal lagoon, Buenos Aires Province, Argentina.

In Mar Chiquita lagoon (37°40'S, 57°22'W), a body of brackish water of some 46 km<sup>2</sup> located in Buenos Aires Province, Argentina (Fasano et al. 1982), information obtained by radio-tracking showed strong site fidelity of juveniles to those areas where sport fishing is important during non-breeding season (Berón et al. 2007). In occasions, fishermen discard baits, offal from fish processing, broken fish-

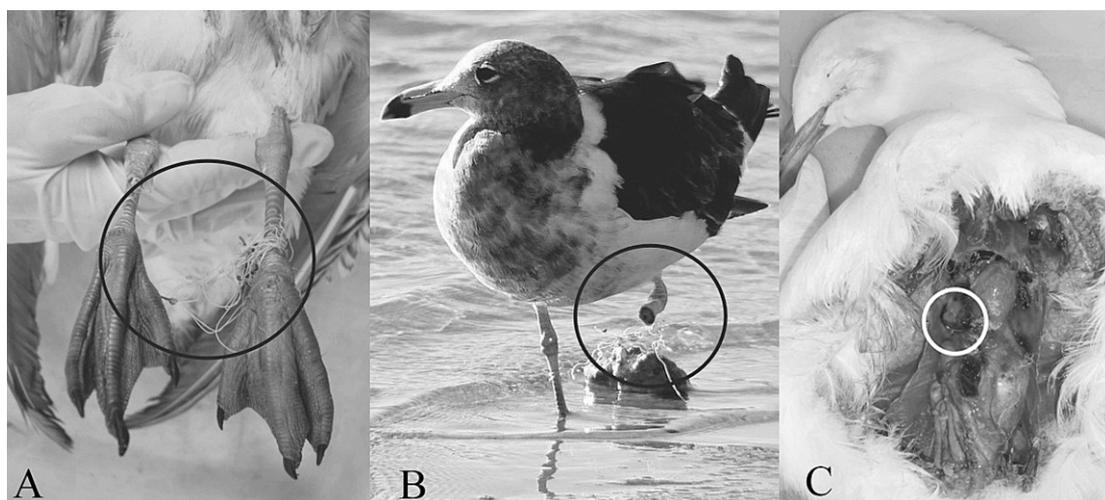


Figure 2. Olog's Gull individuals affected by the interaction with sport fisheries in non-breeding grounds of Buenos Aires Province, Argentina. (A) One year old juvenile bird found dead entangled with a discarded fishing line (photo: M Favero). (B) Subadult (approximately three years old) individual with a severe injury from line entanglement (photo: L Ferrer). (C) Adult (more than three years old) bird found dead by hook ingestion (photo: M Favero).

Table 1. Number of individuals of Olrog's Gull (*Larus atlanticus*) of different age classes observed dead or injured in Mar Chiquita coastal lagoon, Buenos Aires Province, Argentina, during 2004–2008.

	Dead				Injured			
	N	Adults (%)	Subadults (%)	Juveniles (%)	N	Adults (%)	Subadults (%)	Juveniles (%)
2004	5	40	20	40	6	15	35	50
2005	4	25	25	50	4	25	50	25
2006	3	0	75	25	5	20	40	40
2007	2	50	50	0	5	40	40	20
2008	2	0	50	50	20	10	60	30

ing lines and nylon bags, throwing them to the water or leaving them on the jetties and in the beach, places frequently used by the gulls to rest and feed. Among other species, Olrog's Gull was affected by the ingestion of discarded baited hooks, fish innards and heads carrying hooks, or even getting entangled with fishing lines.

During the non-breeding season, from May to October 2004–2008, and while performing censuses of approximately one hour per week, individuals of all age classes were observed in Mar Chiquita coastal lagoon (Fig. 1) associated with crab-beds and sport-fishing activities from the coast or small boats. Information of dead or injured Olrog's Gull individuals was collected *ad libitum*, including location, age class and causes producing injuries or mortality.

Between 2004–2008, a total of 56 individuals of this species of different age classes were found dead or injured as a product of interaction with sport fishery, with an annual mean ( $\pm$  SD) of  $8.0 \pm 6.7$  individuals, in a 6 km long shoreline regularly monitored (Table 1, Fig. 2). Observed fatalities were the result of hook ingestion (10.7%) and entanglements that impeded locomotion (17.9%). Injuries were the result of entanglements with fishing lines or hooks (71.4%).

A slight increase in the mortality rates of non-breeding individuals may easily affect a population (Becker et al. 2001, Nisbet et al. 2002, Favero & Becker 2006), particularly in species like the Olrog's Gull. This species has a restricted range in its distribution and scarce populations, both of which are likely to be undergoing a slow but continuous decline. Given that these observations and numbers correspond to a relatively short coastline, it results very difficult to make extrapolation of

mortalities at a regional scale. However, the impact observed along five years shows clearly that the negative effects are continuous, and that significant number of individuals could be extracted from the population per year along the migration routes and refueling areas. A more accurate evaluation of this impact and the proposal of mitigation measures with educational and outreach components are essential for conservation of this species, considering that sport fishing is a very important activity along shores used by the Olrog's Gull as winter quarters.

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#### LITERATURE CITED

- BECKER PH, WENDELN H, GONZÁLEZ-SOLÍS J (2001) Population dynamics, recruitment, individual quality and reproductive strategies in Common Terns *Sterna hirundo* marked with transponders. *Ardea* 89:241–252
- BERÓN MP (2003) Dieta de juveniles de Gaviota Cangrejera (*Larus atlanticus*) en estuarios de la provincia de Buenos Aires. *Hornero* 18:113–117
- BERÓN MP (2009) *Ecología trófica de la Gaviota de Olrog Larus atlanticus en ambientes naturales y antropizados del este y sudeste bonaerense*. Doctoral thesis, Universidad Nacional de Mar del Plata, Mar del Plata

- BERÓN MP, FAVERO M AND GÓMEZ-LAICH A (2007) Use of natural and anthropogenic resources by the Olrog's Gull *Larus atlanticus*: implications for the conservation of the species in nonbreeding habitats. *Bird Conservation International* 17:351–357
- BIRDLIFE INTERNATIONAL (2009) *Species factsheet: Larus atlanticus*. BirdLife International, Cambridge (URL: <http://www.birdlife.org>)
- BURGER J (1988) Foraging behavior in gulls: differences in method, prey, and habitat. *Colonial Waterbirds* 11:9–23
- BURGER J AND GOCHFELD M (1996) Family Laridae (gulls). Pp 572–623 in: DEL HOYO J, ELLIOTT A, SARGATAL J (eds) *Handbook of the birds of the world. Volume 3. Hoatzin to auks*. Lynx Edicions, Barcelona
- COPELLO S AND FAVERO M (2001) Foraging ecology of Olrog's Gull *Larus atlanticus* in Mar Chiquita Lagoon (Buenos Aires, Argentina): are there age-related differences? *Bird Conservation International* 11:175–188
- CROXALL JP (1998) Research and conservation: a future for albatrosses? Pp. 267–288 in: ROBERTSON G AND GALES R (eds) *Albatross biology and conservation*. Surrey Beatty and Sons, Chipping Norton
- DELHEY JKV, CARRETE M AND MARTÍNEZ M (2001) Diet and feeding behaviour of Olrog's Gull *Larus atlanticus* in Bahía Blanca, Argentina. *Ardea* 89:319–329
- FASANO JL, HERNÁNDEZ MA, ISLA FI AND SCHNACK EJ (1982) Aspectos evolutivos y ambientales de la laguna Mar Chiquita (Provincia de Buenos Aires, Argentina). *Oceanologica Acta* Número especial:285–292
- FAVERO M AND BECKER PH (2006) Effect of North Atlantic Oscillation and El Niño-Southern Oscillation on return rates, body mass and timing of migration of Common Terns breeding in Germany. Pp 405–409 in: BOERE GC, GALBRAITH CA, SCOTT D, STROUD DA AND UNDERHILL LG (eds) *Waterbirds of the world*. The Stationery Office, Edinburgh
- GIACCARDI M AND YORIO P (2004) Temporal patterns of abundance and waste use by Kelp Gulls, *Larus dominicanus*, in Patagonia, Argentina. *Ornitología Neotropical* 15:93–102
- GONZÁLEZ-ZEBALLOS D AND YORIO P (2006) Seabird use of discards and incidental captures at the Argentine hake trawl fishery in the Golfo San Jorge, Argentina. *Marine Ecology Progress Series* 316:175–186
- GÖTMARK F (1984) Food and foraging in five European *Larus* gulls in the breeding season: a comparative review. *Ornis Fennica* 61:9–18
- HERRERA G, PUNTA G AND YORIO P (2005) Diet specialization of Olrog's Gull *Larus atlanticus* during the breeding season at Golfo San Jorge, Argentina. *Bird Conservation International* 15:89–97
- MARTÍNEZ MM, ISACCH JP AND ROJAS M (2000) Olrog's Gull *Larus atlanticus*: specialist or generalist? *Bird Conservation International* 10:89–92
- NISBET ICT, MONTOYA J, BURGER J AND HATCH J (2002) Use of stable isotopes to investigate individual differences in diets and mercury exposures among common terns *Sterna hirundo* in breeding and wintering grounds. *Marine Ecology Progress Series* 242:267–274
- PACHECO JF (2009) Olrog's Gull *Larus atlanticus* in Santa Catarina, Brazil: northern most occurrence and first state record. *Cotinga* 31:80–81
- SILVA RODRÍGUEZ MP, FAVERO M, BERÓN MP, MARIANO-JELICICH R AND MAUCO L (2005) Ecología y conservación de aves marinas que utilizan el litoral bonaerense como área de invernada. *Hornero* 20:111–130
- TASKER ML, CAMPHUYSEN CJ, COOPER J, GARTHE S, MONTEVECCHI WA AND BLABER SM (2000) The impacts of fishing on marine birds. *Journal of Marine Science* 57:531–547
- YORIO P, BERTELLOTTI M AND GARCÍA BORBOROGLU P (2005) Estado poblacional y de conservación de gaviotas que se reproducen en el litoral marítimo argentino. *Hornero* 20:53–74