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# **Killer whales of Sea Lion Island (Falkland Islands)**

Photo-identification catalogue 2022-2023



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# **Killer whales of Sea Lion Island**

A research project

The **Elephant Seal Research** Group is carrying out a research project on killer whales of Sea Lion Island. Killer whales are regular visitors of the island, but information on their activity, sociality, and feeding strategies is scarce. Although elephant seal predation by killer whales is often reported by visitors and media, its frequency and impact on the population dynamics of elephant seals is uncertain. The same holds for the other potential killer whales preys, including southern sea lions and various species of penguins.

In 2013 we started a long-term study of the killer whales of Sea Lion Island. The most important component of any killer whale study is to identify each individual, and this is usually done by taking pictures and matching features of the saddle patch, dorsal fin, and nearby areas. This is the photographic catalogue of the killer whales that we indentified. For each killer whale we provide an individual data sheet, with pictures of the right and left sides, sex, age class and year of first and last sight.

Our plan is to update the catalogue at the end of each field work season, integrate pictures taken in the past, and expand the catalogue to killer whales observed elsewhere in the Falklands, including pictures taken on other islands, and from fishing and cruise vessels. Therefore, we ask everybody who may have pictures of killer whales to help our research by sharing them. The pictures will be used only for the research project, and any contribution will be acknowledged. Please contact us by email at [simo\\_esrg@eleseal.org](mailto:simo_esrg@eleseal.org).

Thank you for your kind help !!!

**The Elephant Seal Research Group**

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## A brief introduction to killer whale biology

### Taxonomy, distribution and numbers

Killer whales (*Orcinus orca*) belong to the order *Cetacea*, the sub-order *Odontoceti*, and the family *Dephinidae*. They are a cosmopolitan species with a worldwide distribution, although they are observed more frequently in areas of high productivity, at high latitudes, and along the boundaries of the continental shelves (within 800 km). They are observed frequently in southern South America, South Africa, Australia, New Zealand, Alaska, and northern Europe. At low latitudes they are observed mostly in California, Hawaii, and Galapagos. They are top predators, at the vertex of the oceanic food chain, and they feed on a wide array of marine species, from small fishes to large whales.

The current worldwide population of killer whales is estimated at about 50000 individuals, although accurate numbers are available for just few populations, and there are no estimates for large areas, in particular in the southern hemisphere. All together, the above estimate should be considered tentative and very likely conservative. It is supposed that at least 25000 killer whales live at latitudes above 60 degrees. At large, more information is available for killer whales of the northern hemisphere than of the southern.



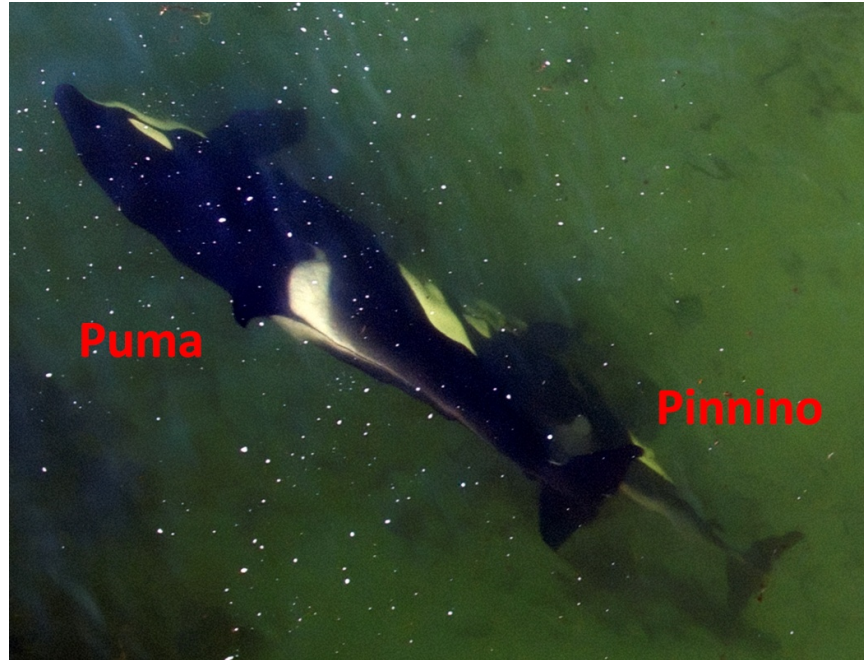
Puma's family (red labels) and Lola's family (blue labels) meet out of the northeast beach of Sea Lion Island in November 2021.

### Size, maturation and lifecycle

Killer whales are about 3.5-4 m long at birth, and up to 4.5 m at weaning. Adult males grow up to 9 m, while maximum size for females is about 7.7 m. They can weigh up to 7 tons. Killer whales can live up to 50-70 years. Calving happens about every 3-5 years, after a



gestation of about 17 months. There is no definite breeding or calving season. Lactation lasts about 12 months, and weaning begins when the calf is about 4 to 4.5 meters long, but the calf can stay with the mother for many more years. Sexual maturity is reached around 20 years of age in both sexes.



Puma suckling her son Pinnino.



Mixing of resident (red labels) and transient (blue labels) killer whales at Sea Lion Island.

## Ecology

Killer whales are top predators that move extensively between coastal waters and open ocean. They have been observed preying on a very large range of species, from fishes to other



whales. There is often a clear specialization in feeding habits, which is in part related to average size of individuals. Maximum dive depth is about 500 meters.

In the northern hemisphere various local populations have been shown to be preying upon a single species of fish, like herring or blue fin tuna. In the North-eastern Pacific killer whales prey most on seals, and occasionally on baleen whales. In the Antarctic seas there are populations taking mostly minke whales, other specialized in taking seals, and other feeding mostly on fish species. Killer whales are estimated to eat up to 4% of their body weight every day, a true killer appetite.

In the past, killer whales were commercially exploited for oil and meat. Now, although there is no extensive commercial taking, meat is still eaten in some countries of the Far East. Currently, killer whales are mostly threatened by exploitation of their prey, general degradation of their living habitat, and accumulation of contaminants in the oceans. Global climate change is of great concern because of its effect on many of the species that are hunted by killer whales. The local populations with a very specialized fish diet are particularly at risk, due to competition with commercial fisheries. Locally, killer whales are often perceived as competitor by fishermen, and intentional shooting is known to occur, in particular at low latitudes. The species is included in the CITES Appendix II list, and various local populations are considered threatened and subject to special conservation measures.

### **Social behaviour**

Killer whales usually are observed in groups called "pods", with an average size of 6 individuals, but larger groups are occasionally observed (up to 40 individuals together).



**Play behaviour: reciprocal “bullying” of calves in very shallow water out of Sea Lion Island south beach in October 2018.**

Group composition differs among populations. In the northern Pacific average composition is 19% mature males, 40% mature females, and 41% of calves and juveniles. In Alaska the average group includes 19% of mature males, 27% of calves and juveniles and rest of females and sub-adult males.

The mating system is likely polygynous, with some males controlling access to females in oestrus, but no definitive data is available on the matter. Killer whales have a rich communication system, which permits the maintenance of groups with complex social relationships. Different local populations show different vocalization patterns and, therefore, are supposed to have well defined dialects. Killer whales, like many other cetaceans, use echolocation while under the water. They emit click trains, and use the reflected sound waves to determine distance, size, and even composition, of objects and other animals.



**Reciprocated homosexual behaviour (male OVO vs male calf PINNINO) observed off the northeast beach of Sea Lion Island in November 2018.**

## **Hunting**

Killer whales hunt in groups, and are able to coordinate attacks, being very efficient in preying upon species of very different size and habits. They show intentional stranding hunting techniques, which permit them to prey on resting sea lions. These techniques are a good example of complex cultural transmission, because young individuals need a long training by the mothers before becoming effective in applying them. Also the predation of other whales requires a long training, because of the complexity of separating large whale



calves from their mothers. At Sea Lion Island killer whales prey mostly on elephant seals, and on weaned pups in particular.



**Weaned elephant seal pups are the main killer whale prey at Sea Lion Island.**



**Hunting a juvenile male elephant seal off the south beach of Sea Lion Island during the seal moulting season (February 2018).**



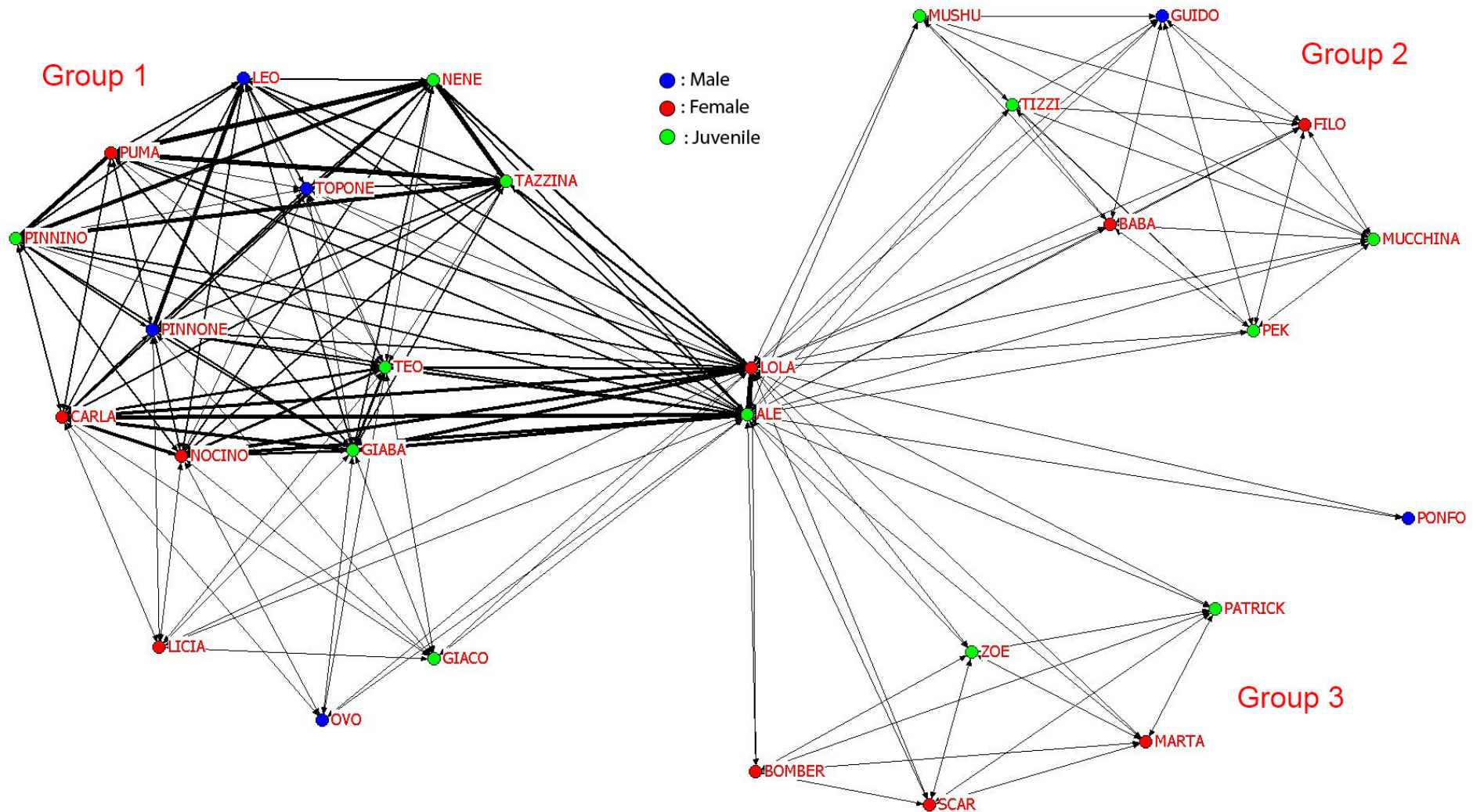
At large, and contrary to what often stated in the media, the number of seals taken is small, and killer whale predation has a modest effect on the demography of the Sea Lion Island seals, in particular if compared to other sources on mortality.



**Puma's family is surrounding a weaned elephant seal pup in December 2019.**

# Sample sociogram of the Sea Lion Island killer whales

A sociogram is a graphic representation of the social relationships among individuals. Line thickness represents the strength of each relationship. The following is a sample sociogram (2014-2015 season) with three distinct groups: one resident group (1) and two transient groups (2,3), connected by a mother-calf pair (LOLA + ALE).



## Sea Lion Island killer whale families

The basic social unit of Sea Lion Island killer whales is the family, i.e., the association of a mother with her calves, up to six generations in the case of Puma. The following is a summary of the all families observed at Sea Lion Island along the years.

Although the colloquial term “pod” is often used to describe Sea Lion Island killer whale groups, in particular in the media, we currently have no established pod. Multi-family groups currently observed at Sea Lion Island are temporary and, therefore, lack the temporal stability that is requisite of a true pod, which is a group of individuals that is stable in time and include also non direct descendants.

### **Puma's family**

Puma + Tazzina + Nene+ Pinnino + Micky + Pepper + Tella (Tazzina's calf) + Giaba (adopted)

### **Lola's family**

Lola + Erika + Luigia + Sarah (adopted)

**Carla's family** (Carla and youngest calf disappeared in 2021, oldest calves adopted)

Carla + Giaba + Sarah + Ghost

### **Nocino's family**

Nocino + Teo

### **Licia's family**

Licia + Giaco (not seen in 2022-2023) + Muschio

### **Bozza's family**

Bozza + Lunga + Tarci

**Bomber's family** (last seen 2016)

Bomber + Didi

**Marta's family** (last seen 2016)

Marta + Patrick + Zoe

**Filo's family** (last seen 2019)

Filo + Mushu

### **Baba's family**

Baba + Pek + Pompey



## Temporal changes in family composition

The composition of family groups may change along the time, due to the birth or adoption of new calves and the death of individuals. As a sample of temporal changes, below we list the yearly changes in the composition of Puma's family, the largest family group of Sea Lion Island (mothers in bold, new calves same color of mother, adopted calf in green).

**2013**

**Puma** + Tazzina + Nene

**2014**

**Puma** + Tazzina + Nene + **Pinnino**

**2015**

**Puma** + Tazzina + Nene + Pinnino

**2016**

**Puma** + Tazzina + Nene + Pinnino

**2017**

**Puma** + Tazzina + Nene + Pinnino + **Micky**

**2018**

**Puma** + Tazzina + Nene + Pinnino + Micky

**2019**

**Puma** + Tazzina + Nene + Pinnino + Micky

**2020**

**Puma** + Tazzina + Nene + Pinnino + Micky + **Pepper**

**2021**

**Puma** + **Tazzina** + Nene + Pinnino + Micky + Pepper + **Tella**

**2022**

**Puma** + **Tazzina** + Nene + Pinnino + Micky + Pepper + Tella + **Giaba**

## Killer whale identification

The identification of killer whales of Sea Lion Island is mostly based on scars, scratches and notches on the saddle patch and dorsal fin. Those features are often stable in time, in particular in adult individuals, but sometimes they are not, in particular in calves and young individuals, making identification across years more difficult. We show here two examples. The first example is an adult female, LOLA, who maintained peculiar signs of the saddle patch along many years (2013-2022).



2013-2014 season



2017-2018 season



2020-2021 season



2022-2023 season



The second example is a calf, PINNINO, who markedly changed its saddle patch signs from birth (2014) to now (2022). This highlights the intrinsic bias of photo-identification. Not only some individuals are more scarred and scratched and, therefore, are easier to identify, but young individuals have less stable marks than adults. All together, the reliability of natural marks changes during growth, and that should be taken into account when studying killer whale demography, life history and sociality. Intensive observation of each individual during each season improves the accuracy of long-term identification of younger animals. This is an added value of intensive studies, like the one we carry out at Sea Lion Island, over opportunistic observations.



2014-2015 season



2017-2018 season



2018-2019 season



2022-2023 season



# ALE

ESRG\_001

Juvenile

First seen: November 2013 - Last seen: March 2015 (probably dead)

Right side



Left side





# GIABA

ESRG\_002

Old juvenile

First seen: November 2013 - Last seen: December 2022

Right side



Left side





# NENE

ESRG\_003

Young adult (probably female)

First seen: October 2013 - Last seen: December 2022

Right side



Left side





# LUNGA

ESRG\_004

Young adult

First seen: December 2013 - Last seen: October 2022

Right side



Left side





# TAZZINA

ESRG\_005

Adult female

First seen: 2010 - Last seen: December 2022

Right side



Left side





# BOMBER

ESRG\_006

Adult female

First seen: December 2013 - Last seen: February 2016

Right side



Left side





# BOZZA

ESRG\_007

Adult female

First seen: December 2013 - Last seen: October 2022

Right side



Left side





# CARLA

ESRG\_008

Adult female

First seen: 2010 - Last seen: November 2021 (probably dead)

Right side



Left side





# LOLA

ESRG\_009

Adult female

First seen: 2004 - Last seen: March 2023

Right side



Left side





# NOCINO

ESRG\_010

Adult female

First seen: 2004 - Last seen: March 2023

Right side



Left side





# PUMA

ESRG\_011

Adult female

First seen: 2004 - Last seen: December 2022

Right side



Left side





# SCAR

ESRG\_012

Probably adult female

First seen: December 2013 - Last seen: February 2016

Right side



Left side





# TOPONE

ESRG\_013

Sub-adult male

First seen: November 2013 - Last seen: February 2023

Right side



Left side





# LEO

ESRG\_014

Adult male

First seen: 2010 - Last seen: November 2016 (dead)

Right side



Left side





# PINNONE

ESRG\_015

Adult male

First seen: 2004 - Last seen: February 2023

Right side



Left side





# TEO

ESRG\_016

Young adult

First seen: November 2013 - Last seen: March 2023

Right side



Left side





# PINNINO

ESRG\_017

Old juvenile male

First seen: October 2014 - Last seen: December 2022

Right side



Left side





# MARTA

ESRG\_018

Adult female

First seen: December 2013 - Last seen: February 2016

Right side



Left side





# PATRICK

ESRG\_019

Old juvenile

First seen: January 2015 - Last seen: February 2016

Right side



Left side





# ZOE

ESRG\_020

Calf

First seen: January 2015 - Last seen: February 2016

Right side



Left side





# FILO

ESRG\_021

Adult female

First seen: January 2015 - Last seen: January 2019

Right side



Left side





# GUIDO

ESRG\_022

Adult male

First seen: January 2015 - Last seen: February 2023

Right side



Left side





# BABA

ESRG\_023

Adult female

First seen: January 2015 - Last seen: January 2023

Right side



Left side





# MUSHU

ESRG\_024

Young juvenile

First seen: January 2015 - Last seen: December 2018

Right side



Left side





# TIZZI

ESRG\_025

Old juvenile

First seen: January 2015 - Last seen: February 2016

Right side



Left side





**PEK**

ESRG\_026

Calf

First seen: January 2015 - Last seen: February 2015

Right side



Left side





# PONFO

ESRG\_027

Adult male

First seen: February 2015 - Last seen: February 2015

From the back





# LICIA

ESRG\_028

Adult female

First seen: February 2015 - Last seen: November 2022

Right side



Left side





# GIACO

ESRG\_029

Old juvenile

First seen: February 2015 - Last seen: February 2022

Right side



Left side





**OVO**

ESRG\_030

Adult male

First seen: 2004 - Last seen: November 2018

Right side



Left side





# MUCCHINA

ESRG\_031

Old juvenile

First seen: January 2015 - Last seen: February 2015

Right side



Left side





# DIDI

ESRG\_032

Calf

First seen: February 2016 - Last seen: February 2016

Right side



Left side





# **POLDO**

ESRG\_033

Adult male

First seen: March 2016 - Last seen: February 2017

Right side



Left side





# ALBERTO

ESRG\_034

Adult male

First seen: September 2016 - Last seen: December 2020

Right side



Left side





# ERIKA

ESRG\_035

Juvenile

First seen: January 2017 - Last seen: March 2023

Right side



Left side





# TRIPPA

ESRG\_036

Adult female

First seen: January 2017 - Last seen: January 2017

Right side



Left side





# PINA

ESRG\_037

Adult female

First seen: January 2017 - Last seen: January 2017

Right side



Left side





# SOTTILE

ESRG\_038

Old juvenile

First seen: December 2016 - Last seen: December 2016

Right side



Left side





# MICKY

ESRG\_039

Juvenile

First seen: September 2017 - Last seen: December 2022

Right side



Left side





# SARAH

ESRG\_040

Juvenile

First seen: November 2017 - Last seen: November 2022

Right side



Left side





# PILLO

ESRG\_041

Adult male

First seen: March 2018 - Last seen: March 2019

Right side



Left side





# LUIGIA

ESRG\_042

Calf

First seen: October 2019 - Last seen: March 2023

Right side



Left side





# PEPPER

ESRG\_043

Calf

First seen: December 2020 - Last seen: December 2022

Right side



Left side





# MUSCHIO

ESRG\_044

Calf

First seen: March 2021 - Last seen: November 2022

Right side



Left side





# TARCI

ESRG\_045

Calf

First seen: December 2020 - Last seen: October 2022

Right side



Left side





# GHOST

ESRG\_046

Calf

First seen: November 2021 - Last seen: November 2021 (probably dead)

Right side



Left side





# TELLA

ESRG\_047

Calf

First seen: November 2021 - Last seen: December 2022

Right side



Left side





# POMPEY

ESRG\_048

Calf

First seen: January 2023 - Last seen: January 2023

Left side



(Photo courtesy of Sarah Bonner)



## **Acknowledgments**

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**The Elephant Seal Research Group**

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