

# The Galápagos sea lion - What does the future hold for this species?

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By Lise Marie Ånestad



## Introduction

The Galápagos sea lion (*Zalophus wollebaeki*) is a social, witty species that only breeds on the Galápagos Islands and on Isla de la Plata outside the Ecuadorian coast. These animals are the key predators of the Galápagos archipelago, and can be found on nearly all of the different islands. The carnivorous species depends very much on its marine resources, and will often travel for days with the purpose of hunting for sardines. When the sea lions are not busy hunting for food, they are usually seen sunbathing, sleeping and playing on the shoreline. The polygynous species form colonies in their hauling-out areas. A colony usually consists of a harem with 5–25 cows and an alpha-male bull defending his territory against other adult-males. While the alpha-male is usually out in the water patrolling his area, the female sea lions and their pups occupy the sandy beaches along the shore. Their playful and tame nature attracts people from all over the world, something that among other things cause problems for the species. IUCN (*International Union for Conservation of Nature*) has listed the species as endangered. In the 1960s there were about 20.000 – 50.000 individuals. Today, there are about 14.000 individuals. What are the main reasons for such a drastic decline?

## ENSO (El Niño Southern Oscillation)

El Niño Southern Oscillation is an event causing dramatic climate changes across the tropical Pacific Ocean. The oceanic component, El Niño, causes temperature changes in the surface waters, whereas the atmospheric component, the Southern Oscillation, causes changes in the surface pressure. The surface pressure increases when El Niño accumulates warm surface waters, causing increased precipitation and a rise in the sea surface temperature. When there is no ocean upwelling, the nutrient-depleted surface waters remains rather than being replaced by nutrient rich water. Due to this, extreme amounts of food resources are reduced, causing catastrophic consequences for the marine organisms.

The Galápagos Islands lie in the main area of where the ENSO activity is exerted. With the drastic decline in available food resources, the mortality of the Galápagos sea lion is humongous. Considering the fact that humans also depend on fishing, they deplete the waters even more, and population recovery for the Galápagos sea lion becomes even more difficult. Despite existing regulations made to protect the species, the problem continues to exist. Climate models also show that the strength and frequency of El Niño events increase due to global warming. When temperatures are higher, it is harder for ocean currents to release all the extra heat pumped into the sea. Therefore, El Niño will occur to help the waters release this extra heat. On average, ENSO occurs every fifth year. For how many more years will the Galápagos sea lion species be able to survive such dramatic conditions when no further regulations are made?

## **Tourism and immigration**

The Galápagos sea lions are known as the “Welcome committee” of the Galápagos Islands. With their social and curious nature, they attract people from all over the world, as well as approaching human inhabited areas themselves. Everyone wants to see their somewhat clumsy appearance on land, or how they in contrast are able to propel themselves through the waters gracefully.

Unfortunately, the Galápagos sea lions are extremely vulnerable to humans. With sun lotion, skin repellent and all other kinds of chemicals that most of the tourists use, it is of outermost importance that they ignore the urge of petting or touching the animals. Many visitors do not take the precautions that are made seriously, and cannot resist the temptation of touching the sea lions while visiting the islands, which is why dead sea lions become a common sight on the island hikes.

Another problem is the curious nature of the species. They are drawn to where the humans live and come in contact with fish nets, human waste and other elements that might cause serious damage. Some inhabitants ignore the rules made and put up fish nets in protected areas, causing even more obstacles for the endangered species.

## **The uniqueness of the species**

Through behavioral studies and with evidence on a molecular level, it is indeed shown that the Galápagos sea lion is a separate species from the Californian sea lion and the Japanese sea lion. With this, there are both negative and positive consequences. Since the Galápagos sea lion species is endemic to the islands, no other individuals of this species can be recruited into the island. If the number of individuals continues to decline, the species will eventually be lost world wide. On the other hand, the fact that it is a unique species could have a positive effect on the conservation management. This might cause stronger and more solid preservation plans to take action, not only for the Galápagos sea lion species, but for the whole archipelago.

## **The low genetic diversity**

Gene diversity within the Galápagos sea lion species is lower than that of the Californian sea lion species. Scientists believe that this might be a result of repeated bottlenecks, meaning that the capacity of the entire species has been limited by the number of resources. This might have occurred as a result of repeated El Niño events, seeing as the Galápagos archipelago lies in the primary region of where the El Niño activity takes place. When the gene variety is low within a population, this could eventually lead to crucial consequences. The population might become more vulnerable to environmental challenges and less resistant towards diseases.

## **Conclusion**

After summarizing the different factors that could lead to extinction of the Galápagos sea lion, it is obvious that more specific conservation precautions need to be made. The fact that the Galápagos sea lion now is proven to be genetically unique, strengthens the case of a more aggressive plan to uphold the marine reserve and fight against the different threats that the species encounters. With the small geographical range in which the Galápagos sea lion breeds, the increasing number of tourists and immigrants exerts a greater effect on the species. Therefore it is extremely important that everyone respects the rules given, especially due to the ENSO events.

Despite the low gene variety in comparison to the Californian sea lion, evidence does show that there are ecological and morphological differences among the species. Behavioral conditions, competitive species, and to some extent, geographical isolation, are all parts of this intra-specific evolutionary process. In theory, given that the species are of highly mobile nature, any genetic differentiation should not occur. However, since the geographical isolation seems to only play a small role, studies show that the species will continue to diverge. Hopefully, people will realize the importance of preserving the unique wildlife of this world, and the species will continue to live on.



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