

ARE MARINE IGUANAS ENDANGERED ON ISLANDS WITH INTRODUCED PREDATORS?

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To visitors of Galápagos, marine iguanas (*Amblyrhynchus cristatus*) are the most obvious large reptile, inhabiting nearly all islands. They occur most abundantly on southern coastlines exposed to the prevailing winds, currents, and wave patterns (Laurie 1983). However, this superficial impression of widespread, healthy and very abundant populations may be in need of careful revision. While it has been known for a long time that introduced mammals prey upon marine iguanas (feral dogs attack adults (Kruuk and Snell 1981); feral cats attack young (Konecny 1983, Laurie 1983)), recent observations indicate a potentially alarming lack of recruitment, i.e., survival and growth to reproductive age, in some populations.

Laurie (1983) described an apparent lack of recruitment in populations of marine iguanas on some islands where cats and rats are abundant and where cats, at least, demonstrably prey heavily on hatchling and juvenile marine iguanas (his Fig. 2 shows cats as a predator on Santiago, where they apparently no longer occur). In his survey of most of the coastline of the Archipelago, Laurie noted this lack of recruitment of hatchlings in a number of colonies on Isabela (see also Jacome 1989), Floreana, San Cristóbal, and Santa Cruz, all islands with abundant cat and rat populations. A comparison of a population from Santa Fe, an island without introduced predators, with a population from Punta Nuñez on Santa Cruz, shows great differences. On Santa Fe, 53% of 650 hatchlings marked in May 1981 still survived in November, whereas at Punta Nuñez less than 1% of over 1000 marked hatchlings were still alive in November (Laurie 1983; Rauch, pers. comm. in Laurie 1983).

On a recent trip to collect blood samples of marine iguanas throughout the Archipelago (February/March 1993, Fig. 1), we were impressed by the conspicuous

absence of juveniles in the populations on Isabela, Floreana, San Cristóbal, and Santa Cruz. These are the only islands, other than Baltra, with feral cat populations. There was evidence of iguana nesting on all islands visited, but only on islands without introduced predators was an abundance of juveniles observed.

Marine iguana populations seem to be much lower today than described for 1981 by Laurie (1983), particularly at Caleta Negra and Punta Albermarle on Isabela. Laurie indicated that many of the populations, particularly those on Isabela, were in severe danger of extermination once the adults presently comprising most of the populations died. Unlike for other populations on Isabela, at Punta Vicente Roca, Laurie found substantial recruitment and suggested that the steep cliffs protected marine iguanas from cat predation. However, Jacome (1989) observed in 1987 and 1988, that feral cats had preyed on hatchlings and that recruitment was nearly zero. The causes for such differences should be investigated as they may be due to factors not directly related to cat predation.

The iguana population on Pinzon, where Laurie also noticed a lack of recruitment, may present a special case. Unlike the other four islands mentioned, where cats appear to be the dominant predator of marine iguanas, the only introduced predator on Pinzon is the black rat. While black rats do not appear to have a major impact on marine iguana populations on other islands, they may be particularly food-stressed on Pinzon and, as in the case of giant tortoises (MacFarland et al., 1974), prey on the recent hatchling marine iguanas, thus limiting recruitment. Only in 1989, when the rat population was near zero following the rat eradication campaign

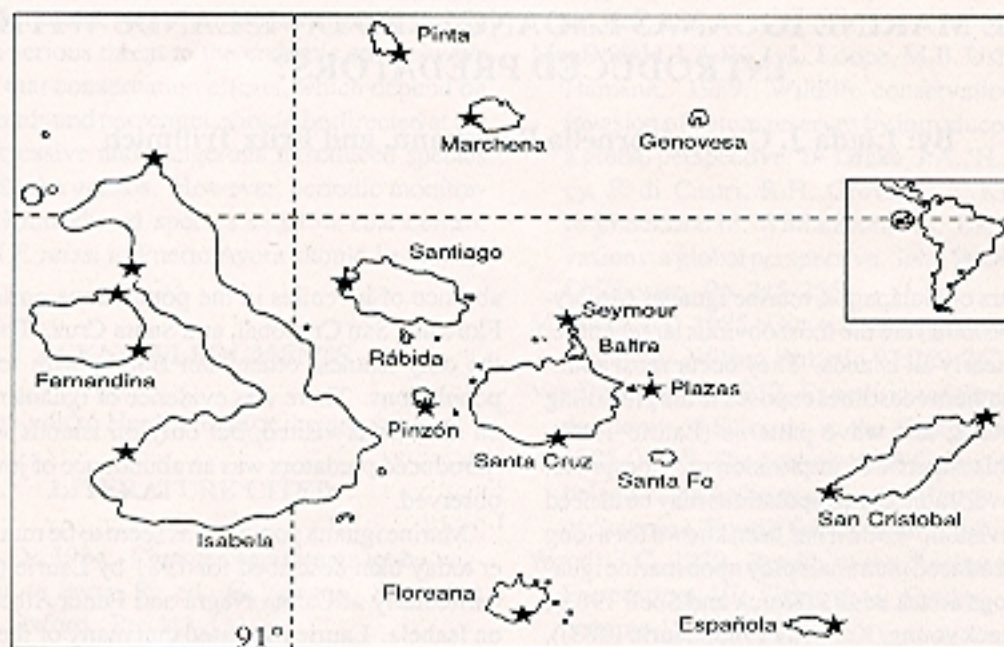


Figure 1. Marine iguana sites visited in February/March 1993.

in 1988 (Cayot and Calvopiña 1989), were more marine iguana hatchlings observed than normally. During our brief stay, we observed few adults and even fewer young. The combination of a coastline that does not provide the ideal habitat for marine iguanas and an abundance of black rats may result in a small marine iguana population.

It is probable that the current status of marine iguana populations on the cat-infested islands is due to the combined effect of high mortality during El Niño 1982-83 (Laurie and Brown 1990) and continued cat predation of hatchlings resulting in low recruitment. We recommend the development of a careful monitoring program to determine the dynamics of the apparently threatened iguana populations and the level of threat due to feral cats. This would involve periodic censusing using mark/recapture at specific sites, on islands with and without cats.

In addition, we recommend a study testing the feasibility of improving hatchling recruitment by

reducing cat numbers in iguana nesting zones. This could be done by comparing survivorship of hatchling iguanas on Caamaño, a small islet without feral cats off the southern coast of Santa Cruz, with survivorship of hatchlings in 4-6 nesting areas on the southern coast of Santa Cruz, where cats are abundant. No reduction in cat numbers would be done at one of the Santa Cruz sites (control), while various levels of cat reduction would be carried out in the remaining sites. A goal of this study should be the development of techniques that will ensure an increase in hatchling survival and eventual recruitment to the breeding population. The results of the proposed study will provide the necessary data to establish both the need for and the means of a pilot management program for marine iguana populations. This program may need to be implemented almost immediately for certain populations; otherwise some marine iguana populations may become severely threatened in the near future if they are not already.

Both a long-term monitoring program and a pilot study on increasing survivorship of hatchling marine iguanas by reducing cat numbers may help maintain the teeming abundance of marine iguanas throughout the Galápagos Archipelago.

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