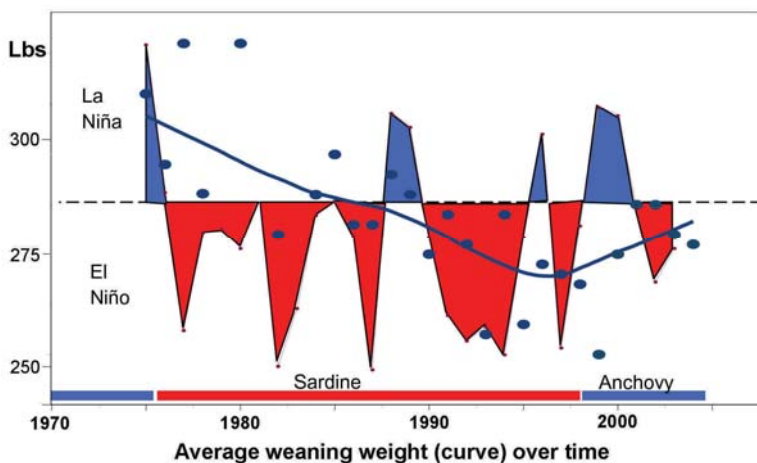




## Are Elephant Seals Affected by Global Warming?

The short answer is that research on elephant seals is not old enough to answer that question directly. There is, however, data on the impact of ocean temperature change on the life and success of the seals. Most of us, particularly those of us on the west coast of the United States, are familiar with El Niños and La Niñas. The El Niño is a period during which the northeastern Pacific Ocean sea surface temperature warms above normal; the La Niña is a period of cooling in the same region.

While individual El Niño and La Niña events are typically of a year's duration there are cycles of a few decades when one or the other predominates. Cool periods, known as "anchovy regimes" because anchovies are in abundance, include the period 1947 to 1976, between two warm or "sardine regimes" from 1925 to 1946 and 1977 to 1995. It appears that another cool period began in the mid-nineties.



A study at Año Nuevo<sup>1</sup> looked at three measures of the impact of ocean temperature between 1979 and 2004: the weight of weaned pups, the weight gain of the mothers during their foraging trip between birthing/breeding and molt, and the duration of that foraging trip. (With delayed implantation, the length of the foraging trip between the molt and birthing is fixed by the gestation time.) From 1977 to 1995 the average weight of weaned pups declined from 300 to 270 pounds and from 1985<sup>2</sup> to 1995 the female weight gain declined from 160 to 140 pounds while the foraging duration increased from an average of 67 days to an average of 89 days. With the return of the anchovy regime in 1995, average pup mass in-

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## A Perilous Life

In the last 125 years, the population of northern elephant seals (NES) has grown from an estimated 50 or fewer to about 200,000, saved from extinction by the development of less expensive oils for lamps and lubrication and by legal protection. Their recovery is quite extraordinary although they retain the very limited genetic diversity associated with that small number of ancestors from a single colony (Guadalupe Island, off the coast of Baja California).

The growth of the population is determined by the replication rate of female seals: if, on average, each female gives birth to at least one female pup during her breeding years, the population will be stable or grow. Since females typically have their first birth at age four and, with a 95% probability, one each year for as long as they live, that doesn't seem difficult to achieve. Half of the pups, however, are male; some of the pups never make that first trip to sea and many are lost at sea.

Hazards for the pups on the beach include starvation and bad weather. The beach during birthing and breeding can be a chaotic place and, at times, the mother and pup are separated and unable to reunite. Unless the lost pup is lucky enough to find a surrogate mother – a female who has lost her pup – or unless the separation occurs quite late in the nursing period, starvation is likely. The risk of this loss increases significantly with crowding in the rookery. Piedras Blancas has, over the last decade, seen such losses grow from 2 to 3 percent to 7 to 8 percent of pups born as the population in the rookery has grown.



High seas in January can be a major threat to the pups

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## Global Warming *(Continued from page 1)*

creased to 282 pounds by 2005, female foraging weight gain moved up to 150 pounds in 2000 and foraging duration was down to 68 days.

Each of these changes associated with the ocean warming of the sardine regime have negative implications for species survival and do not bode well for a future in which the average ocean temperature increases.

<sup>1</sup>Le Boeuf, Burney J., and Daniel E. Crocker. "Ocean climate and seal condition." *BMC biology* 3.1 (2005): 9.

<sup>2</sup>The collection of female weights started later than the one of pup weights.

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## We Make the National News!

The Wall Street Journal published an article which compared the percent of satisfied visitors to seven American "castles" as determined by TripAdvisor scores. The list included Hearst Castle. At the conclusion of the article was this quote: "And Hearst Castle is a distant runner-up to San Simeon's Piedras Blancas Elephant Seal Rookery, a spot from which 98% of visitors come away satisfied."

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## The First of the 2015 Crop

The first pup of the 2015 season came on December 12, unusually early but she is doing fine. The part of the beach usable for birthing was limited during the last few weeks of 2014 because of unusually high swells but that problem has gone away for now. We hope it will not return for a couple of months.



With that change in the weather, the birthing season is well underway with new pups every day, delighting the very many visitors. Plan a trip to the rookery to participate in the excitement.

## A Survey of Molting Males

A comprehensive study of exactly how many adult and sub-adult male elephant seals haul out to molt on the beaches of the Piedras Blancas rookery each summer was conducted in 2014. FES Docent and veterinarian, Bill Goodger, with the help of Craig Brown, an intern receiving scholarship assistance from the FES membership, devised and implemented a system of counting from the bluff that had no impact on the seals. The survey was conducted without going down on the beach and included the entire six-mile stretch of the rookery.

Sub-adult males began to arrive in late May and as the summer progressed, older and larger males arrived as the younger ones neared the completion of their thirty day annual molt. The maximum number of molting adult males on the beach at one time was seen in late July. By the end of August, most of the male seals had left, marking the end of the molting season.

This survey, which will be done annually, classifies the seals into age/size groups. Besides the year-to-year record of adult and sub-adult molting males, one question we hope to answer is: does the arrival time of sub-adult males change as they age?

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## Excitement on the Boardwalk

Recent storms and high tides at the rookery have moved the elephant seals closer to the boardwalk this winter. Early on the morning of December 18th a 10 year old adult male and a 4 year old sub-adult were found lounging on the south boardwalk. They had managed to get through the fence on the north beach and traveled the length of the parking lot. The parking lot was closed and The Marine Mammal Center was called. The adult male weighed about 4000 lbs and the sub-adult approximately 2000 lbs.

The seals resisted being returned to the beach, the adult even managed to take a bite out of a truck headlight. It took the combined efforts of staff from Marine Mammal Rescue, State Parks, Cal Trans and Friends of the Elephant Seal to urge the big guys back onto the beach with the aid of boards, tarps and an air horn. The parking lot and visitor areas were then re-opened. It happened that a local television crew was on site covering another story when this event took place. Thanks to KSBY, you can see footage of the excitement at [www.ksby.com/player/?video\\_id=34532](http://www.ksby.com/player/?video_id=34532).

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Contribute to The Friends of the Elephant Seal's Endowment Fund or include a gift in your will or trust. Contributions can provide substantial tax benefits now and your gift will create income to support the FES mission forever.

### A Perilous Life (Continued from page 1)

Most of the rookeries have beaches that are south-facing. Since the dominant storm direction is from the northwest, this provides protection for the pups in most years. There are years, however, when storms result in high waves from the south during January and February from which there is little or no protection. In one recent year, for example, the north beach in the Piedras Blancas viewing area was, in large part, reduced to bedrock by these southern waves which also carried many pups out to sea.

Those successfully weaned pups that do go to sea face predation, disease and fishing nets. Because death occurs at sea, there is little or no direct data on cause of death.

A study\* of the survival rates by age and sex of the NES looked at seals born and successfully weaned in 1984, 1986 and 1987 at Año Nuevo. Pup mortality at Año Nuevo in a normal weather year is around 15% with higher mortality for years with severe storms in January or February. Of those that survive to go to sea, only 30% (male and female) survive to age 3. Annual survival rates for females thereafter are around 85% (roughly 1 in 7 is lost between age 4 and 18). Males face an age-independent survival rate of around 68% (1 in 3 lost each year). Indeed, the males that dominate the breeding season are usually nine years old or older and only 3% of male pups studied survived to age 9. The higher male mortality is likely due to the very strong male preference for feeding at the edge of the continental shelf. The orca, a powerful predator, is very common in the Gulf of Alaska.

The survival rates found at Año Nuevo would, in fact, not sustain the species; much less predict its population growth over the past twenty years. While the population data from the Mexican rookeries is incomplete, the data from all rookeries suggest an annual population growth between four and five percent. The rookeries at Año Nuevo, the Farallones and Pt. Reyes all see a high level of white shark activity. FES supported the installation of a buoy south of the light house that can detect tagged white



**E- seals comprise from 10 to 12% of the diet of some orcas**

sharks. During the five months the buoy was in the water, only a few sharks were in the area and those for only a short time. It appears that Piedras Blancas does not yet have a serious local problem.

\*Condit, Richard, et al. "Lifetime survival rates and senescence in northern elephant seals." *Marine Mammal Science* 30.1 (2014): 122-138.

### A Very Special Docent



750,000 visitors stop every year to view the elephant seals at the Piedras Blancas Rookery and with that much traffic, the area does take a bit of a beating. For the past eight years, one FES docent has taken on the task of collecting the trash in his personal attempt to keep the beaches, walkways, parking lot and highway clear of debris. Ray Hopkins took on this task, as he modestly explains it, "Because it needed to be done". Almost every Tuesday morning, this dedicated volunteer has picked up the litter that accumulates at the rookery. In January 2015, Ray will retire from this task but visitors will still be lucky enough to encounter him along the walkways as he will enthusiastically continue to interpret seal activity. A retired aerospace engineer, Ray became a docent in the spring of 1998 and has unselfishly volunteered for this added task. Join us as we publicly thank Ray Hopkins for his service. He is, indeed, a very special FES docent.