



## FRIENDS OF THE ELEPHANT SEAL E-SEAL NEWS

FALL  
2013



### A Rest for the Young

In August some adult males may still be on the beaches at the Piedras Blancas elephant seal viewing site, finishing their annual molt, when they grow new skin and hair and shed the old. These males are the last age group to molt in the round robin process that brings different ages to the beach in different months throughout the summer. The big males will leave, one by one, and head north again on their long round-trip migration to forage in the north Pacific, mostly in Alaska waters, bulking up for months of fasting when they return in late November and early December to begin the birthing and breeding season.

As they leave, a new chapter in the migration pattern will begin. We call it the fall haul-out. Young elephant seals, up to about six years old, will come in from the sea and rest on the beaches for about a month. Among them are what we call "young of the year," youngsters that were born in early winter. They have survived perilous journeys, and recent research has discovered that some of them travel as far as Alaska waters their first year at sea.

Researchers have sought to discover why these juvenile seals come in because there seems to be no good reason, as there is in the birthing, breeding, and molting seasons. It appears to be a resting time, but it may also serve as a time for their bodies to strengthen their bones. While they are at sea for months at a time, they are almost weightless, and scientists suggested that, like astronauts, they may lose bone mass. Researchers did MRI tests on some of these young seals when they first came in in the fall and again just before they left and they found that the seals did gain bone mass while get-

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For up-to-date information, visit our web site at [www.elephantseal.org](http://www.elephantseal.org)

### It's In the Blood

Setting the dive-duration record for northern elephant seals (NES), a large bull sustained a dive for 124 minutes. How can an air-breathing mammal stay under water that long?

The record dive-duration for humans is 19 minutes, 21 seconds. Prior to his dive, this free dive champion hyperventilated for several minutes while breathing pure oxygen. At the moment he entered the water, the human diver's hematocrit (percentage of circulating blood volume occupied by red blood cells) was at its peak. And these red blood cells were packed with oxygen. Hematocrit peak is not reached in a diving NES until 15 to 25 minutes into the dive. How is this possible?

In the long-duration dives of marine mammals, size matters; but it must not be the primary factor. Sperm whales, much larger than NES, can dive nearly 3,000 feet deeper, but fall short of NES' dive -duration by more than 40 minutes. Why?

The answer to all these questions: It's in the blood.

It is not the size of the animal, but the ratio of blood volume to total body mass that really matters. Human blood volume is roughly 7%, a sperm whale about 19%, and a NES nearly 22%. A 5,000 pound NES bull, carries about 1,075 pounds of blood that is 50% richer in hemoglobin and twice the volume of a land mammal the same size.

NES long-duration dives require both the storage of oxygen "on board" and the reduction of oxygen use while diving. When a NES dives, an automatic dive response changes its blood flow. To conserve body heat, blood is expressed from the skin (peripheral vasoconstriction) and redirected under the blubber layer for distribution to the brain and other major organs. The heart rate slows (bradycardia) increasing both the circulation time and oxygen use between heartbeats. The rate of metabolism drops so the seal consumes less oxygen because it burns less fuel.

But neither the high volume of stored oxygen nor the efficiencies employed to conserve it can explain why the percentage of red blood cells in circulation increases rather than decreases during the first 15 to 25 minutes of a NES dive. What does explain it? Blood volume partitioning.

Our free dive champion can increase his time un

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## What's New

### New Docents

Six new docents went through training this spring.

### FES sponsored internships:

We have just completed the initial phase of the internship program between The Marine Mammal Center (TMMC), Cal Poly and FES. The internship was at the TMMC operations in Morro Bay which has responsibility for rescue, animal care & treatment/release of pinnipeds, cetaceans, and sea otters along the California coast.

The interns were involved in rescues and animal care for 5 months during the post weaning period for elephant seal pups and the stranded sea lion pups. They gave presentations to the FES docents entitled "An introduction to common diagnoses and research by the Marine Mammal Center" and "Elephant seal rescue and rehabilitation procedures." Others attending included representatives of TMMC, CalPoly and State Parks.

### The FES Endowment Fund

*The Friends of the Elephant Seal Endowment Fund* is now fully operational. The fund assets will be managed for FES by the San Luis Obispo County Community Foundation. The management agreement was signed on June 19 by FES President Brandt Kehoe and Barry VanderKelen, the Foundation's Executive Director.

An initial transfer of \$30,000 from FES cash reserves established the fund's assets. Within hours of the contract signing, four individuals made gifts to the endowment fund. Organized to receive gifts of cash, property, stocks and other negotiables, a full range of tax-deductible opportunities will be established—including memorial gifts, remainder trusts and other options. *Friends* wishing to explore gift options should contact Donovan Marley, Membership Chairman.

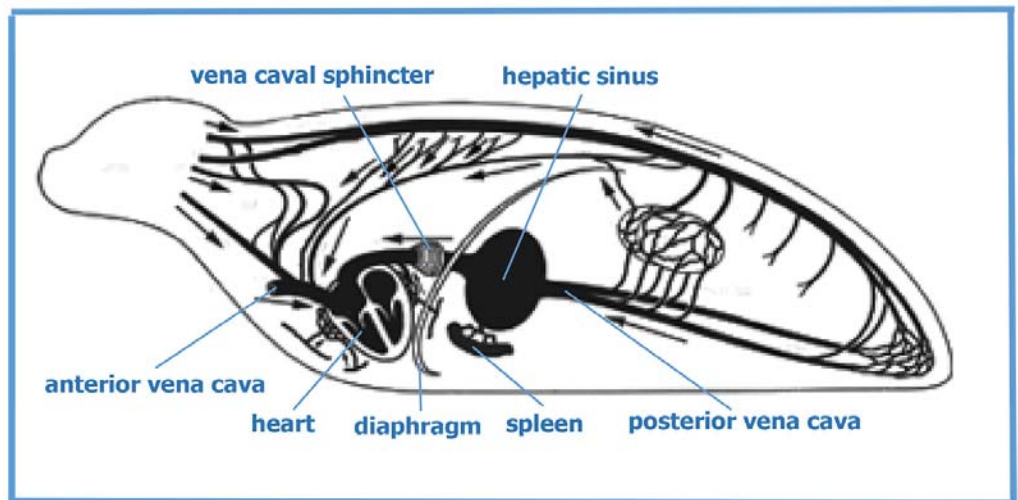
## It's in the Blood

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der water by strapping on SCUBA gear that includes an extra tank of oxygen. NES carry an extra supply of oxygen-rich red blood cells in a "tank" that is partitioned from the circulating blood until it is called into service.

This tank is the spleen. The spleen of a NES stores up to 3-1/3 quarts of red blood cells. When triggered by the automatic dive response, the spleen contracts and in less than three minutes sends 84% of its contents into the hepatic sinus, a balloon-shaped reservoir formed by the widening of the posterior vena cava where the two major veins that return blood from the lower half of the body are joined.

The hepatic sinus is a mixing chamber where uncirculated red blood cells are added to venous blood returning to the heart. Between the heart and the hepatic sinus is the vena caval sphincter—a muscle that opens and closes to ration new red blood cells to the heart for circulation throughout the body. This process steadily increases the percentage of red blood cell in circulation until peak hematocrit is attained 15 to 25 minutes into the dive.



### Docent Training Scheduled for September and October

Would you like to become more involved with Friends of the Elephant Seal and increase your knowledge about our wonderful seals? If so, you should consider applying to be an FES docent and participating in our fall docent training.

This year's fall training will take place in two stages: FES Basics on September 14 - an introduction to elephant seals, mentoring and scheduling; during the next month trainees will participate in three mentoring sessions, working with experienced docents who we help them structure their presentations to visitors. The next stage will be held October 12, 19, and 26, and will include more information on elephant seals, other pinnipeds, whales, otters, birds, sharks and other information relevant to our location at Piedras Blancas. "We pride ourselves on our speakers and the depth of information in our docent handbook," says Bette Bardeen, chair of the docent training committee.

Docents are expected to commit to volunteer for at least a year and to sign up for three or four shifts each month, depending on the distance they live from the Piedras Blancas rookery. If you are interested, please complete the application that can be found on the FES website under [Become a Docent](#), and you will be contacted by a member of the training committee.

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ting gravity back and making weight bearing movements on the beach.

Another theory about the fall haul-out is that it gets these juvenile seals into the migrating and fasting pattern that will bring them back to the rookery for the birthing and mating season later in their lives.

During this fall haul-out some of the seals play in the water or with each other now and then, but for the most part they are conserving energy because they are fasting during their month-long beach vacation. The seals that are playing are young males, playfighting as they practice for the real challenges they will face as adult males. These play-fights are one way of recognizing the males in the group. When they are this young, it isn't easy to tell the males from the females because the males have not yet developed the proboscis that gives elephant seals their name. When he is about four or five, a male develops a little pointy rat-like nose that will broaden out in the next few years and eventually become a trunk-like appendage when he matures. The females just keep their sweet, dog-like faces.

As the juveniles leave, the subadult males will come in to rest, and when their haul out is ending,

**Record Number of Births**

The 2013 birthing season set another record on the number of new pups born. Over 5000 pups were born with just over 4800 surviving to early March.



**Highlighting a Docent**

We are beginning a column for you "Highlighting a Docent" so you may get to know the volunteer guides, dressed in royal blue at the Piedras Blancas viewing site better. Our first column features the 2012 Docent of the Year, Judy Thompson.



Judy began her guide duty in 2006, has been an active member of our Fall Docent Training Committee and currently chairs our School Program. Prior to her retirement, Judy was a Special Needs teacher and an attorney. Judy was not just any Special Needs teacher; she had and has a "calling". Her talent shines so brightly that kids of all types (including us big kids) respond to her with great enthusiasm. She makes the entire process of learning FUN, FUN, FUN!

Interesting career combination, special needs teacher and attorney. After Judy began her career as a special needs teacher she decided she needed a way to advocate for the parents of her kids in the legal system, leading her to law school. In this capacity she also served as the "Public Guardian for Vietnamese Unattended Minors" (the boat kids). All this lead her to many awards, including "Teacher of the Year" in Orange County, CA.

As chairperson for our newly enhanced School Program, Judy and her team have created a comprehensive program, coordinating with the California Standards that teachers utilize in their teaching curriculum. The program will typically consist of Friends of the Elephant Seal visiting the school classroom before the kids visit Piedras Blancas viewing rookery, meeting the kids at the viewing site on a specified date and providing material for after the visit as a conclusion to the process.

2013 sees Friends of the Elephant Seal rolling out an additional benefit for some schools wherein a grant is applied for by the invited school and, if accepted, FES will subsidize the cost of transportation to and from the viewing site. Six schools in the San Luis Obispo County have been invited, completed the application process and received the grants being offered for the upcoming season. FES chose to invite the schools least likely to have funds available for field trips this first year as well. Look for program success stories in our future member newsletters.

**Piedras Blancas Elephant Seal Population**

