



BRINGING UP baby

BRITTANY STEFF

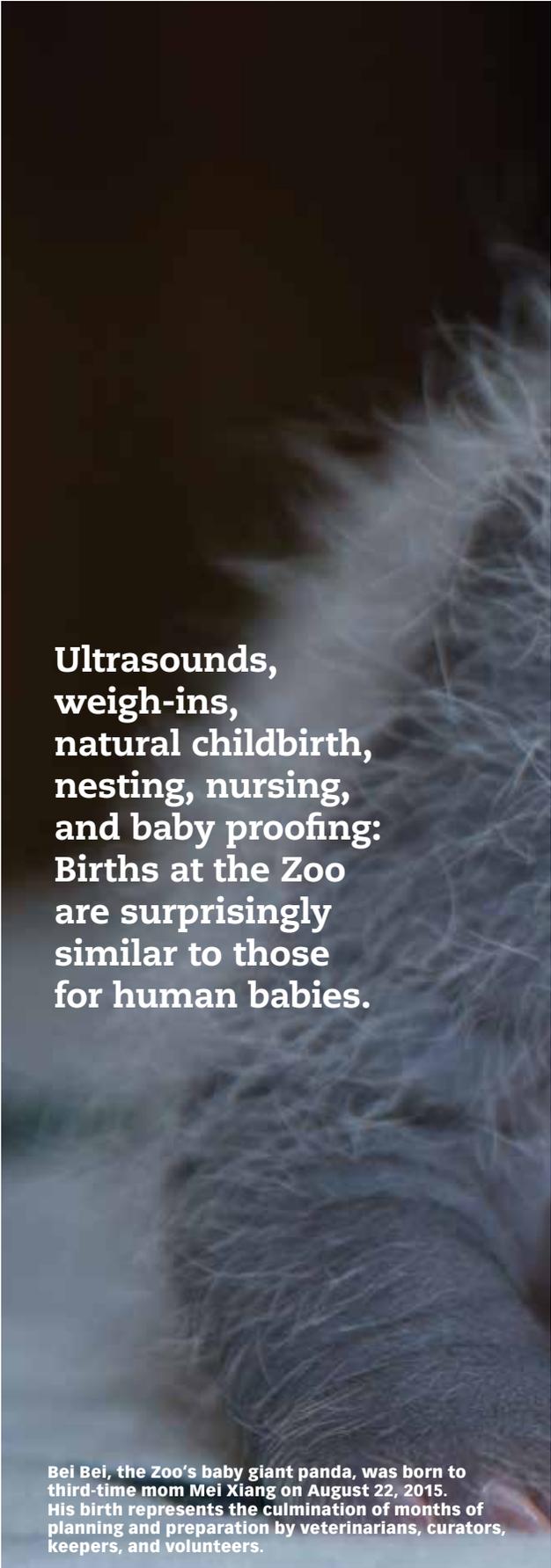
It's a tale as old as time. A couple decides to have a baby. They cease contraception and watch hopefully for signs of a ripening pregnancy, tracking the mother's weight and making sure she gets prenatal care.

Once the bundle of joy arrives, there's an adjustment period for everyone involved. The baby gets checkups. The parents alter their environment to be safer for the baby, and begin teaching the baby how to be a human.

While the babies at the Zoo have scales, fuzz, or feathers rather than sweet-smelling baby skin, the stories of their births are strikingly similar.

The Nesting Instinct

Preparation for birth begins before the babies are anything more than a twinkle in the eye. Animal care staff make plans and talk through scenarios. In most, if not all cases, a husbandry manual and a breeding protocol already exist: documents that are shared across Association of Zoo and Aquarium (AZA) accredited institutions.

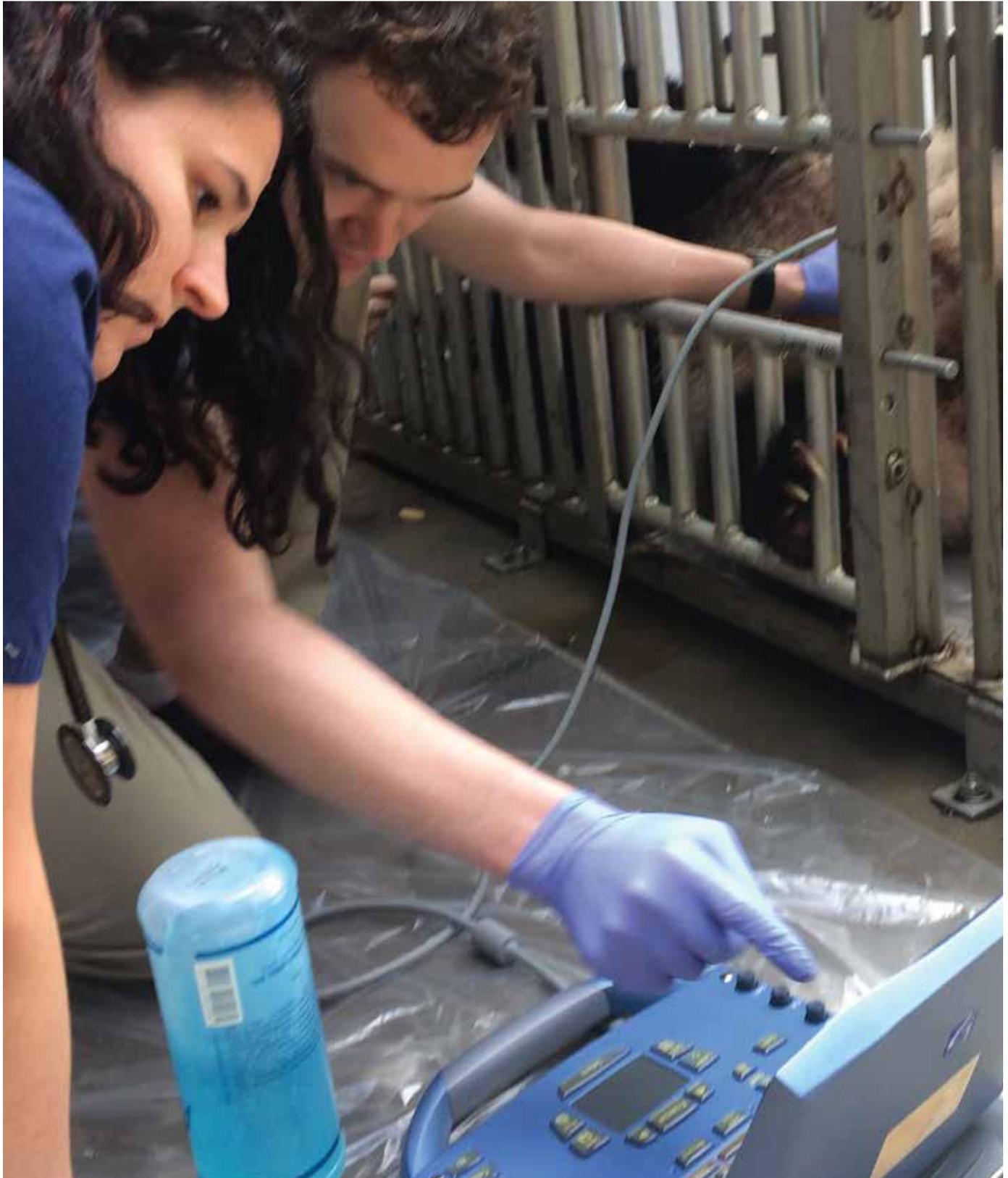


Ultrasounds, weigh-ins, natural childbirth, nesting, nursing, and baby proofing: Births at the Zoo are surprisingly similar to those for human babies.

MEGHAN MURPHY/INZEP

Bei Bei, the Zoo's baby giant panda, was born to third-time mom Mei Xiang on August 22, 2015. His birth represents the culmination of months of planning and preparation by veterinarians, curators, keepers, and volunteers.





Zoo veterinarians and animal care staff use ultrasound to look for signs of pregnancy and track fetal development in a range of animals, many of which have been trained to voluntarily hold still for the non-invasive exam. Here, Mei Xiang allows TK name and TK name to perform an ultrasound on June 9, 2015. A later ultrasound revealed the fetus shown in the insert.



In species where the males and females don't live together year round, such as the sand cats, fishing cats, tigers, and sloth bears, the first step is allowing the couple access to each other. In other cases, such as lions, orangutans, gorillas, seals, and sea lions, it's a matter of ceasing contraception.

Some animals—such as some reptiles, amphibians, and birds—breed every year at the same time. For others, setting the mood can require a bit more work. For example, some species of reptiles and amphibians need environmental cues to breed, which can include changing amounts of sunlight, rainfall, humidity, and other variables that scientists haven't begun to decode yet. According to Reptile Discovery Center keeper Lauren Augustine, getting them to breed can be more of an art than a science.

"We base their conditions on their natural history," Augustine says. "A lot of it is seasonality. We have skylights, so we get a natural daylight cycle. But we can vary humidity and temperature. When the barometric pressure is low, as it would be in the rainy season in many of these animals' natural habitat, we see an increase in eggs."

Animals can alter their own environments to prepare for babies, too. Most obviously, birds build nests. Often having access to the correct kinds of nesting supplies can both increase the chances of successful offspring and cement a pair's bond.

Crocodiles, like the critically endangered Cuban crocodiles that hatched this summer, make nests (often out of heaps of mulch and dirt) and so keepers make sure they have the nesting material they need.

Bears also nest. Giant panda Mei Xiang builds an enormous bamboo nest each year, and sloth and Andean bears both pad their dens with hay. Keepers line lion and tiger dens with special seedless hay, ensuring that the cubs have a safe, soft, warm place to be born.

Prenatal Care

As with humans, medical care is extremely important for expectant animal mothers. One of the most important aspects of confirming a pregnant mother's health is tracking her weight, which can give clues to her health and how far along she is in a pregnancy. Almost all Zoo animals are trained to be weighed frequently, giving keepers and veterinarians a baseline weight against which they can track pregnancy weight gain.

Unlike human mothers, though, zoo mothers don't often change their diet much during pregnancy. "Our animals' diets are already healthy enough to support them

Even more impressive, a strikingly large percentage of the Zoo's mammals cooperate for abdominal ultrasounds.

through a pregnancy," explains Zoo nutritionist Erin Kendrick. "We just make tweaks based on the individual's and species' needs."

That's not to say that diets don't vary at all. Birds may receive extra calcium to make up for the enormous amount they put into making eggshells, and orangutans and gorillas often get the same kinds of prenatal vitamins that human mothers use.

Animal care staff may track an animal's hormones and immune system through blood draws. Many Zoo animals—not just mothers and prospective mothers—will voluntarily participate in a blood draw in exchange for appropriate compensation: a tasty treat.

Even more impressive, a strikingly large percentage of the Zoo's mammals cooperate for abdominal ultrasounds. The list includes lions, tigers, Andean bears, sloth bears, giant pandas, anteaters, orangutans, gibbons, gorillas, and even seals and sea lions. And this year, for the very first time, Zoo veterinarians saw a fetus on Mei Xiang's ultrasound three days before she gave birth to twins.

BRINGING UP baby

“Mei’s personality is just such that, during the last 20 days of a pregnancy or pseudo-pregnancy, she gets a little bit more reclusive, and more reluctant to participate in ultrasounds,” says Zoo head veterinarian Don Neiffer. “The day we got the images, nobody expected her to participate. She walked away three times. But then she came back, and we were ecstatic that we got images.”

Once something has been spotted on ultrasound, or once keepers have calculated a likely birth window, the animal care team goes on high alert.

Mothers on the verge of giving birth are often fractious and want peace, privacy, and quiet. Often keepers will give mothers a den or enclosure—or in the case of seals and sea lions, a pool—to themselves. Typically, this is in a quiet area off-exhibit and off-limits to non-essential personnel. Keepers typically monitor these areas using webcams.

“We keep a close eye on expectant moms, especially first-time moms,” says Small Mammal House keeper Kenton Kerns. “We’re keeping everyone—the vets, the nutritionists, and the other keep-

ers—up to date all the time. The whole Zoo is always in tune with new babies. It’s a team effort.”

Mother Knows Best

Labor often seems to be a rude surprise for first-time mothers. But natural instinct kicks in, and labor is rarely as painful or as protracted as it is for humans.

Throughout the Zoo—whether you’re talking to people who work with elephant shrews or elephants, gorillas, gazelles, or gharials—the keepers all say the same thing. The best outcome is for the mother to raise the babies herself: with help from a mate, if she would have help in the wild; within a den if that’s what her wild cousins prefer; or with a laissez-faire approach if that’s biologically appropriate.

“Nothing can replace moms,” says head veterinarian Neiffer. “They have evolved and adapted to provide exactly the care and nutrition to best promote the baby’s mental and physical development.”

No one teaches a mother animal how to be a mom. They can’t read mommy blogs, and there is no “What to Expect” when you’re about to lay several thousand frog eggs. So animals mostly rely on instinct—which is a remarkably strong force. And social animals, such as the great apes, elephants, and lions, often learn from watching their mothers, sisters, or aunts raise their young.

Most of the mothers at the Zoo are remarkably successful, and only get more comfortable with each successful birth. But sometimes humans have to step in, however reluctant they are to do so. The Zoo always has a hand-rearing plan ready, just in case.

When sloth bear Khali abandoned her cub in December 2013, the animal care team swooped into action. They removed the surviving cub, a female later named Remi, and hand-reared it. Since wild sloth bears carry their cubs on their backs, keepers wore Remi around in a Moby wrap. When she grew large enough they put her next to, and then in with, other sloth bears so she could learn how to be a bear.

Keeping an animal secure in its own identity is of paramount importance. Happily, bears rarely strongly imprint on their



American flamingos are one of many bird species that routinely lay eggs and raise chicks in the zoo’s Bird House.

MEGHAN MURPHY/ZZP

Chicks often sit in front of their mirror, admiring that handsome chick they share an enclosure with.



human handlers. With other animals, such as birds and great apes, maintaining that boundary is more difficult.

When birds are hand-reared, keepers always put a mirror in with them. Their reflection appears to comfort them—perhaps providing them with a sense of companionship when the keepers aren't with them—and also serves to remind the chicks that they are birds, not humans. Chicks often sit in front of their mirror, admiring that handsome chick they share an enclosure with.

In other situations, mom might be the best at caring for a baby, but may not be able to provide all the right nutrients. Nursing mothers get extra food and vitamins, but sometimes their breast milk supply just isn't large enough. Many animals, including the great apes, are trained to allow veterinarians to get a milk sample. This allows animal care staff to track the mother's milk production, and confirm that she is producing enough to feed her young. The milk may also be added to the Zoo's milk bank—a stock of thousands of samples of milk that researchers use to study how the fats and nutrients in milk vary across species and between individuals.

With gray seal mom Kara, pup Rona wasn't gaining enough weight. In the wild, gray seals only stay with their mothers for three weeks, so that nursing time needs to be jam-packed with calories and fats. Animal care staff worked hard to keep Rona with her mom—but also supplemented her nursing with a "formula" made mainly of powdered formula and fish oil.

The staff at Great Apes is prepared for a full range of baby-care intervention, if necessary. The keepers are hoping for



JESSIE COHEN/NZP

Kori bustard chicks are always raised by hand at the Zoo; a safeguard against predators. The chicks are housed with mirrors, and appear to be comforted by the presence of their reflection. This helps prevent the birds from bonding with their keepers.

an orangutan and/or gorilla baby within the next three years, and have already established plans for having a surrogate mother care for a baby if the mother rejects it, bottle feeding a baby who's not getting enough nourishment from breast milk, and hand-rearing the baby completely if necessary—but in an enclosure that would keep adult animals in view at all times, in an effort to remind the baby that she is a non-human ape.

The most recent example of hand rearing came with the birth of Mei Xiang's giant panda twins on August 22, 2015. In the wild, when giant panda mothers give birth to twins, only one survives. At the Zoo, when Mei Xiang unexpectedly

gave birth to a second cub four hours after the first, it was only the third time a giant panda in an American zoo had done so. The plan, as established by the giant panda Species Survival Program, is to keep one cub with the mother at all times, rotating which cub is in human and panda care, so that both cubs have the benefit of time with their mother.

Unfortunately, one of Mei Xiang's cubs was smaller than the other and had respiratory problems. Despite the care of a large and passionate team of experts, the cub died in one of the heartbreaking truths of birth: sometimes everyone can do everything right, and the birth can still end in an early death.

BRINGING UP baby

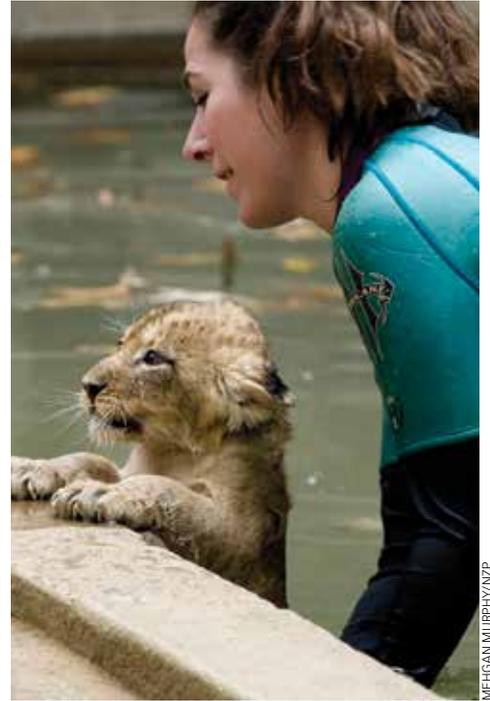
TOP LEFT: Before they are allowed outdoors, each lion and tiger cub born at the Zoo must prove that it is strong enough to swim to the edge of the moat. This ensures the cubs' safety if they accidentally fall into the water while exploring their outdoor yards. Here, a lion cub is wrapped in a towel after successfully passing its swim test.

TOP RIGHT: Every lion and tiger swim test is carefully observed by their keepers, several of whom venture into the moat with the cubs.

BOTTOM: All Zoo babies receive species-appropriate veterinary care. Here, a giant anteater cub is given a vision exam.



JENNIFER ZOON



MEGHAN MURPHY/NZP



MEGHAN MURPHY/NZP

Cub Care

A human baby is given a check-up almost immediately upon birth. For Zoo animals, that checkup is often delayed weeks or even months, and staff may not even know the sex of the babies.

In the wild, bears often stay with their cubs for months before leaving the den, though the exact time varies with species and individual preferences. Animal care staff often have to wait until the mother is comfortable leaving the cubs for short periods of time, then be ready to spring into action to weigh and sex the cubs, and have them back in the den before Mom gets worried about them.

Great cats leave their cubs earlier, and because of the close relationship the Zoo's cats have with their keepers, they often even bring their young up to mesh or windows for the keepers to see.

Before cubs can be allowed out on exhibit, animal care staff ensure the animals are healthy and will be safe outside. Keepers carefully go over their enclosures to look for any tiny gap or hole that young animals could slip through or any other potential hazards for the smaller animals.

Carnivores are all vaccinated against rabies. With the larger animals, keepers carefully cushion any potential places a baby could fall and, for the lions and tigers, conduct swimming tests to make sure the cubs know what to do if they fall into the water-filled moats that line their yards.

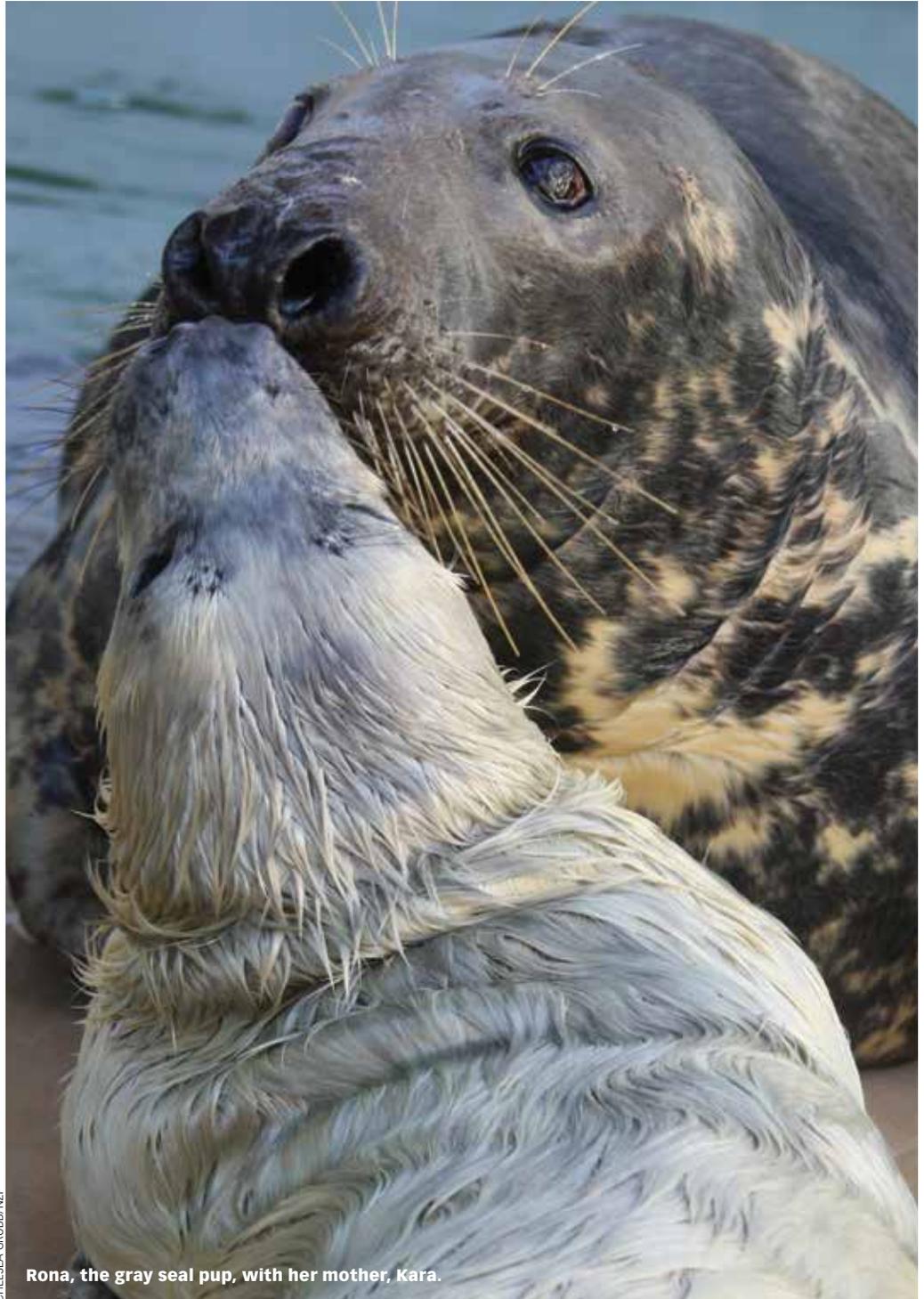
Getting out of deep water is important for seals and sea lions too, and keepers install floats and ramps to be sure the rotund little pups can get out of the water.

"It's important for people to know that we do not approach our newborns with a broad brush," says Neiffer. "We consider the individual's and the species' needs. And the entire Zoo—the husbandry, nutrition, and veterinary teams—all work together."

The Zoo's goal is always to provide the best care for the individual animals—and for the species. Each birth, after all, isn't just a cute and cuddly addition to the family. It's a conservation success, and a step forward on the path to saving species. **SZ**

BRITTANY STEFF is an editor for the Zoo's website and a veteran Smithsonian Zoogoer contributor.

Animal care staff often have to wait until the mother is comfortable leaving the cubs for short periods of time, then be ready to spring into action to weigh and sex the cubs, and have them back in the den before Mom gets worried about them.



CHELSEA GRUBB/NZP

Rona, the gray seal pup, with her mother, Kara.