

AAV

magazine

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2022

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UNDER SIEGE



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First Word

THE ELEPHANT (SEAL) IN THE ROOM

Thanks to a friend and colleague in California, I learned of the extraordinary wintertime return to land by elephant seals and witnessed it myself. The massive seals (males can weigh over 2 tons) come ashore to bring pups into the world and to mate. I had the thrill of actually seeing a mother give birth, with the emerging baby encased in a shiny silver-black film. Dozens of seals were right at the edge of the water, and dozens more “hauled out” on land. We saw single males off in the dunes—too young to compete but too old to be tolerated by protective alpha males? Several of them bore scars, either from fighting or from narrow escapes from such predators as orcas and sharks. Some of the scars may also have been from encounters with fishing gear or boats.

The oceans are full of man-made hazards, including plastic waste and deafening sound from shipping and military exercises. It's an invasion of wild space that is pervasive and causes devastation that most of us don't see. Without intervention, the animals don't stand a chance against human appetites, carelessness, and greed. Their only hope is *other* humans who pledge to defend them.

Fortunately, humans did come to the aid of elephant seals when they were on the brink of extinction from hunting in the late 1800s. Today their populations have rebounded impressively, thanks in large part to the national parks that protect their habitat and laws that prohibit human interference.

Can we help aquatic animals today? Maybe. There is one thing that we can all do: revise our dietary habits. The fact is that the fishing industry is ruthlessly depleting aquatic populations, and there is no stronger message to a company than reduced sales.

What about captive-bred fish? Not so fast. AAVS learned of research on genetically engineered salmon intended for fish farming more than a decade ago and has worked with environmentalists and other advocates to oppose that cruel but potentially lucrative activity. The animal welfare issues are shocking, and the callousness is too.

For those of us who care about animals, the best path is to walk away from supporting fishing industries that are killing animals in the name of everyday consumers. Why don't we just leave the fish for the seals?



Sue A. Leary, President,
American Anti-Vivisection Society

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Briefly Speaking

NEWS YOU NEED TO KNOW

ARDF Grants Develop Non-Animal Research

The Alternatives Research & Development Foundation (ARDF), an AAVS affiliate, announced the 2022 awardees of its Annual Open Grant program, which funds innovative alternative methods that reduce or replace animal use in research and testing. These new grants total nearly \$240,000 for six projects that span a broad range of scientific areas.

"This year's awards point to the trend of applying non-animal methods to biomedical research, which is exciting to see," said Sue Leary, President of ARDF. "We are confident that all of the funded projects will contribute to important fields of research."

Three projects will study cancer, a promising area for the development of alternatives because animal models are often poor predictors of successful clinical therapies. The Children's Hospital of Los Angeles will create a 3D *in vitro* model to study diffuse intrinsic pontine glioma (DIPG), a pediatric brainstem tumor with a tragically high lethality, while the Albert Einstein College of Medicine will use organoid models to examine why some anti-cancer drugs previously developed using animals don't work in humans. These projects are both exciting advances in the field of drug development using human-specific models. Elsewhere, researchers at the Università Vita-Salute San Raffaele in Italy will

use 3D bioprinting and dynamic growth in bioreactors to study the dissemination of cells in Chronic Lymphocytic Leukemia (CLL).

Other grant-funded studies will focus on different non-animal approaches to biomedical and toxicology research. The University of Pittsburgh will use transgenic "mini-Joints" on a chip to replace animals used to develop treatments for osteoarthritis. A researcher at Pace University will develop an *in vitro* culture system to advance research on a parasitic infection that is the second-leading cause of death for young children in developing countries. In addition to replacing the use of animals, this *in vitro* system would provide a deeper understanding of the parasite's life cycle for drug development. At the University of North Carolina, Chapel Hill, scientists will devise a computational model to predict the sensitivity of different species to environmental contaminants.

These awards expand ARDF's already diverse funding portfolio of research focused on replacing and reducing the use of animals in research, testing, and education. By supporting the development of alternative, animal-free models, ARDF continues to advance both animal welfare and human health. Learn more at www.ardf-online.org/ardf-grants.



More Airlines Halt Primate Transport



THE TRANSPORT OF PRIMATES for use in research has been controversial for years, and now there are three fewer airlines contributing to this cruelty. Air France, Kenya Airways, and Egyptair announced in 2022 that they will no longer transport primates for research purposes.

The many dangers associated with primate transport were documented in AAVS's 2011 report "Primates by the Numbers: The Use and Importation of Nonhuman Primates for Research and Testing in the U.S." We found that during transport and required quarantines, primates are at risk of suffering and dying from pneumonia, dehydration, trauma, and stress, or being euthanized due to testing positive for tuberculosis.

These severe health problems are likely related to primates being shipped long distances on multiple flights. We found a shipment of macaques lasting at least 27 hours on three flights from Mauritius (an island off east Africa) to Texas, and another traveling by plane and truck on a journey lasting longer than 56 hours from Indonesia to Louisiana.

While Air France quietly announced on Twitter that it would no longer transport primates for research, Kenya Airways' statement came days after a January 2022 crash on a Pennsylvania highway involving 100 macaques being transported from Mauritius to an undisclosed research facility. Three monkeys who escaped from damaged crates were later shot and killed. Egyptair made its announcement after activists revealed it was transporting primates for research.

Long-tailed macaques are the most common primates in research, often used in highly invasive experiments causing extreme distress and suffering, including infectious disease and biological weapons testing, developmental and neurological research, and addiction studies. This occurs despite this species being listed as vulnerable by the International Union for Conservation of Nature's Red List of Threatened Species.



USDA TO RELEASE FINAL BIRD REGULATIONS

BY FEBRUARY 22, 2023, the U.S. Department of Agriculture (USDA) will publish its long-awaited regulations for the protection of birds under the Animal Welfare Act (AWA).

Birds covered under the AWA are exploited commercially for exhibition, breeding, the pet trade, and certain types of research. But although the AWA has required the USDA to protect birds for over two decades, the agency refused to write regulations, and countless numbers of birds likely suffered and died because of its failure to do its job. But AAVS was determined to hold the USDA to its legal responsibility. As a result of a 2018 lawsuit filed by AAVS and our co-plaintiff, the Avian Welfare Coalition (AWC), the USDA agreed to a federal court's order to enact regulations to protect birds within a specific timeline.

The regulatory process calls for public input, and AAVS organized the effort with other animal protection organizations to submit formal comments. Because birds have a wide variety of specific psychological, physiological, and behavioral needs, the comments required special expertise. AWC led drafting of species-specific standards for birds, calling for high standards of housing and care wherever birds are in captivity, taking into consideration the unique requirements of flighted animals and waterfowl. The USDA recognized the validity of many of our legal, scientific, and ethical arguments, which were incorporated in the draft regulations it released last year.

Another round of comments on the draft demonstrated, once again, the public's concern about birds being protected from those that exploit them; the USDA received more than 30,000 comments, the vast majority in favor of strong regulations. AAVS will report when the final regulations are published, along with an assessment of whether they will adequately protect birds.

Amid Welfare Allegations, Research Breeder Closes

FACING SERIOUS ANIMAL WELFARE ALLEGATIONS following an undercover investigation and a lawsuit brought by the U.S. Department of Justice (DOJ), the animal research breeder Envigo closed its Virginia facility in July 2022. As part of an agreement with the DOJ, Envigo also released nearly 4,000 beagles and puppies (most of whom were destined for use in laboratories) to The Humane Society of the United States, which coordinated a massive adoption effort to ensure the dogs' safe transfer to select shelters and rescue groups across the country.

Not only do these dogs now have a much-deserved chance for a happy life with a loving family, they've also been spared from a lifetime of misery being used in potentially invasive experiments. According to U.S. Department of Agriculture (USDA) data, 48,111 dogs were held and used in laboratories in 2021, with 13,143 categorized as experiencing pain and distress. Dogs are often used in drug and chemical testing, as well as research on such conditions as heart disease.

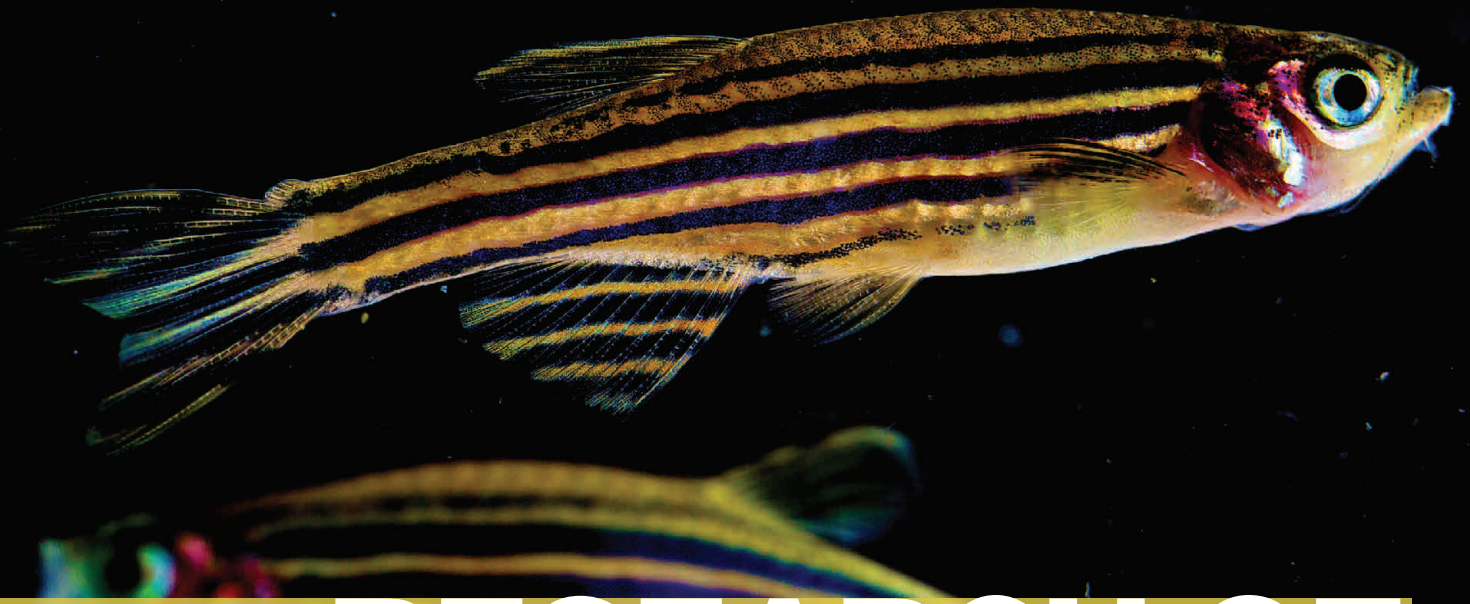
The USDA is congressionally mandated to enforce the Animal Welfare Act by regulating facilities such as breeders and laboratories, but its failures are on display when cases like this come to light.

LEAPING BUNNY LAUNCHES CHINA QUALIFICATION PROGRAM

Updates to China's regulatory requirements have made it possible, under specific circumstances, for cosmetic brands to sell products in China and still avoid animal testing. Several compassionate companies expressed interest in this new opportunity, so the Coalition for Consumer Information on Cosmetics, chaired by AAVS, announced its new Leaping Bunny China Qualification Program to help current Leaping Bunny-certified companies enter the Chinese marketplace, while remaining in compliance with the cruelty-free standard. Leaping Bunny is partnering with the trusted regulatory experts at Knudsen & CRC, based in Shanghai, which will conduct pre- and post-market audits, with full disclosure to the Leaping Bunny team. Companies will also sign an agreement to recall products rather than allow animal testing, should the Chinese government demand it.

"We are thrilled to partner with Knudsen on this important project. They are a reputable consulting agency that has a complete understanding of the requirements of the Leaping Bunny Program and are steadfastly dedicated to helping end animal testing in China," said Kim Paschen, Leaping Bunny's Program Manager. "We are confident that any company that passes their strict audits is avoiding animal testing in China."

The first company to successfully have passed the pre-market audit is Burt's Bees, which now sells a selection of their lip balms domestically in China.



RESEARCH OF A DIFFERENT STRIPE

BY ANGELA HVITVED

WHEN YOU IMAGINE an animal research facility, the first thing that comes to mind is likely a room with racks of small plastic boxes with scurrying white mice, or rows of metal cages housing monkeys. However, over the past few decades, another sight has become increasingly common: dozens, sometimes hundreds, of racks of small, plastic aquaria containing thousands of minnow-sized fish.

The zebrafish (*Danio rerio*) is a small, freshwater fish that—like its namesake—has narrow dark stripes along its body. While fish might not be the first lab animal you think of, zebrafish have become a popular model organism for biomedical and toxicological research, and their use has expanded significantly since the first studies using zebrafish were published in the 1980s.

WHY ZEBRAFISH?

Researchers cite several reasons for the increasing popularity of zebrafish. They are relatively small and easy to keep (com-

pared to mice and other mammals), and they reproduce and grow quickly. The zebrafish genome was sequenced in 2013, and researchers have created many well-characterized genetic mutations for study. All these factors make zebrafish a convenient model organism. That said, most zebrafish research is not actually focused on adult fish. Instead, the life stage of greatest research interest is the zebrafish embryo. In most research labs, adult fish are primarily used for breeding purposes to obtain embryos.

Zebrafish embryos are widely used in biomedical research because they are transparent and develop outside the mother's body. This makes it easy for researchers to watch embryos grow in real time under a microscope, something that is very difficult for a mouse embryo. Zebrafish embryos are also used in toxicity testing and to help determine if or how a particular chemical affects embryonic development. Ironically, the use of zebrafish embryos in toxicity testing is sometimes considered an "alternative" to animal

use, since they are used in place of other "higher" animals.

WELFARE CONCERNS AND LEGAL PROTECTIONS

The rapid increase in zebrafish use raises numerous welfare concerns, since researchers acknowledge there is not enough information about welfare to develop best practices. However, even in cases where good evidence currently exists, uptake of best practices and the implementation of additional protections have been disappointingly slow.

For decades, many scientists insisted that fish do not feel pain, and this was used as justification for not providing welfare protections on par with other research animals. However, it is now well established that fish can feel pain, to the extent that researchers are now working on methods to use zebrafish in studies about pain (Ohnesorge, 2021). As evidence accumulates regarding the ability of fish to feel pain and experience other environmental harms, there is an increased

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urgency for welfare protections.

Fish are not protected by the Animal Welfare Act (AWA), an unfortunate similarity they share with reptiles and cephalopods used in research in the United States. They are also not covered by the AWA's reporting requirements. Around 5 million zebrafish are estimated to be used in over 3,000 research facilities worldwide, but the absence of reporting requirements makes it difficult to know how many are used in the United States (Lidster, 2017). The European Union animal use reporting database (ALURES) indicates that 5 percent (about half a million) of the approximately 10.4 million animals used in EU research in 2019 were zebrafish. The National Institutes of Health RePORTER database lists more than 900 projects with "zebrafish" in the title or keywords for fiscal year 2021, with federal funding over \$460 million.

Although fish are not covered by the AWA, they are afforded consideration under the Health Research Extension Act, which applies to vertebrate animals used in federally funded research. This means their use is subject to review by an Institutional Animal Care and Use Committee and some minimum standards of care. However, the significant knowledge gaps regarding welfare mean that even the most well-intentioned caretakers in labs lack sufficient guidance.

URGENT NEED FOR BETTER PRACTICES

A 2016 survey of 98 laboratories worldwide noted several welfare concerns regarding zebrafish care, from housing and handling to euthanasia, and provides a possible roadmap for future welfare studies (Lidster, 2017). One of the most disconcerting findings involves practices for euthanasia and anesthesia. The most common method for anesthesia, which is often also the first step of euthanasia, uses a chemical called tricaine (MS-222). In some countries, tricaine is the only approved anesthetic for zebrafish in research. However, its use raises serious welfare concerns as researchers have reported adverse effects; in fact, over half of respondents to the survey reported observing behaviors such as rapid swimming, gasping, and

THE RAPID INCREASE IN ZEBRAFISH USE RAISES NUMEROUS WELFARE CONCERNS

color change when using anesthesia (the majority of which used tricaine). Furthermore, almost half the respondents acknowledged not utilizing any refinement methods to improve zebrafish welfare during anesthesia or euthanasia (Lidster, 2017). These responses suggest there is tremendous need for additional evidence to support best practices for anesthesia and euthanasia, as well as increased promotion of their use among researchers.

Another critical issue for zebrafish welfare is the continued use of fin clipping for genetic testing. To verify the genetic sequence of fish they will use in experiments, researchers cut off a small piece of the tail to extract DNA. Zebrafish in the wild have evolved to regenerate such tissue, but fin clipping can be quite invasive. The fish are usually anesthetized in tricaine, removed from the water, and laid on a flat surface while a razor is used to clip the tail. Those without the desired genetics are often euthanized, while those kept for use are often isolated in small tanks so they are not mixed up with different fish, which is likely an additional source of stress.

An alternative method for obtaining DNA is to swab the fish's skin to collect mucus and skin cells. It does not require anesthesia and, in a study comparing swabbing to fin clipping, swabbed fish showed a lower stress response (Tilley, 2020). Despite the availability of a refinement method that can improve fish health and welfare, fin clipping remains common.

Given that the zebrafish's natural habitats are freshwater streams and ponds in South Asia, a bare plastic aquarium is not an instinctively familiar environment. Environmental enrichment practices for zebrafish are widely inconsistent, and

mostly involve adding small plastic plants to provide visual novelty and a sense of safety. However, in the 2016 survey of practices, only a quarter of labs indicated using plants or gravel in their tanks (Lidster, 2017). Several studies suggest that tank enrichments can even lead to surprising cognitive effects such as faster learning and longer memory of trained tasks (Stevens, 2021). Additional cost and potential for increased risk of disease are common reasons given for not providing environmental enrichment, but welfare experts continue to find strong scientific evidence supporting the need to overcome these barriers.

LOOKING FORWARD

The rapid expansion of zebrafish research will likely continue. This creates a strong case for protection under the Animal Welfare Act and more consistent, evidence-based practices. It also underscores the need for alternative methods that reduce reliance on zebrafish. As with other animal models of human disease, zebrafish research faces challenges regarding the translatability of this work to humans. These concerns and other ethical considerations are driving progress in novel methods that are truly non-animal alternatives. Although many of these methods are in the early stages of development, they hold the promise of reducing or replacing the use of zebrafish while advancing human health. **AV**

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MINDING NEMO

THE RICH INNER LIVES OF FISHES

BY JONATHAN BALCOMBE

IN EARLY 2022 a team of researchers from Japan and Germany published a study showing that blue-striped cleaner wrasses—a small, widespread reef fish—recognize themselves in a mirror. Upon seeing their reflection, the wrasses responded by investigating and trying to remove a colored mark placed where they could only see it in a mirror reflection. (“Control” wrasses never attempted to remove transparent marks in the presence of a mirror, or colored marks when no mirror was present.)

This is a significant finding, because so-called “mirror self-recognition” demonstrates that the animal is self-aware. To date, only a handful of mostly big-brained animals have passed this test. Such keen social awareness is useful for cleaner wrasses, who make a living by setting up stations on the reef where they remove parasites from so-called “client” fishes of over 100 species.

In this well-studied mutualism involving the exchange of food for a spa treatment, the wrasses also appear to recognize individual clients, which enables them to track how long since a client’s last visit—and thus how many parasites they might have. Cleaners may take more liberties when there are fewer clients queuing up for their services, because their reputations may stand to suffer less. They sometimes nip at the protective (and nutritious) mucus layer covering the client’s skin. Clients don’t like this, which may explain why the cleaners will mollify miffed clients by giving them gentle caresses with their pectoral fins. No wonder ichthyologists have described this complex mutualism as Machiavellian!

In one study, these clever wrasses outscored great apes and a researcher’s 4-year-old child on a test involving learning and logic.

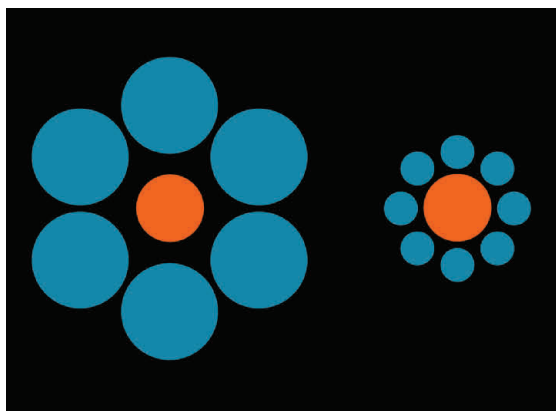
If anyone harbors doubts that caresses could have a pleasurable, calming effect on a fish, consider a study of 32 striated surgeonfishes removed from their homes on the Great Barrier Reef in Australia. Not surprisingly, the abducted fishes were stressed, as confirmed by their high levels of cortisol recorded from a small blood sample. But when the frazzled fishes were given the opportunity to receive strokes from a motorized model of a cleaner wrasse, they sidled up to the model repeatedly, and their

stress levels dropped. A control group of surgeonfishes completely ignored a stationary cleaner wrasse model that could not deliver strokes, and their cortisol remained high. The conclusion: Fishes have feelings, and touch has therapeutic and stress-relieving effects for them. Ethically troubling though this research is, all of the subjects survived their ordeal, and each fish was released in the exact location where he or she had been found.

If fishes can be so smart, how might they respond to a bit of visual trickery? Scientists have presented various fishes with optical illusions originally designed to test human perceptions. One of these is the well-known Ebbinghaus illusion [see figure], in which one of two identically colored (in this case orange) circles appears larger, due to the arrangement of (blue) circles surrounding them. Fishes trained with a food reward to poke their noses against the larger of two circles will in this instance touch the circle on the right.

This response has important implications. If fishes were mindless robots, they would automatically determine that the two orange circles are the same size. But fishes are conscious beings, products of evolution. They have beliefs, and those beliefs, like ours, are fallible. Nature is replete with examples of camouflage, mimicry, and various behaviors that promote survival by exploiting the imperfect perceptions and judgments of other conscious creatures.

As we’ve seen from the fish cleaner-client mutualism described earlier, fish social behavior can evolve high levels of sophistication. Another case in point is the collaborative hunting of grouper fishes and moray eels. The interaction begins with a referential gesture. A hungry grouper swims over a moray’s lair and performs a headshaking motion. This gesture serves as an invitation to the moray that basically translates as, “I’m going hunting, would you care to join me?” It qualifies as referential because it refers to events that will take place later, and in this case elsewhere. If hungry, the eel emerges from her hideaway, and the pair of predators set off, looking for all the world like a pair of Disney characters. Woe betide any little fish targeted by this duo, for if the prey seeks shelter in the reef matrix, the slender moray can



The Ebbinghaus illusion diagram is used by psychologists to gauge an individual's visual perception.



A study showed that stressed surgeonfishes were calmed by therapeutic touch.

follow in hot pursuit. If the target escapes back into the open water, the grouper is waiting to pounce. Divers watching these behaviors in the Red Sea have found that by working together, these two predators achieve up to five times greater success than when they hunt alone. It is also now known that groupers don't collaborate with morays at random; rather, they seek out a competent partner with whom they have had prior success.

If you live among predators like groupers and moray eels, swimming among companions provides improved vigilance against danger. Each individual fish is much safer when there are many eyes and other senses attuned to the surroundings. This is why many fishes prefer to swim in schools or shoals.

Even just a pair of individuals can work together for the common good. Rabbitfishes are colorful reef dwellers who opt for a plant-based diet, nibbling on algae and other vegetation. This diet requires feeding head down on the reef, a position making them vulnerable to lurking predators. While rabbitfish #1 happily plucks away at algae, rabbitfish #2 plays the role of sentinel, hovering above, facing upwards. If trouble approaches, the lookout signals to his companion, and they both dart for cover. During a bout of foraging, the rabbitfish pair repeatedly trade places. This way, they both get to feed in relative safety. The behavior qualifies as virtuous, because the sentinel role entails delayed gratification.

If only humans were as virtuous toward fishes! We catch and kill astronomical numbers, mostly to satisfy our desire to eat them, and to profit from it. Commercial fish catch is measured by weight, but estimates of numbers of individual fishes caught each year range from a few hundred billion to over 2 trillion. Recreational fishing adds another roughly 50 billion to the tally. Add a few hundred billion more for aquaculture—or fish factory farming—and it should come as no surprise that global fish populations have declined by about half since 1970.

But all is not lost. Hundreds of millions of dollars are now being invested in the development of plant-based and cell-cultured fish products, some of which are already appearing in supermarkets and on restaurant menus. Organizations such as Sea Shepherd, Fish Feel, Don't Cage Our Oceans, and The Fish Welfare Initiative are working to change our troubled relations with fishes, as are impactful, award-winning films such as “Seaspiracy” and “The Dark Hobby.”

Just as a cleaner wrasse can recognize herself in a mirror, so can we recognize the steps we must take toward a livable planet for all. **AV**

Jonathan Balcombe, Ph.D., is a biologist and the author of What a Fish Knows, Super Fly, and the children's book Jake and Ava: A Boy and a Fish.

A Legal Leg Up for Octopuses

by Katherine A. Meyer

I'M PRETTY SURE that if I asked my 3-year-old niece if an octopus is an animal, she would unhesitatingly say, "Yes!" So why is it that the National Institutes of Health (NIH), which doles out tens of millions of taxpayer dollars every year for research on animals—including experiments on cephalopods, which include octopuses, squid, and cuttlefish—does not consider these creatures to be "animals" regarding the agency's requirement that those used in federally funded research be treated "humanely"?

Two federal laws generally govern the way animals used in research must be cared for. The first is the Animal Welfare Act (AWA), passed in 1966, which requires the U.S. Department of Agriculture to establish standards for the "humane treatment" of all animals used in research. The statute defines "animal" to include only certain "warm-blooded"

animals, so cephalopods are not covered. Changing the statutory definition would require an act of Congress—not something easily accomplished on any front these days.

The second law is the Health Research Extension Act of 1985, which does not contain a definition of "animal," but provides that the NIH shall establish guidelines for "[t]he proper care and treatment

of animals used in biomedical and behavioral research," and also conditions federally funded research grants on the "assurance" that such guidelines are being met. Thus, technically octopuses are already included within the breadth of that existing statute because clearly they are animals (as opposed to plants or inanimate objects), and are used in biomedical and behavioral research. In fact, more than 3,000 cephalopods are currently held for research purposes at the Woods Hole Marine Biology Laboratory in Massachusetts alone. Yet, the NIH has adopted a Public Health Service Policy on Humane Care and Use of Laboratory Animals that further defines the term "animal" to be limited to "vertebrates." So although cephalopods (particularly octopuses) are increasingly being used in large numbers for research on the brain, nervous system, eyes, and for behavioral research, they need not be

**OCTOPUSES ARE
EXTREMELY
INTELLIGENT
ANIMALS
WHO REACT TO PAIN**



treated humanely because they are not legally considered to be “animals.”

This is why, in June 2020, on behalf of a coalition of cephalopod experts and animal protections groups (including AAVS)¹, Harvard’s Animal Law & Policy Clinic petitioned the NIH to change its definition of “animal” to include cephalopods (see sidebar). As the petition explained, “there has been much research demonstrating that cephalopods are sensitive, intelligent creatures who, like other animals used in biomedical research, deserve to be treated humanely.” It also noted that “the requested action would bring the United States in line with several other countries and governmental entities that already accord these species such humane treatment when used in government-funded research, including the United Kingdom, Canada, New Zealand, Australia, Switzerland, Norway, and the European Union.”

Harvard’s Clinic submitted voluminous scientific evidence and literature demonstrating that octopuses are extremely intelligent animals who react to pain. However, although the NIH responded by acknowledging that it is “fully committed to promoting the best possible care and use of the animals involved in the research it supports,” to date it has failed to grant the petition, and octopuses continue to be denied this basic protection under the law. As one neuroscientist candidly explained, “[I]f you were in a research setting, and you wanted to buy some octopuses and do whatever you wanted to do to them, there is no regulatory oversight to stop you.”²

What could possibly be the rationale for our government not considering octopuses to be animals? I hate to say it, but maybe the reason is that octopuses (and cuttlefish and squid) just don’t look or act anything like us—they are way too alienesque to be considered animals like humans (or other animals that sort of look like us or live with us) who are worthy of humane treatment. Is it because they are so squishy? An octopus has no skeleton, so it can reduce its boneless body to a small slimy dart that can shoot itself into the tiniest of holes. Is it because they squirt ink when they are pissed off? Octo-

puses spew ink as a defense mechanism to confuse their predators. Is it because they can turn many different colors? Octopuses have uncanny camouflage skills, also developed to avoid being eaten. Is it because they have eight arms with extremely strong suckers that also act as essential parts of their nervous system? Maybe.

But I’m beginning to think that the real reason the NIH may be reluctant to consider these magnificent beings “animals” is because they have extremely large brains, and hence are very intelligent. And an extremely intelligent animal—especially one that is so weird looking—is perhaps threatening to us? Especially because we humans tend to think of ourselves as the smartest beings in the universe, and therefore superior in every way to all other animals. But there is no reason to be threatened by the intelligence of octopuses; their intelligence is very different from ours and evolved independently from ours, the result of what is known as parallel evolution. And in terms of which species is more threatening, there really can be no doubt: While humans catch them, cut them open, keep them in unnatural surroundings, limit their every behavior, and even eat them, cephalopods don’t do anything comparably nasty to humans.

So instead of looking down on cephalopods as inferior mollusks unworthy of even a modicum of humane treatment when we subject them to incredibly invasive research—or being afraid of their intelligence and other-worldly appearance—we should revel in these animals’ extraordinary uniqueness and magical powers, and treat them not only humanely, but with the awe and respect that they deserve. **AV**

Katherine A. Meyer is Director of the Animal Law & Policy Clinic at the Harvard Law School.

¹ The Petitioners include the New England Anti-Vivisection Society (now Rise for Animals); American Anti-Vivisection Society; The Physicians Committee for Responsible Medicine; The Humane Society of the United States; Humane Society Legislative Fund; Jennifer Jacquet, PhD; Becca Franks, PhD.; Judit Pungor, PhD.; Jennifer Mather, PhD.; Peter Godfrey-Smith, PhD.; Lori Marino, PhD.; Greg Barord, PhD.; Carl Safina, PhD.; Heather Browning; and Walter Veit.

² E. Preston, *New York Times* (Aug. 27, 2022) (quoting Robyn Cook, of San Francisco State University).

8

THINGS TO KNOW ABOUT OCTOPUSES

- There are about **300 species worldwide**, ranging in size from half an inch to 30 feet.
- They have **nine brains** and **three hearts**.
- They use tools, trick prey, problem solve, and change color to **camouflage**.
- Their **average lifespan** is only 12-18 months.
- Females lay **100,000-500,000 eggs** only once in their lives, and stop eating while they tend to them until the babies hatch. Both parents die soon after mating and incubating, and few hatchlings survive to adulthood.
- The Netflix documentary “My Octopus Teacher,” about a diver who befriends a wild octopus, won an **Academy Award** in 2021.
- Approximately **420,000 metric tons** of octopuses are taken from the sea annually to meet the global demand for octopus meat, which threatens wild populations. Plans to begin mass-farming them are being challenged on humane grounds (see “The Case Against Octopus Farming,” <https://issues.org/the-case-against-octopus-farming/>).

- The petition to **support their inclusion as “animals”** in federal research regulations can be found at <https://animal.law.harvard.edu/wp-content/uploads/CephalopodLetterandPetition.pdf>



The Troubled Waters of GE Salmon

by Crystal Schaeffer

IS GENETICALLY ENGINEERED (GE) SALMON for sale at your local grocery store or on the menu at your favorite restaurant? A better question is, should it be?

A Massachusetts company called AquaBounty has genetically engineered a type of salmon to produce excess growth hormones so the fish can grow to desired market size much faster than their natural counterparts. Although the sale of AquaBounty salmon for human consumption was approved by the U.S. Food and Drug Administration (FDA) in November 2015, it was done with little concern for animal welfare, questionable assessment of the science, and an inappropriate regulatory approval process.

AquaBounty's own data shows that its GE salmon are unhealthy and experience high rates of abnormalities and mortality. Documented conditions include risk of developing skeletal malformations, jaw erosions, lesions, and inflammation, and increased likelihood of succumbing to disease. These AquaAdvantage® salmon are raised in overcrowded indoor tanks, where their natural behaviors are severely limited, there is increased exposure to toxins from high concentrations of excrement, and pollution is produced that can affect the surrounding environment. AquaBounty also kills large numbers of GE salmon during production to remove those deemed unhealthy, "non-performing," or "excess inventory." This suffering and blatant disregard for animal

life are particularly concerning given research that demonstrates that fish experience pain, fear, and distress.

Although they are raised indoors, there is still a risk that the salmon may escape their tanks, something documented in the recent "AquaBounty Exposed Report," based on a whistleblower account of the disturbing practices at AquaBounty's Indiana facility. Even an accidental release of GE salmon while they are being transported¹ could have a devastating impact on wild salmon populations and other wildlife. In an attempt to prevent this, AquaBounty makes these fish "triploid" by shocking fertilized eggs, causing them to have three sets of chromosomes instead of two, rendering them "effectively sterile." However, this process is ineffective 5 percent of the time, and considering the high stakes involved, presents an unacceptable risk.

There is also evidence that triploid fish are more vulnerable to disease. A 2021 study conducted by the Institute of Marine Research (IMR) in Norway compared diploid (normal) and triploid salmon and found that triploid salmon have "low welfare," "higher mortality," and a "higher incidence of emaciated fish."² This led Norway to pause production of triploid salmon until more research on the welfare of these fish can be done.³

The FDA's controversial approval of GE salmon sales was made using its New Animal Drug Application (NADA), considering the fish's genetic modification as the "new drug." AquaBounty was required to demonstrate the safety of this modification to the animals involved, but did so only after removing deformed and unhealthy animals and using a statistically invalid sample size of fewer than a dozen fish. And the NADA approval process fails to evaluate animal welfare or ethics. AAVS's extensive comments to the FDA about the GE salmon approval concluded that the regulatory process was wholly inappropriate.

AquaBounty may have FDA approval, but that doesn't mean the public wants it.

In 2013 nearly 2 million Americans submitted comments to the FDA opposing AquaBounty's GE salmon, and multiple food retailers, food service companies, and restaurants have pledged to not sell it. Environmental, consumer, food safety, and animal protection groups actively oppose the production of GE animals as food. Most recently, NASDAQ threatened to delist AquaBounty because its shares continue to trend downward. While the public's opinion is clear, AquaBounty's future remains murky. **AV**

Crystal Schaeffer, MA Ed., MA IPCR, is the Outreach Director for AAVS.

¹ Block Corporate Salmon campaign (Oct. 25, 2022). "AquaBounty Exposed Report," pg. 11. Accessed Nov. 1, 2022 at <https://docs.google.com/document/d/1FysnUssU4lvPQljNl3nWnWEVtK4N4Yj1CYQgu3B9YXIAo/edit>.

² Angelico Madaro, Sissel Kjølglum, Tom Hansen, Per Gunnar Fjellidal & Lars H. Stien (2021). "A comparison of triploid and diploid Atlantic salmon (*Salmo salar*) performance and welfare under commercial farming conditions in Norway." *Journal of Applied Aquaculture*. DOI: 10.1080/10454438.2021.1916671.

³ Moore, Gareth. (Apr. 30, 2021). "Triploid salmon use to be paused in Norway due to welfare concerns." Fishfarmingexpert. Accessed on Nov. 2022 at <https://www.fishfarmingexpert.com/norway-royal-salmon-norwegian-food-safety-authority-triploid-salmon/triploid-salmon-use-to-be-paused-in-norway-due-to-welfare-concerns/1308082>

Neptune's Nightmare

63 BILLION POUNDS

Estimated annual amount of global "bycatch" (dolphins, turtles, seabirds, or other nontarget species killed by fishing nets or hooks)¹

UP TO 6

POUNDS of bycatch for every pound of shrimp caught¹

UP TO 5 POUNDS

Number of pounds of wild fish taken from the ocean to feed to farmed fish, to produce one pound of salmon or bass meat²

46%

Percentage of plastic found floating in the North Pacific Gyre that is fishing-related⁶

in 1974 **10%**

Percentage of stocks fished at biologically unsustainable levels³

in 2019 **35.4%**

UP TO 32%

Percentage of wild-caught seafood imports that are products of illegal or unreported fishing⁴

UP TO 90%

Percentage of fish consumed in the U.S. that is imported⁴

Estimated annual loss/discard of fishing gear in the oceans⁵

30,000

square miles of purse seine & gillnets

46,000

miles of long lines

9.6 million miles of branch lines

25 million traps & pots

Estimated number of sharks killed globally just for their fins (used in soups and folk medicine)⁷

100 MILLION

Whales killed by boat collisions worldwide each year⁸

20,000 APPROXIMATELY

Main sources of underwater noise pollution that harms whales and other species⁹

commercial ship engines,

seismic airguns from petrochemical exploration,

and military sonar

¹ www.fao.org/3/cc0461en/online/sofia/2022/world-fisheries-aquaculture.html and www.greenmatters.com/p/what-is-bycatch

² www.sentientmedia.org/fish-farming

³ www.fao.org/3/cc0461en/online/sofia/2022/world-fisheries-aquaculture.html

⁴ www.usa.oceana.org/our-campaigns/illegal-fishing-and-transparency

⁵ *Science Advances*, Vol. 8, No. 41, October 2022

⁶ www.europe.nextbook.com/nxteu/wwfint/ghost_gear_report/index.php#/p/1

⁷ www.sharkstewards.org/shark-finning/shark-finning-fin-facts

⁸ www.nautica.news/whales-die-from-naval-accidents

⁹ www.sonicsea.org/learn



Prehistoric Animals, Modern Victims

The Underside of Horseshoe Crab Testing

by Jill Howard Church

BEACH WALKERS ALONG THE U.S. east coast, and several other parts of the world, often encounter the big, brown, helmet-shaped shells of horseshoe crabs. A common reaction is to flip them over to see what's underneath. Many are empty, while others reveal the crabs' rust-colored remains. But what the public does *not* see is the scope of the damage that comes from using these vulnerable arthropods in medical testing.

Horseshoe crabs, who have lived on Earth for 400 million years, have been taken from the wild in huge numbers for decades so that their unique, milky blue

blood can be drained from them for use in testing vaccines and medical equipment for endotoxin contaminants. The blood contains a clotting agent called limulus amebocyte lysate (LAL) and is valued at about \$15,000 a quart—a big moneymaker for companies such as Charles River that run the LAL labs. The crabs are also harvested commercially for use as eel and conch bait.

The U.S. Food and Drug Administration (FDA) currently requires that all of the drugs and surgical implants (such as pacemakers) it certifies must include LAL testing, even though alternative tests are

PHOTO BY JILL HOWARD CHURCH

currently available and used routinely in other countries. Ironically, the LAL test was developed to replace tests on rabbits, but ultimately it only shifted the cruelty of animal use onto another species.

The process involves scooping up crabs by the thousands along the bays and beaches where they spawn and then hauling them to one of five U.S. laboratory facilities. The live crabs are put on racks with catheters in their hearts to drain about a third of their blood. Although most of the crabs are returned to the ocean, 10-30 percent of them die and the survivors are left weakened.

This not only imperils the crab population, but also severely harms the shorebirds who rely on huge numbers of crab eggs to sustain them halfway through their arduous spring migration from Argentina to the Arctic. A dramatic rise in horseshoe crab collection in the 1990s quickly resulted in the crash of several key shorebird populations. In Delaware Bay, the number of red knot birds declined by 80 percent, and they are now listed as threatened under the Endangered Species Act.

Wildlife biologist Larry Niles has led annual surveys of the birds and is on the forefront of trying to protect both the birds and the crabs. In 2021 Niles told the *NJ Spotlight News* that “[t]he long-distance [red knot] population is close to extinction because Delaware Bay resources are too few to allow the population to grow.”

Regulations of crab collection were slow coming, but in 2008—in response to dwindling crab and bird numbers in Delaware Bay, the crabs’ largest spawning ground—New Jersey banned horseshoe crab harvests to help both the crabs and the birds rebound. In 2012, the Atlantic States Marine Fisheries Commission imposed a ban on harvesting female crabs in New Jersey, Delaware, Maryland, and Virginia in an effort to help restore populations. The ban was extended in November 2022, although the commission will still allow 475,000 male crabs to be taken in 2023. Similar policy battles continue in South Carolina, where crabs are also harvested in large numbers. But a study of crab and shorebird concentrations recently published in *Aquatic Conservation*

noted there has been “no clear indication of population recovery of shorebirds and horseshoe crabs despite 2 decades of management interventions to curtail horseshoe crab harvest...”

As with other commodities, the more demand there is for LAL, the more it will affect the world’s supply of horseshoe crabs. But that demand might ease if greater acceptance of alternative testing methods grows.

An alternative to LAL was developed in 1997 using a cloned version of the crab blood clotting enzyme. Called Recombinant Factor C (rFC), it is the ingredient in several subsequent commercial products that are used primarily in Europe in lieu of LAL. Widespread use of this alternative would reduce or even eliminate the bleeding of horseshoe crabs and provide a more innovative testing method to more areas of the world.

The rFC alternative test was incorporated into the European Pharmacopoeia in 2021, which will expand its use overseas, and numerous studies have validated its effectiveness. The U.S. Pharmacopoeia (USP), which sets industry guidelines, has lagged behind. In an interview that year, Niles said, “If USP said rFC and LAL were equivalent, and people went to Big Pharma and said, ‘Stop using this animal,’ that would be the end of it.”

But American pharmaceutical companies have been slow to make the switch, due in part to pushback from Charles River and continued FDA requirements that demand additional validation tests. Currently, only Eli Lilly has adopted the rFC test in drug production.

An even more comprehensive testing method called the Monocyte Activation Test (MAT) was developed using human blood. Thomas Hartung of the Johns Hopkins School of Public Health told Wellbeing International that by using the MAT, “We not only spare the horseshoe crab population and replace the hundreds of thousands of rabbits used every year in laboratories around the world, [but] the MAT test is also a better detector of bacterial contamination.”

A movement to protect the horseshoe crabs and the shorebirds has galvanized scientists and conservationists alike. A

THE LIVE CRABS ARE PUT ON RACKS WITH CATHETERS IN THEIR HEARTS TO DRAIN ABOUT A THIRD OF THEIR BLOOD

group of nearly 50 diverse organizations formed the nonprofit Horseshoe Crab Recovery Coalition to advocate for better environmental and regulatory policies that would restore U.S. populations by 2030.

This effort is personified by Jay Bolden, a bird enthusiast and biologist at Eli Lilly whose focus has been to document the efficacy of the rFC test. His diligent work in cooperation with like-minded colleagues worldwide paid off; as reported in *Audubon* in 2018, Bolden “found that not only does rFC detect endotoxin as well as LAL, it yields fewer time-consuming false positives...and is less wasteful, and therefore less expensive.” Bolden told E&E News in 2021 that Eli Lilly “certainly blazed the trail and showed how to do it, but it takes extra work to validate your method compared to the LAL, and a lot of pharmaceutical companies aren’t going to rock the boat if they don’t have to.” The LAL/rFC issue is another significant topic in the larger movement among scientists trying to promote non-animal alternative methodologies.

The increasing focus on declining crab populations and the ripple effect that has on other species may finally push U.S. regulators and corporations to rethink their reliance on LAL sooner rather than later. And flipping to a new way of testing would benefit many. **AV**

Jill Howard Church, M.A., is Managing Editor of AV Magazine.

The Growing Field of Aquatic Animal Law

By Kathy Hessler

Aquatic animals are among the most numerous types of animals on the planet and also the most used, but they receive very little legal consideration. Some, such as whales, sea turtles, and dolphins, we know and care about. Yet others, such as corals and sea sponges, are crucially important, heavily exploited, and endangered, but most people aren't even aware that they are animals. Not knowing about the abuse and suffering of many aquatic species is an impediment to developing empathy for them.

Humans exploit aquatic animals in more ways and in larger numbers than people realize. They are used in many of the same ways terrestrial animals are—as food and companions, and for research and entertainment. They are also used in less common ways, such as in medicine and jewelry. Some are taken from the wild while others are bred in captivity. Increasingly, they are being farmed for food, research, leather, conservation, aquariums, and so on. The numbers are often staggering; one 2017 scientific article published by NC3Rs estimated that more than 5 million zebrafish are used in research annually, and predicted that the number would increase. A 2005 U.S. Department of Agriculture (USDA) census estimated that more than 480 million goldfish are sold each year in the U.S. Recent USDA numbers indicate over a billion animals are sold as bait annually in this country alone.

Frogs are one example of how widely aquatic animals are used. They are taken from the wild, and bred, to be used for food, research, education, pets, and more. A 2009 article published by the BBC suggested that up to 1 billion frogs globally are taken from the wild each year

for food. From 2014 to 2019, the U.S. imported 3.6 million amphibians for the pet trade. Vehicle traffic is estimated to kill billions of frogs annually. Records are not required for frogs used in research, so those exact numbers are unknown.

By far the greatest numbers of aquatic animals used are those who are caught or bred for food (for both human and non-human animals). The Food and Agriculture Organization of the United Nations does not count the *number of*

OUR CURRENT LAWS GENERALLY DO NOT PROTECT AQUATIC ANIMALS

animals killed, but rather frames their estimates in *tons of animals*. Data for 2020 indicates that global fisheries production reached 178 million tons of animals, but other estimates are up to 1-3 trillion. At the higher end, that would mean over 8 billion aquatic animals are being killed in food production every day! The annual U.S. Animal Kill Clock estimates close to 4 billion fishes and over 43 billion shellfishes were already killed for food in the U.S. by August 2022. These numbers do not include animals killed by ship strikes, pollution, climate change, starvation, ghost nets or entanglements, bycatch, or illegal unreported/unregulated fishing.

The reason we need to talk about this is because our current laws generally do not protect aquatic animals. Some laws

explicitly exclude these animals or do not include them in the definition of protected species. Aquatic animals raised for food in the U.S. have no federal protection as they are taken, bred, transported, raised, or killed. They are excluded even from the minimal protections that exist for some terrestrial farmed animals. Aquatic animals (except marine mammals) used in research are not covered by the Animal Welfare Act, and they are often not even protected by laws that prohibit negligence or abuse of companion animals.

A few laws offer some protections for aquatic animals, including the Marine Mammal Protection Act, the Clean Water Act, and the Endangered Species Act. There are also specific protections for sea turtles, whales, dolphins, and other threatened species and for those who live in Marine Protected Areas, Marine National Monuments, or National Marine Sanctuaries. But much more work needs to be done. It begins with seeing the animals.

Because of this lack of protection and awareness, I started the Aquatic Animal Law Initiative as part of the Animal Law Clinic I directed at Lewis & Clark Law School. I was able to work with students to provide resources to help people understand the plight of aquatic animals and the need for legal protections. Our activities included writing reports about fish sentience, compiling lists of legal shortcomings, supporting pet trade and laboratory reforms, and advocating for endangered species. Amy P. Wilson, an Aquatic Animal Law Initiative Fellow, and I started the annual World Aquatic Animal Day (April 3). We and two other co-authors, Kelly Levenda and Becky Jenkins, are writing the first legal textbook addressing these issues – *Aquatic Animals*:



Law, Science, and Policy, due out in 2024.

I have taught an Aquatic Animal Law summer course for four years, which is still the only one of its kind in the world. It attracts students interested in environmental as well as animal law and has helped infuse their new legal knowledge into many real-world settings.

There is reason to be hopeful. Since my work on Aquatic Animal Law began, two new international organizations addressing aquatic animals have been started (and one is a participant in COP27); there is now an annual aquatic animal conference; there is more awareness of the need to address the plight of aquatic animals in law and policy; and there is more conversation in many societies about the need to protect these animals and their habitats.

Some recent positive changes are in the field of environmental law, where animal and environmental issues overlap. The Endangered Species Act has been used to protect aquatic species and their habitats, and even to question the runoff into streams and waterways produced by factory farms. Some states are doing more to protect marine mammals from ship strikes and entanglements from the fishing industry by restricting areas in which ships can travel, requiring slower speeds

in certain places, and mandating the use of fishing gear that is less harmful to protected animals.

The plight of the Florida manatees has begun to receive more attention, if not enough legal action. In February 2022, the U.S. launched a trade complaint over Mexico's failure to protect the severely endangered vaquitas porpoises from illegal fishing.

Increasingly, major world bodies such as the United Nations, the European Union, the Food and Agriculture Organization, and even the World Bank have begun to recognize the importance of addressing overfishing, including the need to reduce illegal, unreported, and unregulated fishing. Scientists and government officials now acknowledge that the oceans are severely threatened, and that more species are close to complete collapse. In 2021, the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean went into effect, preventing commercial fishing in the area before it begins.

Another area gaining ground is the protection of marine mammals in captivity. In 2019, Canada passed a law banning the confinement of whales, dolphins, and porpoises for entertainment. Similar bans

or restrictions also exist in Brazil, Bolivia, Chile, Costa Rica, India, Luxembourg, Norway, Switzerland, and the U.K. The new owners of the Miami Seaquarium agreed to allow independent veterinarians to visit and assess Tokitae (an endangered Southern Resident orca also known as Lolita) and stopped having her perform. The company's USDA license now requires her retirement from performance and public display. The Whale Sanctuary Project is developing a sanctuary in Canada where these whales can be transferred from the entertainment industry to live out their days in freedom [see page 16].

There are still significant challenges and hurdles to achieving understanding and legal protections for aquatic animals. And they are still too often overlooked and not included in policy discussions that happen in corporations, government agencies, grocery stores, schools, and other places. But we can all work to change that, by simply asking, every chance we get, "What about the aquatic animals?" **AV**

Kathy Hessler, J.D., LL.M., is the inaugural Assistant Dean for Animal Legal Education at George Washington University Law School (GWU), and Director of the Animal Legal Education Initiative.

INTERVIEW

Lori Marino



Lori Marino, Ph.D., is a neuroscientist and former faculty member at Emory University. She is an expert on marine mammal biology and cognition, and the founder of the nonprofit Kimmela Center for Animal Advocacy. She is also the founder of the Whale Sanctuary Project.

AAVS: What drew you to studying marine mammals, especially their brains?

MARINO: I studied psychobiology, better known as neuroscience, and when I was a graduate student I found a picture of a dolphin brain in a book, and from that time on I was fascinated. I thought, this is something I could study for a very long time. It was really their brains that got me hooked.

What have you learned about the cognitive abilities and emotions of whales?

We share a lot of our psychology with dolphins. They have ways of processing auditory and visual information that's different from the way humans do, because they do something that we don't do, and that's echolocate. But they are self-aware, recognize themselves in mirrors, understand simple syntax, and they problem solve and have numerical abilities—very sophisticated cognitive abilities that are shared with us and other primates, and other very intelligent species.

Some parts of their brain, like the limbic system—which processes emotions, feelings—are pretty much the same across species. What that tells me is that while they might have some very different ways of processing sensory information, they are still mammals with emotional systems and they're still very much like us. Their whole social system is built on bonds that are held together by emotions.

Many people were moved by seeing news reports in 2018 about a mother orca who buoyed her deceased baby for 17 days. What can we learn about this and other instances of whales and dolphins expressing their emotions?

Many species of whales are very social, and that means they are held together very strongly by family groups, by pods, and that sociality is very complex. What's more, they're cultural, so what one community of orcas does may be very different from what another community of orcas does. So you can't talk about 'a species,' you have to talk about communities or cultures. These are animals who have very strong social ties held together by learned traditions

PHOTO BY SHUTTERSTOCK

“Captivity is particularly harmful for animals who are very cognitively complex and highly social.”

that are passed on from one generation to the next, and that’s very much like how we do things.

When did your academic role evolve into advocacy?

When I did the [dolphin] study on mirror self-recognition in 2001, I started to think about adding an advocacy component to what I did. I decided not to work with captive dolphins anymore, and started to notice things that students at Emory were being told about their relationship to other animals: “You have to do vivisection, you have to do this, you have to do that, if you want to be a scientist.” I feel like as a scientist I have a responsibility to apply some of my knowledge to protect these animals. I founded the Kimmela Center for Animal Advocacy in 2011, and its mission is to use science to advocate for other animals in various ways. We try to promote students becoming scientists who also advocate for animals, or courses where advocacy is part of the mainstream curriculum.

Why is captivity particularly harmful to whales?

Captivity is particularly harmful for animals who are very cognitively complex and highly social. And there are certain characteristics of animal species who don’t do well in confinement, and that’s [those with] complex brains, self-awareness, social complexity—whales travel a lot in their natural environment, and they need to interact in a very complex manner.

[In captivity] they tend to succumb to opportunistic infections—pneumonia, meningitis, gastritis. We think it’s the basic problem of chronic stress associated with living in a tank. We also see behavioral abnormalities like repetitive behaviors. We see self-harming behaviors, anorexia, [and] depression. And we also see very disturbed abnormal social relations, because they don’t really have a social group or a culture. They’re just a collection of individuals thrown together in a small, barren tank with nothing to do, expected to deal with it. And breed!

Eventually you end up with some pretty awful life and death statistics; orcas live about half as long in the tanks as in the wild. There’s a high mortality rate, a low survivability rate—all of those things point to the fact that it doesn’t work.

Tell us about the Whale Sanctuary Project.

Just as there are sanctuaries for elephants and big cats and bears and chimpanzees, there really ought to be sanctuaries for dolphins and whales so that they have an option of getting out of the tanks. None of these animals can just be dropped into the middle of the ocean and be expected to survive, but what we can do with a sanctuary is give them a life that’s closer to a natural life that respects them and their autonomy more.

We spent over two years looking for a site and we finally

found a beautiful place in Nova Scotia called Port Hilford Bay, where we are creating the first North American sanctuary ever for beluga whales and orcas. We have over 100 acres of water space and we plan to provide a home for about eight beluga whales and perhaps two to three orcas, or some combination thereof.

So the whole thing will be enclosed by a net?

Yes, a very sophisticated net. We don’t know why, but dolphins and whales have an innate fear of barriers. The net will have a walkway that will allow us to feed them and access the animals from any given point. We need to have a way to make sure we’re monitoring them at all times, but also giving them the space they need to explore. We won’t be breeding them, for obvious reasons, so they will either all be one gender or we will use various forms of birth control.

There are many stages to this, and we’re starting the “shovel in the ground” stage. We’re hoping we can have our first resident by spring or summer of 2024. It’s about a \$12-14 million capital project. We’ve raised some of that money, but we still have a way to go. Once the project is up and running, it will be about a \$1-2 million annual cost. There are 3,000 dolphins and whales in captivity, so obviously this is not just about giving a better life to a few of those animals but to model a cultural change that can stand as an alternative to seeing them in tanks performing.

Will it be open to the public, or for academic studies?

There’s a very strong public outreach and education element to our project, so we will have an interpretive center eventually, and we are working with veterinary schools to set up internships. We are working with universities in Nova Scotia to set up marine mammal courses in curricula and internships, and we will have streaming video from under the water so people can see how these individuals are spending their day. And we will also have research to determine how they’re doing, entirely non-invasive. The priority is their autonomy and well-being.

Do you think these efforts are changing human beings’ attitudes about whales and dolphins?

I hope so. If you go to a place like a sanctuary, you begin to understand why the residents are there in the first place and what it is about captivity that doesn’t work for them. We feel very strongly that authentic sanctuaries convey a message of respect. I think most people, once they have a model for that, will start to think more about their relationship with these animals and hopefully change the way they treat dolphins and whales and others. **AV**

TRIBUTES

HONORING LOVED ONES

You can honor or memorialize a companion animal or animal lover by making a donation in his or her name. Gifts of any amount are greatly appreciated. A tribute accompanied by a gift of \$50 or more will be published in *AV Magazine*. At your request, we will also notify the family of the individual you have remembered. All donations are used to continue AAVS's mission of ending the use of animals in biomedical research, product testing, and education.

In memory of Lucky LuLu Belle and
Simon Winslow.

James Spates
Austin, TX

In honor of Fye.

Lin Kojima
Emeryville, CA

In memory of Tiger. We miss you
very much!

Mary Ann Spagnoli
Palm Beach Gardens, FL

In memory of Nita Forrester.

Lani Drolet
Phoenix, AZ

In memory of Lew Scheffey.

Joyce Scheffey
New Paltz, NY

In memory of my mother, Lillian
Sherry. You are always in my heart.

Maureen Vidal
Brooklyn, NY

In honor of Robert and Galia Hunter.
Good luck to you both on your new
life together.

Candice Hunter
Sarasota, FL

In memory of dogs and cats gone
before me.

Sherri Johnson
Falcon, MO

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who brought awareness of AAVS to me
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Chesterfield, NJ

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Babette Eddington
Schaumburg, IL

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of animals.

Donna Stone
Hoffman Estates, IL

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Karen Teitel
Berkeley, CA

In loving memory of Nicki, my wonderful
Sheltie, who guarded me well and was the
darling of the neighborhood aunts.

Gwenn Grondal
Carlsbad, CA

In memory of Miss Scarlett Randol. Our
precious 4-legged little girl brought us more
joy and love than words can express!

Gayle Randol
Houston, TX

In loving memory of Tiger and Fluffy for
16 years of companionship and a lifetime
of feline memories. Miss you both.

Joan Soos
North Tonawanda, NY

In memory of my mom, Denise
Devoghel, who passed away in June 2020
in sad, COVID-related circumstances.
Her actions in favor of nonhuman animals
throughout her life educated and inspired
me. I miss her very much and am grateful
to be able to dedicate this gift of kindness
to her.

Beatrice Lurquin
Brussels, BE

In memory of Alan C. Serlin, who had
a kind and generous heart and loved all
animals.

Michele Alm
Mountain View, CA

In memory of my wife, Jennifer Gile,
who loved all animals and other wildlife.

David Gile
Saint Johnsbury, VT

In honor of Jennifer Hillman. Thank
you for all you do in the protection of
animals' lives!

Dale Kelley
Port Ludlow, WA

In memory of Daddy's goodest girlie,
Cookie.

Robert Gelfand
Pittsburgh, PA

In memory of Romeo, our beautiful boy.
We miss you.

Sue Leary and Rob Cardillo
Ambler, PA

In memory of Muffins Rubin. In January
1992, AAVS published my article on the
first nonhuman animal who rescued me:
Muffins, my beloved Shepherd mix. Her
gentle and loving soul, devotion and
courage started me on a journey to animal
advocacy and veganism now spanning
more than 35 years.

Aaron Rubin
Rockville, MD

In memory of my dog, Nikki, and my cat,
Miami. I miss you so much and will love
you forever. You are always in my heart.

Maureen Vidal
Brooklyn, NY

In memory of Mikey, the sweetest
pet bunny.
Michaela Bober
New York, NY

In memory of McCartney, an Airedale
rescue. He brought us many smiles
and happy times. We will love and miss
him always.
Susan LaForge
Valley Center, KS

In memory of my wife, Carolyn.
Gerald Rizzer
Chicago, IL

In memory of Yogi, Brandi, Savannah,
Sampson, Cory, Ollie, and our stray cat,
Blackie. We loved you all! And bless our
new trio: Zeus, Dingo, and Winter.
Joan Condreras
Whiting, NJ

In honor of my cat, Marty.
Phyllis Timko
Houston, TX

In memory of Angel, Stevie, and Fritzie.
You were my Northern Stars.
Francine Mears
Fairbanks, AK

In honor of my new cat friend, Harrigan,
who is a great pet. He was found a year
ago as a stray. After spending nine months
in the Lehigh County Humane Society,
he has a forever home with me.
Eileen Smith
Emmaus, PA

In honor of Cindy Barott. Thanks for
caring about animals.
Cari Lombardi
Minneapolis, MN

In honor of Eddie Machtinger, M.D.
Thank you, Dr. Machtinger, for giving
my daughter the opportunity to
interview you for her project on animal
rights, and for inspiring her with
your important contribution to ending
the unnecessary killing of dogs in the
dog lab at Harvard Medical School.
Mary Stewart
Richmond, CA



In loving memory of Mel Kessler.
Kitty Kessler
Fort Lauderdale, FL

In memory of my husband, Jim.
Gail Maconkey
Landrum, SC

In memory of Madison, Maggie, and
Carmel. You were all the best. I miss you
so much. You are all forever in my heart.
Bonnie Kohn
San Diego, CA

In honor of all the world's rats: most
hated by others, but loved by me! May
their suffering be vindicated someday.
Annette Ravinsky for Philly Rat Rescue
Philadelphia, PA

In memory of Kelly.
Sue Leary and Rob Cardillo
Ambler, PA

In memory of Margaret Dawson.
Celebrate with ongoing kindness.
Alisa Ahearn Spector
Gig Harbor, WA

In honor of Susan Weller.
Terry Carlin
Santa Fe, NM

In memory of Elizabeth Schulze.
Gregg Schulze
San Francisco, CA

In memory of Tina Nelson, former
AAVS Executive Director. Always missed.
Never forgotten.
Susan Giglia
Damariscotta, ME

In memory of Tiger, Blue Eyes, Orange
Puffy, Chrissy Gray, and Mittens.
Mark Shuttleworth
Caseville, MI

In honor of Evelyn Pugin Hunter.
Mary Anne Pugin
Palm Springs, CA

In memory of my beloved husband
Leonard's yahrzeit.
Janice Belfer
Jenkintown, PA

For information on planned giving,
leadership gifts, recurring gifts, or
other support, contact Chris Derer,
Director of Development & Member
Services, at 800-SAY-AAVS or
cderer@aavs.org. When including
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Members' Corner

"So long, and thanks for all the fish."

In Douglas Adams' classic science fiction opus "The Hitchhiker's Guide to the Galaxy," that valediction comes from the Earth's dolphins, who leave the planet just prior to its destruction. Their parting message was intended to warn humanity about the planet's pending peril, as the clever and compassionate dolphins realize that humans are a less intelligent species. Gratitude for the provision of fish is fictionally portrayed by dolphins in marine parks, but in reality, these captive creatures are not thankful, and cannot escape.

Humans have long exploited marine mammals and fish species for entertainment and profit, most often without concern for their physical or emotional well-being. For all their claims of conservation, protection, and education, aquariums and aquatic theme parks are still penitentiaries consisting of pools—artificially created environments that cannot possibly compare to the expanse and biodiversity of the world's oceans.

While imprisoned in water tanks at tourist destinations, marine mammals are at risk of serious and sometime fatal health issues from self-harm, poor dental care, illnesses, infections, and attacks by dominant cellmates. Also, the behavior of wild animals is unpredictable, and direct human interaction with wildlife has resulted in injuries and deaths. Two revealing documentaries focused on cetaceans, "The Cove" (2009) and "Blackfish" (2013), exposed the cruelty and psychological impacts of their capture in the wild, separation from family and social groups, long-term captivity, breeding, aggressive training, and hunger-induced performance.

Despite the detriment to animals held in profit-driven tourist venues, humans still seek to observe and invasively interact with oceanic animals. However, humane and responsible ecotourism can potentially be safe and even beneficial for wildlife, with trips inspiring advocacy efforts to protect vulnerable species and their habitats.

When booking a wildlife excursion, it doesn't hurt to approach "no animals harmed" claims with some skepticism. Conduct proper research and exercise best practices for the benefit of yourself and the animals you wish to observe in their natural environments. Read online reviews and social media posts for destinations and tour operators, noting any questionable activities encouraged or allowed during visits and trips. Some travel websites include sections dedicated to animal welfare and the ethical standards of tourist attractions.

At the least, if you are interested in viewing cetaceans and other wild aquatic species on whale-watching or other excursions, a program sponsored by the National Oceanic and Atmospheric Administration called Whale Sense (whalesense.org) lists tour companies that are committed to responsible practices. You also might consider travel opportunities organized by reputable organizations dedicated to animal protection and/or environmental conservation.

Wherever you go, have a whale of a good time and maybe even discover the *porpoise* of life!



For the animals,

A handwritten signature in black ink, appearing to read "Chris Derer". The signature is fluid and cursive.

Chris Derer
Director of Development & Member Services

PHOTO BY ADOBESTOCK

Caring is Forever

Planning for the future assures your
legacy and our mission.

As an AAVS member, you help animals every day by supporting our campaigns, outreach efforts, education programs, and Sanctuary Fund. Providing for AAVS in your will or other estate plans guarantees that our vital work continues into the future—until all laboratory cages are empty.

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Society

For more information, please contact Chris Derer at membership@aavs.org or **1-800-SAY-AAVS**. AAVS suggests consulting an attorney or financial advisor about options that are right for you.



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**“PERHAPS THE TIME HAS COME
TO FORMULATE A MORAL CODE
WHICH WOULD GOVERN OUR RELATIONS WITH
THE GREAT CREATURES OF THE SEA
AS WELL AS WITH THOSE ON DRY LAND.”**

JACQUES-YVES COUSTEAU

