



Science in Service to Wildlife Health and Conservation

Wildlife health experts at the school have developed new tools, innovative training programs and critical discoveries. Veterinary research provides much-needed data that society may use to inform decisions about conservation, species management and wildlife diseases.

Deadly parasite harms sea otters – School investigators conducted groundbreaking research revealing that *Toxoplasma gondii*, which can cause illness in pregnant women, is responsible for fatal brain disease in 17 percent of California's endangered sea otters. Researchers further learned that the single-celled parasite may be transmitted by cat feces through water runoff from land to sea, a discovery that raised new awareness of ecosystem health.

International model for oiled wildlife response – The Oiled Wildlife Care Network, established in 1994, has emerged as the world leader in oiled wildlife response. Working with member partners throughout the state, school veterinarians have pioneered new methods of care and rehabilitation of oiled wildlife on the 1100-mile coast of California. The program's research has led to greater survival rates of oiled birds and other marine animals.

Regional resource for raptors – For more than 30 years, the school's teaching hospital and the [California Raptor Center](#) have treated and rehabilitated thousands of injured and orphaned birds of prey, releasing 60 percent of them back into the wild. Faculty and staff have trained generations of students in avian medicine and surgery. Volunteers have also engaged in countless hours of community outreach and on-site environmental education.

Mountain lions in Southern California – In a long-term study of 65 mountain lions monitored in Southern California, researchers found that 52 percent of the animals died, and that roughly two-thirds of the fatalities were caused directly or indirectly by humans; the most commonly reported cause of death was being hit by a vehicle.

One million feet of fishing line – Leaders of California's first Lost Fishing Gear Recovery Project, working with fishermen, foundations and public agencies, have removed more than 60 tons of lost commercial and recreational fishing gear from California coastal waters since 2006—including a single fishing net that covered 5,000 square feet of the sea floor. Members have taken more than one million feet of fishing line from public-access piers, mitigating habitat damage, reducing risks of injury and death for coastal marine wildlife and increasing awareness and public participation.

The tools of genetics influence wildlife health – Genetics specialists have contributed new knowledge in genomics, biology and disease ecology to aid in wildlife conservation and population health. Discovering associations among genetic mechanisms, disease distribution, genetic diversity and evolutionary history, team members are the first to:

- Demonstrate that Yosemite's Great Gray Owl is genetically distinct from the species in other parts of the West. Researchers also observed differences in behavior, migration patterns, prey preference and nest-site selection in this long-isolated population. The endangered raptor is one of Yosemite National Park's highest research priorities
- Identify a previously unknown avian pox in the Anna's Hummingbird, an infection that has severely affected other bird species.

- Discover that the Yellow-billed Magpie, found only in central California, experienced alarming mortality since 2004 of up to 81 percent due to West Nile virus, the highest percentage of all birds. The team launched the first studies to estimate population size, loss of genetic diversity due to West Nile virus, and long-term species viability.
- Analyze molecular evidence and gather “citizen science” observations, revealing that the endangered Sierra Nevada red fox persists in California and that the Sacramento Valley fox is truly native to the region; the veterinary geneticists also track the movement and genetic history of other fox species in the United States.
- Research mountain lion behavior and habitats, which has lent valuable insights to people living in proximity to wildlife.
- Evaluate mitochondrial DNA and conclude that within a given home-range group, desert bighorn sheep ewes generally associate with other ewes based on their availability rather than their matrilineal relationships; the study contributes valuable information on the genetic diversity of the rare species and subpopulations in the Peninsular ranges of Southern California.

The first wildlife health programs – Based on pioneering programs in zoological medicine established at the school, faculty developed what is believed to be the first formal curriculum in a veterinary school to emphasize the health of wildlife and ecosystems.

A strong link between viruses and cancer in sea lions – A consortium of veterinarians found that up to 45 percent of male sea lions with urogenital cancer have herpesvirus. About 18 percent of deaths in stranded adult sea lions result from tumors in the reproductive and urinary tracts. Veterinary pathologists also discovered that animals with higher concentrations of PCBs in their blubber are more likely to have died of this type of cancer.

Lead exposure and scavenging birds – School studies demonstrated that patterns of lead exposure in turkey vultures were associated with big game hunting activities and that lead exposure in turkey vultures and golden eagles in two areas within the condor range decreased the first year following implementation of lead ammunition regulations within condor range in California. The school is partnering with the condor recovery program to inform on the pervasive threat of lead exposure, which is critical for science-based management of this endangered species.

Island foxes back from the brink of extinction – Faculty pathology specialists were instrumental in developing strategies for bringing [Channel Island foxes](#) back from the brink of extinction. The professors developed pivotal information on diseases, captive breeding, vaccination programs and other health tactics.

Comprehensive surveillance of cheetahs – In wild and captive cheetahs, investigations contributed fresh knowledge on *Helicobacter gastritis*, veno-occlusive disease, and the role of captive stress on cheetah health. A 2008 publication found an association between climate extremes and infectious epidemics in African lions; the paper is a major contribution to understanding the ecology of canine distemper in wildlife.

Gathering more data from killer whales (orcas) – The standardized killer-whale necropsy system co-developed at the school in 2004 has boosted the collection of data from stranded killer whales from 2 percent to about 33 percent. More complete data is helping conservationists to comprehend the life history of orcas—and protect their health.

Marine animals and human virus – In 2010, veterinarians published the first report of pandemic influenza A (H1N1) virus in a marine mammal, showing evidence that influenza viruses move between humans and wildlife. The investigators isolated the virus from Northern elephant seals along the central California coast.

Wildlife and food safety – Researchers reported that the disease-causing bacterium *E. coli* O157:H7 is present, but rare, in some wildlife species of the Central Coast agricultural region. Investigators documented occasional infections in area wildlife species, including cowbirds, coyotes, crows, mice and feral pigs, which have shown exposure to campylobacter. These findings led to a caution for hunters to be prudent when handling and processing wild swine meat.

Environmental “double whammy” – Aquatic toxicologists discovered that [marine animals that ingest plastic debris in the ocean](#) might suffer from both the plastic itself and the pollutants those plastics have absorbed while floating in the open seas. The study found that the most commonly produced plastics also absorbed the most chemicals, and for longer periods of time than previously thought.

Encouraging news on mountain gorillas – Since the inception of the Gorilla Doctors program, now based at the school, the population of mountain gorillas has risen to 880, encouraging news for the endangered species. The program delivers life-saving veterinary care for life-threatening illness and injuries. Gorilla Doctors are the first to confirm that a virus that causes respiratory disease in humans is linked to the deaths of mountain gorillas.

Putting teeth into poaching rules – Researchers proved that voluntary Marine Protected Areas are ineffective in preventing poaching. As a result, agencies are now working with anglers, citizens, the Washington Department of Fish and Wildlife and the Tribes to create a new plan for protecting bottomfish; the results have also led to increased enforcement and increased public outreach.

Alarming risks – In 2013, wildlife pathologists and veterinary toxicologists brought to light [a fatal danger to the fisher](#), a rare forest carnivore, due to the use of rat poison on illegal marijuana farms. In studies of remote forests of California, including Redwood and Yosemite national parks, fishers and other animals were found dead from rodenticide poisoning. Fishers are candidate species for listing under the federal Endangered Species Act.

Ecosystem-based restoration – beyond national boundaries – School faculty convinced decision makers to include a transboundary approach in restoring the Salish Sea by viewing it as an ecosystem rather than a body of water defined by political boundaries. A 2008 publication has transformed the overall approach to improving the region’s ecosystem. Concurrently, lists of bird, fish and mammal species developed by this group provide the basis for documenting disease, population declines and research priorities.

Restoring disappearing species – Over several decades, northern abalone numbers dwindled so low that the population stopped reproducing. The SeaDoc Society spearheaded workshops and funded critical science on the issue, which resulted in the development of the first technique to successfully raise genetically-correct abalone that survive in the wild.

The [Wildlife Health Center](#) draws upon expertise spanning a wide range of wildlife species and veterinary disciplines to facilitate multidisciplinary studies for restoring ecosystem health. School collaborators and affiliated partners address complex issues of conservation and illness, such as zoonotic disease, which impacts animals and humans, as well as disease issues of free-ranging and captive terrestrial and aquatic wild animals. Center faculty support the One Health approach, recognizing that health is inextricably linked among domestic animals, wildlife people and the environment.

The One Health Diagnostic and Technology Development Laboratory develops and optimizes new methods to detect known and novel viruses in wildlife and to monitor them with an eye to evaluating the potential for spillover of disease to other species. This distinctive laboratory provides [diagnostic testing](#) to support members of the national Marine Mammal Health and Stranding Network, wildlife biologists, marine animal scientists and marine animal clinicians. The program supports and transfers diagnostic technology to laboratories in 20 countries. Personnel also initiate scientific collaborations concerning emerging diseases and epidemiology.

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