Research Projects
Health Assessments and Student Workshops in Madagascar

Thanks to generous funding from a donor to the Saint Louis Zoo, ICM and the Department of Animal Health continued our collaboration with the Turtle Survival Alliance to conduct health assessments of radiated tortoises in Madagascar confiscated from wildlife traffickers. Jamie Palmer, Dr. Ainoa Nieto Claudin, Dr. Kari Musgrave (DAH), and Sarah O’Brien (DAH) all traveled to Madagascar in mid-November. They successfully placed pit tags in 2,000 tortoises and conducted health evaluations of 159 tortoises. Not only are we making sure these animals are healthy before being released back into the wild, but the data collected will provide valuable information about this endangered species.

In late November, Kathleen Apakupakul also traveled to Madagascar to conduct a molecular lab workshop for local Malagasy biologists, veterinarians and veterinary students. Kathleen received a WildCare Institute Field Conservation Grant and partnered with Dr. Fidisoa Rasambainarivo to make this workshop possible. Working with Kathleen were Drs. Lilian Catenacci (ICM affiliate researcher from Brazil) and Ainoa Nieto Claudin. These three ICM team members taught students how to test blood and swab samples for infectious diseases using PCR testing. The students learned about the health assessments of the confiscated radiated tortoises, which provided a perfect example why prompt, in-country results are so important for conservation. The objective of this workshop was to build local capacity for disease testing and eliminate the need to export research samples to western countries.
Galapagos Tortoise Movement and Ecology Programme (GTMEP)

Drs. Sharon Deem and Steve Blake traveled to the Galapagos this past summer. They, along with the GTMEP team that included Dr. Ainoa Nieto Claudin and Emily Donovan, a Ph.D. student at Southern Illinois University, started a study to evaluate reproductive fitness of female giant tortoises using a mobile X-ray machine. The team worked in the Cerro Fatal region and was able to get X-rays of all 15 tagged females at regular intervals during the summer. This study is the first of its kind and will allow us to understand the reproductive success of migrating versus non-migrating females. The Charles Darwin Foundation put together a video of the work that has been shared extensively, and which may be found on their Facebook page.

Viral Pathogens in Brazilian Wildlife

Dr. Lilian Catenacci and her team continued tracking West Nile virus and other arboviruses circulating in Northeast Brazil. To date they have collected samples from more than 600 wild birds, 400 horses, 200 bats, 120 primates and 300 pools of mosquitoes. These data will provide information about the prevalence of Saint Louis Encephalitis virus, Ilheus virus, West Nile virus and other zoonotic viruses in Brazil. These samples also have been tested for coronavirus and influenza and fortunately these do not seem to be present in the study sites. Lilian's team includes four local students, two conducting research for undergraduate degrees in veterinary science and two conducting work for their master's theses in animal science.

Under the supervision of Dr. Nieto Claudin, five local students from Galapagos and Ecuador are conducting research for their undergraduate degrees in biology. As part of this work, we are describing for the first time the cause of the white growths that some tortoises have on their carapaces: the fungus *Aphanoascus galapagosensis*. More research will be conducted to determine how this fungus may affect tortoise health. Another study carried out by local student Karina Ramon highlighted a new threat for tortoises as we have shown that these animals are eating significant amounts of plastics when roaming near human-modified areas of Santa Cruz Island. These results will be used to inform local management decisions and propose specific conservation actions to reduce plastic pollution in Galapagos.
Lilian also has presented three free training courses in Brazil since August. The goal of the first was to improve the reporting of outbreaks associated with neurological disorders in animals, the second course was to improve health professionals’ ability to analyze data from the Brazilian health system, and the goal of the last course was to improve health professionals’ ability to identify vectors. Representatives from the Brazilian Ministry of Health, animal health agencies and Brazilian research institutions were present. The overall goal of this surveillance and training was to mobilize the Ministry of Health to carry out arbovirus diagnoses in humans at the state level. The hope is that in 2023, the response time for diagnosing arboviruses in humans can be reduced from more than one year to a few days. This is a clear example of how animal and human health are connected and how wildlife can help people’s health!

**Bolivian Dolphins**

In October, Dr. Sharon Deem traveled to Bolivia as part of the partnership with the Maryland Zoo in Baltimore and the Noel Kempff Mercado National Park Museum in Santa Cruz, Bolivia. Two young female pink Bolivian river dolphins were trapped in an artificial canal system in a large agriculture system in the San Pedro region of Bolivia. During the rainy season, flood waters are deep and can cover wide swathes of land. The dolphins swim beyond the boundaries of their natural river system and into the artificial canals built for agriculture. However, when the waters recede in the dry season, dolphins become trapped in isolated bodies of water. These lagoons and lakes are not ecologically healthy enough to sustain the dolphins, and they need to be physically moved back to the free-flowing Rio Grande river. During the relocation efforts, Sharon performed complete health evaluations on each animal, including ultrasounds, and then satellite telemetry tags were placed on the dolphins to monitor their river use post-translocations. Very little is known about these endemic dolphins, and the health assessment data are important for ongoing conservation efforts for this species.

This third rescue trip involved not only relocating the dolphins back to their river homes, but also provided capacity building so local teams can continue future dolphin rescue efforts. With our assistance, Noel Kempff Mercado submitted a grant proposal to Loro Parque to fund this ongoing work. Sharon gave an interview to a Reuters reporter about the trip, which led to a number of news releases.
Going Wild in Forest Park

The Living Lab project in Forest Park continues to gain strength. We now have 11 box turtles, two snapping turtles, five raccoons and one great horned owl with telemetry tags that allow us to track their movements. This allows us to better understand their habitat needs. We continue to add new species to the study, with water birds and squirrels next in line. More importantly, we have been bringing our love of the park to many through fun educational sessions at the St. Louis Children’s Hospital and a number of internet outlets. Check out the new Forest Park Living Lab website: forestparklivinglab.org.

Canid Conservation Initiative (CCI)

The CCI field season began in October with camera and physical traps set at both WildCare Park and Tyson Research Center. So far we have caught one bobcat, nine opossums, and 15 raccoons. We conducted health assessments on all 25 animals, and the juvenile bobcat received a GPS collar we will use to track her movements for the next six months. Samples from a total of 34 animals from the previous trapping season were submitted to Cornell University Animal Health Diagnostic Center for infectious disease testing. Our preliminary findings show that the mesocarnivore community is exposed to several zoonotic pathogens such as West Nile virus, Bourbon virus, Toxoplasma gondii and Lyme disease and also is exposed to common domestic feline/canine viruses such as canine distemper virus, canine parvovirus or feline parvovirus, among others.

Dr. Fernando Najera continues to track the movement of Timmy, the bobcat at Tyson Research Center and Jamie Foxx, the red fox at Saint Louis Zoo WildCare Park. Unfortunately, Bobby, the other collared bobcat, is missing. John Hewlett, a pilot from Kentucky, generously volunteered to fly his plane over Bobby’s known territory in an attempt to locate him. Fernando and Murray State graduate student Michelle Weaver were able to conduct telemetry from the plane, but unfortunately, no signal was detected. We are grateful to both John and Michelle for volunteering their time and resources in this endeavor.

In more exciting carnivore news, one of the female bobcats at Tyson that we have been monitoring with our camera traps since last year showed up on the trail camera earlier this summer with four kittens. Based on the most recent footage, it looks like three of the kittens are doing well. Raising four kittens successfully would have been an impressive accomplishment, and it’s just a reminder to us of the difficulties of being a wild animal in the world.
Outreach

Turtle safaris were wildly successful in 2022. A total of 20 individual or family events took place, including five that were booked as birthday gifts, along with one larger school group. These turtle tracking experiences continue to be a wonderful way of getting both children and adults into the woods to meet turtles and learn about local and global One Health topics. Keri Lammering leads these events with assistance from Jamie and ICM interns. A turtle safari was also held with Wells Fargo employees, and we were so pleased to read one participant’s quote, “I have to say, the two people that the Zoo sent to lead the turtle tracking did an EXCELLENT job. They were friendly, funny, and great at educating and engaging us. I hope you pass this feedback on to them!” Tracking experiences also were provided as a field trip for a few school groups and to the Zoo’s Teen Camp.

Jamie presented the Zoo’s work on the health of Cuban crocodiles being raised in Cuba at the International Union for Conservation of Nature Crocodile Specialist Group meeting in Chetumal, Mexico, in July. Her talk was titled “Hematology and Blood chemistry in Cuban crocodiles (Crocodylus rhombifer) at the Zapata Crocodile Farm in Cuba.” After her presentation, she had great follow-up discussions with our international participants. This WildCare Institute Program is a partnership between ICM, the Zapata Crocodile Farm, and now the Philadelphia Zoo through Lauren Augustine.

As part of the Association of Zoos and Aquariums Reduce the Risk program, an article was published in their magazine CONNECT, which included information on the Saint Louis Zoo, ICM and our One Health work.

One Health Day was Nov. 3, and ICM worked with the Zoo’s social media team for various posts to both Facebook and Instagram to celebrate the day.

Before leaving for Spain, Ainoa gave lectures about the Galapagos Tortoise Program and One Health to the National Park guides and one to a group of visiting scientists in Galapagos. The visiting scientists included Nobel Prize winners Erwin Nehr and Richard Roberts (Nobel Prize for Medicine) and Aaron Ciechanover and Richard Schrock (Nobel Prize for Chemistry).

Ainoa also presented additional talks about the Galapagos Tortoise Movement Ecology Programme at the Symposium Galapagos-Israel, Endeavour Cruise, ATBC conference in Colombia, Galapagos Day in UK, and Annual Ecuadorian Biology Conference, along with local events with national park guides and families in San Cristobal.

The Living Earth Collaborative hosted a symposium at the Zoo in October titled “Microbes of Diverse Ecosystems: Research Happening in St. Louis.” Sharon was a keynote speaker, and she presented “One Health: The Little Ones that Rule the World.”

People

In November, Dr. Ainoa Nieto Claudin gave an excellent defense of her Ph.D. dissertation (for which Dr. Deem was her mentor) at the Universidad Complutense de Madrid in Madrid, and many in ICM were able to attend via Zoom. We are so proud, of her! We appreciate all the Zoo support we have been able to give Ainoa and the Galapagos Tortoise Movement Ecology Programme these past years. We look forward to continuing our work with Ainoa in the future.
ICM was fortunate to have four summer interns in 2022, all of whom exceeded our expectations (which were already high!). Carly Etter (SIU-C), Brianna Hawkins (ASU), Nate Phillips (Cornell College), and Erin Sedlacek (SIU-C) assisted with box turtle and canid projects as well as data collation and organization. This fall we've had three very hardworking interns: Bri stayed on after summer and was joined by Victoria Christianson Galina (WashU) and Abbie Harville (Zoo employee and WashU grad). They have all been a tremendous help with many aspects of the Canid Conservation Initiative fieldwork and data entry.

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