

# CREW PROGRESS REPORT

Lindner Center for Conservation and Research of Endangered Wildlife

## Little One's Legacy



Photo by Mark Dumont

Most people will never see a polar bear in the wild, but it's estimated that nearly 15 million visitors walked past Cincinnati Zoo's Bearline and likely caught a glimpse of resident male "Little One" (LO). Polar bears are consistently ranked as visitor favorites and, as ambassadors for their wild cousins, their presence in zoos sparks conversations about climate change and raises awareness that an entire species of apex predators is impacted by our own daily actions, even 2000 miles away. With his laid-back demeanor, LO was also adored by his care team, so it was with heavy hearts that the decision was made to euthanize him in March 2021, due to complications of old age. At 31, he was the oldest male in any North American institution and had surpassed the median life expectancy by a decade, undoubtedly a result of the top-notch care he received by his dedicated team.

Reflecting on the life of this Arctic icon, it's apparent that his contributions to his species stretched even further than visitor counts suggest. Because wild populations of polar bears are challenging to study, scientists are turning to zoo bears to learn more about bear behavior and physiology. Consequently, over the course of his lifetime, LO contributed to over a dozen scientific studies conducted by at least nine different scientific groups. His fecal samples have been used to better understand annual fluctuations in male testosterone concentrations and to characterize the gut microbiome. His breeding behaviors helped to define the breeding season of this species and, when females were given fertility treatments, LO helped CREW scientists determine when they came into estrus following hormone therapy. Urine-soaked straw bedding collected from LO's sleeping area was presented to solo-housed females to stimulate them prior to artificial insemination procedures (the females all seemed to enjoy the "Odeur de Little One"! ). To assess how bears of different ages, sexes, and sizes regulated their body temperatures, LO was fed an internal temperature sensor the size of a button; results helped guide housing recommendations for zoo bears and also provided insight into challenges experienced by wild populations facing warming temperatures. Blood samples collected at routine examinations were used to determine species-specific concentrations of vitamins and minerals and also to validate laboratory tests which later proved that wild bears with higher levels of circulating environmental pollutants had suppressed immune systems. As polar bear land use, food sources, and exposure to environmental pollutants shift with a changing environment, it's essential to have tools available to assess physiological functions in this species.

Even after his death, blood and tissue samples were collected and preserved for the scientific community. Although LO never sired offspring, CREW scientists performed a sperm rescue procedure and, in doing so, preserved his valuable genetic material indefinitely and created the possibility that maybe, one day, he will sire cubs. In accordance with their commitment to the Polar Bear *Signature* Project, CREW scientists will honor LO's legacy by continuing to use cutting-edge science to address challenges impacting the conservation and survival of this flagship species.

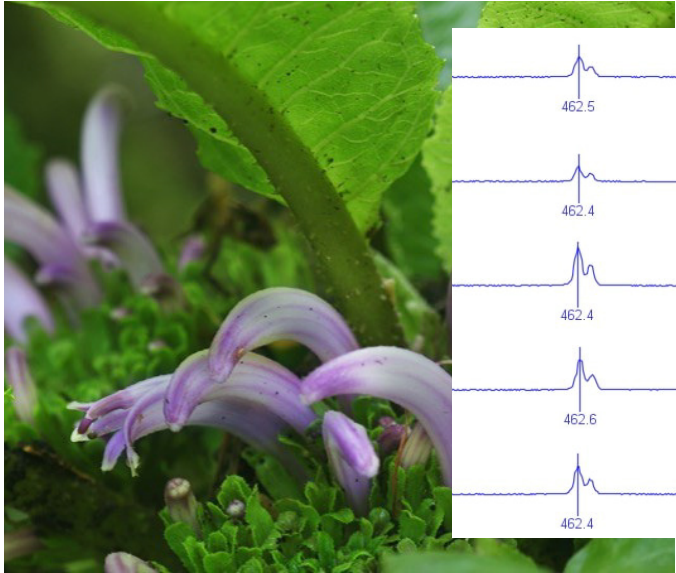


"Using Science to Learn,  
Applying Knowledge to Save,  
A Future for Wildlife"

[cincinnati zoo.org](http://cincinnati zoo.org)

# CREW PROGRESS REPORT

## Delving into DNA to Discover the Diversity in Rare Hawaiian Plant Species



With only two individuals remaining in the wild, *Cyanea truncata* is just one of many critically endangered Hawaiian plant species. Luckily, our partners at Lyon Arboretum in Hawaii are maintaining over 60 individuals from four maternal founders. Struggling insular species with low genetic diversity are vulnerable to quickly changing environments like that of the current climate crisis. For the successful storage and reintroduction of *C. truncata* it is imperative that all genetic diversity is well represented. One goal of our grant, funded by the Institute of Museum and Library Services, is to evaluate the genetic diversity of the material held at Lyon Arboretum and individuals remaining in the wild. Leaf tissue collected from Lyon Arboretum was sent to CREW where DNA was extracted to carry out further genetic analyses in collaboration with the University of Cincinnati. Microsatellite primers were used to amplify fragments in the DNA that often show diversity between individuals based on fragment sizes. Screenshots of raw data from one of 12 microsatellite primers is shown here. These peaks show fragment lengths for each individual (five individuals shown). Many of the microsatellite primers, like the one shown here, had equal fragment lengths for all DNA samples suggesting that diversity is lacking between individuals, but further analysis is currently underway. Understanding the genetic diversity available in *C. truncata* and many other Hawaiian species will help conservationists prioritize their resources accordingly for the long-term preservation of Hawaiian biodiversity.

## Sloths can be Stealthy in More Ways Than One!

Five years ago, the CZBG's sloth couple was observed mating, and to everyone's delight, Moe began displaying behaviors indicative of pregnancy. Baby sloths are adorable, and the staff was very excited to welcome the new arrival into the zoo's family. In a rather confusing turn of events, an ultrasound exam by CREW found not a fetus but two testes! Moe was unfortunately not pregnant, but rather, male, and sadly for Moe, no longer allowed to eat for two. A second exam showed that Moe's mate, Twix, had also been mis-sexed and was actually a female. Since sloth reproductive organs are internal, it can be very difficult to determine gender based on an external exam alone, so when Moe arrived at the zoo described as a female and Twix as a male, no one was the wiser. In time, it was clear things just weren't working out for the couple, and based on a Species Survival Plan® recommendation, Moe was eventually paired with a new female (Lightning) who immediately seemed to strike Moe's fancy. Lightning and Moe were apparently not interested in socially distancing, and in late 2020, ultrasound exams conducted by CREW scientists finally confirmed a sloth pregnancy. Lightning is thoroughly enjoying her weekly ultrasound exams which come with rewards of bananas dipped in strawberry jam. In true sloth form, the fetus is taking its time, but should be joining us in October 2021 and will certainly be worth the wait.

