

Hopeful Re-Tern: Black Tern Monitoring 2021

By Ava Landgraf and Jenni Fuller

Between 2013 and 2020, Great Lakes water levels rose higher than have been seen in decades. Where lakeside communities braced against flooding and watched their docks slip underwater, the Black Terns and other marsh bird species at Lake St. Clair suffered as well. Areas once full of the floating vegetation mats used for nesting were largely submerged or washed away. Our most recent season (2021) offered some relief for both people and Black Terns, as the average summer (May-July) lake levels in Lake St. Clair dropped 1.3 feet. Shallower waters supported a possible rebound for the terns and a season ending on a hopeful note.



Juvenile Black Tern with nanotag and color band by Jennifer Fuller.

During the first six years (2013-2018) of monitoring Black Terns at St. Clair Flats (SCF) the lake level rose gradually, but we were still able to search the marsh walking in waders. Meanwhile, the Black Tern population at SCF began to plummet, and many nesting attempts were unsuccessful. By 2019, the deep water began to flood our waders, so we turned to kayaks. Compared to walking, kayaks were faster and prevented dangerous wading situations, but carrying kayaks took up the mud boat's limited space and prevented us from taking out more volunteers. With higher water levels, Black Terns struggled all the more to locate stable vegetation mats for nesting and often built their nests on floating debris, anything from logs, broken-up dock planks, or bright pink slabs of Styrofoam. In 2020, lake levels were the highest they had been since we started monitoring in 2013. Within the first days of the season, we had to locate a new boat launch as we found our regular site entirely flooded. We motored through vast open water where the Black Tern's usual swaths of marsh habitat once stood. Narrow tips of bulrush barely broke the surface and served as the only indication that this once had been an ideal Black Tern nesting habitat. The Black Tern population dwindled to only 115 individuals (only 23 percent of the original 2013 cohort), and those individuals struggled to raise successful broods. Compared to 2013, the known hatch rate had dropped 56 percent.

The change in scenery from 2020 to 2021 was unbelievable. Almost overnight massive floating "islands" of bulrush mat topped the shallower lake's surface. We could hardly contain our delight as we observed far more Black and Forster's Terns soaring over the tops of cattails and bulrushes or offering minnows to prospective mates on mounds of thick vegetation. The lower water level allowed us to wade through the marsh again. Knowing the benefits, we found a way to still bring our kayaks by strapping them to the sides of the mud boat. With them, we could quickly locate and vacate from nests and chicks to minimize disturbance.

The return of the marsh vegetation in 2021 supported about 45 more terns, more nests, and best of all, more surviving chicks. One of our priorities for 2021 was to track the Black Tern young both at SCF and across the country once they took flight. To do so we utilized nanotags, a rapidly advancing technology in wildlife tracking. These tiny radio transmitters are designed as incredibly lightweight harnesses, emitting unique ID numbers to receivers from long, thin antennae. The nanotags are attached to juvenile Black Terns that are within 10 days of flying (50-60 grams), and are hardly noticeable to the bird at all. After a couple of months, the harness wears away and falls off. Before the fledglings leave the colony, researchers look for their ID number using handheld receivers. Once they leave, however, it's up to Motus Wildlife Tracking towers installed throughout North and South America. These towers are capable of recording any nanotag that comes within a nine-mile radius, whether it is a Black Tern or an animal from an entirely

different study. Data from the towers is available only after the end of the season.

In 2021, we deployed 20 nanotags, detected 6 with our handheld receiver, and spotted four fledglings flying with their harnesses attached. The most memorable of the juveniles was the first we ever tagged this summer. Hatched in a small sub-colony called "Little Muscamoot," it was one of only two surviving young after the other nests were eaten by Northern Water Snakes or destroyed by a particularly large storm we had captured on nest cameras. Whereas the other juveniles were rarely detected more than once, we tracked this bird three separate

times, traveling miles apart with its parents to visit two other sub-colonies and the lakeside Brown's Bar. The nanotags have been an amazing way to track the juvenile birds after they fledge and to help us determine which nesting pairs successfully fledged young (raised them to the point they leave the nest and are flying).

Another exciting addition to our monitoring efforts in 2021 were nest cameras, loaned to Detroit Audubon by the Detroit Zoological Society. We were able to record 10 nests continuously using a one-minute time lapse setting. Unfortunately, some mats with nests floated completely out of view of the camera, confirming that the SCF mats can be highly mobile and can move surprising distances. Luckily, other cameras recorded chicks hatching and events that helped us understand both natural and unnatural causes of nest failure.

Eggs were eaten at two nests by native Northern Water Snakes, and another was recorded being completely washed away by a major storm surge. At another nest, mobile chicks had run off the nest in the morning. This is a common occurrence, especially among older young, but they still often return. However, in the late afternoon, this particular nesting mat was run over by a boat. Probably not coincidentally, this happened on July 5, likely a continuation of Fourth of July celebrations when many people are out on the water. This footage suggests that boater activity could contribute to nest failures, either by running over mats as happened in this case, or by creating a large enough wake to submerge eggs or chicks. Young chicks are especially vulnerable to the elements due to their soft down, which is not water repellent; thus wet chicks can get too cold and die. Both nests and chicks are incredibly well camouflaged, so increasing boater awareness may be an important step towards protecting breeding Black Terns in the future.

In 2021, we also continued deploying artificial nest platforms as a way to provide Black Terns with additional nest support. Despite the fact that many Black Terns chose to nest on debris in 2020, they surprisingly ignored nest platforms in the sparse remaining habitat. Still uncertain of their reception in 2021, we set out 12 nesting platforms to see if any terns would choose to use them. The platforms were left empty until mid-July. After several storms washed away or compromised the stability of large bulrush mats, three platforms were used by either late or re-nesting pairs, indicating that platforms were only of interest when mat availability diminished. Two of these nests failed, and we were unable to ascertain the outcome of the last nest. To date, we still have little data to support that man-made nesting platforms are a successful management strategy at SCF, but this merits continued research and potentially more site-specific designs.

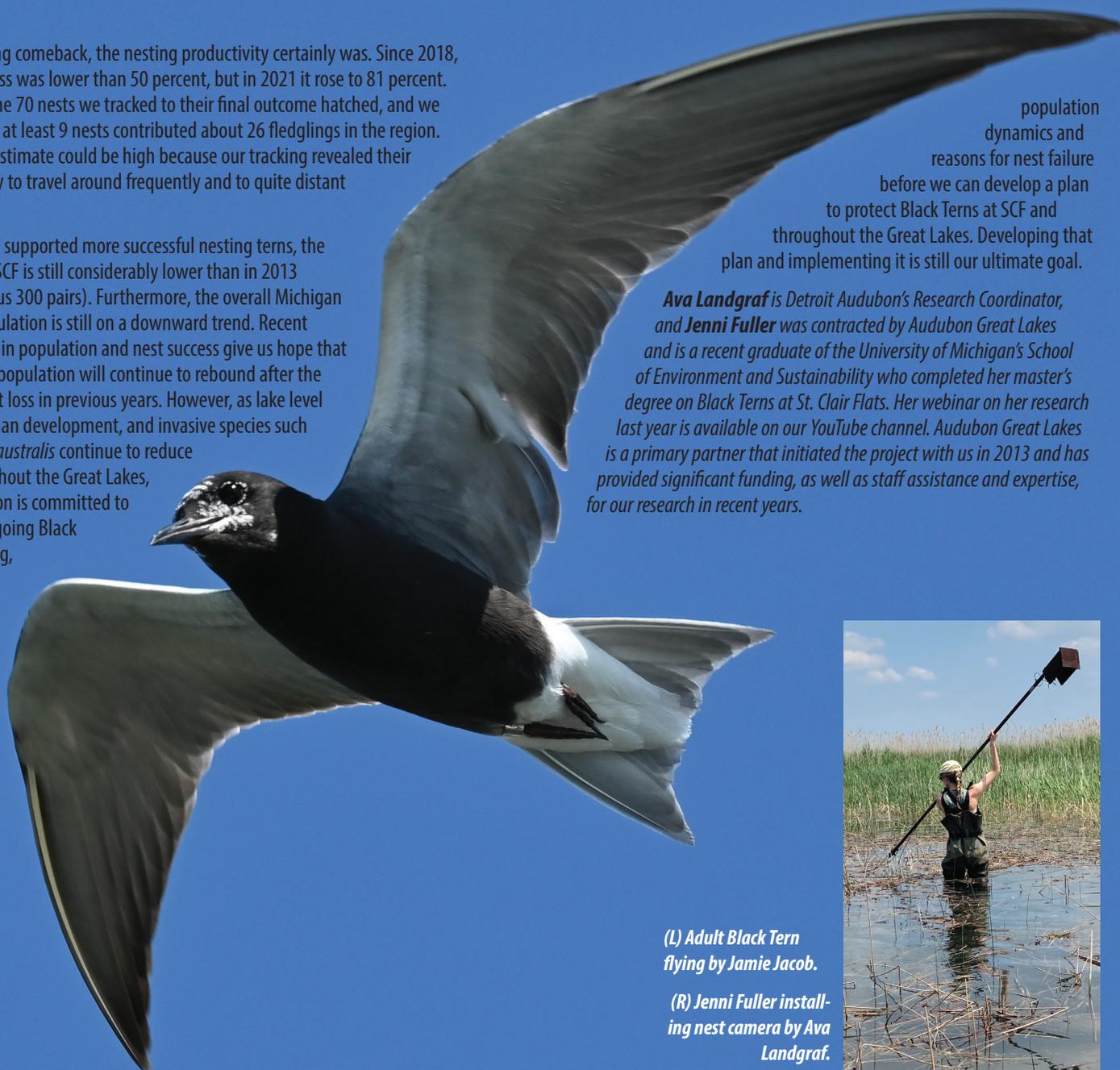
Overall in 2021, we estimated that about 150 individuals (or 75 nesting pairs) returned to SCF, bringing the population closer to the counts in 2019. While

not a staggering comeback, the nesting productivity certainly was. Since 2018, hatching success was lower than 50 percent, but in 2021 it rose to 81 percent. Eggs in 57 of the 70 nests we tracked to their final outcome hatched, and we estimated that at least 9 nests contributed about 26 fledglings in the region. Our fledgling estimate could be high because our tracking revealed their uncanny ability to travel around frequently and to quite distant locales.

Although 2021 supported more successful nesting terns, the population at SCF is still considerably lower than in 2013 (about 75 versus 300 pairs). Furthermore, the overall Michigan Black Tern population is still on a downward trend. Recent improvements in population and nest success give us hope that the Black Tern population will continue to rebound after the marked habitat loss in previous years. However, as lake level extremes, human development, and invasive species such as *Phragmites australis* continue to reduce habitat throughout the Great Lakes, Detroit Audubon is committed to continuing ongoing Black Tern monitoring, research, and well-informed restoration and wetland protection efforts. There is still more work to do in order to understand Black Tern

population dynamics and reasons for nest failure before we can develop a plan to protect Black Terns at SCF and throughout the Great Lakes. Developing that plan and implementing it is still our ultimate goal.

Ava Landgraf is Detroit Audubon's Research Coordinator, and **Jenni Fuller** was contracted by Audubon Great Lakes and is a recent graduate of the University of Michigan's School of Environment and Sustainability who completed her master's degree on Black Terns at St. Clair Flats. Her webinar on her research last year is available on our YouTube channel. Audubon Great Lakes is a primary partner that initiated the project with us in 2013 and has provided significant funding, as well as staff assistance and expertise, for our research in recent years.

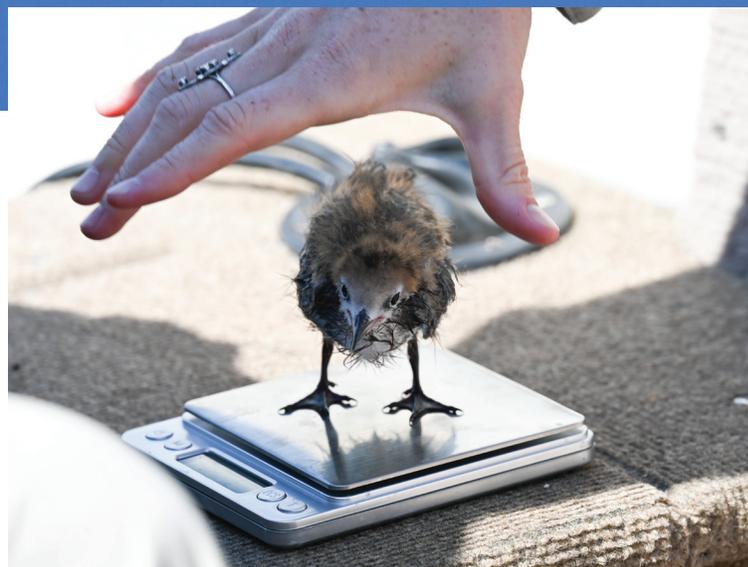


(L) Adult Black Tern flying by Jamie Jacob.

(R) Jenni Fuller installing nest camera by Ava Landgraf.



Three Black Tern chicks in a nest on floating vegetation mat by Jenni Fuller.



Black Tern chick being weighed prior to banding by Jamie Jacob