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Searching for the ROSS'S Gull in Canada's High Arctic

In 1894 famed polar explorer Fridtjof Nansen found himself in a predicament both daunting and exhilarating. After deliberately sailing his stout wooden ship, the *Fram*, into the heart of the Arctic pack ice somewhere north of the Taymyr Peninsula, he and his crew were now entering their second year of drifting amid a sea of ice, slowly approaching the islands of Spitsbergen. On 3 August, he recorded in his journal:

A remarkable occurrence took place: we were visited by the Arctic ross-gull—today my longing has at last been satisfied—This rare mysterious inhabitant of the unknown north, which is only occasionally seen, and of which no one knows whence it cometh or whither it goeth, which belongs exclusively to the world to which the imagination aspires, is what, from the first moment I saw these tracts, I had always hoped to discover as my eyes roamed over the lonely plains of ice.

Exactly 117 years later to the day, I look back to find recorded in *my* journal that I spent much of 3 August 2011 lying on a gravel beach staring into the blinding sun reflecting off

This Ross's Gull in breeding plumage was photographed just after the first birds had returned to the colony.

5 June 2011. Photo by © Mark Maftei.



The brief Arctic summer produces amazing colors, even on seemingly barren Nasaruaalik Island. This mossy area has been fertilized over hundreds if not thousands of years by the Arctic Terns nesting all around. Purple Saxifrage is the most common flowering plant on the island, and for a few weeks each summer it steals the show. *29 June 2011. Photo by © Mark Maftei.*

the ice in a seemingly interminable wait for my own visit from a Ross's Gull. On that occasion, I reflected on how little has changed during the almost 200 years since this remarkable species was first described to science by the sharp-shooting and enterprising young deck-hand James Clark Ross, long before he was knighted for his achievements as an explorer and naturalist. Even today we still know less, in many respects, about the Ross's Gull than about any other breeding bird in North America. The questions my colleagues and I are hoping to answer are most likely the same ones asked by Ross, Nansen, and every other Arctic traveler fortunate enough to have seen one of these incredible birds:

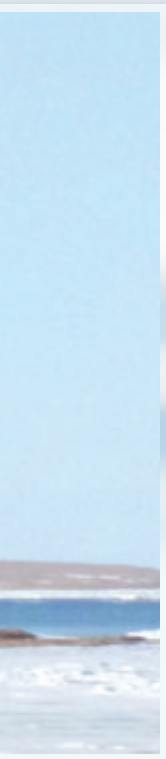
- Where are they coming from?
- Where are they going?
- How can so delicate and graceful a creature not only survive but thrive in one of the harshest and most unforgiving climates on Earth, during the depths of a sunless winter?

On that lazy afternoon this past summer, I was more worried about where *one particular* Ross's Gull was coming from, and, especially, *when* was it going to show up. We had already been camped on tiny Nasaruaalik Island for more than two months studying a small colony of Ross's Gulls, and our main focus had been to try to deploy a handful of *geolocator* tracking devices on the birds breeding there. Geolocators are very small units that affix to a bird and that record daily sunrise, sunset, and day length; based on that information, it is possible to determine where a bird is each day. Unlike radio transmitters, geolocators cannot be remotely monitored. A geolocator-tagged bird must be recaptured to recover its geolocator data. So in our case, it wasn't enough to catch just any old Ross's Gull. We had to capture birds that we thought would have a good chance of returning to the exact same place the following summer.

We had already successfully captured five birds, but a sixth proved remarkably adept at evading capture. That sixth bird was a male who had bred at the site in previous summers but not in the summer of 2011. After exhausting every other trapping method at our disposal, including a very expensive state-of-the-art CO₂-powered net gun, we had finally been forced to resort to the oldest but surest trap of all. It

19 June 2011. Photo by © Shanti Davis.





One of the Ross's Gulls breeding on Nasaruaalik Island flies over to investigate researchers at an Arctic Tern colony on the south end of the island. This bird's nest was near the base of the hill visible in the background in the photo at left, p. 44. The researchers' camp was situated atop the hill.



19 June 2011. Photo by © Mark Maftel.

is one that requires infinite patience and guile, less a trap than an attempt to realign cosmic forces beyond our control. Stretched across a few feet of wet cobble within the ever-shifting tide line, occasionally obscured by the brash ice drifting onto the beach by the constantly swirling currents, lay an impossibly thin length of aluminum wire, and attached at regular intervals along its length were even thinner wire nooses, each delicately formed out of stainless steel fishing line slightly thicker than a strand of hair. Each noose was carefully positioned and set so as to disappear into the gravel, but positioned exactly where I thought my partner in this slow-motion dance might eventually step.

It had been almost two weeks now, and, although I was starting to lose hope, I knew that patience and persistence were all I had left. I scanned the shimmering horizon for the thousandth time before lying back on the warm stones and closing my eyes. Almost immediately, I heard an unmistakable sound, uncannily similar to a dog's squeaky toy, carrying over the ice on the breeze. I could hardly have been any less excited than Nansen when he saw *his* first Ross's Gull, and, although this was not my first sighting of this bird, it would probably be the most memorable. I slowly shifted in my narrow trench in the gravel, and brought my binoculars to my eyes just in time to catch a Ross's Gull gliding in for a beach

This is one of the non-breeding Ross's Gulls that eluded capture; note that it has no geolocator. This photo was taken from a zodiac cruising amid chunks of grounded ice upon which the birds liked to perch. Despite repeated attempts with a net gun, the researchers were outwitted by this individual. 29 July 2011.

Photo by © Mark Maftei.



landing. The tide was dropping, the shallow water close to shore swarmed with tiny amphipods, and the lone male Ross's Gull casually started strolling up the beach, picking around his feet as he headed ever closer toward the trap...

The High Arctic Gull Research Group was formed in 2011 to encourage and facilitate cooperation among scientists from a number of academic and government institutions, all united in their pursuit of studying a trio of poorly known species: Ross's, Sabine's, and Ivory gulls. Ivory Gulls are listed as endangered in Canada, and Ross's Gulls are classified as threatened. Although Sabine's Gull populations appear to be healthy and stable, we know so little about these birds that any opportunity to study them is hard to pass up. In our inaugural season of 2011, we enjoyed an unusual combination of good weather and good luck—the two variables that can make or break any kind of Arctic research project. We managed to accomplish many of our goals for this first field season, but the story really began several years earlier, in 2005.

Mark Mallory and Grant Gilchrist, both seabird biologists with the Canadian Wildlife Service, were in the middle of conducting an ambitious census of marine birds breeding in the Canadian High Arctic. While flying an aerial survey across Queens Channel, a broad expanse of water stretching between Bathurst and Devon islands, they noted a large colony of terns rising from a tiny but uncharacteristically lush island below them. The island was little more than a gravel ridge, and it didn't even have a name on the map, but, following a gut feeling, Mark and Grant decided to land and investigate. It wasn't long before a distinctive squeaky-toy call alerted them to a most unexpected and exciting discovery.

Scattered amid the hundreds of Arctic Terns, Common Eiders, Sabine's Gulls, and other nesting birds on the island were five pairs of Ross's Gulls, each defending a nest. This was only the fourth nesting site for Ross's Gull in Canada, and one of fewer than a dozen outside Russia. Since legendary Russian biologist Sergei Buturlin first

During their first few days back at the colony, Ross's Gulls spend most of the time flying around the small polynya off the tip of the island. 6 June 2011. Photo by © Mark Maftel.



Before the snow has melted enough to open up nesting sites, Ross's Gulls hang around the polynya. Pair bonds are formed or reformed at this time. The male (in flight) performs a distinctive "landing display" during which he makes an impressively loud, descending, rattling call.

11 June 2011. Photo by © Mark Maftei.

discovered several small and widely dispersed colonies of Ross's Gulls during his epic travels across the coastal taiga of Siberia in 1905, no other major breeding areas had been noted. More recently, a few scattered breeding records from the Nearctic, notably in Canada and Greenland, have suggested that perhaps the Ross's Gull is more of a circumpolar breeder than a Siberian endemic, as was long believed.

Either way, we are a long way from knowing the Ross's Gull's breeding range, since we can currently account for less than 1% of the estimated global population at known colony sites. To put it another way, fewer than 200 pairs of Ross's Gulls had ever been seen nesting anywhere in the world, and now Mark and Grant were looking at five more.



Mark quickly decided that the opportunity to study the colony on the then-unnamed island was too good to pass up, and, by 2007, a small but cozy camp was built on the central plateau of the island; from here the nesting birds, including the Ross's Gulls, could be easily observed but left undisturbed. One of the first problems to be solved was a name for the new study site. Jason Akearok, Mark's colleague at the Canadian Wildlife Service, had been conducting interviews in several Inuit communities in Nunavut to determine the species with which local hunters were familiar and to document their perceptions of changes in abundance and distribution. Although some of the people in the villages remembered seeing "little pink gulls," they were so rare that they didn't really have a common name. The Resolute Bay Hunters and Trappers Association finally put an end to the confusion by calling the birds *nasaruvaaalik*, which in Inuktitut translates as "thing that wears a scarf." Anyone who has ever seen a Ross's Gull in breeding plumage would be hard pressed to think of a better description!

The Ross's Gulls nesting on Nasaruvaaalik Island were monitored and observed each season. Slowly, researchers began to notice that there are some significant differences between them and the other birds nesting on the island. Ross's Gulls typically arrive up to two weeks ahead of any other species, and they are often well into incubation by the time the first Arctic Terns even start laying eggs. Before 2011, nobody had even been around to see when the Ross's Gulls first arrive. Once they start nesting, Ross's Gulls also show some unusual nest-defense strategies. Unlike Arctic Terns and Sabine's Gulls, which typically all rise up and mob a potential predator by swooping and pecking at the invader, Ross's Gulls leave their nests at the first sign of trouble and fly high into the air, the incubating bird calling and circling well overhead to alert its mate—which is never far off. In the few instances in which Ross's Gulls *do* remain on the nest long enough

The male (top) is wearing a blue color band affixed to him on the island in 2008.

11 June 2011. Photo by © Mark Maftei.



to allow researchers to approach closely, they finally flush and perform a sophisticated broken-wing display, just like that of many shorebirds.

Most intriguing of all from a biological perspective is that, in more than seven years, we have not been able to confirm that even a single Ross's Gull chick has ever fledged on Nasaruaalik Island. Ross's Gulls seem to be particularly susceptible to predation during the early part of the breeding season, when they are among the only birds nesting and thus highly conspicuous on the ground. And even when they do manage to successfully hatch chicks, the young either disappear or die within the first few days, often for no obvious reason. The extremely low reproductive output of this species had been noted before by researchers in Russia, but why they so often fail to fledge remains a total mystery.

Along with a lot of questions about the general breeding biology of Ross's Gulls that we hoped to answer in 2011 when we formed the High Arctic Gull Research Group, our main objective was to determine where Ross's Gulls are spending the winter. Not only is this one of the last big questions in North

American field ornithology, but it is becoming an increasingly critical gap in our knowledge as industrial activity and development burgeons across the Arctic. From what anecdotal evidence exists, it appears that Ross's Gulls are among the very few species of birds that spend their entire lives in the Arctic. As seabirds which feed on marine organisms, they are highly dependent on a poorly understood and increasingly unpredictable habitat along the edge of the seasonal pack ice.

Although the high Arctic is among the most difficult areas of the world from which to conduct scientific observations, recent developments in miniaturizing tracking devices like satellite transmitters and geolocators mean that biologists can now follow smaller birds with increasing accuracy. Working with Lotek, a Canadian company specializing in manufacturing wildlife tracking devices, we customized the programming on one of their smallest geocator units specifically for deployment on Ross's Gulls. In addition to providing daily positional fixes for each bird, these units also record air temperature and sea surface temperature. These geolocators can even record wet/dry cycles, telling us when birds are swimming or walking around.

Grant Gilchrist, a long-time seabird biologist with the CWS, was part of the team that found Canada's first Ross's Gull colony. In this image, he goes back to the helicopter to grab a snack during a survey of Middle Cheyne Island—the site where Ross's Gulls were first discovered, in 1978, to be breeding in North America. 11 June 2011. Photo by © Mark Maftai.





A geolocator has been attached to a tarsal band on a Ross's Gull captured at its nest. In addition to deploying the geolocators, researchers attach a metal band and a colored band, they note a suite of morphological measurements, and they collect a few feathers for analysis. From start to finish, the procedure requires just over five minutes. The birds become entirely relaxed once their heads are tucked into a handy, duct-taped juice cup.

13 June 2011. Photo by © Shanti Davis.

in the Arctic is more unpredictable in the summer than in the winter. Particularly challenging is the period from spring to early summer; at that season, warm air blowing off the ground heated by round-the-clock sunlight meets the cold air lying low over the still mostly frozen ocean. That combination can convert blinding sun and blue skies to milky fog in minutes.

Even in favorable flying conditions, the incredible remoteness of the areas in which we are working means that everything costs way more than expected. Helicopter time, even at a subsidized rate, runs around

Geolocators are far smaller and less expensive than satellite transmitters, but they come with a major constraint: They are designed to archive the data they collect instead of transmitting it. That means a tagged bird must be *recaptured*. This is not a major problem for highly *philopatric* species—that is to say, species in which individual birds return to almost exactly the same nesting or roosting site year after year. Through re-sightings of a small number of Ross's Gulls marked with unique color bands, we have determined that at least some individuals return to the same breeding sites in consecutive years, and we are hoping this tendency indicates strong philopatry in the general population. If so, geolocators will prove to be a highly effective way to track these birds during their annual migrations.

Another major focus of our work in 2011 was to start systematically surveying areas of suitable habitat in an effort to locate more breeding pairs of Ross's Gulls. Indirect evidence, like sightings of breeding birds during the spring, summer, and fall, as well as reports of juvenile birds in the late fall and early winter in Nunavut, indicate that there is probably a relatively large and important breeding population of Ross's Gulls in the Canadian Arctic. Although it is currently assumed that most of the world's population of Ross's Gulls nests along a narrow strip of coastal tundra in Siberia, we are starting to gather evidence suggesting that a substantial and possibly distinct population of birds also nests in the Canadian High Arctic, and probably Greenland as well.

The job of surveying areas suspected of harboring breeding Ross's Gulls is a major logistical challenge. Perhaps surprisingly, the weather

\$2,000 per hour. On top of the high cost, the scarcity of available pilots and machines puts a serious limit on how much can be done in any given season. Given these challenges, we decided to start small in our first year and focus on a few key sites just a little farther south in Penny Strait and McDougall Sound, where we had some tantalizing hints that we might find more Ross's Gulls. After a straight week of fog and rain in late June, we finally woke up to a bluebird day, and quickly readied for a day of flying with high hopes that our surveys would turn up new Ross's Gull nesting sites.

Spending time anywhere in the Arctic is a humbling experience, and visitors realize almost immediately how vulnerable they are in such an unforgiving environment. Seen from the air, the effect is even more pronounced. Out of the windows of the helicopter, a mesmerizing sheet of glimmering white ice stretches out to the horizon, patterned with an infinitely varied combination of tiny melt ponds and meandering streams radiating toward seal breathing holes. The water is sapphire blue and lit from beneath by the reflections off the ice; it seems to glow with an inner light. Scattered here and there are small islands, most of them nothing but barren gravel and ancient coral, mainly devoid of life. On small patches of ground protected from the wind or fed by small streams of snowmelt, there are tiny oases of more fertile ground where stunted clumps of purple saxifrage, spider saxifrage, and Arctic poppies grow.

A few islands, however, are teeming with birdlife, a testament to the incredible productivity of the waters in which they lie. A combination of factors contributes to the rich birdlife of these islands: surrounding areas of shallow water, strong tidal currents that maintain *polynyas* (areas of open water that never freeze), and the absence of mammalian predators wary of crossing open water or risking a stranding on a small island during the summer thaw. The result is that these smaller islands are highly attractive to ground-nesting birds like terns, gulls, and waterfowl. Even from the air,



While flying surveys over Emikutailaq Island, researchers were dazzled when hundreds of birds lifted off the ground as the helicopter approached. The team landed and immediately found a couple of pairs of Ross's Gulls! Two individuals were trapped and outfitted with geolocators. This discovery marked only the fifth breeding colony of Ross's Gulls found in North America. In this photo, author Mark Maftai is double checking that all the measurements have been recorded; in a moment, the bird will be released. 26 June 2011. Photo by © Shanti Davis.



This bird, already banded but not mated, was attracted to an improvised Ross's Gull decoy (carved out of a two-by-four) accompanied by Ross's Gull calls from an iPod. It is gratifying that the Ross's Gulls seemed to ignore the geolocators after a few days of initial curiosity—indicated by their frequent picking at the contraptions.

19 June 2011. Photo by © Mark Maftei.

these islands are instantly recognizable by their greenness. Fertilized by thousands of years of occupation by birds, they support a surprisingly lush, albeit stunted, flora.

Many of these islands also bear witness to occupation by *human* visitors as well. Islands that provide good foraging for birds also provide good foraging for people. Ancient stone tent rings, meat caches, and bowhead whale bones remain from the brief window between about 1000 and 1400 A.D. when warmer temperatures kept much more of the Arctic ice free than is the

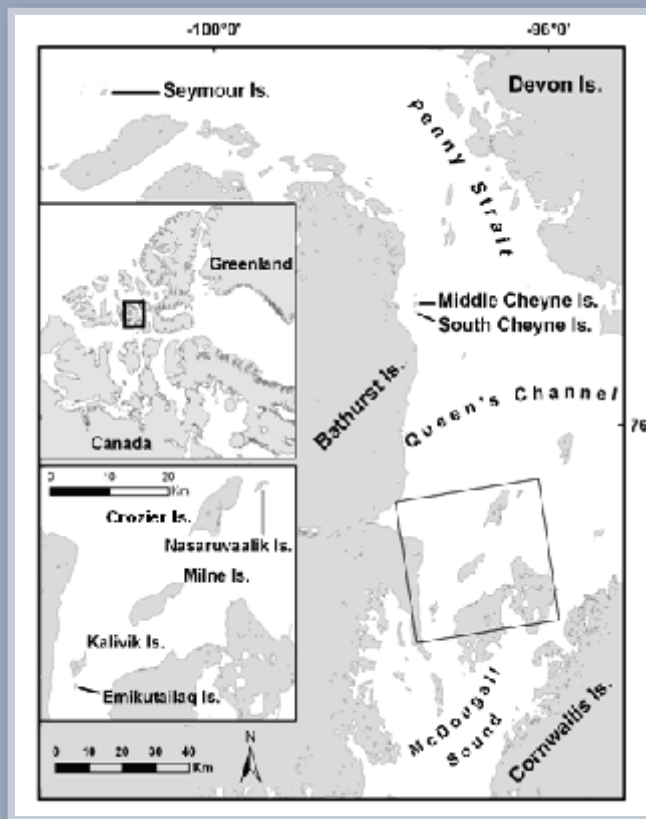
case today; during that period, large whales ventured widely among the High Arctic islands. The Thule people, ancestors of today's Inuit, were sophisticated hunters specializing in hunting bowhead whales and other large marine mammals. They flourished during this warm phase, leaving their mark across much of what was prime hunting territory.

After flying transects over several larger islands with minimal suitable habitat, we approached tiny but auspiciously

named Emikutailaq Island—named after the Inuktitut word for tern. Even from a distance, we were struck by the sheer number of birds that rose up at the approach of the helicopter. Hundreds of Arctic Terns and dozens of Sabine's Gulls swirled around above the island, while many small flocks of Red Phalaropes darted among several small ponds. Common Eiders, Red-throated Loons, and Long-tailed Ducks also scattered as we set down on a raised beach ridge at one end of the island.

Ross's Gulls tend to react to disturbance by flying a considerable distance away and returning only when things quiet down. So instead of trying to circle the small island and survey from the air (a time-saving technique we employed when covering larger islands or those with fewer birds), we opted for a more thorough ground-based search. It wasn't long before we spotted the first Ross's Gull circling over the shore of a pond. We lay down and waited, and a few minutes later the bird finally sat down on what we knew must be a nest. One of the other reasons we decided to start surveying close to our base camp on Nasaruvaalik Island was so that we could extend our tracking study to include birds from other suspected breeding sites nearby. Our hunch had just paid off.

We used a bow net, a simple yet effective snap trap that looks like something from a Bugs Bunny cartoon. We quickly trapped both members of the nesting pair, and outfitted each bird with a unique combination of color bands and a geolocator. While biologist Shanti Davis and our multi-talented pilot Steve Lodge finished taking morphological measurements and collecting a small sample of feathers to be used for DNA and



Map by Kei Sochi.

stable-isotope analysis from the second Ross's Gull, I was amazed to see another pair of Ross's Gulls circling over us! As much as we would have liked to have stayed longer and finish surveying the island, the extra time we spent trapping the birds had put us way behind schedule and we had to leave without searching for more nests. Clearly Emikutailaq Island represents an important breeding site for an unusually high number of birds—including at least two pairs of Ross's Gulls. A thorough census is a top priority when we return this year



Researchers played hide-and-peek with this wary individual, who was never captured.

26 July 2011. Photo by © Mark Maftai.

to recover the geolocators deployed in 2011.

Along with the birds we found nesting on Emikutailaq Island, we spotted a lone Ross's Gull on nearby Kalivik Island, which we presumed was a member of a breeding pair. We also suspect that at least one pair of Ross's Gulls which showed up and copulated on Nasaruvaaalik Island bred somewhere nearby because both birds reappeared again in the late summer, still together. We know a lot of good habitat remains to be surveyed, but our preliminary work is very encouraging: Not only does it confirm that there are Ross's Gulls nesting around our main study site on Nasaruvaaalik Island, but we have also learned which habitat characteristics indicate which sites are most likely to attract Ross's Gulls. We have a solid handle on

where to focus our searches in 2012 and beyond.

We had an exceptionally successful season in 2011, and we collected valuable data that is helping us start piecing together the life history of the Ross's Gull. There is also a certain excitement in knowing that many secrets remain. One of the most alluring aspects of studying such a poorly known bird is the mystery itself. We have high hopes that our research group's work will ultimately prove Nansen wrong in his claim that the Ross's Gull belongs "exclusively to the world to which the imagination aspires." At the same time, we have little doubt that such a world will always be the preferred habitat of such a remarkable bird that is so reluctant to yield its secrets.

Emikutailaq island was covered in old Thule tent rings and the remains of meat caches, along with a considerable number of marine mammal bones. This bowhead whale skull was one of several indicating that the island was an important base for hunting some 400–600 years ago. On the horizon, members of the research team look for Ross's Gulls. 26 June 2011. Photo by © Shanti Davis.

