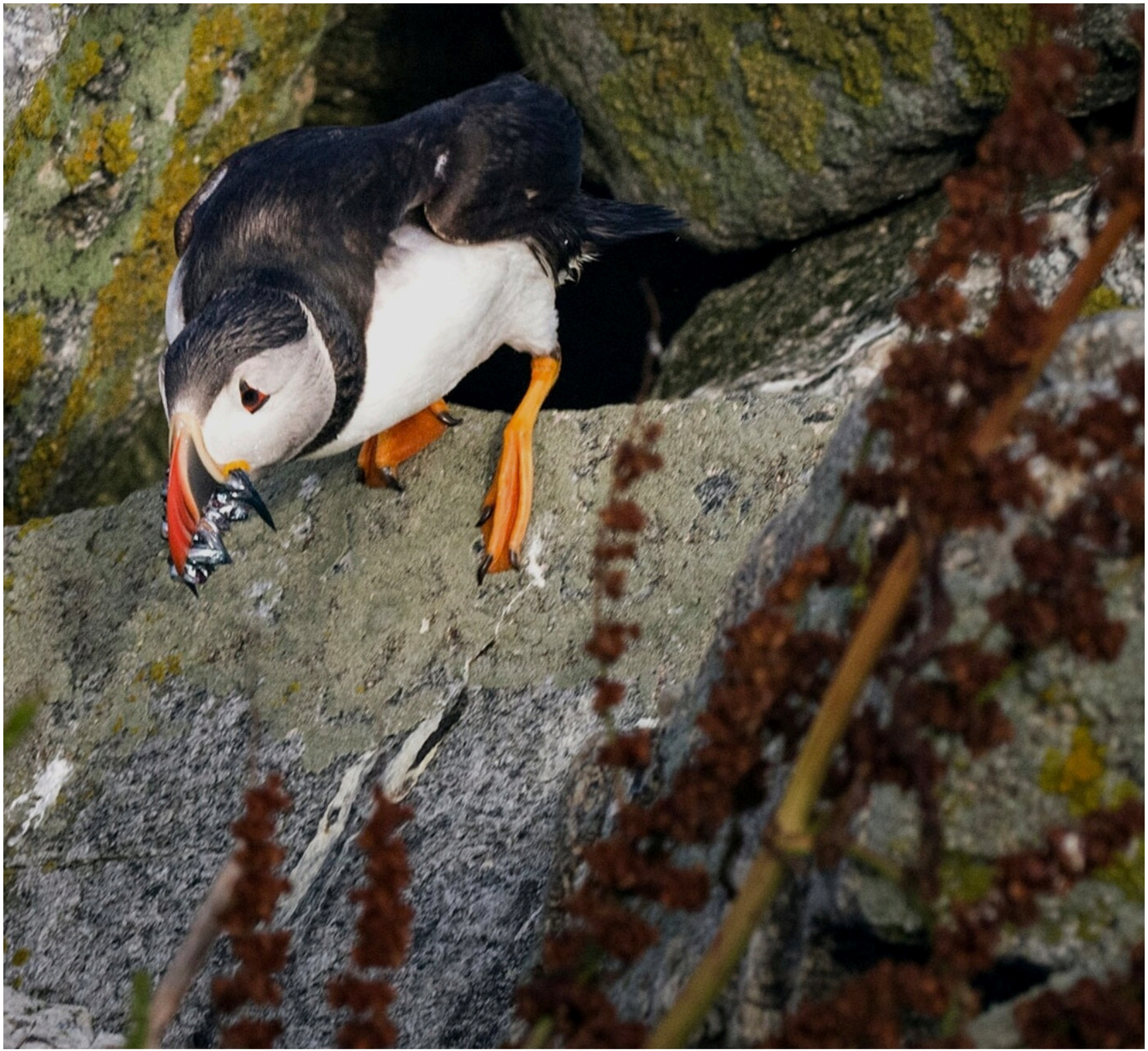
ANIMALS

Puffins have returned to the Gulf of Maine—but for how long?

Decades of hard work restored Atlantic puffins and other seabirds to rocky islands in the gulf, but now puffins face threats from climate change.



Hunters had extirpated Atlantic puffins in the Gulf of Maine by the late 1800s. Determined efforts since the 1970s have established a colony of 180 breeding pairs here on Eastern Egg Rock, in Muscongus Bay.

BY **JAMES PROSEK**

PHOTOGRAPHS BY **BRIAN SKERRY**

PUBLISHED DECEMBER 15, 2021 • 15 MIN READ

EASTERN EGG ROCK, MAINE — "We know that things are changing in the Gulf of Maine because the puffins are telling us," said Don Lyons, the director of conservation science for the National Audubon Society's Seabird Institute and the head of the society's Project Puffin. We were standing in front of the Egg Rock Hilton, as researchers affectionately call a small wooden shack that's the only sign of human presence—other than an outhouse and some bird blinds—on Eastern Egg Rock, a tiny island in Muscongus Bay.

Project Puffin is a decades-long initiative to reestablish seabird populations—puffins but also guillemots, terns, and petrels on Eastern Egg Rock and two other rocky islands in the Gulf—*Matinicus* Rock and *Seal* Island. Puffins had been gone from these islands since the late 1800s, targeted by hunters and egg collectors. The restoration effort began in the early 1970s with the transfer of a few chicks from Newfoundland to Eastern Egg Rock. Today, the seven-acre island is home to roughly 180 breeding pairs.

I visited Eastern Egg Rock with Lyons and photographer Brian Skerry this August. I was excited to see the charismatic little birds with the colorful beaks and clown faces. (Puffins are alcids, a family that includes the now extinct great auk).

Lyons had suggested I bring my tent and spend the night to get the full seabird experience. Indeed, the cacophony of sounds—the most identifiable being the shrill chatter of terns and descending cackle of laughing gulls—made me wish I'd brought ear plugs. (Puffins' vocalizations are lower and quieter, somewhere between a croaking and a cow mooing.) Nonetheless, it was an experience to be savored—the beautiful noise of vibrant, diverse life.

Under Project Puffin, chicks were brought to seven-acre Eastern Egg Rock from Newfoundland. It took a few years for adult puffins, which spend most of their lives at sea, to make this their permanent breeding home.

STEVE DE NEEF

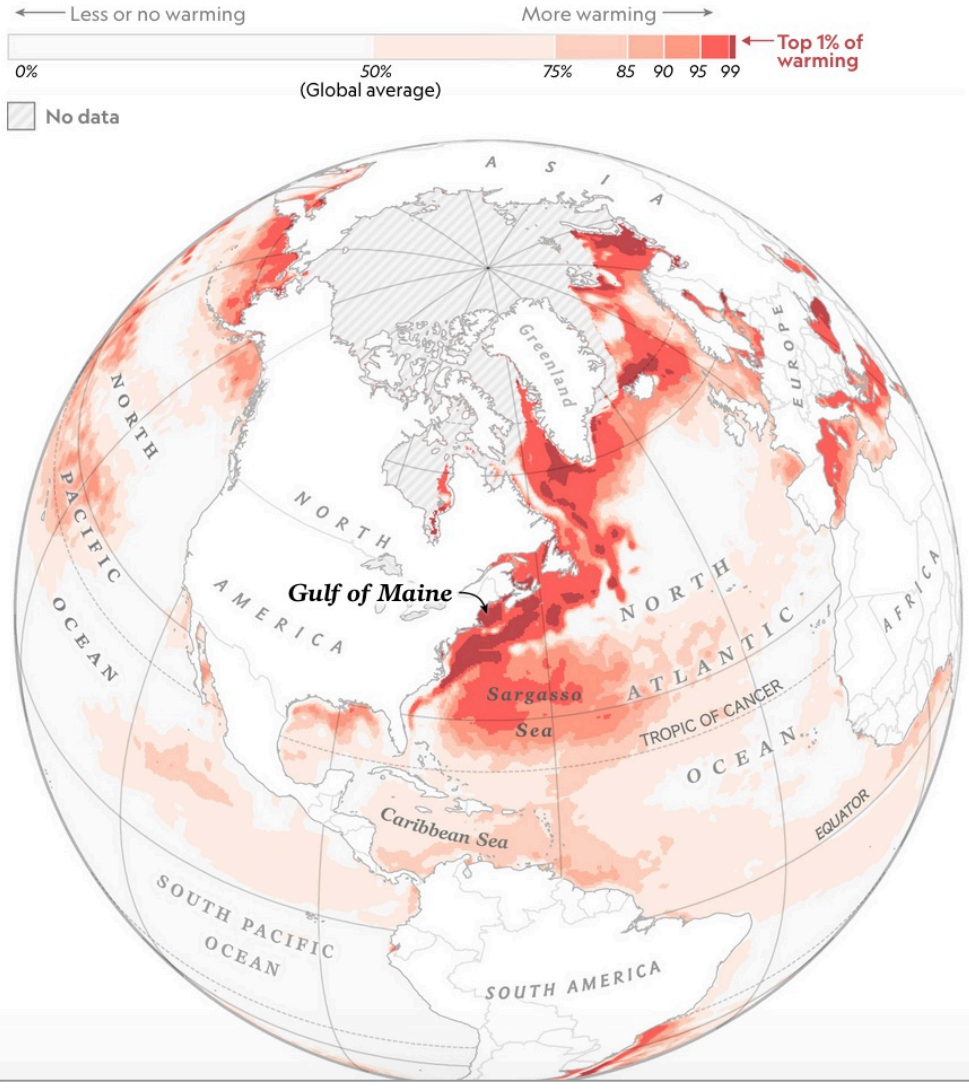
But how vibrant? Just as puffins and their companion species seemed to have made a remarkable comeback—three species of terns now number a thousand breeding pairs on Eastern Egg Rock—a new threat looms.

In a typical year, two-thirds of puffin chicks survive, but in 2021 on Eastern Egg Rock and the other islands, only a quarter to a third have made it. Lyons said breeding results from this summer's observations of puffins are "strikingly poor." Two years ago was "pretty good," but "2020 was marginal, and this year was relatively catastrophic." He attributes this to lack of good food, a direct result of warming waters caused by climate change, as well as overfishing of puffins' preferred food fish.

The Gulf of Maine is experiencing extreme warming

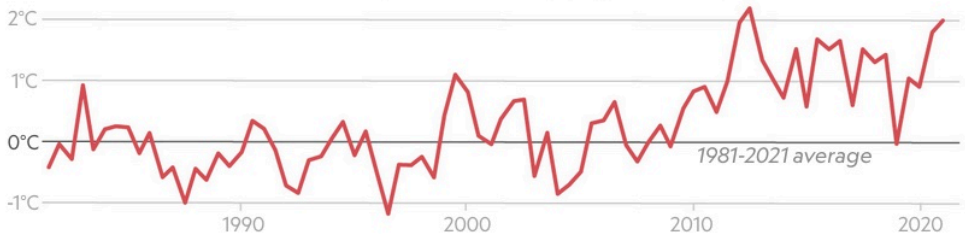
Much of the Northwest Atlantic, especially the Gulf of Maine, has been warming faster than elsewhere in the world's oceans—99 percent faster, according to one study. If warming continues unchecked, it could threaten Maine's lobster fishery.

Sea surface temperature warming (1989–2019)
Represented as percentile



How the gulf has warmed
For more than a decade, sea surface temperatures in the Gulf of Maine have consistently been higher than what is considered normal.

Biannual Gulf of Maine sea surface temperature anomaly (degrees Celsius)



Soren Walljasper, NGM Staff
Sources: Andrew Pershing, Climate Central Inc; Gulf of Maine Research Institute

Food shortage

Warmer conditions mean that baitfish puffins depend on may be going elsewhere. “We see less of their standard species, like Atlantic herring, sand lance, hake, and start to see more baitfish that are otherwise rare in the Gulf of Maine,” Lyons said. These include subtropical species such as butterfish and rough scad. That puffins are turning to these is “a sign that it’s tough going” for the birds.

Butterfish pose a problem when puffin parents bring them to their chicks, Lyons explained, because they’re deep-bodied, and the chicks have a hard time swallowing them. Nesting burrows can be littered with uneaten fish and chicks can sometimes starve, even though their parents have brought them plenty to eat. Other available fish, such as rough scad, “don’t have that issue of shape,” Lyons said, “but they are not particularly nutritious —their caloric density is not very high.”

As climate change warms the gulf, puffins’ staple food fish, such as hake and herring, are becoming harder to find. This puffin is bringing its chick a butterfish, a wide-bodied subtropical species that the young have trouble swallowing. It’s “a sign that it’s tough going” fo... **Read More**

This summer presented other climate-related challenges. Eastern Egg Rock recorded 18 inches of rain in July, the most for that month in over a hundred years. Water flooded some of the birds’ nesting burrows on Egg Rock and Matinicus, suffocating the eggs. Then, hurricane Elsa dropped more than three inches of rain shortly after chicks had hatched. “If the chicks are well fed and have enough energy to keep themselves warm, they

will do much better in these events," Lyons said. "But the double whammy of poor food and ill-timed and really significant storms had a big impact."

Seabirds are long-lived (a puffin can live 30 years or more), and adults are able to withstand tough conditions and unproductive years. "What we worry about is how many bad years stack up, and if we do see more bad years than good, where's the tipping point?," Lyons said.

Puffin dream

Immense effort has been required by dozens of researchers to restore—and maintain—puffins, terns, and other seabirds on these Maine islands. Vegetation must be trimmed to make better nesting habitat, for example, and the numbers of several species of gulls, which prey on puffin and tern chicks and steal food from adults, must be kept in check.

It all began in 1969 when Stephen Kress came to Audubon's camp on Hog Island, eight miles north of Eastern Egg Rock, as an ornithology instructor. While there, he read about the colonies of puffins that once had thrived on nearby islands. It sparked a dream.

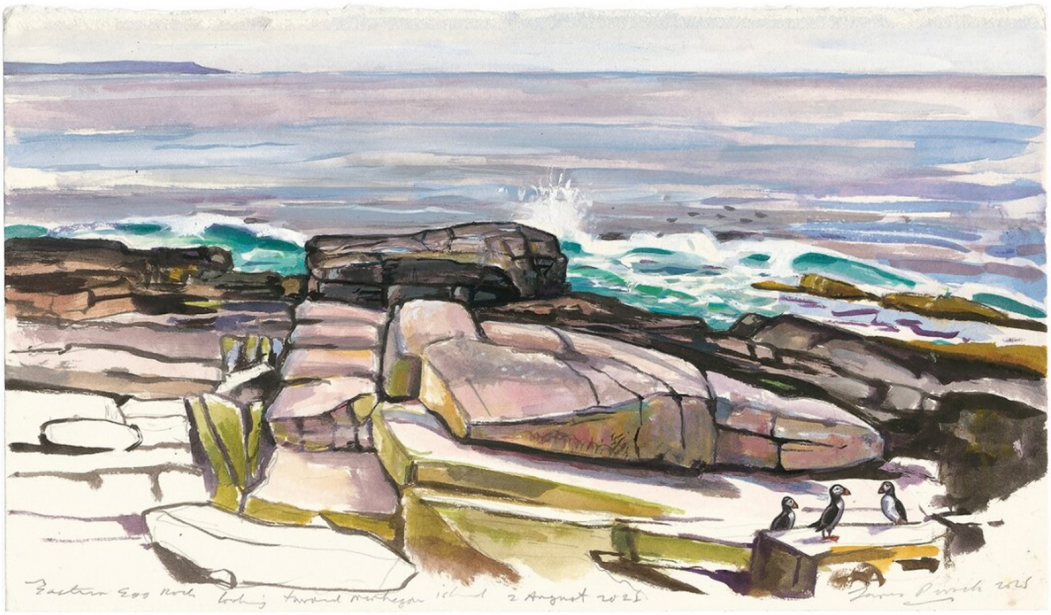
Puffins can dive to 150 feet on the hunt for fish for their chicks. Lyons says this year's breeding results on Eastern Egg Rock are "relatively catastrophic," mainly because of a lack of good food.
STEVE DE NEEF

In 1973 Kress brought six chicks from Great Island, in Newfoundland, where puffins were abundant, to Eastern Egg Rock. He hoped they'd imprint on the island and return to breed between May and August. (Puffins spend much of the rest of the year offshore.) During the first several years, Kress and his team nurtured hundreds of chicks transplanted from Canada—but no adults were seen returning to Eastern Egg Rock.

In June 1977 Kress spotted an adult puffin on the island; it was one of his, identifiable by a band on its leg. But it was not until 1981, eight years after Project Puffin began, that a mature puffin with a fish in its bill disappeared into crevices in the rocks—a sure sign that the first puffin born on Eastern Egg Rock since 1885 was feeding a chick in a nesting burrow.

Kress knew that seabirds are social animals that live in colonies so he placed wooden puffin decoys all around Eastern Egg Rock. Sure enough, puffins began to return and nuzzle up to their wooden counterparts, validating what came to be known as Kress's theory of social attraction.

To a puffin, the presence of other puffins signals that conditions are favorable for breeding. The simulated colony (the lure of the decoys was enhanced by recordings of puffin sounds) spawned a real one. And as puffins returned, other birds followed: three species of terns (Arctic, common, and roseate), Leach's storm petrels, common eiders, and black guillemots.



Return of the puffins: Eastern Egg Rock, Muscongus Bay, Maine
ART BY JAMES PROSEK

Puffin researchers

"I often describe puffins as our researchers," said Lyons, who took over from Kress as head of Project Puffin in 2018. "They go out and sample the ocean every day, multiple times a day, in ways that we would never be able to." (Puffins can dive as deep as 150 feet to catch fish.) Then, he added, "they report in to Kay, Jasmine, and Emily" on how their food sources are changing.

Lyons was referring to the three young scientists based on Eastern Egg Rock from May through August 2021. Kay Garlick-Ott, a Chinese American Ph.D. student in behavioral ecology at the University of California, Davis, was logging her fourth summer with Project Puffin. Emily Sandly, who has an undergraduate degree in wildlife biology from Keystone College, in Pennsylvania, was on her second stint. And Jasmine Eason, an African American undergraduate at Florida A&M University studying animal science "in hopes of being a veterinarian one day," was enjoying her first Project Puffin summer.

These human researchers work nine hours a day—or more during "peak hatch" in late June— engaged in a variety of duties, from conducting island-wide nest censuses of birds and recording the kinds of food adult puffins bring to their chicks to controlling invasive red raspberry and other vegetation that hinders nesting by terns and petrels and protecting puffins from predatory gulls. They trap and attach identification bands to the legs of adult puffins. They also gently extract chicks from burrows, using a long piece of wire bent into a hook that they loop around their feet, so they can measure and weigh them and check their growth rates. Puffins are their main focus, Garlick-Ott said, but "we work with six different species, so it's a lot to juggle."

As the sun set, I sat with her and Skerry in one of the blinds—a grey plywood shack set atop rocks not far from the surf-pounded shore—watching fleets of puffins bobbing on the water. A few landed on the rocks near us, then zoomed down into the crevices between the boulders. Soon we could hear the birds "talking" in the rocks around us where their fuzzy

little progeny were awaiting dinner.

Left: Researcher Kay Garlick-Ott examines a puffin between five and six weeks old. The chick is underweight, likely because it can't swallow the butterfish its parents bring into the burrow, a safe crevice in the rocks. Garlick-Ott expects it will die in the days ahead.

Right: Emily Sandly (center) and Jasmine Eason examine a puffin chick, while Garlick-Ott (right) gets ready to weigh a puffin in the white bag.

Feeding studies take a lot of their time, Garlick-Ott explained. "We are trying to figure out what fish are being eaten by the chicks, and how frequently, and the size of the fish." Armed with binoculars, a clipboard, and a camera, they take three-hour shifts in the blinds, which "have names

like Heaven, Hell, Pru, or Arizona," she said. "You get comfy, pull the curtains, and you watch feeds come in." Adult puffins swoop into their burrows so fast that it's difficult to identify the fish in their beaks unless there is a photograph to study. "You're marking every time a feed comes in to one of the study chicks. You write which chick it went to, and you identify the type of fish that come in." The painstaking work is necessary for advancing the science around puffins, and it can be years before the accumulated data reveal trends.

The scourge of kleptoparasitism

The puffin and tern colonies on Eastern Egg Rock are"conservation-reliant," Garlick-Ott said. What she means, in part, is that humans must intervene against the depredations of gulls. "Laughing gulls will steal and eat small chicks and eggs," she said. "Herring gulls will take chicks ranging from medium to large. Perhaps the bigger pressure is that the laughing gulls will steal food from the adult puffins and terns as they are carrying them to chicks." The biological term for food thievery is kleptoparasitism. "Every fish that's taken is a fish that doesn't end up in a chick's mouth," she said.

"Kleptoparasitism [by] the laughing gulls is horrendous to watch," Sandly told me. "They pin puffins to rocks and take their food. Gulls are bullies."

For the researchers, combating gulls is an unavoidable and unwelcome job. One way they do it is by oiling gull eggs, Garlick-Ott said. Oil prevents the exchange of air into and out of the egg by blocking pores in the egg's shell, essentially asphyxiating the embryo. Sometimes, she said, they also shoot gulls.

Without such drastic measures, the puffins and terns wouldn't survive, Lyons told me. "They are in our care because we've altered the system they evolved in, particularly since colonization here in North America, and we continue to do so." Without these conservation efforts, "we will lose these species."

The small fish this puffin parent snagged will make a nutritious, digestible meal for its young.

"If you keep pulling out more and more populations, or species, in an ecosystem, even though maybe that's just one little piece," Garlick-Ott said, "it still makes the overall structure or foundation weaker." If the foundation is weak, it's more likely that "something like climate change could come along and knock out the species or the entire ecosystem." She admitted that taking drastic steps to maintain biodiversity, such as eliminating some of the gulls on Eastern Egg Rock, "can be ethically difficult, not to mention exasperating. It's a never-ending battle…worth fighting, but it's very precarious."

For Eason, who grew up in inner city Miami, tending to the puffins goes beyond shoring up biodiversity—they're a source of joy. "I'd seen puffins before on TV and movies," she said laughing. "I was always intrigued, like, 'Oh my gosh, that bird exists?!' That bird is so pretty. And when I first came out here and saw one, you put it together. It was mind blowing."

All three researchers agreed that there's something captivating about getting deep into puffin families' daily lives through close observation of individuals. "They let you have this little sliver of land, and everything else is theirs," Sandly said. You really get to be a part of it."

But this year has been difficult, she added. "A lot of people I know think this work is dismal because we're on the front lines of climate change. This summer has definitely been a more emotional one."

Garlick-Ott described watching malnourished chicks that never fledge as "gut-wrenching." Nonetheless, she remains optimistic, evoking Stephen Kress (whom the researchers call their "puffin daddy"). "You can't get any work done, create a hopeful or positive future, unless you have a vision yourself of what we want the future to be," she said.

In the Egg Rock Hilton is a small library, with one shelf dedicated to facsimiles of Kress's handwritten journals from the early years of Project Puffin. Garlick-Ott flipped to an entry from July 4, 1981—the day Kress saw the first puffin returning with fish.

"Puffins are again nesting at Eastern Egg Rock," he wrote, "a fourth of July celebration I will never forget."