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THE GREATEST SHOW
ON THE EAST COAST
North Carolina's Nightscapes

THE OUTER ALBEMARLE PENINSULA OFFERS SOME OF THE DARKEST SKIES
ON THE U.S. ATLANTIC SEABOARD, WITH SITES FOR UNSURPASSED STARGAZING AND
A NIGHTSCAPE EXPERIENCE FULL OF WILDLIFE AT PLAY UNDER THE MUSIC OF THE SPHERES.

THE GREATEST SHOW ON THE EAST COAST

NEW JOURNEYS INTO THE HEART OF NORTH CAROLINA'S DARKNESS

DAVE SHAW

THE BUFFER AROUND THE OUTER ALBEMARLE PENINSULA'S
AMAZING NIGHTSCAPES INCLUDES OCRACOE ISLAND.

Welcome to the “Yellowstone of the East,” where the Gothic South meets the galaxy. Here on the Outer Albemarle Peninsula, you can stare into the soul of the Milky Way, a gash of glitter across the night sky that formed billions of years before our planet. You can watch the moon rise, feathering cirrus clouds of silver and indigo, or follow the night’s new river of light across a black inlet out to the horizon. Here, nighttime cues the cacophony of tundra swans. Your shoes will find solid earth, but the terrain also includes bays, marshes, ghost forests, and pocosins — wetlands built on sandy, peaty soil, saturated with groundwater, and made for boots. This country belongs to wild creatures and critters, to red wolves, alligators, black bears, otters, and manatees.

Bring your telescope, your binoculars, your sense of adventure, and anyone you know who still believes that reality beats virtual reality. Over 2.4 million acres of public lands and waters stretch across the Outer Albemarle Peninsula (OAP) and the surrounding estuaries and barrier islands. Locals live in small towns on the peninsula’s perimeter like Columbia, Stumpy Point, Engelhard, and Swan Quarter, or in crossroad communities like Goat Neck, Alligator, and Gum Neck. This part of the state remains mostly untamable, and, at night, strikingly dark.

All of which makes the peninsula one of the country’s best kept secrets — an expanse of land and sky that offers the rarest of settings. The OAP stages a nightscape that not only awes visitors but that might provide a much-needed boost to ecotourism in northeastern North Carolina.

“When you have a vast area of public wetlands surrounded by expansive estuarine bodies of water, with minimal human activity, the 360-degree vistas of the horizon provide a never-ending parade of night sky magic. Thunderheads illuminate the stage with dramatic lightning, as spectacular cloud displays at day’s end introduce a zenith of planets, constellations, and an astronomical wonderland that is becoming an endangered environment along our coast, because of increasing light pollution.”

THE YELLOWSTONE OF THE EAST

“These are world-class natural resources,” says Stan Riggs. Since the early 1970s, North Carolina Sea Grant has supported numerous research initiatives Riggs has spearheaded, including his latest, the Night-Scape Resource Project. Riggs, now coastal and marine geologist with NC LOW (“North Carolina Land of Water”), is exploring the Outer Albemarle Peninsula after dark.

“It’s truly a magic place,” he says, “once you get off the main highways.”

Riggs first heard the “Yellowstone of the East” description of the peninsula from Mike Dunn, a naturalist and science educator, who worked with Riggs on earlier research. Dunn has led tours for visitors from around the world primarily to two jaw-dropping regions — Costa Rica and Yellowstone Park — and also, at first blush, to seemingly much less exotic eastern North Carolina.

“Mike was right,” Riggs says. “There are plenty of reasons to compare Yellowstone with aspects of the OAP that require more introspection and contemplation. You just have to slow down and understand a little about the natural resources that we have here.”

Riggs’s enthusiasm is catching, especially when he begins cataloging why exactly the Outer Albemarle, like the iconic national park, possesses the potential for ecotourism. The biodiversity within OAP terrain rivals Yellowstone’s, for instance, even among the large animals — black bears, red wolves, porpoises, and sharks versus the famous park’s moose, elk, and grizzly bears — not to mention that the peninsula’s panoramas can compete with any location’s.

In fact, the OAP’s 780 square miles of national wildlife refuges, state parks and reserves, and vast swaths of public game land seem to unfurl endlessly because of an additional 2,900 square miles of publicly owned buffer enveloping it all.

Albemarle Sound to the north, Croatan and Pamlico sounds to the east and southeast, and Pamlico River Estuary to the south surround the OAP. Cape Hatteras and Cape Lookout National Seashores further protect the peninsula to the east, as do the Pea Island and Cedar Island National Wildlife Refuges. To the west, broad stretches of agricultural fields sprawl across the lower Coastal Plain.

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INTO THE DARK

Because of the OAP’s immense tracts of protected and unpopulated terrain, these night skies are some of the darkest on the U.S. Atlantic Coast between Boston and Miami.

Riggs recalls when he previously could view the Milky Way from his own back doorstep, a level of visibility astronomers consider necessary both for optimal stargazing with the unaided eye and for exploring the farther reaches of space with binoculars and telescopes. Today, he says, due to light pollution from nearby residential developments, “I can’t see either the Milky Way or the Little Dipper.”

In large part, the conspicuous black sky over the OAP that appears on nighttime satellite maps of the Eastern Seaboard prompted Riggs to document this terrain. Naturalists and astronomers covet such conditions,

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Allie Stewart/USFWS

THE OUTER ALBEMARLE PENINSULA BELONGS TO RED WOLVES, ALLIGATORS, AND MANY OTHER CREATURES, INCLUDING RIVER OTTERS (LIKE THIS ONE, BELOW), AND TUNDRA SWANS (ABOVE, AT LAKE MATTAMUSKEET).



Mike Dunn



INSIDE THE RED CIRCLE, THE OAP REGION'S PRISTINE DARKNESS STANDS IN CONTRAST TO THE EAST COAST'S BRIGHT LIGHTS.

which offer a paradise for both professional and amateur explorers alike — with significant implications for the future economic health of the whole region.

To partner with astronomy experts, his NC LOW joined forces to form the Night-Scape Resource Project with another nonprofit, Greenville's "A Time For Science." The project trained survey teams to journey across the peninsula to catalog night landscapes and soundscapes, as well as the viewsapes of those deep and spacious skies untouched by artificial light.

The teams would visit sites on national wildlife refuges (Alligator River, Pocosin Lakes, Mattamuskeet, and Swanquarter), state parks and reserves (Pettigrew, Somerset Place, and Buckridge), and vast parcels of public game lands (NC Wildlife Resources Commission). But first, there was a caution for everyone who had volunteered for the assignment — scientists, educators, and students alike — about the remote ground they were about to cover.

"The sites with a shoreline are the best. The stage becomes much vaster. Incredible cloud patterns, distant thunderheads with flashing lightning spectacles. Out here, the sunsets and sunrises, and moonrises and moonsets, are among the biggest shows on Earth."

"Most of this land is low, wet, and wild," reads the project's instructional guide. "Do not drive off any paved, graveled, or sand roadway. YOU WILL GET STUCK."

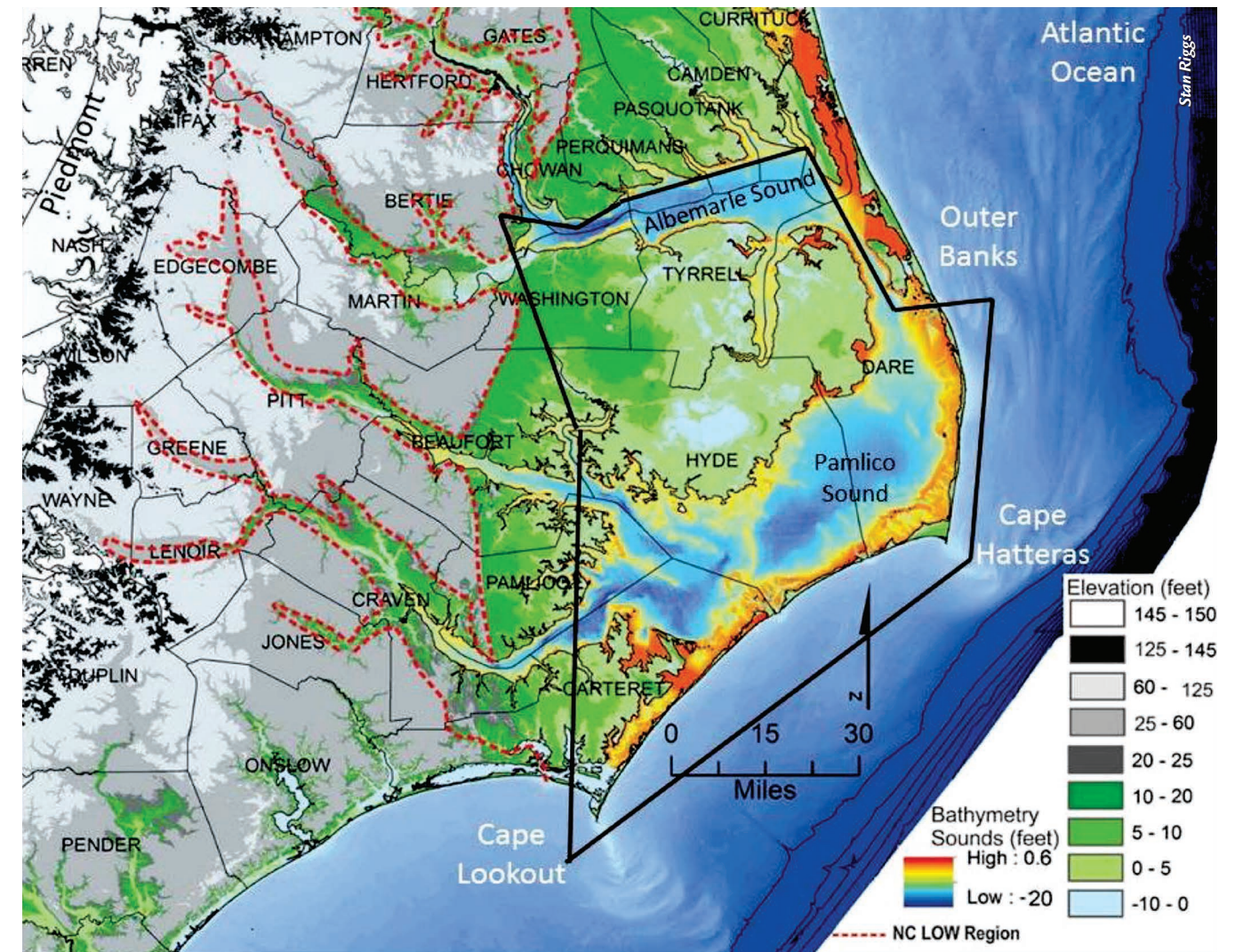
To be sure, venturing off the beaten path on the OAP could lead you into territory Edgar Allen Poe could have borrowed for a literary milieu. Undaunted, though, three adventurous teams fanned out across Tyrrell, Washington, mainland Dare, and mainland Hyde counties to map and develop profiles of optimal sites to experience the nightscape.

Armed with GPS devices, sky-quality light meters, sound meters, and weather instruments, the teams collected data for 11 months, across each season, timing their visits as closely as possible with new and full moons. By the end of the project, they had logged 250 visits to 83 sites, mostly on public land, compiling portraits of each location's darkness, ambient sound, light pollution, nearby environment, accessibility, and even available parking space.

Not only did the project produce comprehensive site profiles, but its data on light pollution possibly could earn the OAP a regional designation as an "International Dark Sky Reserve."

"A majority of our survey sites on the OAP offer starry nights that the International Dark Sky Association's guidelines rate as gold or silver," Riggs says.

The dark sky designation, Riggs adds, along with the accompanying stamp of approval from the International Dark Sky



ABOVE: THE NIGHT-SCAPE RESOURCE PROJECT STUDIED THE QUALITY OF DARKNESS AND MANY OTHER ENVIRONMENTAL FACTORS AT 83 SITES INSIDE THE AREA THAT THE BLACK BORDER ON THIS MAP REPRESENTS.

Association, would enhance the peninsula's visibility, infusing the region's slowly growing ecotourism industry with instant marketability.

Jane Harrison, North Carolina Sea Grant's coastal economics specialist, says tourism on the coast is a key economic driver.

"For Dare County, one in four jobs is in tourism and recreation," she explains. "Hyde, Washington, and Tyrrell counties are looking to grow their tourism economies especially, and night sky ecotours would be a great addition to what they already offer."

In 2015, Harrison says, tourism in Tyrrell County provided less than 2% of the jobs.

THE STARGAZER'S PLAYGROUND

The Yellowstone of the East's appeal is significant and indelible.

"The sites with a shoreline are the best," Riggs says. "The stage becomes much vaster. Incredible cloud patterns, distant thunderheads with flashing lightning spectacles. Out here, the sunsets and sunrises, and moonrises and moonsets, are among the biggest shows on Earth."

"Opportunities for building programs around the nocturnal environment and night sky are unlimited.

Educating the youth, public, and leadership of the Roanoke-Albemarle region is critical for the protection and management of this dark-sky natural resource, but also to capitalize on the potential for developing a sustainable ecotourism for the region's future."

The OAP offers a majestic platform to watch lunar eclipses and rising planets, to unfold a chaise-lounge for shooting stars — especially the seasonal Perseid or Geminid meteor showers — or a place to plant

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USFW

ABOVE: SUNRISES AND SUNSETS AND MOONRISES AND MOONSETS CAPTIVATE VISITORS TO THE ALLIGATOR RIVER REFUGE (HERE) AND ELSEWHERE ACROSS THE OUTER ALBEMARLE PENINSULA.
BELOW: BLACK BEARS ARE COMMON SIGHTS ACROSS THE OAP REGION.



Mike Dunn

your telescope to gaze at supernovas, Saturn’s rings, or Jupiter’s red spot.

And, of course, out in the heart of all this darkness, our own Milky Way gleams for the naked eye. Most of us no longer can see it from our own back door, with or without a lens. But out on the OAP, that long band of stellar haze crosses the celestial sky faithfully — as faithfully each night as, well, Old Faithful — hinting, like the famous geyser, at the universe’s hidden depths.

“Sweeping through the Milky Way with a telescope reveals a window deep into the center of our galaxy,” Riggs says. “Interstellar gas and dust constitute the spiral arm as it cuts through the starry ‘cloud.’ Within this cloud is a treasure trove of nebulae and star clusters — a stargazer’s playground. Here, it’s important to see not only with your eyes, but with your mind.”

Of course, lifting our chins to the heavens was the original mind-altering experience. From ancient constellations made in the shape of mythological heroes to contemporary literature’s marriage of setting and psychology, the night sky has always offered contemplation, inspiration, and awe. One of John Cheever’s acclaimed stories, “The Swimmer,” depicts a suburbanite’s nighttime trek through town, full of youthful vigor as he plunges into his neighbors’ pools, flutter-kicking and crawl-stroking his way across one backyard after the other, only to arrive home to find the constellations have changed. Summer’s metaphorical skies have become fall’s — and just as the seasons have passed, so, too, has much of his life.

NATURE’S REMEDY

In addition to nature’s archetypal resonance within us, a record of research as wide as the OAP’s dark expanses suggests the very act of beholding the natural world can help alleviate many ills that consume our psychological space — afflictions including stress, depression, and even attention deficit disorder. In fact, science over the past decade has shown that spending time in nature may be especially important for the well-being of children.

In 2018, researchers at NC State and Clemson found that even rural children, amid easily accessible natural settings, are spending more time in front of electronic screens than they spend outside. The study looked at middle school students, in particular, and determined that gaps between time spent on screens and time in the outdoors were widest for girls and African American students.

When the study was published, NC State’s Lincoln Larson, co-author of the journal article, said that middle school could be a turning point for children as priorities shifted and their lives became more structured. “This often results in fewer opportunities for outdoor recreation,” he explained. “This is a problem, because connection to nature plays a positive role in young people’s physical health and psychological development.”

For Riggs, the nightscape offers a natural remedy, a valuable alternative for families zigzagging through life with their eyes locked on screens.

“The whole concept is to get people in tune with these hidden resources,” he says. “When I take people out on North Carolina’s large estuarine water bodies and away from the large urban centers, I tell them to count the number of boats they see. It’s rare to see more than a fisherman or two on any given day on most of North Carolina’s underutilized estuarine waters.”

Accordingly, a large part of the Night-Scape Resource Project’s charge is to educate — in effect, to take the sky into the classroom and to draw students into the environment. Riggs and his team have held a series of science teacher education workshops and fieldtrips, and A Time For Science’s Brian Baker has taken his portable planetarium into many coastal N.C. schools.

The project also collaborates with the Coastal Studies Institute to host “Star Parties” at Jennette’s Pier in Nags Head and the Windsor Middle School in Bertie County, with another slated for April 24 at Jockey’s Ridge. Hundreds of eager participants typically attend these events, which include a series of large outdoor telescopes and where “sky time” eclipses “screen time.”

“Opportunities for building programs around the nocturnal environment and night sky are unlimited,” Riggs says. “Educating the youth, public, and leadership of the Roanoke-Albemarle region is critical for the protection and management of this dark-sky natural resource, but also to capitalize on the potential for developing a sustainable ecotourism for the region’s future.”

Riggs adds that this ecotourism doesn’t depend on clear skies. While spellbinding, the region’s unpolluted gateway to the celestial is only part of its hidden magic.

“The best part of stargazing on the OAP often is the environment around you,” Riggs says. “Hearing the owls talk to each other, as otters splash in the water. Wolves howl in the distance. And the cacophony of summer amphibians and winter swans and geese. The awesome wind blows through the marsh grasses and causes the waves to lap onshore.”

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The skies, wildlife, possibilities for photography and kayaking, the potential for an astonishing trail system, even simply the sheer breadth of the terrain to explore — the more you contemplate all that the Outer Albemarle Peninsula offers, the more apt “The Yellowstone of the East” begins to sound.

But the OAP also defies comparison.

“I’ve lived and worked all over the world,” Riggs says. “This region is unique. We’ve got blackwater streams and swamp forests. The estuaries are drowned river valleys that are bounded by the beaches and capes of the outer barrier islands. And it’s all dynamic, subject to high-energy

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THIS COMPOSITE OF EXPOSURES DOCUMENTED 24 MEMORABLE MINUTES FROM BROOK VALLEY IN PITT COUNTY, DURING LAST YEAR'S FULL LUNAR ECLIPSE.



P. Gemperline

storms that cause ongoing changes to the coastal system. It's far more than just a place where astronomers go wow. And it's ours. It belongs to the people.”

This project defined nightscape resources within northeastern North Carolina's coastal system, but local, county, state, and/or federal agencies, with specific rules and regulations pertaining to night visitation, manage these sites. Contact the appropriate office for permission to access specific sites for nightscape viewing.

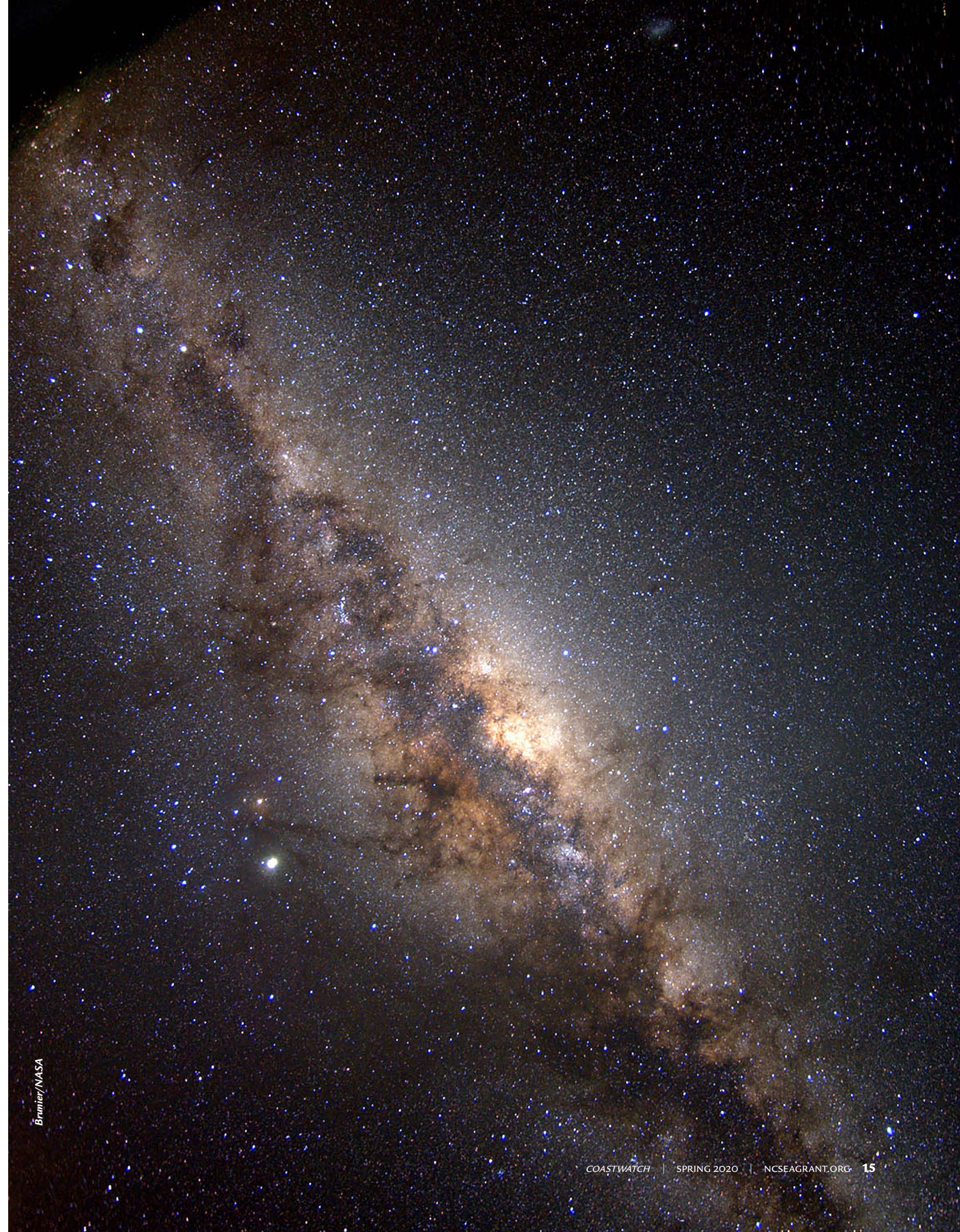
North Carolina Sea Grant funded the Night-Scape Resource Project through a Community Collaborative Research Grant, in partnership with NC State's Kenan Institute of Engineering, Technology, and Science. North Carolina Space Grant, East Carolina University's Department of Geological Sciences, and ECU's Coastal Studies Institute also provided key support. The project includes: Stanley Riggs, coastal and marine geologist at North Carolina Land of Water and project lead investigator; Karen Clough, NC LOW's community outreach coordinator; Emily Jarvis, executive director of A Time For Science; and Brian Baker, director of astronomy with ATFS. The project has a working partnership with Reide Corbett, oceanographer and executive director of the ECU Coastal Studies Institute, as well as three groups of local volunteers who constituted the field-mapping teams. The project also has developed working partnerships with the U.S. Fish and Wildlife Service (Alligator River, Pocosin Lakes, Mattamuskeet, and Swanquarter National Wildlife Refuges), Pettigrew State Park, and the N.C. Wildlife Resources Commission.

EDITOR'S NOTE: This article heavily relies on Stan Riggs's report, *Night-Scape Resources: Northeastern North Carolina Coastal System*, as well as interviews with and presentations by Stan Riggs. NC State News, Jane Harrison, and other sources also provided information.

- Community Collaborative Research Grants: go.ncsu.edu/CCRGprogram
- North Carolina Sea Grant funding opportunities: NCseagrant.ncsu.edu/funding-opps/
- Stan Riggs on "A Brief History of Sea Level Rise": go.ncsu.edu/a-brief-history

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We've got blackwater streams and swamp forests. The estuaries are drowned river valleys that are bounded by the beaches and capes of the outer barrier islands. And it's all dynamic, subject to high-energy storms that cause ongoing changes to the coastal system. It's far more than just a place where astronomers go wow. And it's ours. It belongs to the people."



Brunner/NASA