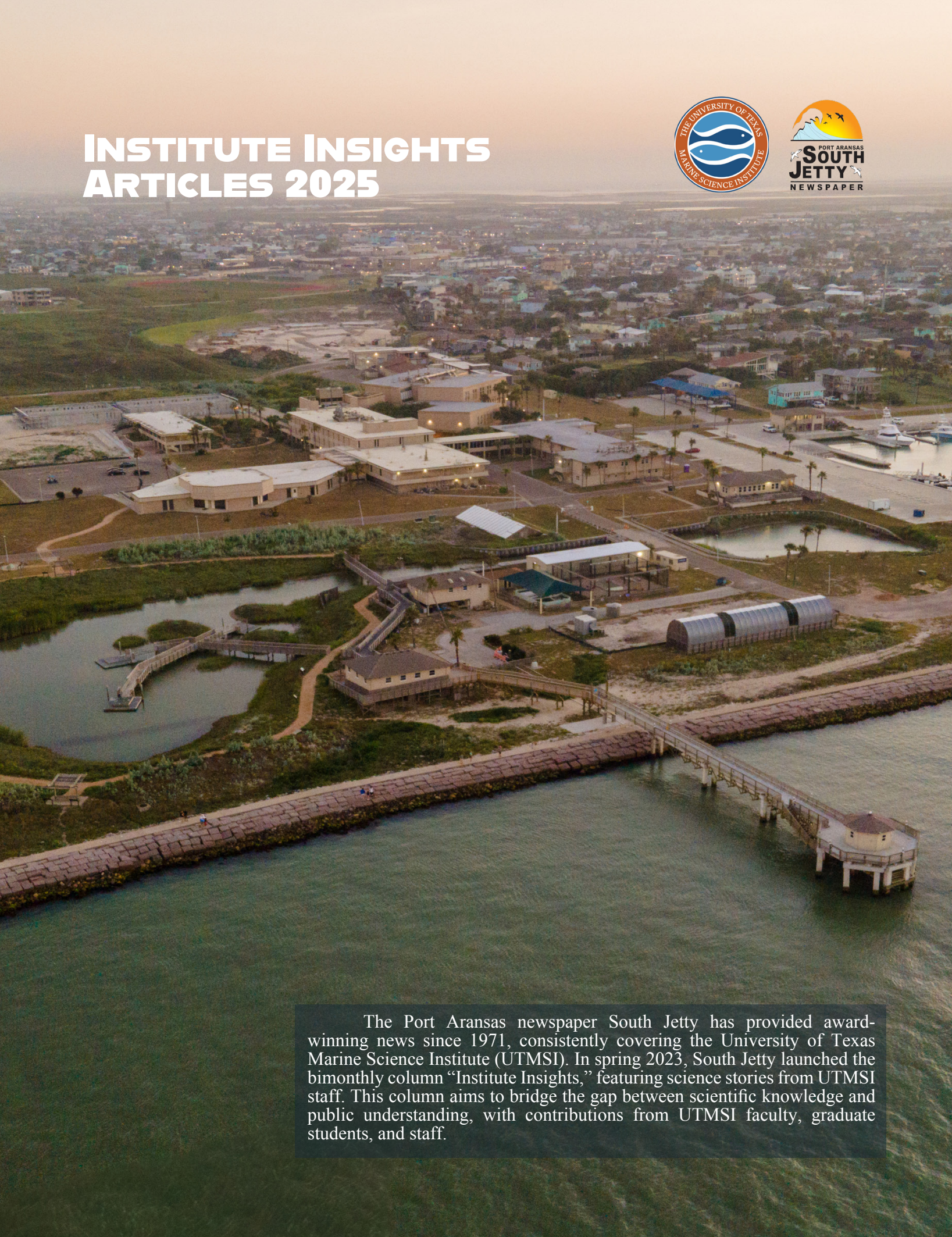
Institute Insights Articles 2025

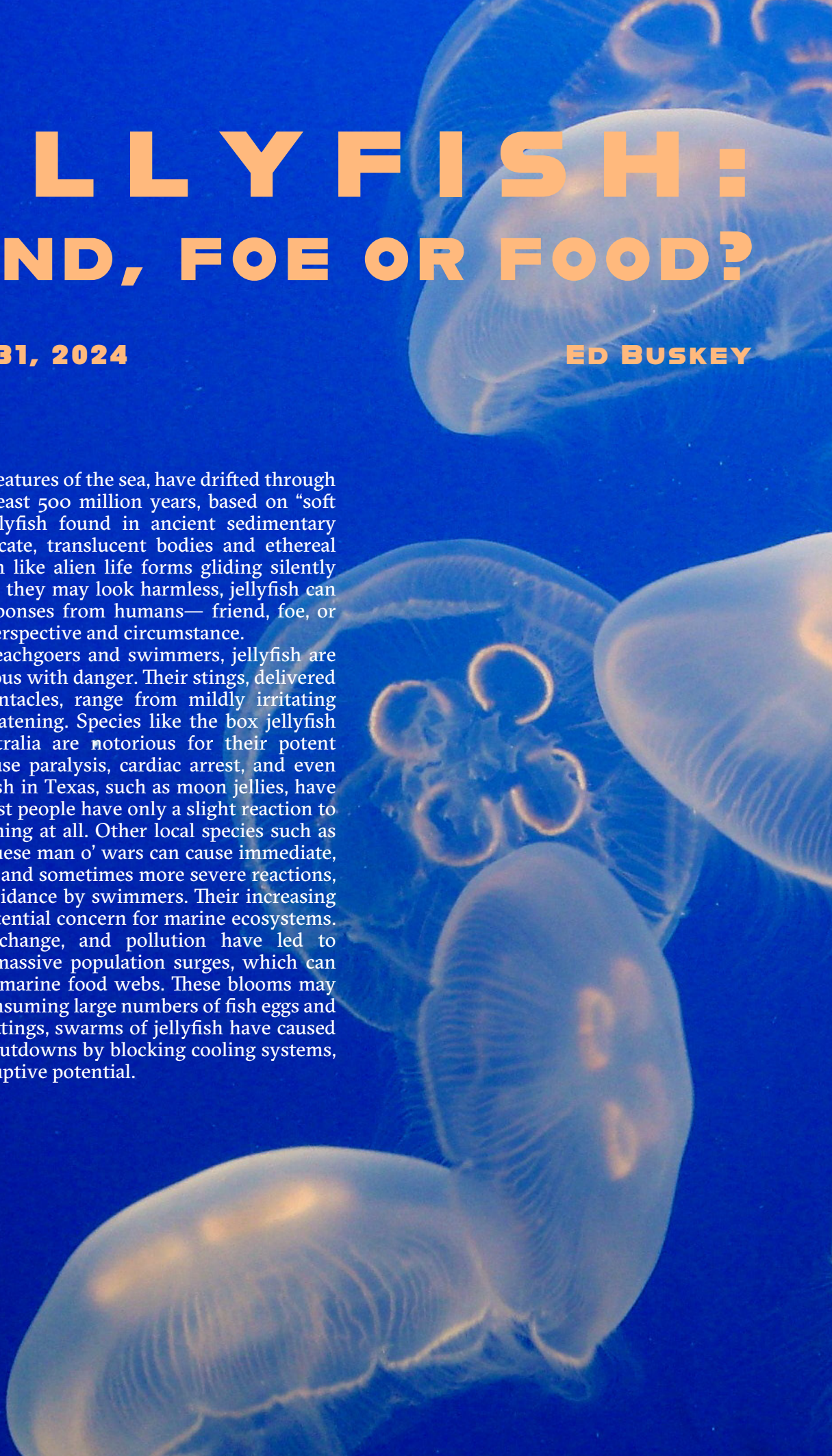


The Port Aransas newspaper South Jetty has provided award-winning news since 1971, consistently covering the University of Texas Marine Science Institute (UTMSI). In spring 2023, South Jetty launched the bimonthly column “Institute Insights,” featuring science stories from UTMSI staff. This column aims to bridge the gap between scientific knowledge and public understanding, with contributions from UTMSI faculty, graduate students, and staff.

Jellyfish: Friend, foe or food?

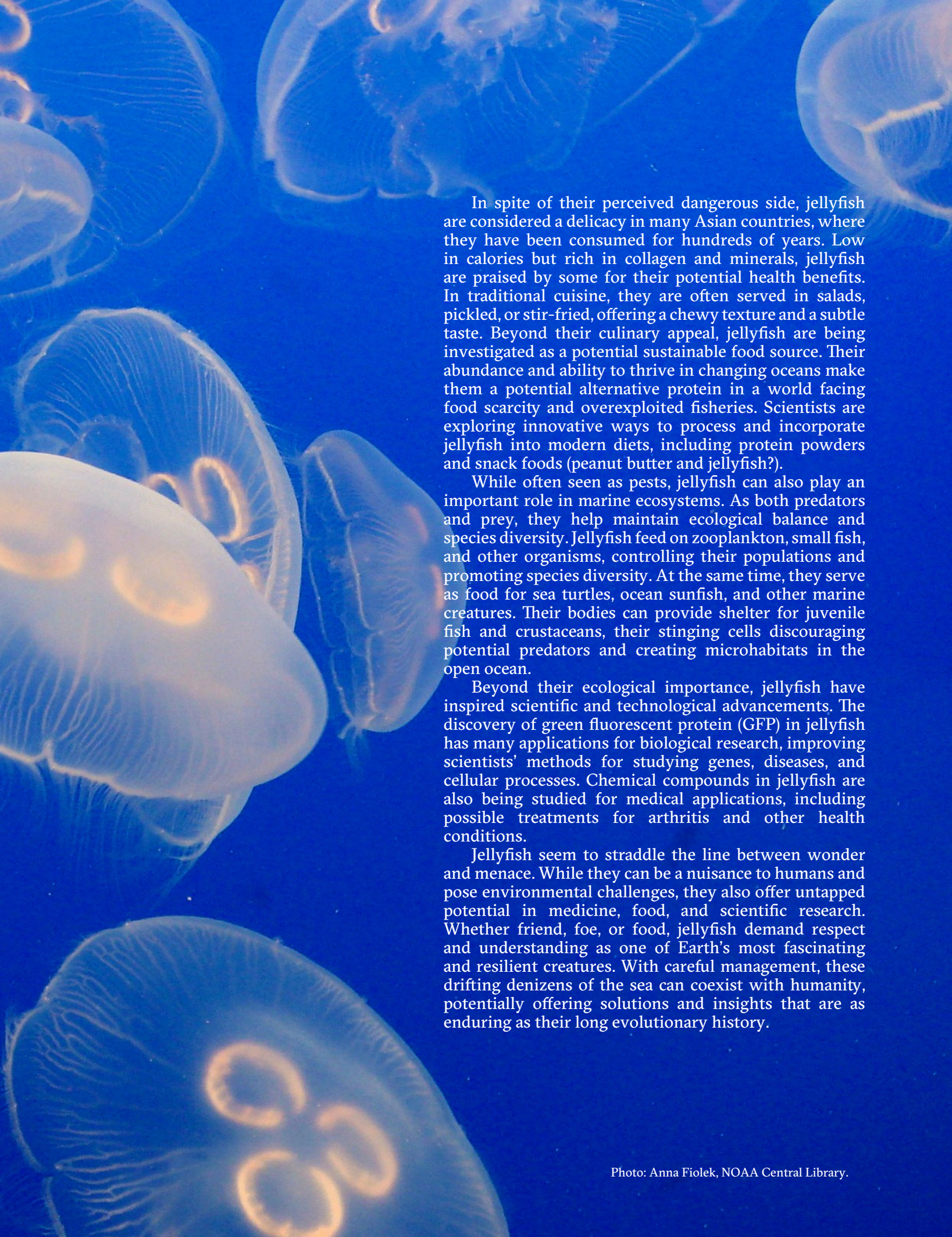
December 31, 2024

Ed Buskey



Jellyfish, ancient creatures of the sea, have drifted through Earth's oceans for at least 500 million years, based on "soft fossil" imprints of jellyfish found in ancient sedimentary rocks. With their delicate, translucent bodies and ethereal beauty, they may seem like alien life forms gliding silently through the sea. While they may look harmless, jellyfish can evoke a variety of responses from humans— friend, foe, or food—depending on perspective and circumstance.

For many ocean beachgoers and swimmers, jellyfish are perceived as synonymous with danger. Their stings, delivered through venomous tentacles, range from mildly irritating to potentially life-threatening. Species like the box jellyfish found in coastal Australia are notorious for their potent venom, which can cause paralysis, cardiac arrest, and even death. Common jellyfish in Texas, such as moon jellies, have short tentacles and most people have only a slight reaction to them if they feel anything at all. Other local species such as sea nettles and Portuguese man o' wars can cause immediate, intense pain, red welts and sometimes more severe reactions, leading to fear and avoidance by swimmers. Their increasing population is also a potential concern for marine ecosystems. Overfishing, climate change, and pollution have led to jellyfish "blooms," or massive population surges, which can disrupt the balance of marine food webs. These blooms may damage fisheries by consuming large numbers of fish eggs and larvae. In industrial settings, swarms of jellyfish have caused nuclear power plant shutdowns by blocking cooling systems, highlighting their disruptive potential.



In spite of their perceived dangerous side, jellyfish are considered a delicacy in many Asian countries, where they have been consumed for hundreds of years. Low in calories but rich in collagen and minerals, jellyfish are praised by some for their potential health benefits. In traditional cuisine, they are often served in salads, pickled, or stir-fried, offering a chewy texture and a subtle taste. Beyond their culinary appeal, jellyfish are being investigated as a potential sustainable food source. Their abundance and ability to thrive in changing oceans make them a potential alternative protein in a world facing food scarcity and overexploited fisheries. Scientists are exploring innovative ways to process and incorporate jellyfish into modern diets, including protein powders and snack foods (peanut butter and jellyfish?).

While often seen as pests, jellyfish can also play an important role in marine ecosystems. As both predators and prey, they help maintain ecological balance and species diversity. Jellyfish feed on zooplankton, small fish, and other organisms, controlling their populations and promoting species diversity. At the same time, they serve as food for sea turtles, ocean sunfish, and other marine creatures. Their bodies can provide shelter for juvenile fish and crustaceans, their stinging cells discouraging potential predators and creating microhabitats in the open ocean.

Beyond their ecological importance, jellyfish have inspired scientific and technological advancements. The discovery of green fluorescent protein (GFP) in jellyfish has many applications for biological research, improving scientists' methods for studying genes, diseases, and cellular processes. Chemical compounds in jellyfish are also being studied for medical applications, including possible treatments for arthritis and other health conditions.

Jellyfish seem to straddle the line between wonder and menace. While they can be a nuisance to humans and pose environmental challenges, they also offer untapped potential in medicine, food, and scientific research. Whether friend, foe, or food, jellyfish demand respect and understanding as one of Earth's most fascinating and resilient creatures. With careful management, these drifting denizens of the sea can coexist with humanity, potentially offering solutions and insights that are as enduring as their long evolutionary history.

Photo: Anna Fiolek, NOAA Central Library.

Fieldwork in the Florida Keys

January 15, 2025

Christina Marconi

Photo: Christina Marconi

For the past two summers, I've had the opportunity to work on a research vessel in the Florida Keys to study queen conch. Have you ever ordered at a restaurant in Florida or the Caribbean and seen conch on the menu? Conch salad is a fresh favorite. It's a ceviche-style dish with fresh peppers, tomatoes, and citrus juices. Cracked conch is another crowd pleaser. Here, the conch is tenderized, battered, and fried to perfection. As delicious as these conch-centric dishes are, we may want to think twice before ordering a double serving of conch fritters.

You see, the queen conch is a large marine snail that travels around the sea floor by hopping from one spot to another. In the Florida Keys, conch are cultural icons that are known for their ornate shells and delicious protein-rich meat. Key West is even nicknamed the Conch Republic, and local residents refer to themselves as conchs! Queen conch once formed the basis of a lucrative fishery in South Florida, contributing millions of dollars in local revenue. However, due to overharvest, populations declined, and Florida stopped the harvest of these snails to help the local populations recover. Unfortunately, because queen conch are slow-moving and require high densities to reproduce, their recovery in the Florida Keys has been slow. Conch are also on the menu for a lot of marine predators, including sharks, rays, sea turtles, fish, and even lobsters, which makes life even more difficult for these delicious gastropods.

Just this year, in February, the National Oceanic and Atmospheric Administration listed queen conch as threatened under the Endangered Species Act. This is a step in the right direction to help protect and rebuild populations of this iconic species, but more research is needed to help inform management. Part of my PhD research is conducting environmental DNA (eDNA) surveys to monitor queen conch. eDNA is DNA that is found in the environment, including water, sediment, and even air! Animals shed DNA constantly, whether it's skin cells, mucus, hair, saliva, or even poop (gross, I know). Just like our favorite true crime podcasts, we can use DNA found in the environment to uncover which animals have recently visited an area. This technique is extra helpful when dealing with threatened or endangered animals because it doesn't harm the animals we aim to study. All we need is a water sample, and we're good to go!

During my research cruise, I would wake up at 5am and drink my coffee with the rising sun. This was the time I would gather my thoughts and form a plan of attack for the day. Conducting fieldwork is fun, but leading a research team is hard work. Which is why I always rely on my trusty checklists to make sure we are prepared and ready for a day on the water, including lots of snacks (my favorite are always fruit snacks and Cheez Its)! A typical day for us consisted of four survey dives and two eDNA water sample collections in the morning. We would break for an hour lunch and then repeat the process in the afternoon. The days were long, but team morale never wavered. Our mixed group of scientists, students, and volunteers all worked hard with a singular goal in mind: To provide science aimed at protecting queen conch, our favorite marine snails. When you're working with good people in beautiful places, even the long days don't seem so bad.

ARK HELPS STUNNED TURTLES

January 29, 2025 **Eric Ehrlich**

The recent cold-stunning event along the Texas coast began late Tuesday, January 21st and has once again highlighted the importance of swift and coordinated responses to protect marine wildlife. A sea turtle cold stunning event begins to occur when water temperatures drop below 50°F and the temperature is sustained below the threshold for at least 24 hours.

The Amos Rehabilitation Keep (ARK) at The University of Texas Marine Science Institute has been instrumental in rescuing and rehabilitating cold-stunned sea turtles for decades and the team here has guided collaborative response efforts for the Port Aransas and mid-coast area involving multiple agencies and organizations, as well as good samaritans. The ARK's immediate response area focuses on Corpus Christi and Aransas Bays, near Mustang Island, but also accepts turtles from northern bays up to Espiritu Santo Bay.

The coordinated response begins when a drop in water temperatures causes sea turtles to become lethargic and unable to swim, making them vulnerable to hypothermia, drowning, boat strikes, and predation. When a turtle is rescued the GPS location is recorded, and the turtle is transported to the ARK. Once it arrives at the ARK, they are weighed and measured and blood samples are taken to check their glucose levels. Turtles that are weakened and have been struggling for a while may have lower levels and appropriate fluids can be administered to bring these values back up to normal to ensure they have full strength before being returned to water. All turtles are allowed 24-48 hours to warm up and assess their condition. Oftentimes, cold stunned turtles can appear deceased with little to no reflex.

Eye drops are also applied to prevent ulcers, and the turtles are assigned an identification number by trained staff. During large scale events, turtles brought to the ARK are often transported to partners such as the Texas State Aquarium, a partner with state-of-the-art resources and staffing capabilities. Some turtles may be transferred to the Texas Sealife Center for tank space and continued medical care. The condition of the rescued turtle will determine how long it is in rehab. Most turtles will be released back into the Gulf of Mexico beachside waters (to reduce likelihood of being affected by another cold event) once Gulf surf temperatures reach 56°F.

Response to this cold stun event faced a significant challenge when a power outage threatened the stability of the water temperature in tanks housing the ARK's residents and patient sea turtles. Some of these turtles at the ARK are still receiving care from the previous week's cold stun event! Other resident sea turtles, cannot be released to the wild due to existing conditions limiting their ability to feed in the wild. Luckily, the ARK was able to call their partner at the Texas State Aquarium, who had room and heat, to temporarily house the animals.

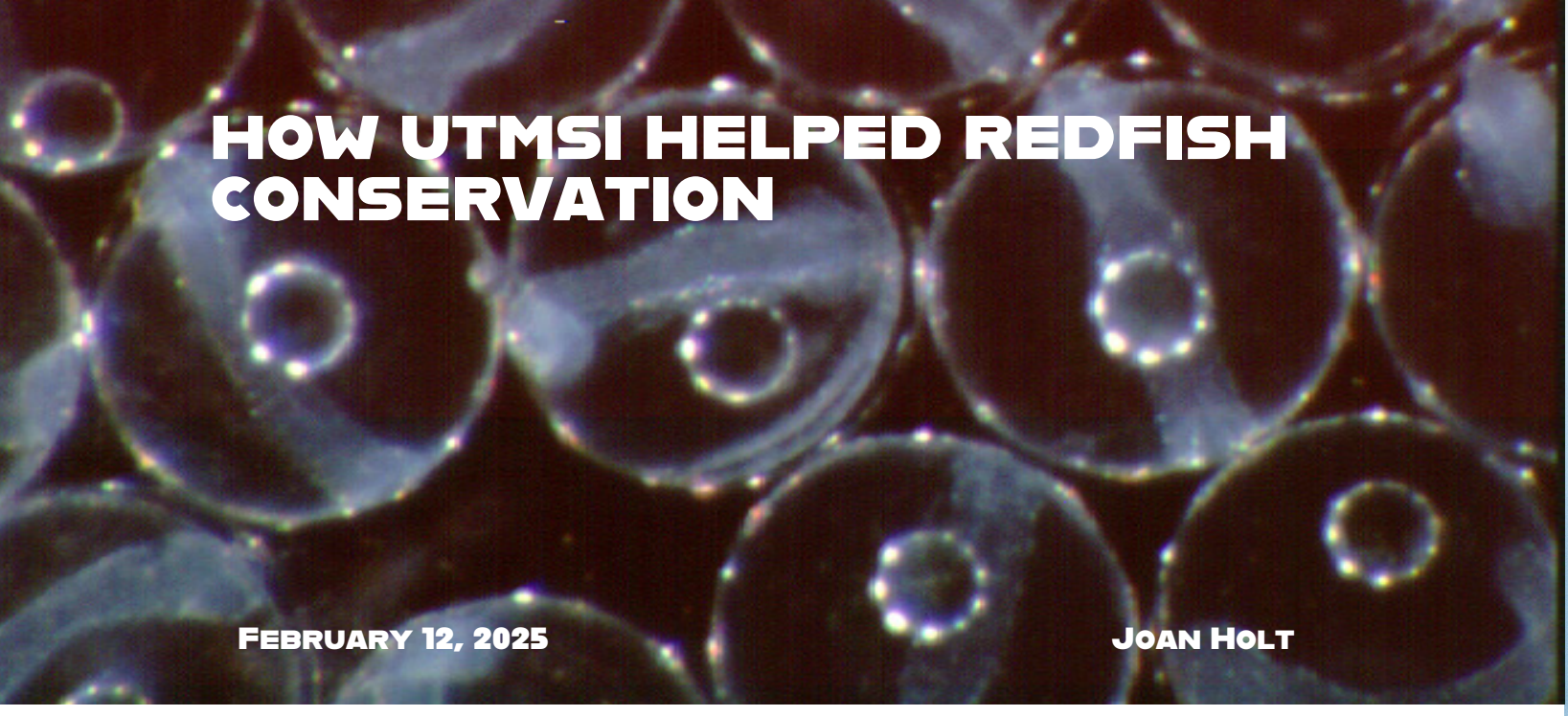
The collaborative efforts to save these cold stun sea turtles takes a team. Around the Texas Coastal Bend that team includes members of the ARK, the Texas State Aquarium, Texas Sealife Center, United States Fish and Wildlife Service, Texas Parks and Wildlife Department, Padre Island National Seashore, San Antonio Bay Partnership, SeaWorld San Antonio, NOAA, SeaTow, as well as many members of the public. Their efforts, swift action, and dedication to the well-being of the sea turtles saved over 700 turtles around the Coastal Bend during this most recent event, 128 of which were brought into the ARK.

For future cold stun events, if you find a turtle, please try to avoid touching them and DO NOT try to put them back in the water—turtles affected need specialized care.

As we continue to face environmental challenges, the importance of such collaborative actions cannot be overstated. These efforts serve as a testament to the power of teamwork and the commitment to preserving our marine ecosystems. Together, we can make a difference and ensure a brighter future for our sea turtles and other marine wildlife.

If you find a sea turtle either washed ashore or floating at the water's surface, please call for help. You can contact the Texas Sea Turtle Hotline at 1-866-TURTLE-5 (887-8535) or the ARK at (361) 749-6793.

Photo: Andrew Orgill



How UTMSI Helped Redfish Conservation

February 12, 2025

Joan Holt

Here is how the UT Marine Science Institute's Fisheries and Mariculture Lab in Port Aransas became involved in redfish conservation.

Basic information about redfish was developed in the mid 1970's when adult fish were induced to spawn in the laboratory using day length and temperature manipulations to reproduce natural spawning conditions. Dr. Connie Arnold had developed this methodology when he was Director of the Narragansett NOAA Lab in the early 70'. Large adult redfish (~5 ft, 200 lbs.) were held in 4500-gallon circular tanks (12 ft high) and fed 2.5 lbs. fish, squid or shrimp every other day. When the temperature and day length reached conditions that mimicked natural spawning, redfish spawn and eggs are collected.

My research focused on larval fish development, growth, temperature and salinity requirements. Understanding how the environment (temperature, light, space) acts on early stages to promote survival, growth and development. This information was unknown, and it took several years to successfully rear newly hatched larvae to juvenile fish.

In the 70's redfish populations in Texas reached an all-time low because of environmental changes and heavy harvesting by gill nets. A group of Texas saltwater anglers got together to change the status of redfish to a gamefish, lobbing Texas legislatures and in 1977 the Red drum Conservation Act was passed. But there were continued commercial catches supplying restaurants and the Blacked Redfish craze.

This became important because if commercial catches of redfish were banned, there would be none available for the public to buy, a particular problem for those in the restaurant industry who were in opposition to the Red Drum Bill. Since Connie Arnold was able to spawn redfish in the lab, and myself and others working with Connie figured out how to raise the larvae to produce juveniles, the possibility for production of redfish in captivity (mariculture) became a distinct reality.

About this time a helicopter landed in the field by our lab and a man came to the door asking are you the people raising redfish? It was Perry Bass, and he suggested that if we could raise redfish for the market, then the restaurant industry would not have any reason to oppose the bill. This strategy worked and provided one more argument for closure of the commercial harvest of redfish by Texas Parks & Wildlife Department. A new organization, the GCCA (now CCA), was formed to support the closure of commercial fishing on redfish and seatrout. It worked and Redfish were declared a gamefish.

But populations of redfish were low, so the newly formed GCCA worked with the state and the Central Power and Light Company (American Electric Power) to build a fish hatchery to produce redfish for release into the bays.

To make this work, technology developed at UTMSI Fisheries and Mariculture Lab was transferred to the new facility. For a time, the Fisheries and Mariculture group had a lab in the new hatchery where redfish were conditioned to spawn and eggs were produced. In 1982, Texas Parks and Wildlife Hatchery used this technology to spawn redfish from early spring through fall to stock into Texas bays. The first stocking of redfish occurred in the spring of 1983.

We had a close association with TP&W and collaborated on other projects including spotted seatrout and Southern flounder. We transferred young Southern Flounder from our lab to Texas Parks & Wildlife hatchery for pond grow-out. Now they have successful production and release of flounder.

Photo: Joan Holt

Learning from what's left behind

February 26, 2025 **David Malcolm**

As I take some time to summarize my work as research staff at MSI, it's funny to me how much my work today, and my scientific career to this point, is founded on footprints. Today, I am an ecologist in Port A, but fifteen years ago, I was a Boy Scout in North Florida, traipsing through palmetto bushes and following white-tailed deer to river streams. I wasn't necessarily aware of it then, but among my favorite natural wonders were tracks of footprints. Their sizes, shapes, the depths that changed as the animal's footfalls grew heavy and light; they told stories of life etched in ephemeral sandy mud. Those stories captured my young imagination, inspired my path to my current field, and drive my current work as an environmentalist and researcher.

That current field is molecular ecology, namely the use of what's called environmental DNA (or more commonly, eDNA). The work is founded in the recognition that animals and plants leave behind remnants of themselves wherever they go: deer hair, pine pollen, fish mucus; wherever living things go, they leave small traces of their unique DNA. And where we might expect that DNA to quickly degrade and fade away, it doesn't. The land and water support these molecules for days, months, or even millennia in the right conditions, preserving the traces of animal life, creating 'genetic footprints'.

Port Aransas has its own genetic footprints to follow. Much of my work focuses on the monthly collection of eDNA samples from Aransas and Packery Channels. The leader of my lab, Dr. Jordan Casey, noticed that commercial ships navigated Aransas Channel daily while Packery saw limited, recreational boat traffic. She questioned how that traffic affected fish communities in the channels, and our lab began the work of reading the genetic footprints the fish leave in their wake. I continue that work, purifying eDNA samples in our laboratory and having conversations with anglers on the jetties while I filter seawater. Stop by and say hi if you see me, I love to talk science (I'm the one that's covered up like an astronaut because I can't stand sunburns).

The eDNA footprints we track are invisible to human eyes and have only been made accessible through years of investment in the research of genetic sequencing technology. At the beginning of eDNA research, genetic sequencing was far too complex and expensive to justify using it on dirt and seawater samples. Scientists had dreams of medical advances and understanding what it meant to encode a human; natural communities weren't necessarily prioritized. Nowadays, efforts have made gene sequencing much more affordable and accessible, allowing ecologists that study natural communities, like myself, to unravel the memories and stories in genetic footprints. Our work sheds light on how animals use and move through their world, especially in places that people can't easily see, like the waters of our estuaries. eDNA holds stories of our natural community: how it arranges itself by season, how it adjusts to changes in our land and water, and how it forms the natural character of Coastal Texas as we know it.

Being a scientist is a unique thing: each person who plays in this world comes to their own meaning for it, one defined through the following of their own path. If I were to express my career to a colleague, I'd say I'm a molecular ecologist. Though if I had the chance to wax poetic on my science, I'd say I'm a modern tracker. I'd say that I'm still just following footprints. I'd say I'm grateful to work with nature's memories.

Photo: David Malcolm

Getting Excited About Science

March 12, 2025 **Bailey Bonham**

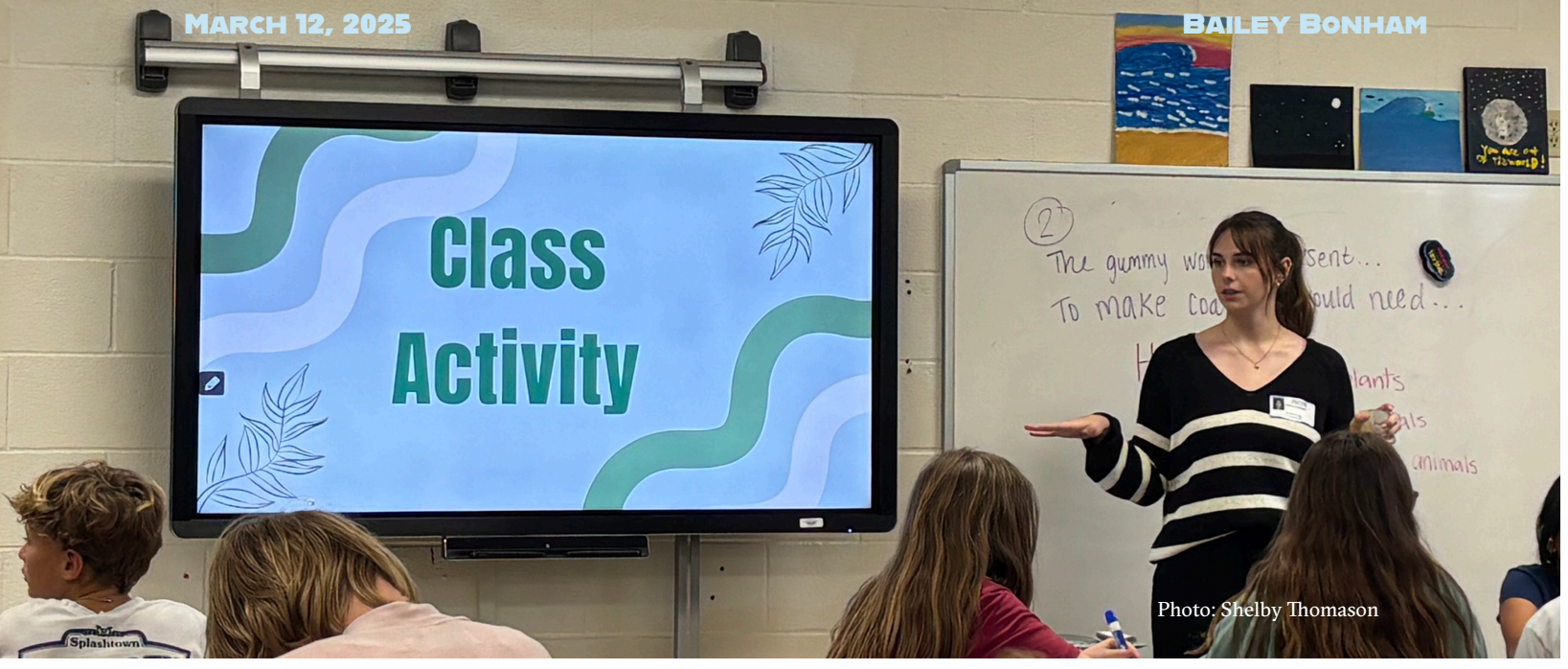


Photo: Shelby Thomason

Seeing the faces of over 300 middle school students light up at the sight of a great white shark's jaws was the moment I realized public outreach might be my new passion. When I first started my undergraduate studies in marine biology, I never imagined education and outreach would be part of my path. Public speaking made my hands shake, my voice falter, and my mind freeze. However, by my senior year, that fear had transformed into a love for sharing science with anyone willing to listen.

My journey into education began as a volunteer at the CSULB Shark Lab in Long Beach, California. I spoke at outreach events, teaching the public about beach safety and juvenile white sharks. As my confidence grew, so did my passion for connecting with the community. I realized I could make a real impact by helping people understand the science happening in their own backyard. That passion led to my role as lead education coordinator for the lab after graduation. I expanded our public engagement, giving school presentations, leading classroom lessons, training lifeguards, and hosting research facility tours. Within a year, I quadrupled our outreach efforts and witnessed firsthand how science communication shifts public perceptions of sharks, marine research, and the ocean.

Now, as a PhD student at the University of Texas Marine Science Institute (UTMSI), I'm excited to continue outreach in Port Aransas. My goal is to connect with the local community and inspire younger generations to explore science. This past fall, I was awarded the Scientist in Residence Fellowship, allowing me to teach 4th and 5th graders at H.G. Wilson Elementary School. Throughout the semester, I introduced over 80 students to scientific concepts through hands-on activities and shared my research on nutrient cycling within local oyster reefs.

One of the most rewarding experiences was organizing the elementary school's annual science fair. Students applied the scientific method to their own experiments and proudly presented their projects to UTMSI graduate students and faculty. Seeing their creativity and enthusiasm was incredibly fulfilling. I've learned as much from them as they have from me.

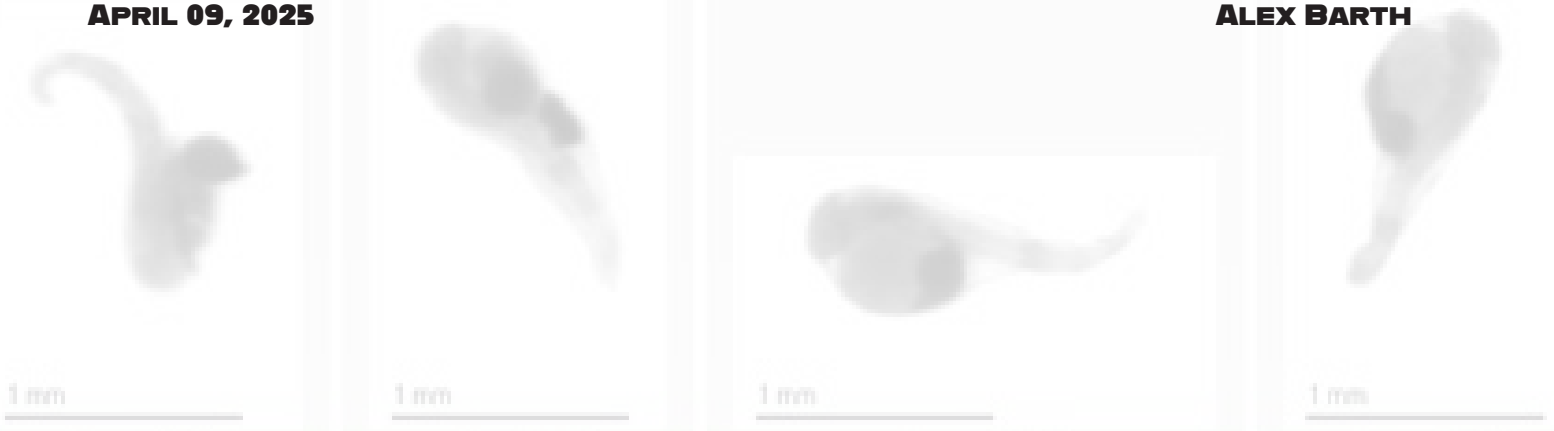
Beyond the classroom, I've engaged with the public in other ways. During UTMSI's Island Science Day, I led squid dissections, offering families a hands-on look at marine life. Opportunities like these remind me why I love outreach—getting people excited about science in a way that feels real and tangible. Marine research can often feel inaccessible, so bringing marine life to the public is crucial.

Ultimately, I hope to continue making science available and exciting throughout my career. Outreach isn't just about sharing knowledge; it's about inspiring curiosity, fostering a love for exploration, and showing future scientists that they belong in this field. Without communication and education, the impact of research may never be fully realized.

Port Aransas is home to incredible marine ecosystems, and I feel lucky to be part of a community that values both research and education. Through continued outreach, I hope to inspire the next generation of Port A marine biologists and conservationists, helping them see that science isn't just in textbooks—it's happening all around them!

Can AI impact ocean discovery?

April 09, 2025 **Alex Barth**



It seems like across every facet of life, artificial intelligence (AI) is drastically changing the status quo. There is a lot of discussion about generative AI, from models like ChatGPT (OpenAI), Claude (Anthropic), or Gemini (Google). These models are trained on extremely large swaths of data, from across the internet, to predict text and images on a wide range of topics. The developers of AI suggest it will revolutionize industries, from finance to entertainment to government. Companies and governments are investing billions of dollars into research and development of new AI algorithms and infrastructure.

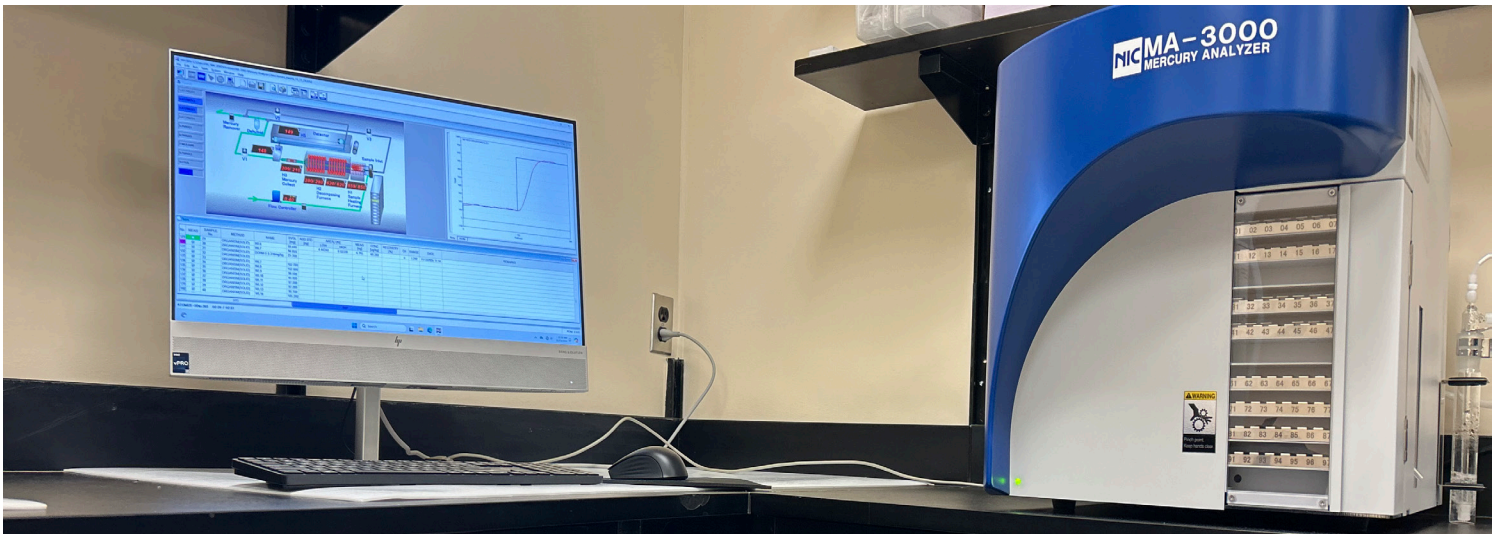
In marine science, it may not be immediately evident how AI will change our work. A generative AI model can't drive a boat or dissect fish. Nonetheless, AI is rapidly becoming a tool of research. I am in no way an AI-expert. However, I regularly use AI to facilitate my research. I began my marine science career a decade ago as a phytoplankton taxonomist. I spent hundreds of hours peering under a microscope, identifying and counting tiny organisms. As I strained my eyes every week, I figured there had to be a better way. So, I sought out more efficient ways to study plankton. During my Ph.D., I researched deep-sea plankton using a camera we sent into the deep ocean to collect live images of plankton. Now, rather than peering through a microscope, I had millions of images that needed to be sorted through. This is where AI entered the picture. By training an AI-model on a small set of plankton images, it can predict new images into categories, making sorting much easier.

Quickly sorting millions of images is only feasible through advances made in AI over the past 20 years. And I'm not the only one who relies on such methods for their work. I've worked with plankton researchers to sort historic images of plankton in Mission-Aransas using AI. Other researchers at UTMSI are developing new AI classifiers for cryptic reef fishes. At Woods-Hole Oceanographic Institute, scientists are utilizing AI for self-driving robots to track marine life. AI can also facilitate processing large amounts of data to predict waves or storms.

So, if AI will drive robots to new depths of the ocean, better process big data, and improve our ability to identify the tiniest of marine critters, will it fully revolutionize the field of marine research? Yes and no.

Yes, AI can accelerate scientists' ability to process data. However, it's important to consider how AI tools are built. They are trained on large sets of existing knowledge. AI models can only make predictions based on training. For example, to train a classifier to identify plankton, a taxonomist must provide thousands of identified pictures. If a new species is introduced to an area that hasn't been observed before, an AI-model might not be trained to identify it. More broadly, there is a lot of uncertainty about the ocean which makes it difficult to train AI-models. Less than 20% of the ocean has been observed, so many unknown organisms and marine processes exist. Thus, if researchers want to use AI to predict biodiversity patterns, they are limited by the lack of total information for training. Considering the work I do here in Texas to study plankton feeding interactions in the Mission-Aransas estuary: Small plankton are numerous and their food-web can structure the flow of energy through the ocean. Plankton diets have been identified as one of the major sources of uncertainty in global climate and fisheries predictions. If we ask AI to create better predictions of energy transfer in Aransas Bay, the AI would be just as limited as we are. Currently, we are using DNA to understand the linkages of plankton diet and fish. That requires us to drive boats, dissect fish, and run analyses in the lab – all of which will provide new information about our oceans. So, while AI may help scientists better process information, we must still work at resolving the great unknowns of the ocean.

Photo: Alex Barth



A GUIDE TO MEASURING MERCURY

April 23, 2025 **Izzy Nelson**

In November of 2024, I travelled to the University of Calgary, which is in Alberta, Canada. Why would I travel 2,000 miles to a dark, cold city in Canada? It's all for one machine – the direct mercury analyzer. This machine can take samples and tell us how much mercury it is in, which is incredibly important for my work. At the Nielsen Lab at UTMSI, we study how mercury moves through the environment and the animals that live in it. Our research is based in Kachemak Bay, which is within the Cook Inlet of Alaska. This is an important study site because locals rely on fishing as their main food source, so understanding the effects of mercury in the region can help inform fish consumption advice.

The first step in measuring mercury is collecting samples. The Nielsen Lab travelled to Homer, Alaska in September 2024 to take water, sediment, and animal samples from 5 locations in Kachemak Bay. Tamara Rivera, a PhD student in the Nielsen Lab, collected mussels, snails, and other invertebrates during her time in Alaska. These samples were then frozen in Alaska, flew back to Port Aransas, and then flew to Calgary – they were well-travelled! During the transportation process, we had to be extremely careful to ensure the samples stayed frozen throughout the flights. We had a large cooler that was filled with samples and ice packs for the airport, and once we got to our Airbnb, we transferred all the samples to the freezer.

On our first day, Tamara and I headed to the University of Calgary to meet with a collaborator and learn how to use the direct mercury analyzer. The machine is quite large, taking up half of the desk space and connects to a computer with a program that shows you what is happening inside the machine. There is a clear panel on the machine, and you can see the rows of boats, which are small porcelain containers to put samples in. After we were given a walkthrough of the lab space, we got to work on the invertebrate samples.

Each animal came with a unique set of obstacles. Since these are shelled creatures, we had to get the soft tissue of the animal out of the shell to run the sample. This was a new lab, so we spent a lot of time digging for materials that we could use to crack open the shells and pull out the tissue. We finally came up with a system: Tamara would open the shell and pull out the tissue with tweezers, then use a sharp tool to mash the tissue all together. Then, I would take that tissue, weigh it, and place it in a boat. These boats were then put into the machine, and I would sit at the computer and input the sample name and weight.

After a row is filled up, we can run the analyzer. The row of samples is taken out of our view, but we can watch the computer to see the steps: heating, mercury collection, detection, and mercury removal. Essentially, the mercury is extracted from the sample by heating it up, and once it is complete the sample is returned to us as ash. On the computer, we eagerly await the concentration readings. We did this for over 100 samples, which took us a week. It was tedious (and smelly) work, but this provided us with insight on the mercury levels throughout Kachemak Bay, which is essential for ensuring the safety of food for locals.

Photo: Izzy Nelson

Waste, not: Ingenuity in research

May 07, 2025 **David Malcolm**

I used to dumpster dive a lot as a kid. Many probably wouldn't disclose that in a newspaper article from their professional research job. But growing up in a rapidly suburbanizing North Florida, with parents that were staunch believers in the gospel of self-reliance, my friends and I were certainly not averse to digging for treasure in another's trash. The results were often mixed, but there was a consistent pride in knowing that no misshapen board or cracked PVC pipe in our ramshackle forts was ever sourced new. Those memories bring a smile to my face as I scavenge through research supplies left behind by a retired professor here at UTMSI. I can't help but see the parallels, making the most of materials that would otherwise remain unused.

The researcher's tendency to innovate with unexpected materials extends beyond our supplies, often incorporating itself into the design of our projects. It's a time-honored tradition to - through collaborative investigation - find a way to learn about our environment through a resource most would view as worthless. Examples are everywhere, but my recent favorites come from my friends Elisabeth Frasch and Julia Berliner in the UTMSI Fish & Function Lab. Elisabeth, a wildlife professional with experience across the globe, and Julia, a UT Entomologist whose passion for ecology stemmed from her experiences in birding, have been studying how recreational activities could impact the food sources of migrating shorebirds in Port Aransas. Guided by recent studies that suggest these birds spend their summers eating fragile, protein-rich, microbial mats-called 'biofilm'- alongside insects, the team is working to understand how our beach traffic affects these food resources for birds coming to winter here in Port A. Where two people can't watch enough birds to generate enough data to see feeding differences between popular and remote sites, the team identified a product of feeding that's much easier to collect and analyze: bird poop. By sterilely scraping up samples of biofilm (with a paint scraper), collecting resident insects (with a hardware-store leaf vacuum), and scooping copious amounts of bird poop (with an ethanol-sterilized scoop) at sites frequented by beachgoers and sites where few but Julia and Elisabeth take time to visit, the team can identify the genetic and chemical signatures within the poop and determine the identity and quality of the birds' food. Through their work, Julia and Elisabeth are helping us understand what our birds need and how our activities affect the food resources that bring them here to make Port A the birding tourism destination it is. And, though they work with waste, they waste nothing themselves.

It rarely dawned on me as a kid how resourcefulness dovetails with an environmental ethic, but reflecting on it as an adult, I see how the process of natural science research tends to dig its treasures out of what many might see as 'waste'. Elisabeth often laughed in the field, thinking about what product designers would say if told how we used their vacuum to suck up bugs on a mudflat. Julia would happily remind us that she saved hundreds of dollars in state grant money figuring out that the job didn't need a pricey, custom-built entomologist's vacuum; Ace Hardware's did just fine. Those savings translated to more sampling done and more complete data collected: products of an ingenuity founded equally in lofty theory and down-to-earth frugality. In a time when funding is at risk and resources are limited, I remember that science has always made the most with what it has. That progress pushes forward, even if we have to pull it from a dumpster.

Photos: David Malcolm

Photo: David Malcolm