Dennis Wise/University of Washington

Adult sunflower sea stars feeding on mussels at the University of Washington Friday Harbor Laboratories.

Scientists become parents for endangered sea stars

By NELL GREENFIELDBOYCE
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'NOBODY KNOWS HOW TO AGE A SEA STAR, SO YOU SEE SOMETHING IN THE WILD AND YOU HAVE NO IDEA HOW OLD IT IS. IT COULD BE 2 YEARS OLD. IT COULD BE 50. IT COULD BE 100.'

Jason Hodin | University of Washington's Friday Harbor Laboratories

Jason Hodin hauls up a rope that's hanging from a dock in the waters off San Juan Island in the Pacific Northwest. At the end is a square, sandwich-size Tupperware container, with mesh-covered holes in the sides to let water flow through. Hodin pulls off the lid and peers inside at some crushed bits of shell. He points to some reddish-orange dots.

"See that? That little dot right there in front of my finger?" Hodin said. "That's a juvenile sea star that's about a month old."

It's only the size of a poppy seed. But when this baby is all grown up, it could be as big as a manhole cover. That's because this is Pycnopodia helianthoides, aka the sunflower sea star. It's one of the biggest sea stars in the world, with an arm span that can be more than 3 feet across, and it used to be a common sight in the waters off the West Coast.

Now, though, it's critically endangered and is being driven toward extinction by a mysterious, devastating disease.

This is why Hodin and his colleagues at the University of Washington's Friday Harbor Laboratories have spent the last two years figuring out how to raise this species in captivity. It's an act of desperation born out of the hope that someday, lab-grown sunflower sea stars could be reintroduced into places where this species has disappeared.

This voracious predator used to prowl the waters across a nearly 2,000-mile range, from Alaska to Baja California. Their brightly colored bodies — which come in vivid shades of orange, pink, blue and green — would move along the seafloor on as many as 24 arms, gobbling up mussels and scallops and sea urchins. Their consumption of sea urchins, in particular, helped to protect vital forests of kelp, which are home to numerous marine species.

In recent years, however, populations of the sunflower sea star have declined by 80% to 100%. In California, "sunflower sea stars are more than 95% gone," Hodin said. "Some people think that they are entirely extinct in the wild down there. I've heard scattered reports of people maybe seeing a few."

This species seems particularly susceptible to a wasting disease that's hit more than 20 sea star species since 2013. Hodin says the sick sea stars are horrible to behold. "I witnessed it, and it's not pretty," he said. "They really do kind of like dissolve into a pile of goo."

In 2019, Hodin said, the Nature Conservancy approached him about the possibility of setting up a program to breed sunflower sea stars. He'd already been interested in the basic science of sea stars because of the way they are able to transform themselves from bilaterally symmetrical larvae to juveniles with five-sided symmetry. He agreed to try raising large numbers of sunflower sea stars to adulthood, even though no one had tried to do anything like this before.

"For this species in particular, there were very few published efforts to raise them at all, even through embryo or larval stages," Hodin said.

He didn't know the answer to some of the most basic questions, such as what did this species eat early on? And how fast could it grow?

"Nobody knows how to age a sea star, so you see something in the wild and you have no idea how old it is," Hodin said. "It could be 2 years old. It could be 50. It could be 100."

His team started by taking some sunflower sea stars from the wild. About 30 of these giants now live outside the lab in large, burbling tanks.

"I didn't really anticipate how exuberant their behaviors are," Hodin said. "You get to know them, and you get to know them individually. We noticed early on that we could tell them apart by their color patterns. And we gave them names."

A lot of their names are linked to their colors. Prince, for example, has arms with tips that are purple.

"This here's Deep Blue, and she's our biggest," researcher Fleur Anteau said as she feeds the sea stars by gently tucking mussels under their arms. "Some of them, when I open the cage, will basically really start moving their arms to the surface, like Olga here. Some of them are a little shyer."

Even the shy ones suddenly come to life once they clutch a mussel. They hunch over the prey so they can swallow it whole. "When food comes, then you really see the predator come out," Anteau notes.

Pointing to the red eye spot at the end of each arm, she adds, "They're looking at you. They don't have eyes like us, but they can see a light-and-dark kind of vision."

This lab has figured out how to get sperm and eggs from the wild-caught adults and grow up their offspring. The oldest sea stars they've produced are now nearly a year and a half, and they are about 3 inches across.

The lab only has about a dozen young sea stars that have reached this stage. But considering how little was known at the start — and the fact that they had to work out their techniques during a pandemic that restricted who could go to the lab — Hodin said he feels lucky to have gotten that many.

"We're assuming that by next year, they might be reproductive, based on ones that we've seen in the field," Hodin said. "It's good news that they can grow relatively quickly."

Having learned the tricks needed to raise these sea stars, the research team's new goal is to produce up to 1,000 more young stars. The lab is full of glass pickle jars that contain larvae, and food containers that hold the poppy seed-size juveniles.

Hodin said that first, lab-grown sea stars could be put into the local waters, where their parents came from, to test how well they fare in the wild. If that goes well, it might be possible in the coming years to try to restore populations off the California coast.

But the danger of sea star wasting disease could still be out there.

"I would say at the outset that it's critical to understand more about what's killing them before trying to put them back," said Drew Harvell, a professor emeritus with Cornell University who is also a researcher at the Friday Harbor Laboratories.

She says scientists disagree on the nature of the killer. Some blame an infectious agent, such as a virus, while others point to warming oceans or other environmental changes.

"It's extremely controversial," said Harvell, author of a book called "Ocean Outbreak: Confronting the Rising Tide of Marine Disease." She believes there's a lot of evidence that sea star wasting disease is infectious.

This month, she and her colleagues are starting new lab experiments to test that idea. In a fish pathogen lab, extracts from sick sea stars will be injected into seemingly healthy ones. She'll be using sunflower sea stars since they are so susceptible.

"These are difficult experiments to get to run consistently, and so if you try to do them with a species that is somewhat resistant, sometimes just nothing happens," Harvell said.

Even if scientists never are able to figure out what causes this illness, she said, eventually it could still be worth trying some kind of reintroduction of captive-bred sea stars to the wild.

"At some point we would just have to probably go forward," Harvell said, "even though scientifically that wouldn't be the very best plan."

Trenary: 'It's just so amazing that so many people love and care about me'

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'THERE WAS NOTHING I COULD DO. IT TOOK THE FIRE DEPARTMENT HALF AN HOUR TO GET THERE. SO I JUST SAT IN A CHAIR OUTSIDE MY HOUSE AND WATCHED MY HOUSE BURN.'

Jeff Trenary | local organic farmer who recently lost his home in a fire

"I couldn't deal with it. It was going to kill me," he said. "There was nothing I could do. It took the fire department half an hour to get there. So I just sat in a chair outside my house and watched my house burn."

He emerged unscathed but with just his phone, a pair of flip flops and the clothes on his back.

Trenary bought the property north of Nehalem in 1986. It featured just a small house at the time. As his family grew and they settled down, he worked on additions to the home and started to make a living in farming produce.

Today, Trenary said he's known among locals as the godfather of organic farming — best known for his spinach and leafy greens. Along with selling his produce to local restaurants and at farmers markets, he said he's proud to be a source of advice for many younger farmers.

"He gave us a local source of organic produce, before anybody else did," said Pam Trenary, Jeff's sister. "In the beginning, he really did his research and studied the biologics of organics. He was a model for making small farms happen here. And with sustainable agriculture."

As Trenary begins the early stages of navigating the crisis, neighbors and co-workers are returning the kindness he's shown his community for decades.

"I'll go to the grocery store and I'll try to pay them and they just tell me to leave," Trenary said. "I go to my car and just sit there and cry because it's just so amazing that so many people love and care about me."

Kingfisher Farms launched an online fundraiser through GoFundMe to support Trenary and his family. As of early Monday, it's received around $40,000 toward a $75,000 goal. Comments on the fundraiser page from friends and others touched by Trenary's work share colorful stories of how his farming and acts of charity have had a positive impact.

John Newman, the chef at Newman's at 988 in Cannon Beach, refers to Trenary as his "best friend."

"People have stepped up — that's refreshing to know, having lived here, that your friends and family can step up when things go wrong," Newman said. "It's sad, but I'm optimistic and I look forward to Jeff landing on his feet."

The two have a shared appreciation for food and have traveled and done business together since Newman moved to the region in 1998. "The quality of his food compared to packaged salad that you'd get from Portland or wherever, if you put them next to each other, it's not even comparable," Newman said. "It's like a different product."

Though overwhelmed with grief and unsure of his next step, Trenary said he won't leave his property and is hoping to rebuild soon. Friends like Newman believe the community will rally around Trenary and ensure he's able to get a new place to live.

"I've got a bunch of carpenter friends that are saying they're going to help me reestablish a new place," Trenary said.

Smith: Addressing emotional needs and lives outside the classroom are big priorities

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'I FEEL REALLY LUCKY. THERE WERE A LOT OF SIGNS ALONG THE WAY THAT SHARED FOR ME THAT THIS WAS THE RIGHT PATH.'

Nicole Smith | new principal of Lewis and Clark Elementary School.

Working as part of a Fulbright teacher exchange in West Yorkshire, England — a place she said reminds her of Astoria — inspired Smith to continue exploring alternate approaches to education.

Today, one of her biggest priorities as an educator is addressing the emotional needs and lives of her students outside the classroom. The emphasis was something Smith said was enhanced by her experience during the pandemic.

"She's very concerned about and intuitive about the lived experience of her students," said Carrie Ferguson, a former co-worker and the principal at James Templeton Elementary School in Tigard.

"I always appreciated that about her, because she did always advocate for the marginalized or the underserved or underrepresented students and kind of reminded us about them," Ferguson said.

Ferguson highlighted how Smith was particularly good at acknowledging and unpacking details of larger ideas and plans in education, something that proved to be a complementary trait in their time working together.

Though Smith is new to Astoria, she said regular visits to her grandfather's home north of Seaside throughout her life exposed her to the beauty of the North Coast and the growth of Astoria.

"At Lewis and Clark, as soon as I walked into the building for my interview, there was something about it that felt like home," she said. "And I thought, 'This is an environment that I want to be a part of and lead and continue to nurture and grow and be a part of a really strong community.'"

As schools continue to navigate the pandemic, Smith is excited to develop more creative approaches to engage with her students and the community.

"I feel really lucky," she said. "There were a lot of signs along the way that shared for me that this was the right path."

Firehouse: Cost will be about $10.5 million

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Among the 309 voters who participated in the survey, 51% supported both the Highlands Lane site and the bond, a narrow margin that indicates voters are more skeptical than others in the community.

This was the second survey conducted by the city to help determine a firehouse site. A 2019 survey pinpointed the High Point site on North Marion as preferable to Gearhart Park or the firehouse on Pacific Way.

The new survey period was from June 25 to Aug. 1 — just over a month.

By comparison, the 2019 survey was open for three months and received significantly more responses, with 947 people participating.

The new survey came as plans for a firehouse on North Marion Avenue hit a wall. The project faced high costs and opposition from the nearby Palisades Homeowners Association.

The city is working with planners to bring the 30-acre Cottages at Gearhart subdivision off Highlands Lane into the city's urban growth boundary. The cost to perform land improvements and build the firehouse on the Highlands Lane site will be about $10.5 million.

At last week's City Council meeting, City Administrator Chad Sweet said he was pleased by a recent geotechnical report. "This could affect the type of foundation that we use in this building, and they anticipate that this will actually not be a foundation as expensive as the one we were looking at previously, so there's likely going to be a cost savings for that."

Sweet also said conversations with the state Department of Geology and Mineral Industries indicated the Highlands Lane site was outside the extra-large tsunami zone. "That's kind of a big deal," he said.