

CULTURE

Sushi As We Know It Will Not Survive. Can the Restaurant Industry Reinvent It?

Fish populations have shrunk while America's appetite for sushi has only grown. Restaurants are starting to adapt—will it work?



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Photograph By Emma Fishman

Chef Jay Huang will never forget the day he took unagi off the menu at Lucky Robot Japanese Kitchen in Austin. “Several customers lashed out at us. They told me they’d never eat here again,” he says. “But it was a step we had to take.”

Huang had been searching for ways to source his sushi fish more sustainably instead of relying on whatever his large restaurant supplier imported. But unlike organic, the term *sustainable* has an elusive definition, prompting a dizzying series of questions: Is the fish wild-caught or farmed? Does it come from nearby or the other side of the world? Is it even the same species the menu says it is?

Through careful questioning, Huang was able to find better alternatives for some species, but unagi had proved to be impossible. Nearly all of the world’s eel supply is farmed, but because eels’ breeding habits are so clouded in mystery, farms have had to source juvenile eels from a global supply chain rife with smuggling from overfished areas. Japanese and European wild eel populations are listed as endangered or critically endangered by the International Union for Conservation of Nature.

For a while Huang tried to prepare American catfish like unagi, seared and lacquered with sweet eel sauce, but diners were not persuaded. Some told Huang they wouldn’t be back until the eel was too. He tried sourcing eels from American Unagi, a pioneering land-based aquaculture fishery raising sustainably managed wild American eels in Maine. But, Huang says, customers just weren’t willing to pay more for a product they expected to be cheap.

From destination restaurants like Noma to chains such as Chipotle, the trend has been toward sourcing produce locally, offering plant-based alternatives and sometimes eliminating red meat altogether. But even decades into the farm-to-table movement, fish overnighted from the other side of the world remains a signal of quality at sushi restaurants across the U.S.

As they’re forced to confront the realities of overfishing and climate change, America’s sushi restaurants will need to redefine their practices to survive—and they’ll have to convince diners to get on board.

Sushi has reinvented itself before. It wasn’t always nigiri—a slice of raw fish resting on a pat of warm rice seasoned with vinegar, popularized as street food in Tokyo around 200 years ago. The earliest prototype for sushi was common in Southeast Asia around the 2nd century CE: a deeply funky mixture of rice and fish fermented in salt for months or years. This method of food preservation is thought to have arrived in Japan in the eighth century, when it became known as narezushi and was eaten for over a thousand years.

By the 17th century rice vinegar provided a sour taste to sushi without fermentation. Eventually, traditional paper-making methodology allowed for sheets of nori, and ocean fish and shellfish were introduced, as were rice alternatives. A cookbook published in 1802, *Meihan Burui*, included a recipe that swapped rice for okara, the soy pulp left over from making tofu. The pantheon of sushi continued to expand.



When sushi swept America in the 1980s, one of the trendiest items had no raw fish at all: the California roll. Multiple chefs in Los Angeles and Vancouver claim to have invented the pairing of avocado and cooked (or imitation) crab, with rice encircling the nori to appeal to diners unfamiliar with seaweed. But one thing is clear: It was a huge hit. Soon sushi was being served alongside hot dogs at San Diego Padres games....and just about everywhere else.

Today sushi is a \$27.5 billion dollar industry in the U.S., available everywhere from high-end omakase restaurants to convenience store refrigerators. Globally, it's projected to grow nearly 3 percent—or \$2.49 billion—by 2025. Walk into a typical sushi restaurant and you can likely predict what's on the menu without even glancing at it. Salmon, tuna, eel, and hamachi, also known as the core four, are as synonymous with sushi in the U.S. as beef is with burgers. And, much like beef, the environmental costs of eating these fish varieties are becoming too high to ignore. Twenty-two percent of commercial oceanic tuna populations are exposed to dangerously high fishing pressure. Wild Atlantic salmon is endangered in the U.S. And that's just the start. More than a third of the world's fish stocks are being caught at "biologically unsustainable" levels, according to the Food and Agriculture Organization, meaning that we're harvesting it more quickly than it can recover.

It's easy to point out what's unsustainable about sushi, but it's a lot harder to imagine what "sustainable sushi" could look like. While livestock can be farmed virtually anywhere, many fish species have specific seasons and migration patterns. To meet year-round demand, restaurants import seafood from oceans around the world at a significant financial and carbon costs. Often this fish is caught in waters regulated by nations with less-stringent quotas, lower prices, and dubious labor practices. Illegal, unreported, and unregulated seafood accounted for an estimated \$2.4 billion worth of U.S. imports in 2019, according to a report by the U.S. International Trade Commission, often relying on slave labor and human trafficking.

Farmed seafood accounts for more than 50% of the seafood we eat today, but even aquaculture is not a panacea for destructive practices. To feed captive populations, farms often catch wild stocks with huge trawl nets that also capture anything within reach. The amount of electricity used to power these facilities is significant too.

“The word *sustainable* has become the equivalent of good or ethical, but it’s difficult to encounter a situation where you’re not getting into one [ethical] problem or another,” says Daniel Pauly, PhD, a world-renowned fisheries scientist. “Humanity is living at the edge, and it’s very hard not to fall.”

Photograph By Emma Fishman

At Rosella’s, overlooking New York City’s Tompkins Square Park, the walls are the color of the deep ocean. Philodendrons hang from overhead and Jorja Smith pipes through the speakers. There’s sake brewed in Japan, but also a house label pét-nat from Long Island’s North Fork. The sushi rice is seasoned with Carolina Gold rice vinegar made in Pennsylvania. The sleek wood bar is salvaged from a tree felled by Hurricane Sandy.

Rosella is an unconventional, unapologetically local sushi restaurant. On a cold night in late December, the omakase menu featured steelhead trout from a farm in Hudson, New York, seasoned with a hint of fiery wasabi. Butterflied Louisiana shrimp, lightly cured with salt and sugar, was burnished with a blowtorch, then brushed with soy and shrimp-

head-infused chili oil. Fatty arctic char convincingly doubled as salmon. Sweet Kumamoto oysters were served in a shot glass and spiked with fish sauce, and albacore ceviche studded with calamansi and persimmon swam in a coconut milk broth.

Chef Jeffrey Miller learned the intricacies of sourcing local fish for sushi preparation at Mayanoki, a now-closed sustainable sushi omakase restaurant just a few blocks from Rosella. Over three years he worked with a staggering 91 species of local seafood vetted by the Monterey Bay Aquarium Seafood Watch and other programs.

Farmed fish is available year-round, but similar to peaches or heirloom tomatoes, wild fish shifts dramatically in flavor and availability over the seasons. “It was fascinating for me to order a fish that was completely unusable as sushi in one season—and six months later it was this amazing fish that people can’t get enough of,” says Miller, who opened Rosella with business partner TJ Provenzano in October 2020.

If you studied under a chef who uses fish from Tokyo’s famed markets, you’re likely to follow their methods, even if that means overnighting it from halfway around the world.

Many American sushi restaurants use seafood imported from a single company: True World Foods. According to the *New York Times*, around 70%–80% of mid- and high-range sushi restaurants in some U.S. cities buy from True World. In comparison, most of Rosella’s fish comes from local fishmonger Greenpoint Fish and Lobster Company, which works with a network of small domestic fisherman around the country. Some East Coast staples like bluefish and porgy are often maligned as “trash fish,” too bony or fishy to serve. But Miller waits all year until they’re at their fatty peak before putting them on the menu. “Porgy is this beautiful mild but fatty whitefish that seems like it’s made for sushi, but I don’t see it on any sushi menus,” he says. “It’s a very close relative of madai, which is a Japanese staple.”

Unlike at Lucky Robot, Miller says no diner has ever gotten upset about what isn’t on the menu. “When you open a restaurant like Rosella, there aren’t really expectations of having what you have at every other sushi restaurant,” he says. “I think now we’re getting to a point where the omakase market is starting to become saturated and it’ll inevitably lead to more chefs looking for fish that other chefs aren’t using.”



Photograph By Emma Fishman

Not every chef feels comfortable messing with tradition. Becoming a sushi chef requires years of studying time-honored techniques in an apprenticeship with an established chef. Respecting the art of sushi and sushi masters is paramount: If you studied under a chef who uses fish from Tokyo's famed markets, you're likely to follow their methods, even if that means overnighting it from halfway around the world.

"Sushi chefs, especially high-end, hate local fish because the stereotype is that local fish is of poor quality," says Seiichi Yokota, a seventh-generation seafood wholesaler from Japan who now lives and works in Southern California. Yokota partners with five local fishing families, all of whom bring in live catch for him to ikejime, a Japanese technique for killing fish that's said to improve flavor by reducing stress on the animal. He sells around 220 pounds of black cod, rockfish, and halibut each week to restaurants across Los Angeles, including Wolfgang Puck's Spago and Niki

Nakayama's modern kaiseki restaurant N/Naka. Before COVID-19 decimated the restaurant industry, he was selling twice as much.

According to Yokota, "local fish has less validity, but the quality is way better." "I'd be willing to pay twice as much for a lot of these fish," Miller agrees. "They're so cheap compared to Japanese fish." If more restaurants like Rosella succeed in winning over diners with unfamiliar fish, it would be a boon for the climate and the sushi industry alike. But as critics like fisheries scientist Pauly point out, expanding our diets isn't a long-term solution. What if bluefish somehow became as popular as bigeye tuna? "Sustainability has been associated with certain gear or a certain mode of fishing, but that's not what defines sustainability," Pauly says. "It's the amount of it, relative to what the population can produce." In other words: Once enough people start eating an underutilized species, it won't be a better option.

Twenty-one years ago, chef Bun Lai was walking along the Connecticut shoreline with a Yale undergrad and waiter at his mother's sushi restaurant, Miya's, in New Haven, Connecticut. They noticed unfamiliar tiny crabs scuttling around the rocks, caught a bunch, and researched them at a Yale library. Turns out they were Asian shore crabs—an invasive species. "I'd just started working on sustainable seafood for our menu at Miya's, so it occurred to me that targeting invasive species as a food source might be a part of the solution to the gargantuan problem of overeating threatened species," Lai says.

Over 6,500 invasive species have been identified in the United States, which can outcompete native populations for food and other resources. For Lai, these species presented an opportunity for Miya's. He began incorporating Asian shore crabs and lionfish, a carnivorous species that devours smaller fish and crustaceans.

For close to a decade, a lot of guests looking for salmon and tuna walked out of the restaurant. Lai would go from table to table sharing complimentary bites of those salty little Asian shore crabs. He hosted events at the local natural history museum and talked to a lot of journalists and scientists.

Eventually, Miya's became known for turning the destructive into the delicious. Lai wrapped those shore crabs in crispy potato skin rolls topped with melty local Gouda cheese, folded herbaceous mugwort into steamed rice, and even smoked cicadas to top kale salads with an unexpected crunch. His family leased shellfishing grounds on the Long Island Sound and bought a 10-acre farm nearby to grow vegetables while letting wild plants flourish for foraging. Lai even received a White House Champions of Change award in 2016 for his efforts.

If seafood is to follow in the footsteps of meat, there comes an inevitable question: What is the Impossible Burger of sushi?

At the end of 2020, Lai closed the restaurant to focus on a new era. "My life in the restaurant business had become hypocritical and unhealthy," he says. He was using late-night drinking and smoking to cope with the stress and responsibilities of running a restaurant. "While I obsessed over sustainability, I was not living in a way that was sustainable."

Now, Lai invites friends and followers to Miya's In The Woods, an outdoor dinner featuring whatever subversive seasonal ingredients are capturing his attention at the moment. He also offered "sustainable sushi master classes" that taught Japanese tenkara fly-fishing, weed foraging, and sushi techniques.

Lai sees invasive species as the food industry's next frontier, like fair trade coffee and farm-to-table dining before it. And while sourcing invasives from major restaurant distributors is limited, Lai thinks the industry is primed to expand.

If seafood is to follow in the footsteps of meat, there comes an inevitable question: What is the Impossible Burger of sushi? In the Hulu show *The Next Thing You Eat*, Momofuku chef David Chang and former *Lucky Peach* editor in chief Chris Ying visit the San Francisco offices of start-up Wildtype, a company creating cell-grown seafood by cultivating live fish cells in large tanks. They try a piece of cell-grown Coho salmon nigiri. "Delicious," Chang says, chewing. "You read about it and you're like, One day..." Ying replies. "I didn't know it was today."

Wildtype is still gearing up for market, but there are at least a dozen other start-ups developing plant-based or cell-grown seafood around the world. There are undeniably energy costs to running these high-tech laboratories, but that hasn't deterred some investors. BlueNalu, a San Diego-based company aiming to introduce cell-grown seafood like mahi-mahi, raised \$60 million last year.

For some restaurants, the future is already here. Lucky Robot now uses legume-based tuna from Good Catch in a spicy tuna maki designed to tempt vegans and omnivores alike. The texture is closer to flaky tinned fish than smooth slabs of nigiri, but Huang says it works for spicy tuna rolls, which usually feature chopped fish. Plus, that all-important spicy mayo goes a long way.

Then, of course, there's the old-school version of "plant-based." Bun Lai used to stock a sushi buffet with salt-cured Chinese jumping beans and fried pickled artichoke hearts. Silky eggplant is a popular Japanese replacement for barbecued eel. Lucky Robot's seared mushroom nigiri is delicious in its own right.

It's impossible to say whether sushi bars of the future will offer mushrooms, lionfish, cell-grown salmon, or all of the above. But hybrid menus like this might be the key to unlocking a more sustainable future.

"I think humanity will have to get away from eating animals," Pauly says, "and it will be driven by two things: Animals will become rare and expensive, and we will develop substitutes that are tasty."

Photograph By Emma Fishman

A few weeks into writing this piece, I found myself ordering takeout and proceeded to spiral over whether to order spicy tuna rolls. Can I really feel good about the sourcing practices behind an \$8 tuna roll? Is salmon any better? Should I just get a cucumber and avocado roll and be done with it? It's tempting to set clear rules around what fish to eat and avoid, but, for me, the unsexy truth is that truly "good" options are few and far between, not to mention difficult to access and not always affordable.

Two years into a pandemic that has destabilized an already tenuous industry, too many restaurants are struggling simply to keep their doors open. Switching suppliers and educating staff and diners are risks many restaurants aren't willing to take—especially when popular menu items are on the line. Governments around the globe would need to crack down on overfishing and illegal practices, eliminate forced labor, and make supply chains more transparent before we can see a meaningful shift.

Still, sushi in this country is primed for another reinvention. Will more American chefs follow the lead of chefs in Japan, where highly seasonal menus shift with fish migration and the markets? Will we eat more bivalves like oysters, mussels, and clams, which extract carbon from the environment as they grow? Will we embrace lab-grown fish, use vegetables in new ways, or turn to invasive species? One thing is certain: If we want to keep eating sushi, it's going to have to be a lot different. But it might taste even more delicious.

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