

## Central Kansas Bay Oysters: Landlocked Ocean Fresh by Sarah Marks

The C K Bay lab operates on two premises: to waste no biological byproduct, no matter how small or filthy, and to imitate ideal oceanic conditions so well that even a refined food critic cannot differentiate between lab-grown sea food and the real deal.

The lab is dark and cluttered when the first shift comes in, and at six in the morning, the lights kick on all at once, all reds and blues and presence-of-all-colors white, glinting from corners and beneath mylar shields and twinkling from the corners of Grow Room Glasses that the employees don.

Upstairs is the microalgae room, of fluorescent tube lights and glowing green phials. An intricate inlay of thin glass tubing, like a piezometer, except it measures the speed at which *Tetraselmis* flagellate themselves up and down. A thin whirl and the bubbles begin to come up. Delicate carbon dioxide tanks rotate a quarter turn, and a faint hiss down the line; the *Nannochloropsis* froths, the *Euglena gracilis* – dark with oil and rich in potential - come to life, and the millions upon millions of cells are under a wave-like condition.

The stats are there to read, and first shift clicks through, looking at things like pH and cell count, squinting at the tiny perfect graphs. The dry weight machine pulls two milliliters from every culture, folds a filter paper into a funnel, and lets the salt media drip down until there is nothing left but a faint green film of robust algae. A furnace blasts this sample with a tremendous heat, and whoever is on Morning Micro duty weighs this sample, holding it with tweezers so as not to transfer any oils or dirt from the gloved human hand onto the sample accidentally.

An optical density is a measure of how much algae is present in a sample, and the higher the number, the more life there is to reflect back a beam of light. The spectrophotometer beams down from the ceiling at 750 nanometers and beeps at each phial. Each tube that reads a .5 is passed over; the morning shift watches as any racks of tubes that read over or under the .5 parameter are plucked from the line, whizzed down to the right, and compiled into beeping boxes that observe pH and nitrate.

The microalgae looks good. Tara, this morning's technician, watches as the clean white fingers of the Scraper hum and pluck the phials for further testing. She moves downstairs.

The fish, *Thunnus albacares*, are not visible right now, and Tara squints at the dark waters of the tank and resets the filtration unit. She watches as muddy, poop-filled water gurgles from the fish tank into the shallow shellfish pans. The water swirls and circulates, in big circles interspersed with airstones sending up tiny bubbles to surface. A stray piece of *Macrocystis pyrifera* has somehow gotten in to the shellfish tank. Tara absently plucks it out and munches on it, although it has been floating in the fish refuse.

Today, Tara puts on her glasses and sits at the old computer, difficult to turn on due to the large quantities of salt that are evaporated in all the crevices and the power button. One of the sensors is offline. She puts on thin, vinyl, fingerprint-masking gloves and reaches in, nearly up

to her shoulder, into the second shellfish tank. She feels a barnacle. It has taken hold of the small sensor head. Tara fishes it out and tries to crack off the barnacle under her fingernail. She goes at it with the blade of her pocketknife, and pries off the barnacle along with the protective glass screen of the sensor. The vibration of the sensor slows to a stop. Tara must replace it.

No matter, there are more sensors in a bag somewhere. She finds them in a dusty corner and neatly snaps it back into the electrode net. The computer blinks back. There are three dozen oysters in the tank, and a handful of mussels. Their ages and growth rates are in S-shaped exponential charts. Tara checks the kelp tanks, the ruffled green seaweeds circulating above the delicate fingered dulse pieces. She watches as a Scraper pinches two seed oysters and deposits them back in their respective tank.

The rest of Tara's shift is slow, and she spends a decent bit of it watching the filter suck the brown color out of the fish tank. The *Thunnus albacares*, or Yellowfin tuna, are now visible and scattering then reforming into several schools. Their gaping mouths seem hungry, though they have just eaten a meal of herring; Tara watched the red ball valve turn and the baitfish tank drain slowly into the tuna enclosure. Maybe Tara is the hungry one. She puts her hand back into the shellfish pan and takes out a few oysters. She cracks them and tips the cold, salty-sweet goodness into her mouth while the fish look on vacantly.

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*Ask me about my Integrated Multitrophic Aquaculture Obsession*, reads the back of Jeremiah's T-shirt. He sees Tara in the parking lot, unplugging her Tesla and taking off her salt-speckled lab coat. Jeremiah himself was on bicycle, for some tormented reason opting for his old rusted Surl in lieu of an e-bike; the C K Bay lab was indeed up a few steep hills from his apartment.

Everything was rusted, not just Jeremiah's chain; the Tesla had flakes of rust here and there, and when Jeremiah went in, punched his PIN into the clock, and put on his coveralls, a red line showed exactly where his boots rested when they were not directly on his feet. The fish filter had shown unhealthy amounts of iron until a tweak in the program actively took out rust. When that couldn't keep up, Jeremiah came in on his off day and painted all the underwater shelves with Rust-Oleum, paid for out of pocket. And they didn't even give him a raise.

Jeremiah likes to look at the fish first and to walk the long rows of shellfish tanks, not just the two sample ones for which Tara wrote down measurements. He climbs the ladder to every kelp tank and grins at the end, since it's Friday, and that means it is packaging day, and the last two tanks slowly drain their water back down into the fish tank. A heap of green lettuce is left, one cell thick and millions across, scraped with a glorified automatic rake into a vacuum sealer bag to be flash frozen and distributed to every Shell Taco and McDonalds in America, and 150+ other individual or small-chain restaurants in 48 states and 6 countries. Wow!

But Jeremiah doesn't know about all that. He's got analytics to look over, like a sensor that Tara screwed on loose, which allowed a salt bug to get in. He watches the real-time graph of a temperature fluctuation and control feedback, marveling at how he spent the better part of two

years wrestling with things like aquarium chillers and messy sump pumps in his backyard before he realized he could get paid (instead of pay) to do such things. He sometimes turns off the Scrapers so he can harvest the kelp by hand, squeezing clear salt water at 36.3 g/L all over his pants and taking bites out of his riches. The C K Bay lab owners like Jeremiah, they do, they just think he's a little overenthusiastic about kelp. But maybe they've just never had his noodles before.

The lights snap off, and by now Jeremiah is nearing the end of his shift, having a coffee with the other technicians and watching as two of the men dip into the microalgae green matrix with an eyedropper to send it off to the USDA for some new calorie julianization thing they've got going. Jeremiah doesn't really know, he skipped that day of training, along with the Tuna Species Diversity and Inclusion series and the Don't-Stick-Your-Fingers-In-The-Acid-Bubbler refresher. The guys pull up a microscope and watch on the big screen as the most light-mobile microalgae species, *Chlamydomonas*, swim across the slide like a determined pack of sperm. Axel moves the light to the other side of the scope, and the cluster of cells arcs like a cardioid and makes its way back to the bulb.

"Hey, Jemmy, flooded Room 2 lately?" they ask him, as a joke, as they take off their boots; meanwhile, the Dead Watch janitors come in to reset cultures and pack dishwashers under headlamp beams and green strobes so as not to disrupt the light-and-dark cycles of sensitive young kelps. "Caused any major saltwater catastrophes in the microprocessors lab?"

Maybe another reason he hadn't gotten a raise. The next batch of controllers was now put off until 2052, summer at the earliest, due to Jeremiah rendering the prototype set useless by accidentally using a metric tank instead of an Imperial one. An easy mistake, since C K Bay had gotten several thousand pieces of glorified Tupperware off an Instagram Marketplace score, all in clearly demarcated metric units, basically unused, untouched, and ripe for growing all sorts of shellfish and algae species. Jeremiah hooked one up to the automatic valve system and later saw a small, innocent trickle of water flowing into the street's storm drain when he clocked in the next morning. He had to pull a 'clopen' shift and then work nearly twelve additional hours to rectify his mistake. The control room had three inches of standing water since the floor drain was full of oyster spat.

Flooding happened often, though it was normally corrected instantly by things like Wet Alarms and mini sump pumps and giant (although metric) backup reservoirs. Many of these systems were put into place by Jeremiah, banished to brainless backup-systems building after several mishaps. He was the reason that water stayed in the fish tank when the 2049 electrical storm wiped out grid, generators, and even double backups. The one-way valve was Jeremiah's wheel.

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Tara tries her first abalone of the breeding cycle, a thin one with a burnt 37E2 on the side, perfect and buttery and begging for hot sauce. She sits quiet on a stool upstairs. The lights have not yet kicked on. A fellow morning shift technician turns off his light and bumps into a

photobioreactor bag of *Pyrocystis*, a bioluminescent microalgae that appears transparent during the day and usually in its dark cycle, too. The bag flashes with speckles of blue light as the culture is agitated. The technician curses and apologizes to the algae, which subdues in the next moment with dwindling bioluminescence and visible settling.

Behind her is the Matrix, where the Scraper puts the older vials of microalgae mixtures, and trickles of liquid teeming with life make their way down to the tanks. How fitting that the trophic levels are reversed in this laboratory, the lower forms of life upstairs, unicellular organisms succumbing to gravity-enforced feeders that lower them to their noble death of feeding the small crawlers that eventually feed the rest. The oysters are deep-cupped and crinkled, heavy and full of a meat so sweet that even Tara's dad couldn't tell it came from the ugly part of Kansas. The kelp is ruffled, thick and crunchy. There are tanks of scallops and trial urchins, as well as one of sea snails. That was a smaller glass Imperial-sized tank, probably installed by the maniacal Jeremiah during his experimental phase. The snails kept crawling up the sides of the nearby opaque pans and ruining things like water celerity tests and gas bubble counts.

Tara follows the green inlay of clear tubing downstairs and watches as the microalgae is washed into the baitfish tanks. It gets consumed, all of it, with a first pass for the small fry and then a longer, slower journey through the filter mouths of the shellfish. And it grows, prolific and pretty, from the salt that crusts off the fish pans and the tiny brown specks of fish poop. She used to remember every bit of it, how each filter worked, how the nitrogen and phosphorus fed back upstairs to the perfectly clear media that then birthed microalgae cells by the daily millions. That's since faded, but she still thinks about those micron filters, and she even went in last year to pick out a coding bug that was somehow dumping whole fish poop pellets into the back dishwasher.

The system closed fully a decade ago, and not the bankruptcy kind of closing, but the "We-don't-need-to-fill-up-a-tanker-truck-of-ocean-water-twice-a-week-anymore" kind of closing. The evaporation was caught, salt was scraped with no error, and the last round of oyster spat that died a lonely open-mouthed death was composted to a nearby farm and celebrated as gone for good. The last time that Tara had seen such a high water bill was when Jeremiah insisted on using the chemical shower every day to rinse off his sweat when he began doing intervals on his bike rides to work.

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Jeremiah has two kids, whom he takes to McDonalds on Tuesday, so they can marvel at how mediocre the fries are. Julia is vegan and Henry is not, not that it really matters; their food was essentially the same. Julie orders the impossible third-pounder, and Henry orders the possible burger; they dip their mediocre fries in ranch speckled with C K Bay bull kelp chip bits and chomp away, blissfully unaware that the milkshakes they're washing down their burgers with have little bits of mollusk shell powder so that their teeth won't fall out in twenty years due to California Rot.

“Dad, when are you going to take me fishing?” says Henry, and Jeremiah has to patiently remind him that it isn’t fishing anymore, really, since the modern mutation of tuna is no longer scared of the human hand so you can just catch one on your first go. Besides, the kid should really try real fishing, like in a river, not just staring into a thousand-gallon tank of invisibly micro-algal media where all the fish grow to the same size. And if the fish weren’t all the same weight, well, they were migrated into another thousand-gallon tank of their fellow tunas that were one standard deviation underweight. Sometimes it took the fun out of the whole thing.

Julia finishes her fries and her hidden-seaweed ranch and says she’d rather just eat at home next time, where the food is just as good and a great deal less greasy.

Jeremiah taught them both to cook as they grew up, and although they no longer shriek with joy when he pilfers buckets of sea lettuce or young clams, they never say no to a surf-and-surf.

*How to Make Jeremiah’s C K Bay Oyster Surprise:*

2 cups finely cubed Bull Kelp stem pieces (C K Bay product *Fall Bulk Special*)

Meat of 24 young oysters (C K Bay classification F or above)

*Or Meat of 12 grown oysters (C K Bay classification M)*

2 tbsp. butter

1 tsp. salt

Splash of white wine (optional)

Lemon wedges (optional)

1 package concentrate *Pyrocystis* gel (now available DAY and NIGHT!)

To prepare: Preheat large cast-iron skillet, melt butter. Turn to high heat and let butter brown. Add Bull Kelp and salt, then toss. The cubes should be dark brown after 2-3 minutes. You may deglaze pan with white wine, or simply use a metal spatula to scrape. Cook the kelp cubes for another 2-3 minutes while flipping frequently. Remove from heat. This is commonly called Bull Kelp Relish or Kelp Char.

Shell the oysters (see C K Bay guide to *Premium Oyster Hulling*) and leave them on the half shell. Some opt for lemon wedges alongside if consumers of the meal are less accustomed to whole raw oysters. Pipe half of the package of *Pyrocystis* gel across the oyster meat and let set for 3-5 minutes (it will feel like a thin Jell-O layer when set). When Bull Kelp ‘relish’ is cool, spoon across oysters. Finish with the remaining *Pyrocystis* gel and let set again.

Recipients of Oyster Surprise are to be served their oysters in a dark room. Effects are best observed 20-30 minutes after the final *Pyrocystis* layer is set. The oysters should be faintly glowing blue. Consumers are to tip the whole of the oyster meat, and its accompanying

condiments, into their mouths and to let this sit for a few seconds until the immediate bite of salt is gone. The consumer can then chew and savor their bite. Small children will delight in the fact that their tongues may bioluminesce blue for up to two hours after their meal.