

March 6, 2017, oc030617.mp3
3-D Ocean Farming-A Restorative Model
Jennifer Stock, Bren Smith

Jennifer Stock: You're listening to Ocean Currents. A podcast brought to you by NOAA's Cordell Bank National Marine Sanctuary. This show was originally broadcast on K, W M, our in point Reyes station, California. Thanks for listening.

Jennifer Stock: You're tuned to ocean currents. I'm your host, Jennifer stock on this show. We talk with scientists, educators, fishermen, explorers, policymakers, ocean enthusiasts, authors, and more all uncovering and learning about the mysterious and vital part of our planet, the Blue Ocean. I bring this show to monthly from NOAA's Cordell Bank, national marine sanctuary, one of four National Marine sanctuaries in California. All working to protect unique and biologically diverse ecosystems just off shore of the K W M listening radius on the West Coast are the Greater Farallones and Cordell Bank, National Marine Sanctuaries, which together protect 4,500 and eighty one square miles up. A culture has been a part of human society for eons of time from the ancient Polynesians to now it takes its taken many turns, some for the better. Some not so much. Aqua culture by definition refers to the breeding, rearing, and harvesting of plants and animals and all types of water environments, including ponds, rivers, lakes, and the ocean.

Jennifer Stock: The US imports over 90 percent of its seafood, about half of which is farmed. Well. Aqua culture globally has grown dramatically over the last 30 years. In the US, production has remained low. Well, aqua culture remains a controversial topic, a fisheries management and sustaining wild populations. There is a role to play for producing the ever-growing demand for seafood. Greenwave is a non-profit that not only produces food but does so in what's called a restorative model. Today we'll be talking with Brian Smith, the executive director of Greenwave, a nonprofit organization that's working to support a new generation of ocean farmers to restore ecosystems, mitigate climate change, and build a blue green economy. So stick around here to ocean currents. We have a full show back just a minute. My name is Jennifer Stock and today we're talking about a restorative model of aqua culture with Bren Smith from Greenwave and brand. I want to welcome you to [inaudible]. You're live on the air.

Bren Smith: Thanks so much. It's an honor to be here.

Jennifer Stock: Thank you so much for calling in, so I don't want to just start with finding out how you got to aqua culture. You started out in commercial fishing. What brought you to aqua culture?

Bren Smith: I was born and raised in new land and dropped out of high school and I was 14 and turned into a commercial fisherman and fished all over the globe, but I ended up in the, in the Bering Sea fishing for cod and crab. Absolutely loved that job. Who was the. I really miss it so much for the, you know, [inaudible] has been unbelievable with bunch of other people working 30 hour shifts, a great life for a young kid, but the cod stocks crash back in Newfoundland while I was working in the Bering Sea and I'm sort of a wake up call for a whole generation of us trying

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to figure out, you know, OK, this is not sustainable sort of factory trawling on faith. What's the future? And so I started doing agriculture in northern Canada and on the salmon farms because that was supposed to be answer to over fishing and job creation, stuff like that.

Jennifer Stock: So what brought you to starting your own model of aqua culture?

Bren Smith: Yes. So you know the thing on the days when the advocate, the seventh farms back in the. Not In these. Essentially we're running Iowa pig farms at sea, all the things we know, you know, agriculture is actually probably the worst brand name and the grocery store at this point and it's made incredible improvements in wild fish meal usage in, in, in fee as far as the use of pesticides and antibiotics taking real leap. But I decided I want to come at it from a totally different direction and sort of asked the oceans were what's in the ocean to provide what are, what's the most sustainable food we can grow and then change tastes. So I mean the, the, the, one of the challenges, what the missteps of agriculture was. It first started growing what people wanted to eat rather than what the ecology the ocean could provide.

Bren Smith: And that was salmon and tuna and things like that. So we're coming the other direction. So I headed after I left the salmon farms, I ended up in long island sound came out with your partner and that was sort of the beginning of Boutique Oyster running a new program to open up shell fishing grounds to young fishers to track them in this back on the industry. So I remind myself that the moisture and I did that for a bunch of years and there was a big shift quite honestly, like the thrill of hunting on the ocean was done. It was kind of boring. I feel like, uh, you know, on a regular farmer, just always knowing where I'm going to go to the half mile out, floating around all day. It's a real sort of psychic shift for official [inaudible]

Jennifer Stock: [inaudible] oyster farms around here. Might have a challenge with the beautiful place to be oyster farms here on tomorrow's Bay. And in this region.

Bren Smith: Well it's, I mean it's beautiful, but it really is a change of an identity. The commercial fisheries and chasing hunting. I mean seafood is our last wild foods. Overtime we're going to say goodbye to that and that's really heartbreaking and the question for all of us, which I hadn't thought of when we were moving into this, but how do we keep that sort of culture and the soul of a fish, a fishing alive was that core component and I think it is the excitement, but we're going to lose that because we have to become farmers instead. What we can keep, and I tell this to my fishermen with when we go to the training programs, which is he gets to own your own boat, succeed and fail on your own terms. No boss, a self-directed life, and you still get the pride of helping feed the country and you know, we think you have to be a fisherman to through certain professions in the country. Coal miners, steel workers. I think farmers, fishermen that come with an entire culture for the jobs you can write and sing songs about until that question,

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for the transition of our oceans, for wild fishery into ocean farming is can we keep these sort of beautiful, meaningful jobs we just love.

Jennifer Stock: Yeah. Thanks for explaining. So tell us what is Greenwave, what is the mission of your organization, and we'll talk a little bit about to this restorative model, but let's first just to start with what is Greenwave all about?

Bren Smith: It's a "Green" wave is designed to help replicate, as you were saying, in short train a new generation of farmers and we do two sorts of things when we do training and education and our training and education program includes you get two years the support to get small grants, you get access to free or low cost seed for your pharmacy, get gear from Patagonia and we agree on our for-profit side to buy eighty percent of what you grow. So that's our training programs and the other two things relate does is policy work. Trying to figure out how do we protect our common, how do we work with stakeholders so that ocean farming really has a light footprint both aesthetically and then the R and d side. How do we stay, how do we do research to stay ahead of the curve? How do we develop solar processing, you know, ocean combine in new hatchery technology that reduces energy costs,

Jennifer Stock: So you're really looking at a lot of main components of a successful model here, both for the environment and for profit and for producing food, which I think is different than a lot of other systems. Can you talk about what the restorative model is because I think that also helps put it all together.

Bren Smith: So there's so many people doing amazing work around the country, around the world and lots of pieces. What we tried to do was really simplify it and make it accessible so it could be replicated and we came at it from an approach. So much of it was probably pretty much hundred percent, is a mono-cultural angle. So we fixed the poly-culture in. What we do is we grow a range of species, seaweeds and shellfish shoes in the entire water water column, so we grow clams, oysters, mussels, scallops, and then two types of seaweed, kelp and aggressive clarity. We also harvest salt in these same 20 acre areas and it's restorative for a couple reasons. One for the environment we talked about five times more carbon land based plants are [inaudible], is called the sequoia to the New Yorker, called it the culinary equivalent of the electric car until nitrogen through our oysters and other shellfish.

Bren Smith: Of course, as you all know, over nitrification, the root causes of a dead zone. We also worked with the Department of Energy and some folks around the world and the early stages of of biofuels, and then we also use it for land-based input, so animal feeds and fertilizers. If you feed cattle a majority diet of seaweed, you get up to a 90 percent reduction in methane. And what's key here in terms of the sustainable restorative pieces, regrow zero input foods so we don't require any freshwater, no fee, no fertilizers, and this makes it the most sustainable form of food production on the planet. And in the era of climate change, water prices go up, feed fertilizer prices go up, and energy prices go up. Zero input food will also

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be the most affordable food on the planet so that the economics of climate change will drive us towards zero input food. And luckily, you know, as, as, um, as former fishermen and farmers were able to grow

Jennifer Stock: When you were talking about training for people to be able to start growing a range of species, how much do you take into account the actual region that you're in? And I know you're based in Long Island right now, do you have farmers all around the United States or some different bioregions cause I'm thinking that species you are able to grow probably vary based on the region.

Bren Smith: Absolutely. And we really need some serious, great scientific research behind this is why it's so important to the sea grant as a NOAA labs really stay alive. They're there. They're absolutely central to those of us that are creating, trying to create this new industry or new, new, um, sorts of jobs in the US. So the way we, we, I mean actually in Connecticut outside of new haven and we have a, we only grow native species and our farm network right now is from Maine, from all its throughout New England, Maine, all the way down to Rhode Island, Massachusetts, Connecticut. When just starting in New York, we have a first farm going through its permitting processes in Santa Barbara, a small cluster farms forming the Pacific northwest, but the key is like I know what to grow in my area, but there are 10,000 edible plants in the ocean, a couple hundred kinds of shellfish.

Bren Smith: As soon as you look at your local ecosystem, get with the scientists, get with the chefs and asked the question, what are all the kinds of restorative species we can grow and that we can eat. The possibilities are limitless. You know, the doom and gloom of climate change. Disrupting the food system, which is all true is a flip side which our oceans are this incredible bounty where we can grow a whole new crops, new lettuces, Corrine's tomatoes, but you know, we've never seen before. And then this new climate cuisine actually for the chefs in the home cooks becomes pretty exciting.

Jennifer Stock: So how about the regulatory angle? I'd be. We have a lot of marine protected areas around here and I. I'm not so familiar with the amount of marine protected areas in the east coast, but how do you work with the local regulations in terms of identifying an area to potentially farm and what types of regulations might you experience as a farmer?

Bren Smith: Yeah, I think the first way to deal with emotions, oceans of these beautiful, pristine places and we need to keep them that way and really what we've tried to do is take all the lessons from industrial agriculture, all the lessons with industrial agriculture and not repeat them. So part of the issue around around permitting and legislation is actually farm design. So when you come out to our farm is kind of very little dusty because it's way below the surface. Anybody can vote swim women, our farms, their community, not privatized spaces. People dive through our kelp forests, a tire commercial fishing the entire area surrounding our farm. People, you know, surrounded literally with Gillnets. The other thing is because

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we're vertical, we have such a small. We've got a much smaller footprint. My to be a hundred acres, now it's down to 20 acres and I can go way more food than than ever before and then the least right [inaudible], because we don't own that fodder for that patch of water.

Bren Smith: All we own is the right to grow shellfish and seaweed, so we own a process on a property right and it's up for renewal every five years. The community has a lever of democratic control and then when I die on my head boat happily one day that least goes back to the town or state said, I think there's a lot of work needs to be done on ocean planning. We need to get together with our wind farm companies embedded our 3d farms in the wind farms. We need to make sure shoreline residents and you know, recreation commercial voters aren't interrupted. There is one thing I'd say about marine zones, huge advocate of marine zones. They're really important conservation zones that the issue is, is that if you were, if you could set, you can set aside the entire world's ocean as a marine park and in the era of climate change, it's still going to die unless we have strategies to address climate change in our waters.

Bren Smith: A Marine Park strategy won't work. And this is so in a way a conservation only solely strategy is almost like a Teddy Roosevelt Republican environmental policy and not a of oftentimes where, where they are. Conservationists did some decorating, you know, they're good friends. I don't mean to be overly critical, but are their own sort of climate deniers because they. So they see, they know that it's real, but they haven't accepted their real implications. We believe that the vision is marine parks with 3d ocean farms embedded in our, in the marines zones which breathe life back into our oceans, keep those conservation parks alive. And the less we have those engines of restoration embedded or surrounding the marine parks, it's, um, you know, we're just not prepared for the future of, uh, uh, climate change.

Jennifer Stock: I hear what you're saying about marine protected areas and this need for multiuse and adapting as we are in this age of climate change and I think we're all quite in that stage right now of how to move forward and, and we'll have to see how our local coastal plans and state plans and federal plans can adopt if they can go as quickly as we need. One of the things I'm hearing really loudly is this, the farming of algae and [inaudible] structure, vertical farming. And I'm wondering if you could just verbally describe what that looks like from sea floor to surface in terms of all those species and how do you do it?

Bren Smith: Sure. So the great thing about the ocean and you don't have to fight gravity, so it just makes great business. Then from the farmer perspective to use that to our advantage. So I imagine a water garden where we just have anchors that are hurricane proof from the edges of the farm and been ropes vertically upwards to the surface with a bully. And then by eight feet below the surface we have horizontal zonal lines. So a simple, simple scaffolding system and from there we grow our Kelp vertically downwards. We have our scallops in lantern, next we have muscles and muscle socks. And then down below that on the sea floor

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we've got our oysters and oyster cages. And then down in the mud we have our clumps which we harvest, you know, like between the rows of Kelp and other other shellfish. So it's, you know, multi species of sea basket approach from a farmer's perspective, the more species you can grow the, it reduces their list, right? It's spreads the risk. So if one crop fails to replay the reason, big Kelp Fan, I'm never gonna eat seaweed, that's still, it's not my culture, but from a farming perspective, kelp is so fast growing, then it becomes the economic engine of the farm right from those fastest growing plant plants on earth. So the shellfish or regional super regional markets real well. But the kelp is like the joy of the seat. It then everything with food, fertilizers, cosmetics, pharmaceuticals. So we can weave it through our, you know, food and other other sectors.

Jennifer Stock: So one of the efforts that you have with your organization is to kind of do market development and where, how is that going with kelp and other seaweeds? I know here on the West Coast we have somewhat limited harvesting of sea sea weed and it's marketed in stores but not quite on the scale that it sounds like we could potentially go in in terms of in the restaurants, you know, it's a very limited market so far. So I'm curious how you are marketing seaweed and doing research and development with it.

Bren Smith: I mean it's been. I was worried that it was going to take 20 years to figure out the market and kind of get Americans to eat this stuff, how to move shellfish and sea greens to the center of the plate and wild fish to the edges. That was like this. The supply. We figured out, we open sourced the model on a farm. We reduced the cost. So anybody who has 20 acres and a boat and \$20,000 can start their own farm, be up and running the market side. We leaned heavily on us on storing food on social media, but what I did wrong was starting the boutique market and I did Cal cocktail events in New York City and sort of all these hipster things. That was a mistake because we need to go to scale, right? Our farmers markets, things like that.

Bren Smith: They're actually not viable at any scale. Most, 91 percent of land based farmers, lost money last year or we need to figure out actually how to scale the new food economy in a way that's viable. So W, what we did was we started working out with sea food chef because they brought the same sort of sensibilities of wrapping it around fish and seaweed salad, things like that. We didn't move into Asian market. We decided, OK, what we need to do is be Sushi, fly this, and we started working with chefs that knew nothing about seafood, so we worked with Brooks Headley at superiority burger in New York City. We gave them our kelp noodles, which is a main product we remake any he first thing he came up with was barbecue kelp noodles. With parcel and breadcrumb sells out every night, you begin to see it as a vegetable, not as a seafood, and it completely flips.

Bren Smith: The other thing is we worked with large institutions, so we're working. We worked with Google or Patagonia universities, large scale stable markets for our farmers, crops, the we just. One thing about about scale, one is you know, we're able to produce a huge amount of food in per acre, you know, 10 to 25 tons per acre. If

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you were to take a network of our farms totaling the size of Washington state, you could technically see the world, but we don't want a thousand acre farms what we want as network production. So they the greenways vision of 25 to 50 farms, dotting our coastlines, surrounded by conservation zones, a seafood hub and a hatchery located in struggling and poor shoreline communities. A ring of big institutional buyers that Google's the Patagonias and then a ring of entrepreneurs doing value added products. Then you take that green wave reef and you replicated every 200 miles and I think that's the. That's the. Hopefully that's the future of ocean farming, of having a sort of a light touch on our oceans, but actually scale and create thousands and thousands of jobs and really try to lift communities out of poverty.

Jennifer Stock: How did the health of the surrounding waters of each farm effect product? You know, we have a lot of red tide here, more a toxic algal blooms on the rise and warming waters. And have you encountered issues with rapid changes in any of these areas and what are some of the challenges that come with that?

Bren Smith: Yeah, I mean, one of my challenges is I'm getting different growth rates on the same plot year-to-year. Radically different alone will go from 20 feet to three feet year to year. Exact same spot. It drives me crazy and that's why working with NOAA, we've got a really close relationship with the NOAA labs here in Milford, Connecticut, which is the birth of shell fishing and shellfish aquaculture in America back in the thirties. To really figure out what to grow, where and how to stay ahead of that climate curve. The potion question, which I think is, is uh, an, uh, an important one is we see it, we see two kinds of farming, we farm for food and we farmed for pollution. So our foods where we're growing food or waters, it's the most regular, just like all the oysters oystermen growing stuff out on your closest, most regulated food in the country will want to keep it that way. You wish your in spots where whereas I'm traceable as our shellfish. Then we also grow a polluted areas like the Bronx River and get plans and many other plants to just farm for ecosystem services, pulling that nitrogen, pulling that carbon, pulling those heavy metals out of the system so that we're cleaning waterways and those crops can either stay and just pipe to use to rebuild reefs or the seaweeds and sounds can go potentially into the biofuel sector.

Jennifer Stock: Wow, that's fascinating. So do you actually work with scientists in areas like that to, to monitor the uptake and changes in the water quality with that system in place?

Bren Smith: Oh, absolutely. Absolutely. I mean we were close to the university Connecticut Woods Hole, Yale here. We've got new relationships to the University of Santa Barbara, uh, Scripps, places like that. One of the exciting new things we're doing is working with the EPA and some of the companies developing new sensor technology to use our farms as data platform. So let's take this new affordable sensor technology embedded in our farms and then all we've 15 farms now scattered up and down the coast. We can use those, extracted about change about pollution, nitrogen, carbon of the ecosystem services our farms are

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providing so the farmers can benefit on carbon trading market, some nitrogen trading markets. And also I'd hope that our farmers at some point actually can sell that data to the scientific community because it's way cheaper for us to collect it on our farms and for scientists to set up new farms. So as soon as you begin, as soon as you sort of wade out into these waters, the oceans are a blank slate and we can just rethink every. We can just think through all the different levels and potential uses of our farmers. It gets pretty exciting.

Jennifer Stock: See how your partnership with NOAA. See Graham is very important because that's a big thing of what sea grant does and working with fishing communities and scaling up and also doing some of the science and some of these areas

Bren Smith: We wouldn't exist without the secret. I mean that the sequence shifts at that place of applied science, of taking some basic science in early science that comes out of the universities, improving it and then getting it out to folks like me that can create jobs, businesses, things like that. But Connecticut Sea grant here has just been just amazing. No, a lab where we actually have a greenway hatchery. We got invited into, to grow our stocks there. Uh, honestly, you know, I'm a high school dropout. Don't know anything about science, but I do know that I wouldn't be here today without, without that help.

Jennifer Stock: That's fantastic to hear. I know a lot of people are going to be speaking about Seagrant much more in the coming months and other divisions of NOAA and I, I hope they do talk about the value that they bring that organization agency brings. We're going to come up on a break in just a minute here, but I can squeeze in one more question and this goes back to talking about the areas that are kind of polluted in farming and you were talking about the leg and growing kelp and harvesting for t for fertilizer, for plants, science wise, do do allergies, absorb those toxic chemicals and do they pass them on as they, as you process that kelp to become fertilizer or does it somehow act as a buffer? I don't really know that much about seaweed and how it works like that.

Bren Smith: Yeah, it's a great question. So the, the was re-growing polluted areas does, doesn't go into fertilizer. I'd see that as the food system. So everything we're growing in clean, pristine waters that can go into animal feed fertilizers, you know, human food is that, uh, you know, I'm up and down that chain. The, the, the, what we grow in political waters of go into bio-fuel, which is key. So it stays out of the food system, food system completely.

Jennifer Stock: How much biofuel market is there right now?

Bren Smith: So the trouble is it's really expensive to produce viable department of Energy has a 30 new \$30,000,000 program to to figure out how to scale and on and deal with sort of the points to article choke points to scale up a and make biofuel viable say that Europe Kelpie in, I think it's England help as part of their 50 year energy plan. Some early studies that was done by the Department of Energy, I think a decade ago. It was that you could get five times more ethanol yield than corn per

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acre, but it's still expensive to process. We need, we, you know, we'd be, we at the fuel level, I think, you know, we're, we're a decade or two away, but we have the machinery to do it. We can make it. And so, um, to which it's an experimental places we really want to push forward.

Jennifer Stock: That sounds great. Sounds like you're right on the cutting edge of helping that to really go forward. So that's awesome. Back into a little bit or take a little short musical break. We'll come back and continue talking about greenways.

Jennifer Stock: We are back live on the air. So you know, I'm thinking about do fishermen come to you or do you recruit fisherman and I'm curious, why are they coming to you? I mean they coming to you the same way you started this up or what? Tell me some stories about some of the folks that are coming to you to help get, get, get involved in this.

Bren Smith: Yeah. So when I first started doing this, I was getting left off the water, you know, to hang up and the same bars I used to beat up and I had to go to the rubella farmer bars, but over what's happened is a couple of reasons. One is, you know, running out of the US fisheries, extremely well managed, but more and more doctors are, are um, I mean one more fishermen need to diversify. So we don't have request a stark farms in every coastal state in North America in 20 countries around the world. We're a small organization is just stunning. Some of the farmers we have, we got 11 generation fisherman out of Rhode Island's third generation lobster men, but we also have in enough a lot of land based farmers, young kid that can afford to build to get land because it's so expensive. But here with, you know, 20 grand in a boat, we can get them up.

Bren Smith: I started the first year. We also have, we have a lot of the women coming in so it's, I think it's because of this low barrier to entry, minimal skill requirements, minimal capital cost. So it sort of the nail salon model of the sea. We're attracting more and more folks. We never, we've never had an advertiser or nothing like that. Unfortunately. We spend too much time saying no to people because we just don't have the resources to run enough programs. I mean just in California, I think we have over a hundred and 50 a list of a hundred and 50 farmers that want to start right away and other regulatory, you know, there needs to be real work on legalizing the other. We'd grow a seaweed and a lot of states, including California at this point. As far as the fishers, they're just, they're, they're, they're poised and ready.

Jennifer Stock: This radio stations on the west coast, California. Is there a farm in the bay area or near anywhere in California that people can see that's been supported by Greenwave.

Bren Smith: There's one in Santa Barbara that's not in the water yet. That where will be our first multi-species arm is the last leg of, of the permitting process. The Denmark has fifth generation out of Santa Barbara. Just brother was a commercial

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fisherman and he's our. He's our first sort of Greenwave storyteller and ocean farmer and an ambassador. Not In California.

Jennifer Stock: Do you ever have people come to you that are. Haven't been commercial fisherman before that they're just young and really motivated by this model and want to get involved early on in their. In their career?

Bren Smith: Yeah. I mean that's the, the land-based land-based. Land-Based farmers are a huge sector of that. I've got a new kid, did eight years on a dairy farm. It's just been looking for land forever, so it's, you know, [inaudible] 300,000 bucks for him to buy the land needs and he came to us and now he's farming, but then endless got a college and high school kids. There's just a lot of energy and I, you know, I think the reason why is that it's giving people a sense of agency so you don't need to be a google or an Amazon in order to build your own farm, defeating your local community, but also participating in helping address some of the major problems we faced, whether it's food security or climate change, you can actually be, you know, you can make a difference, but with very low overhead and it just feels, yeah. Feels possible.

Jennifer Stock: What's your biggest limitation at this point in terms of being able to help all these people that are wanting to get started and dive into doing this?

Bren Smith: Yeah, I think there were three. One is resources. You know, we just, uh, you know, getting enough money for a training program and you know, folks really do need two years of support. So they become, you know, good, consistent, high quality growers, the science really figuring out what to grow, where in that goes all the way from hatchery to harvest time, species selection, things like that. We figured it out here, but I think, you know, we've got farmers that want to start in the Gulf coast and also all different places and it's not clear yet what mix of species are the most, the most viable. And then the last one is, is permitting. We've had huge success here out in New England because we'd just have a lot of support that we've been writing legislation state to stay in. Our legislation here was called a seaweed jobs bill, little things and so, but as we expand and create the new reef, there needs to be sort of, you know, new legislation on a rethinking of how we use our ocean resources and making sure we bring everybody onboard together. Start small. You know, our model, what I did, I just put two experimental wines in the water, grew all my species, invited the community, are invited legislators out, environmentalist just to sort of see and learn, create the coalition that thing can go that, that move forward to create a, to really support it as a, as a, um, you know, a new model of agriculture.

Jennifer Stock: It seems like a great marketing tool for the restaurants in terms of selling a product like that that is so local and adding stewardship to the environment and the three r's coming all together and their own hometown. Are you seeing that from the restaurants?

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- Bren Smith: Yeah, I mean we just had been incredibly. I mean it's hard being a chef. It's hard to stay ahead of the curve for a chef. So any new local crops they can use. We just had, you know, Rene Redzepi, David Chang, top chefs from around the world out on the farm. The Summer Leadership Institute was so interesting. Folks who really know their seafood and they really know their seaweeds. They had never tasted a. it's like this because of the marijuana grow in the southern region of health, uh, and so our customers have very mild taste. It's got a nice mouth feel, and so they were shocked how it didn't taste like what they think of it as we're working with more and more chefs. I think they, they're bringing their creativity to make this delicious food. Like if this is either going to be like we're going to be eating it because of the economic stuff, but there's no question is it going to be delicious and beautiful or is it going to be like being force fed cod liver oil. That's where we're at with climate cuisine. Is it going to be bugs and lab meet or is it going to be beautiful things that were able to grow locally, sustain communities.
- Jennifer Stock: Fantastic. Friend. Thank you so much for sharing all this information and knowledge. Is there any last pieces you'd want to share with listeners and please include ways that people can learn more about Greenwave.
- Bren Smith: The 30,000 foot view is that this is our chance to do food right now. Oceans are a blank slate of things like food justice into the DNA of the new ocean economy and really take those lessons learned from land and ocean industrialized model and just do it right this time and I think that's exciting. We need all hands on deck because we need scientists, students, other farmers and chefs. We need everybody. So this is a, we really want folks to come and make our model better and you know, enjoying the movement he can get hold of us through on Greenwave Dot Award g r e e n w a v e Dot Org and we've got a place where people to sign up for far as farmers, as volunteers, fellows like that, and we'd love to hear from you.
- Jennifer Stock: Fantastic. Thank you so much and congratulations on your success to date. And it's really exciting to hear a model that takes into account everything with job training and climate and food and a small footprint. Um, I really enjoyed hearing all about the different models that you're, you're working to scale up. So best of luck to you.
- Bren Smith: Well thanks so much. It was a honor to be on.
- Jennifer Stock: Thank you. Have a great afternoon. Thank you for you folks that are tuning in. This is ocean currents. My name's Jennifer Stock and I just was speaking with Brian Smith from Greenwave talking about the restorative model of aqua culture using a 3d model of vertical farming in the ocean and very cutting edge time for thinking about food models and um, a way to mitigate climate change by growing species that absorb carbon and also take out nutrients out of the water that are excess and recycling the product to land and also to the, to the soil. So keep in touch with that green wave.org and I hope we'll be hearing more about them in

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Jennifer Stock, Bren Smith

the future. This is my 90 ninth radio program, which means April is my hundredth radio program and I love hearing from listeners, so if you have ideas for topics, questions, comments, please email me Cordellbank@NOAA.gov. You can also tweet at Ocean [inaudible]. Thanks so much for listening and enjoy the ocean bay or whatever body of water you can get into safely. This has been an Ocean Currents here on KWMR. Community Radio for North Marin.

Jennifer Stock: Thank you for listening to ocean currents. This show is brought to you by NOAA's Cordell Bank, national marine sanctuary on Virginia Marine community radio K W m. Our views expressed by guests on this program may or may not be that of the National Oceanic and atmospheric administration and are meant to be educational in nature. To contact the show's host, Jennifer stock, email me at Jennifer stock at n o a a Dot g o v. to learn more about Cordell Bank National Marine Sanctuary, go to Cordell Bank dot NOAA.

Jennifer Stock: This thanks to ben sound.org, royalty free music for the Ocean Currents podcast.