

Welcome to Doing What Works: Exploring the Blue Economy, a podcast series that dives deep into the vast potential and challenges of the blue economy. I'm your host, Ashanti Blaize Hopkins, interim associate dean at the Santa Monica College Center for Media and Design. Together, we'll navigate the uncharted waters of this exciting and rapidly growing sector. Joining us on the podcast today is someone who is passionate about problem-solving at the intersection of sustainable food and healthy ecosystems. He is an ecologist by trade with deep roots as an educator. Currently, he is the Science, Sustainability, and Farm Education Manager at Hog Island Oyster Company, an organization that raises five edible oyster varieties on 250 acres of intertidal lands in Tomales and Humboldt Bays. Dr. Gary Fleener, thank you so much for joining us on the podcast.

Dr. Gary Fleener: Hi, Ashanti. It's great to be here with you today.

Ashanti: Our first question is always the same for all of our Doing What Works podcast guests. What was your first job ever, and how does what you learned in that job impact what you do today?

Dr. Fleener: Wow, that's going to take me back a couple of years. My first job was mowing lawns in Tulsa, Oklahoma, at age 12. I have that classic story. One day, my dad came home with a brand new mower and said, "This is for you, son. All you have to do is mow my lawn for me, and you can do whatever else you want with that mower." So, I dragged that mower around the neighborhood for the next several years, cutting grass and taking care of people's lawns as a young entrepreneur. And yeah, that's how it all started.

Ashanti: It feels like even then, you were kind of taking care of the Earth in your own way, right?

Dr. Fleener: I think I was taking care of my bank account mostly.

Ashanti: That's fair. That's fair. Let me ask you, is the ocean something that you've always been interested in? When did you discover a passion for it, and when did you also discover that you could turn this into a career?

Dr. Fleener: You know Ashanti, that's a great question because I am a midwesterner by birth, and I did my graduate schooling in Colorado. I was educated more in the freshwater realm, on rivers of the Mountain West. And, for me, the ocean was a vast and almost terrifying space that I really didn't understand very well until... Obviously, I'd been to the beach, I'd been to the coast, but when we moved to California, my family and I, about 12 years ago, my career interests and personal interests had really gravitated from being an ecologist in the mountain landscape to being deeply interested in food systems and foodways. Everywhere that I looked and went in the world, I realized that the main way that people interact with their environment is typically through their mouths, their stomachs. They're finding food, they're changing the landscape from one kind of ecosystem to another to produce food. When we moved to California, I discovered, much to my joy and surprise, that there was this whole world of ocean farming and aquaculture.

Hog Island Oyster Company, where I have the great opportunity to work now, is actually my gateway into that as a customer, eating oysters, and mussels, and clams. So, the long arc of my career did not include as much ocean work, but about 10-12 years ago, I was able to take that toolbox of being an educator, I had an academic career before that, and an ecologist, and train those tools on the food systems of the nearshore environment. That's still where my passion and energy lies today.

Ashanti: You mentioned that a lot of folks experience their environment through their mouths, through food. When most people think about oysters, the idea that someone on a farm is raising them may not immediately come to mind. What are you all doing in this aquaculture or farming underwater? What can you tell me about how Hog Island Oyster Company came to be and how it's grown throughout the years in that space?

Dr. Fleener: Sure. There's a couple of really important distinctions as we launch into this conversation. One of the primary ones is the difference between what we consider fed aquaculture and unfed aquaculture. Fed aquaculture would be fishery, anything where you have to feed the animals that you're growing. Unfed aquaculture was something I didn't really have much of a sense of a decade ago. That's the production of animals and, in fact, macroalgae like seaweeds that don't need to be fed. Essentially, it's more like a ranching proposition where you put them in the water, you seed them, but they're growing and feeding off the abundance of a natural resource. In the case of oysters, clams, and mussels, that's phytoplankton, the small microscopic photosynthesizing organisms. In the case of seaweeds, it's sunlight and the nutrients that are available in the water. The story of oyster farming, and we might look more largely at bivalve mollusks, so oysters, clams, mussels, scallops, we call them farmed, but in fact, those animals are completely built off the natural resource base of the ocean environment that they're grown in, whether that's a bay and estuary for clams and oysters or more of an open water environment for mussels or potentially scallops. It's the pasture-raised version, if you will. When we say that they're being farmed, they're really being tended by humans in a wild environment, but that's subject to both the resource abundance and environmental uncertainty of that wild environment.

Hog Island is a wonderful company the founders who still run the company today John Finger and Terry Sawyer I think both had Marine Science backgrounds and they were drawn to this proposition of growing sustainable animal protein in the ocean I think there might have been a surfboard or two on their roofs Back 40 years ago when the company was started and that fundamental commitment to producing a delicious nutritious and sustainable food I think is always undergirded the company they did hit a Quantum amplifier about 20 years ago when they moved from being strictly a primarily a farming to the back doors of restaurants kind of operation to having their own restaurants so today Hog Island has five restaurants around the Bay Area the company serves roughly a half a million people a year and I like to tell people that the restaurants are where the money gets made and where we tell the story share the story of what Hog Island does but the Farms are still really at the sole of the business and Hog Island is one of the only true it's not just Farm to Table I tell people it's larv to table right because we we actually have a hatchery operation in Humble Bay in Northern far Northern

California and a nursery operation we have farms in Humboldt and tamalis and then we have these restaurants where we can take take the food to the people if you will and so it's it's an interesting company and I think it's created a unique opportunity for somebody like me because if it were strictly a restaurant business there might not be as much of a place for an ecologist but when you're growing food in the ocean you really have to pay attention to the variables and that's fundamentally a a scientific and biological Endeavor because growing growing wild you know grow growing farmed animals or or plants in the case of seaweeds algae in a wild environment is is fundamentally an ecological proposition and so I think they built the company on their own tool boxes of of knowledge about the marine environment and that continues today but as it's gotten to be a bigger company there's a place for somebody like myself in fact we have a small team of folks that that work on everything from water quality issues to environmental monitoring to trying to think through what we call developing climate resilient shellfish right how do we prepare for climate uncertainty when we can't really there's no knobs on the ocean right we can't really change the environmental conditions on the farm but perhaps we can work at our Hatchery to breed animals that that are more resilient to to climate stressors so so it's a super interesting proposition

Ashanti: it's interesting that the two Founders are still very much involved and to hear how the company has evolved Through Time what were the challenges in getting Hog Island Oyster Company off the ground back in 1983 when it was founded it really feels like the company was almost ahead of its time in many ways.

Fleener: you know that's a good question and if I could channel the you know John or Terry's voice on this I think that those first 20 years and especially in the 80s it was it was pretty close to the Bone at times I when you're in in any farming operation when you are growing food and then you have to sell it into the supply chain at that early part of the arc from Farm to Table you make less money and it is very hard work the work that's being done out on the farm so I do think one of the things that really helped was that John and Terry Advanced when they started in the early 80s most oyster farming on the west coast and really around North America was growing oysters for the shucked Market meaning the animals were grown in fairly rough clusters then they would be opened in a in a shucking house and pack into jars and sold Shu the whole oysters on the half shell U thing hadn't really quite hit you but but so so timing was important in the Malcolm Gladwell sense you know and I think the early 80s saw a couple of important things in the Bay Area it was really the accelerating of the farm to table movement shapan Alice Waters work and Zi those restaurants were taking off and John and Terry were able through a great supply network supply chain network to get into those restaurants and build their brand through association with these important Farm by table organizations like L Sha panise but also the sushi craze was really amping up in in the 80s and I think the American public's interest in eating raw Seafoods was also evolving so I think the 80s was a great time to to hop on that train but I think they they they busted their butts in their backs quite a bit in those first two decades and built their brand to a point where when some Redevelopment was happening in San Francisco they were invited to join into a a a new idea for a downtown San Francisco that that would feature small producers from around the North Bay at the if for folks listeners who might be familiar with the San Francisco Bay Area the ferry building down on the water was really reimagined in the early 2000s and opening the Oyster Bar there really you know changed the business model model because it took that hard work of the first 20 years and kind of blew it up by linking the productivity and profitability of a restaurant with all the work that had gone in the 20 years before that.

Ashanti: what lessons did the founders of Hog Island oyster company learn along the way that might serve other similar businesses or entrepreneurs hoping to open their own aquaculture businesses in California. You know with new legislation in the State of California is it easier then is it easier now than it was back in 1983 to get started in this space.

Fleener: It is much more challenging now one the opportunities that I have been able to grow from in my last couple of years is starting to support the company's permitting and Regulatory interactions and it's it's an interesting space and again I'm a I'm a learner I'm a lifelong learner and so as I learn this space California is a state that has placed a very high importance on protecting Coastal resources it has the California Coastal commission anything that's involved with the coastal environment that involves modifying in any way is very carefully scrutinized and managed for for all the right reasons right however in the case of ocean farming and this is

really true for and we're going to strictly stay on that side of unfed aquaculture right so shellfish and then of course the newly emerging area of seaweed aquaculture which is also super interesting those activities even though they bring with them probably almost certainly tremendous environmental benefits they new Environmental Services whether that's filtration or the uptake of CO₂ in the case of of marine algae any aquaculture is an incursion a developmental incursion into the coastal zone and that triggers tremendous amounts of of scrutiny and process which again is all part of how the state has built multiple levels of of safety valves for protecting the coastal zone but currently today a seaweed Farm an oyster Farm is regulated and permitted in a way that's really not very much different than a condo complex or a golf course you know a power plant and we're hopeful that as time goes by and we can utilize scientific search which is partly what I do I do a lot of coordinating with academic scientists up and down the coast to to Really build the case for unfed aquaculture as a food producing system that also provides if properly done properly managed net benefits and services to the ecosystems around where it's happening and if that's the case then hopefully we may get to a place where the pathway for permitting and Regulatory activities is is different for in the way that our colleagues at The Nature Conservancy would refer to as as restorative it's a food producing system that's nature positive rather than nature negative and in that sense maybe we'll get to a place where we're regulated in that way today the best estimates the Western Regional aquaculture Center which is a really a federal agency is determined that it's about \$150,000 to permit a new Farm on the west coast if you average in Washington Oregon Alaska Hawaii and look at them all and that's really outside the budget of of most aspirational young ocean Farmers you know and so I think 40 years ago you know the fun company narrative is that John borrowed \$500 and got his stirred in in oystering into MOS Bay and I'm not sure if those are exactly the right numbers but it gives you a sense of scale from \$500 startup to to \$150,000 startup it's a very different proposition the other thing that's important to acknowledge in the state of California regardless of the regulatory landscape is that most unfed aquaculture shellfish aquaculture seaweed aquaculture needs to take place either in a protected Bay or estuary or offshore and currently there's very little precedent offshore aquaculture is really in its infancy and there's not very many clean bays and estuaries in the state of California it's a very rugged Coastline and our biggest bays and estuaries like San Francisco and San Diego are not really food grade estuaries in terms of water quality so that leaves us with humble tamalis and Morrow Bay for the most part and pult Bay is approaching saturation and also is now facing changes as the state prioritizes wind energy development and how how will those prioritizations interact with aquaculture tamalis Bay is there there's plenty of room in tamalis Bay but tamalis Bay is a very complex regulatory landscape it's a national Marine Sanctuary there's a national park state parks and Marrow Bay is very small and the water quality there is right on the cusp of of being suitable so even if the regulatory landscape was much easier the way we think about where aquaculture can happen again unfed aquaculture is somewhat constrained simply by locations that's where I think the real promise is with some of these offshore seaweed and muscle Farms that are being developed and proposed particularly right now in Southern California.

Ashanti: Let's shift gears a bit and talk about kind of the sustainability piece of kind of what Hog Island is doing and in many aquaculture businesses that are already set up and running how

important from a sustainability standpoint is the work that you do at Hog Island Oyster company and how does what you do impact the environment and those who live in California why should the everyday person care what it is you do.

Fleener: Sure now that's a fabulous question and one that's really near and dear to to my heart and I think our heart here at Hog Island so let's split that into two broad categories one would be the more typical conversation about the ecosystem services that shellfish filter feeding by valves and seaweeds play while while the food is growing what what is happening to the environment so if we take a strictly terrestrial animal protein model U even a a pastured poultry which which let's say receives very little feed still has a high fresh water requirement typically when you convert a landscape from whatever the native vegetation was forests P grasslands and you make it into a a foraging landscape for you know my boy and I raised chickens for years let's let's use pastured poultry you know and animal protein on land the production of animal protein requires a large freshwater input it requires a feed input of some type and it requires the conversion of one natural ecosystem to a more simplified less natural ecosystem doesn't mean it can't be really rich and beautiful and biodiverse on that farm but with Filter feeders like oysters clams muscles you're producing a nutrient-dense highly nutritious animal protein with no freshwater inputs zero no feed inputs zero and you're modifying a natural ecosystem to host those animals but you're modifying it only slightly and in a way that a lot of good science shows in many cases Inc increases the species diversity and abundance at that location so if you imagine that oyster baskets or oyster gear if they're again thoughtfully placed with with some kind of best management practices in there now you have what amount to kind of artificial reefs right and those become aggregators for juvenile fishes larvel dungeoness crabs and even the shells of the oysters host tremendous structural diversity so we we we talk about when I do educational program we talk about the ecosystem Services largely in in in those terms as oysters filter out the pythoplankton that they're building their bodies out of they also filter out a lot of other sediment and debris in the water and they they have a remarkable biological function and you know you may have to edit this out but oysters have two poop shoots what what so what what does that mean well because people are like well if they're filtering all that stuff I don't want to eat that stuff and what's amazing because without the benefit of brains or eyes they do they're they're filtering everything that's in the water column but they have this remarkable ability to sort that material that they're filtering into the pythoplankton that they want to eat which goes through their digestive tract gets processed as food and everything else gets packed into a little mucousy pellet and deposited through a secondary Chute that's poop shoot number two if you will and it has the wonderful name of a pseudo feces at this point and that gets deposited on the seafloor well what an amazing thing to take take that detrius that's in suspension and pelletize it and put it on the seafloor and they're doing this whether they're wild oysters or Farm oysters or whatever and that clarifying of the water allows better light penetration that means the photosynthesizers like eelgrass or macro algaeas can do their photosynthesizing better so that's a powerful service right there they're great at uptaking Surplus nitrogen in the water and in fact in in New York City maybe have' heard of the billion oyster project they're deploying lots of oysters not as food currently but to clean up the water for these filtration services and for these nitrogen uptake services and then the other block is this what we call Habitat provisioning so by virtue of putting these animals out there we're creating habitat providing habitat that's useful to

other animals so those are the ecosystem services that we tend to think about as environmental benefits and again these just happen as a as a essentially a side benefit of producing this nutrient-dense animal protein that requires no fresh water inputs no feed and of course with seaweeds you're getting kind of the vegetable equivalent right they're they're taking up for in exchange for sunlight and ocean nutrients you're getting CO2 uptake you're getting an incredibly nutrient dense vegetable material that has habitat provisioning values and again no freshwater inputs no it's a heck of a meal when you bring those together you know you got your salads you got your you got your nutrient Den animal protein and it's a pretty good gig.

Ashanti: Well, I definitely learned something today about oysters. I had no idea they had two poop shoots.

Fleener: there you go I know listeners want to know.

Ashanti: the listeners want to know exactly. So at Santa Monica College we're very fortunate to have an aquaculture program launching in the spring of 2024 can you tell me the types of careers that might await students who complete this program and what kind of skills do you think they need in order to work at a company like Hog Island or others in the aquaculture space.

Fleener: yeah Asanti that's that's a great question I would say that two or three things one is be a generalist in terms of learning about the ocean environment if there's one thing that comes up around here at Hog Island frequently and I know from colleagues at other companies up and down the coast sure you might work on the farm crew planting shellfish harvesting shellfish or in the Hatcher but you have to do your work with with a lens and a background appreciation for the ocean environment we are fundamentally players in in a much larger venue and you you really can't you you have to see the work of ocean aquaculture from that broadly informed background of ocean you know Marine biology ocean ecology ocean chemistry sorry sorry kids chemistry still matters still a thing I know it's tough but so much of the ocean that we experience and you know I like saying this I learned to say this here at Hog Island but you know we're a company built on the backs of some very tiny tiny organisms because behind our oysters is phytoplankton right and phytoplankton are amazing single cell photo synthesizers who are swimming in chemistry right and so number one learn broadly you're not going to make it in this industry by being too much of a of a specialist the second is be willing to jump into industry where the opportunity presents itself right right now there you know in California especially and Southern California Santa Monica is a great place to be because a lot of this offshore aquaculture growth is happening in Southern California and I think that the opportunities that the job opportunities will you know in a related way also be be blooming down there but you know I kid you not I've had a PhD I'm I'm an old guy old bald guy and I had an academic career I was tenured but when I came to Hog Island I first came as a customer I became smitten with what they were doing but I was willing to do whatever was available and learn about what was happening here and so I spent my first few years telling stories as kind of a dosent and you know did some dishes here and there and I think being willing to to to find your opportunity wherever it presents itself in the field is is super important because right now there aren't a lot of like you know we're looking for a you know Master's degreed or or certificated person to do

exactly this thing you're going to do a little bit of everything whatever the job title may say we're going to squeeze a little bit of everything out of you right and the third thing I would say is is one of the things that makes this proposition so interesting and of course Hog Island is a little unique in California because we're we have a nursery we have a hatchery we have Farms we also have restaurants so we engage with you know around 300 employees with different experiences some some work on our restaurant side we have culinary people we have Hatchery technician type people but but again I it's related to the first thing I said see it in the big picture I think that aquaculture is fundamentally about Food Systems right it's a way of producing food in in the ocean if it's Marine you know Mar culture broadly it could be raisin raisin trout or tilapia in a freshwater place but ultimately it links back to Food Systems and I think it's important for us all to realize that we're we're you know whether you want to have your boots in the water and work next to the ocean that's all great but ultimately it's about growing nutritious food for people in a way that not only is not nature negative but ultimately is nature positive which I think is what an incredible thing that there's a place and I want to give a nod because I spent years I mean I have a lot of great friends that are working in the terrestrial landscape also working to grow incredible food in a way that's nature positive it's not that that opportunity doesn't exist on land but it's growing rapidly in the Marine sector and I think seeing holistically is super important.

Ashanti: Dr Gary Fleener thank you so much for joining us today and sharing your insights and expertise with us and thank you for joining us on this incredible journey through the blue economy we hope this episode has inspired you to explore further and learn more about this vital sector if you enjoy doing what works exploring the blue economy be sure to subscribe to our podcast and leave us a review stay tuned for more exciting episodes that push the boundaries of knowledge and open new possibilities until next [Music] time [Music]