Interviewee Name: Kyle Pepperman

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Interviewer(s) Name(s) and Affiliation:
Natalie Springuel (Maine Sea Grant) and Eliza Oldach (UC-Davis)

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Interview Description:
Kyle Pepperman, a marine biologist at the Downeast Institute in Jonesboro, ME, spoke about the work of DEI, his experience there from summer intern to now more than a decade of employment, how hatcheries could help vulnerable shellfish populations, and his hopes for the future of aquaculture in Maine.

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NS: Natalie Springuel
EO: Eliza Oldach
KP: Kyle Pepperman

[0:00:00.0]

NS: So why don't we start with you, um, telling us your name, and maybe spelling it for us.

KP: Yeah, okay, so my name is Kyle Pepperman, K-Y-L-E P-E-P-P-E-R-M-A-N.

NS: Where do you live?

KP: I live in Jonesboro, Maine.

NS: What do you do?

KP: Uh I work at the Downeast Institute so I work in the shellfish hatchery growing, uh, primarily blue mussels, uh, some clams, uh. I'm the phycologist there, so I grow all the microalgae to feed all the animals, and I'm involved in marine research in a number of different topics primarily the intertidal, um, focused around clam, uh, culture with communities and stock enhancement. Uh, and I'm kinda Brian Beal's slave, so I'm, I'm out doing whatever he tells me to do.

NS: And, I wasn't able to attend this morning, but I hear that you presented, what did you present?

KP: Yeah I had two talks this morning, um. One was on a project uh that's funded, uh, by the Broadreach Foundation through the Maine Community Foundation um working with communities in Eastern Maine to improve their clam management practices. So we showed the efficacy of predator exclusion when using hatchery seed, promoting recruitment, and uh doing growing area classification, uh, looking for the flats that (clears throat) if I'm a community and I'm going to invest in seed or I'm gonna talk my diggers into going out and putting down nets in order to help protect clams where is my resources going to be best spent? Um, so we look at lots of different, uh, flats and see how clams grow and see what their recruitment's like, and it's been really good, uh. I also had a talk, uh, about hatchery-reared blue mussels, which is something that I think you're going to see in Maine in the future. Uhm, if you look around the world there's already countries and even in the United States there's places that do it and make money. Uh and where we see (inhales) uh temporal variation in, in mussel sediment, um, it really gives the farmer a resource, um, to take some of that, uh, you know uncertainty out of their business. So we're, we're tryin something new.

[0:02:10.7]

NS: What makes it new?

KP: Well no one's ever done it in Maine, um, that's that's the main thing, really no one's done it on the east coast—

NS: No one's grown mussels? No one's actually—

KP: No one is growing them in a hatchery and and seeding them onto ropes or any matter in making it commercially viable. So what we're trying to do now is, uh, this year we did a cost assessment to see what it actually costs us, um, and then how do we bring that cost down and does this work for the farmer?

NS: And how did you come to do this work in mussels, why are you guys doing mussels?

KP: So, we first got into this 'cause we were approached by Cooke Aquaculture and they wanted to diversify their business at one point and cause they're getting all these mussels that settle on their nets, their predator nets. And they're like, well this is a real nuisance, we're catching pounds and pounds of mussels and we have to send a diver down and power wash the nets, or pull the nets off and throw them up on shore, and they stink terribly, what if we strip these mussels off and try and sell them, what if we diversify our business with mussels? So Brian worked with them a little bit, with some small money basically

NS: And Brian is . . . ?

[0:03:20.2]

KP: Uh, Dr. Brian Beal, my boss, director of research at the University of Maine, ah, well director of research at the Downeast Institute, he also works at the University of Maine, Machias. And we did some preliminary, uh, tries in the hatchery, seeding mussels onto rope, worked okay. So then he started trying to go for some bigger money, we had an NF grant that went really well, working with Cooke's. And then Cooke's decided "We're not going to be in the mussel industry, we don't want anything to do with it," and so we kind of were, we got done with this NSF project, and then we were approached by some people at Woods Hole, Scott Lindell's lab, and they got a, uh, Salt & Saul Kennedy Grant and they wanted to collaborate with us doing three different hatcheries on the east coast looking at, you know, how do people deal with this? And uh that went really well and from there we've really just been keeping going, right now we're working on a Sea Grant um and we got one more year on that and I think we're going to be at a commercial scale this year, next year.

NS: Wow. And are you starting the mussels, like what's the life cycle in terms of where you're fitting in? You're right from the get-go, right?

[0:04:31.4]

KP: Yeah so yesterday, I uh well two days ago I spawned mussels uh for the first time this year. So we do is we have brood stock and uhm we selectively breed for this beautiful golden-striped phenotype. Um and what we're trying to do is make the golden retriever of the mussel industry because it's expensive to grow in a hatchery, more expense than just putting out rope and catching them so you need to do something that makes it more attractive that you can get a better price for the final product, and you can market it as sustainably produced and create a new brand. Ah so we take our brood stock, we go through a process called thermal conditioning which is basically tricking them into thinking that it's summertime by

gradually warming the water temperature over the course of about a month, so we take them from two degrees Celsius up to 12 degrees Celsius, hold them there for three weeks and feed them microalgae the whole time, and they don't know that it's not June. Um, so, uh, then when they're nice and plump we just give them thermal shock, basically put them in a tub of water and that induces them to spawn, we harvest the eggs, fertilize them, and uh for the first two weeks of their life they're swimming larval, ah, swimming larvae. When they're ready to go from their swimming stage to their larval stage, we throw them in a tank with a bunch of ropes. hey, the first byssal thread of larva comes out as a little strand of mucus and it gets caught up in the rope. hey pull themselves in just like a spider parachuting really, and uh, it's on.

[0:06:03.1]

NS: Wow.

KP: And then two more weeks in the hatchery just to get up to size, uh between half a millimeter and one millimeter, and then we send them out the door.

NS: And where are you, where do send them? Or where's the hope to send them?

KP: Yeah, so, we've worked with uh a few growers around the state and um looking for the ideal location so what we've found is that site selection just like with any aquaculture is super important. So where we've had the most success is in Blue Hill working with Devin Young of Blue Hill Bay mussels, he has a lease in the Blue Hill Salt Pond. It's a really magical place because there are no ducks, it gets very warm and there's really good feed in there. So we, this year we had an average of about 25% retention which is actually pretty good, um, and we feel that could be cost-effective, um, but for instance we were working with Ralph Smith of Moosabec Mussels and he has a lease, large lease from the state, in Trenton, and we didn't have a single mussel stay on. So it's really try it small-scale, see if it works on your site, and then think about getting bigger.

NS: Between Trenton and the salt pond, they're pretty close but they're pretty different, right?

KP: Well the sites are completely different.

NS: Yeah.

KP: Yeah um so in Trenton Ralph's site is only about three or four feet deep at low water so really not good for suspended culture. Lot of flow coming through there. Whereas the salt pond is, you know most of the places are less than 15 feet deep, it's really calm, it's, it's really a nice place.

[0:07:33.3]

NS: Yeah, yeah. So, so the long-term goal of the mussel work is to be able to provide a place for mussel farmers to access seed, is that correct?

KP: Yeah, so, you know if you're a mussel farmer right now in Maine what you do is put out miles and miles of rope and hope that mussels set on them. Sometimes that works out great, and you have bumper crops, sometimes that doesn't work at all and you don't have a single

animal. And if you don't have seed, you don't have a business. Um, and if you don't catch any seed then you're calling other mussel farmers which some of them cooperate. Most of them don't. Um, and you know, then you're, like, what am I gonna do? I've gotta lay off my crew, I've gotta go without earnings. Um, I might lose my market. Um, you know, my my buyer might decide "Well, jeez, I can't provide product for four, five, six, seven months? I'm out." So, you know, if you have a small undiversified business and you don't get a seed set, especially if it's a new business, you're probably done.

NS: Yeah.

KP: So the hatchery really allows us to add a bit more certainty, um, because there isn't the guesswork, not that it's a, you know, a guarantee, but, um, it does give you a bit more.

NS: Mm hmm. How long have you been at Downeast Institute?

KP: I started at DEI uh in 2006 as a student, um, as an intern, and worked there three summers while I was getting my degree, and then when I graduated, uh, Brian wouldn't let me leave and I've been there ever since.

NS: That's great.

[0:09:05.6]

KP: It's been great.

NS: Uh, what do you love about it?

KP: Well it's interesting work, I mean I've got a really cool job, uh, you know, could be something different, you know, we work with a lot of animals that no one else grows in the world, um, so, and animals that no one else has ever grown. Um so you know you get to create new technology. Um, if you are growing a clam that, that lives up here by Nova Scotia that no one's ever grown in a hatchery before, what do you feed it? How do you get it to eat? You know, what do you do with it when you have larvae? How long do they swim? You don't know. So you know you get to create that, that technology essentially to hopefully put money in people's pockets and food in people's bellies.

NS: And so you've been there for more than a decade now, what are you, what are changes that you've observed in terms of the ecology of the animals that you've worked with?

KP: Well, uh, you know certainly our bread and butter is softshell clams. Um, you know, we're the largest producer of hatchery-reared softshell clams in the world. Not saying much because there's really only one other place, but. Um, you know, it's the demand for softshell clam seed has increased every year and uh people want to do more for their flats so certainly the ecology of the the clam fishermen and the clam fishery has changed, um. You see a lot less clammers these days because there's more money to go out in a boat or there's more money to go dig worms than there is to dig clams, so, you know. I've definitely seen changes, changes in that, that sense, with more crabs than we've ever had.

[0:10:42.7]

NS: Uh what are your, what are the guesses that you, not the guess, you've done tons of research about why there are fewer clams.

KP: Predation.

NS: Yeah.

KP: Yeah. Not a guess. Yeah, mostly green crabs I guess that would have to be a guess but it's pretty strong evidence. Um, you know, clams have a have a rough life. Um, you know, they're gonna spend the first 3 weeks of their life swimming around in the water, absolutely defenseless. Um, and you know, even before that, for that egg and sperm to meet in the ocean is just kind of astronomical odds, um, you know a female clam may produce 10 million eggs, um, of those very few will ever survive to reproduce and settle. Um so from, you know, from even when the egg is released til the rest of its life it just has a hard go of it. And then when they do settle, if they happen to settle in a good spot, um, they're just sitting around top of the mud, and you've got all these crabs coming along and just munching 'em to bits. If they survive to be, let's say an inch and a half, they're pretty safe from crabs at that point, typically they can reach a depth depth refuge, um, crabs can still nip at their siphons and possibly pull them out if it's really soft, but then you open yourself up to a new predator, uh, the milky ribbon worm. It's not new, it's endemic, um, but they wait until the clams are about an inch, inch and half long before they eat them. So certain places in the state do not have clams and the outlook is not good because that's a predator that we really can't do anything about.

NS: And these are all places that did have clams—

KP: Absolutely.

NS: —that don't anymore?

[0:12:16.8]

KP: Mm, yeah, you go down to places like Harpswell, um, Maquoit Bay was fantastic for clams, uh they still have some quahogs there but it's, you're hard-pressed to find a clam.

NS: So have you guys found that the uh demand for clam seed has grown?

KP: It has grown, um, but you know you also have less clammers in, in the industry, so as people leave the industry, the clasmmers that are left have basically free reign of the flats so you know if you get a good set over here that overcomes the predation basically, you know predator satiation, then you can dig all the clams you want. And you know we hear from some towns that because there's only four clammers, you know, on thousands of acres, we can find the clams that we need. But, you know, when you start to look and, so, I'm a little worried about the summer because there's going to be a bait shortage. And, you know, people who were running two sternmen because they're catching so many lobsters, they might not be doing that this year, you know, they might be running one stern man, or none, if it's a small enough boat, so what are these guys going to do? Well, it's really easy to go dig clams, it's uh, it's a very profitable industry 'cause you need nothing but grit. You need a town license which might cost you two hundred dollars, you need a state license which is eighty dollars. If it's soft mud, you don't even need a, a clam hoe, you just need something to throw your clams in

so, you know, the return on your investment is very, very fast. So I think you're going to see a lot of clammers this year, more than we have in the past.

NS: hat's such an interesting correlation, because less, because of the challenges and the herring industry which impacts the lobster industry, you're envisioning we're going to have this spike in the number of clammers. Yeah.

KP: Uh, I think so, and, I mean, if the price is good too, um, you know when the price of clams goes up, you see more clammers.

[0:14:09.6]

NS: Yeah.

KP: Um, a lot of these towns will sell thirty, forty licenses, but that doesn't mean they have thirty, forty diggers, people will just buy their license so they don't, you know, lose it, so they can hold on to it, so there's always you know that money in the bank so if something happens and I need to go clamming, I can go out and have a paycheck.

NS: Yeah.

KP: Mm hmm.

NS: Yeah. Do you have any questions that have been going through your brain?

EO: Uh. I mean, I guess I always wonder about origin stories. You said you started working at the Downeast Institute as a, as an undergraduate student, and I'm curious how your role there felt when you started and how, how it's changed since you've spent years there now?

KP: Well the institute has changed enormously. Um, it's really been, I can't even believe it. When I started there as a sophomore in college, um, I just needed a summer job, and Brian puts posters around UMM, you know, find summer employment, I wasn't thinking about the future at all, really, internships pay for themselves 1000 times over, I know that now. But um there was one employee at that point, right now we're over, I think we have 12 employees in the last 12 years, um, and it was all we did was grow softshell clams, we only grew about a million softshell clams, uh, we didn't do near the work that we do now. Um, this year we underwent renovation that was just shy of 7 million dollars, um, to create the easternmost marine research laboratory in the United States. So it's been, it's been a roller coaster but a great one, you know? It's, it's nice, when I first graduated, you know, Brian wouldn't let me leave but it was soft money, so it was, I got six months of funding, I got a year of funding. And you know that year's coming up and what do I do now, and Brian would, I mean he fought hard to keep us, um, which is great. And now it's, the momentum, you know we're just too big to fail, um, so it's, it's turned into a great career. Really neat. I invite you to come check it out.

[0:16:13.7]

NS: That's great, that's great. Um, we probably need to wrap it up—

KP: Great.

NS: —'cause we're gonna have someone else coming in, but is there anything else that you think we should hear from you about any thoughts, hopes for the future?

KP: (Laughs.) Hopes for the future?

NS: Yeah.

KP: Future people embrace aquaculture. Um, you go into Washington County and say aquaculture, you might as well say a swear word. Um, it's just not embraced. Um, aquaculture and wild harvest don't have to be mutually exclusive. Um, any town can offer its residents an acre plot in the intertidal and they can start their own little farm there, you know? You go to these towns that have, you know, thirty licenses but four diggers, if you offer each resident an acre out of the thousands and thousands of acres that you have available, what is that gonna hurt? It's not gonna hurt anything, but someone that wants to be entrepreneurial and either purchase seed or, or protect the seed that Mother Nature is giving them on their acre, they can make something from that. Um, you know, they're primarily a wild harvester but, it gets gets towards the Fourth of July and the price of clams is almost 3 dollars a pound, you're not gonna go wild harvest, you're gonna go to your plot and you're gonna harvest your, your clams, and you'll be able to harvest bushels and bushels every tide and get the premium price. So, you know, I wish, I wish there was more aquaculture, I also wish that, you know, clammers would think of, of the industry as a business. hey don't. It's, their business plan is I'm gonna go dig as much as I possibly can whether it's two dollars a pound, whether it's 1 dollar a pound. If it's one dollar a pound, well, I gotta dig double tides to make the same amount of money. And they're willing to do that, but they're not thinking long-term and and creating business plans, so. I don't know, I think more education in our diggers is, would go a long way.

NS: Thank you Kyle.

KP: You're welcome.

NS: That's great.

EO: Yeah. So.

KP: (Laughs.) Good deal.

[0:18:10.0]