NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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MARINE FISHERIES ADVISORY COMMITTEE

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SPRING 2023 MEETING

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THURSDAY
JUNE 1, 2023

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The Committee met at the Westgate Hotel, 1055 Second Avenue, San Diego, California, at 8:00 a.m., Megan Davis, Chair, presiding.

MEMBERS PRESENT:

MEGAN DAVIS, Ph.D., Chair; Research Professor, Aquaculture, Florida Atlantic University, Harbor Branch Oceanographic Institute
JANET COIT, Assistant Administrator, National Marine Fisheries Service (ex officio member of MAFAC)
BOB BEAL, Executive Director, Atlantic States Marine Fisheries Commission (ex officio member)
SEBASTIAN BELLE, Executive Director, Maine Aquaculture Association*
ROGER BERKOWITZ, Founder and Head Fishmonger/CEO, Roger's Fish Co.
DAVID DONALDSON, Executive Director, Gulf States Marine Fisheries Commission (ex officio member)
THOMAS "TOM" FOTE, Retired, Recreational Fisherman*
NATASHA HAYDEN, Vice President of Lands & Natural Resources, Afognak Native Corporation
DONNA KALEZ, Owner and Manager, Dana Wharf Sportfishing and Whale Watching

SARA McDONALD, Ph.D., Director of Conservation, South Carolina Aquarium
MEREDITH MOORE, Director, Fish Conservation Program, Ocean Conservancy
STEFANIE MORELAND, Director of Government Relations and Seafood Sustainability, Trident Seafoods
LINDA ODIERNO, Fish and Seafood Development Specialist
JOCELYN RUNNEBAUM, Ph.D., Marine Scientist, The Nature Conservancy
ERVIN "JOE" SCHUMACKER, Marine Scientist, Quinault Department of Fisheries, Quinault Indian Nation
SARAH SCHUMANN, Fisherman; Owner/Principal Consultant, Shining Seas Fisheries Consulting, LLC*
PATRICK ‘‘PAT’’ SULLIVAN, Ph.D., Professor Emeritus, Department of Natural Resources, Cornell University
CLAYWARD "CLAY" TAM, Cooperative Fisheries Research Coordinator, Pacific Islands Fisheries Group
BARRY THOM, Executive Director, Pacific States Marine Fisheries Commission (ex officio member)
MATTHEW UPTON, General Counsel and Director of Catcher Vessel Operations, United States Seafood
BRETT VEERHUSEN, Principal, Ocean Strategies
RICHARD YAMADA, Owner, Shelter Lodge

NOAA/NMFS STAFF PARTICIPANTS PRESENT:

RUSS DUNN, National Policy Advisor for Recreational Fisheries, NOAA Fisheries
JIM LANDON, Acting Deputy Assistant Administrator of Operations, NOAA Fisheries
HEIDI LOVETT, Alternate Designated Federal Officer, NOAA Fisheries
JENNIFER LUKENS, Director, Office of Policy and MAFAC Designated Federal Officer, NOAA Fisheries
BARBARA MUHLING, Project Scientist, Southwest Fisheries Science Center, NOAA Fisheries
SARAH SHOFFLER, National Seafood Strategy

Coordinator, NOAA Fisheries*
CISCO WERNER, Ph.D., Director, Scientific Programs and Chief Science Advisor, NOAA Fisheries
KATIE DENMAN ZANOWICZ, Policy Analyst, Office of Policy, NOAA Fisheries

ALSO PRESENT (NOAA/NMFS STAFF AND VISITORS):

GRANT ADAMS, University of Washington*
KATIE ALMEIDA, Senior Representative of Government Relations and Sustainability, The Town Dock*
CAREN BARCELÓ, NOAA Fisheries*
CARDEN BARKLEY, Advisor to the NMFS Deputy Assistant Administrator for Operations (Acting)
MEAGHAN BRYAN, NOAA Fisheries*
LORETTA BROWN, Salmon State*
MERRICK BURDEN, Executive Director, Pacific Fishery Management Council
JEREMY COLLIE, University of Rhode Island*
LISA CROZIER, NOAA Fisheries*
KELLY DENIT, NOAA Fisheries*
BILL DEWEY, Senior Director of Public Affairs, Taylor Shellfish Farms
DORI DICK, NOAA*
LAURA DIEDERICK, External Affairs Lead, Office of Communications, NOAA Fisheries
KIMBERLY FITZPATRICK, NOAA Fisheries*
JAMIE GOEN, Executive Director, Alaska Bering Sea Crabbers
ROGER GRIFFIS, NOAA Fisheries*
ANNE HOLLOWED, Affiliate Professor, School of Aquatic and Fishery Sciences, University of Washington
MICHAEL JACOX, NOAA Fisheries*
MIKE JOHNSON, NOAA Fisheries*
STEVE JONER, Makah Fisheries Management*
CHARLES KAAIAI, Indigenous Program Coordinator, Western Pacific Regional Fishery Management Council
MELISSA KARP, NOAA Fisheries*
KRISTEN KOCH, Director, Southwest Fisheries Science Center, NOAA Fisheries

LINDSEY KRAATZ, Senior Science Advisor, NOAA Fisheries
HANNAH LACHANCE, NOAA Fisheries*
CAPTAIN TODD MANSUR, Dana Wharf Sportfishing
SEAN McNALLY, Senior Advisor to the Assistant Administrator for NOAA Fisheries
WENDY MORRISON, NOAA Fisheries*
KATE NAUGHTEN, Director, Office of Communications, NOAA Fisheries*
KENRIC OSGOOD, NOAA Fisheries*
MATEO PAZ-SOLDAN, MP Strategies*
JAY PETERSON, NOAA Fisheries*
NICOLE PITTS, NOAA Fisheries*
WILL POSTON, American Saltwater Guides Association*
KRISTEN RICKETT, Meeting Manager, HB & Company, Inc.
DANA RUDY, Alaska Bering Sea Crabbers*
TIM SARTWELL, External Affairs, Office Communications, NOAA Fisheries
ERIC SHOTT, NOAA Fisheries*
DANIEL STUDT, NOAA Fisheries*
GRACE ROSKAR, NOAA Fisheries*
CODY SZUWALSKI, Fishery Biologist, NOAA Fisheries
MARYSIA SZYMKOWIAK, NOAA Fisheries*
MAUREEN TRNKA, Advisor to the Deputy Assistant Administrator of Regulatory Programs, NOAA Fisheries
ZACH YAMADA, Western Pacific Regional Fishery Management Council*

*participating via webinar

A G E N D A

P-R-O-C-E-E-D-I-N-G-S

8:03 a.m.

CHAIR DAVIS: Good morning, everyone.

PARTICIPANT: Good morning, Megan. We'll try it again.

CHAIR DAVIS: Good morning, everyone.

VOICES: Good morning, Megan.

CHAIR DAVIS: I love it, thank you. We're going to have -- we had a great day yesterday, and we're going to have a great day today as well. We don't really have any opening remarks per se, but I do want to let you know that we have two great panels that Jocelyn and Meredith and their team have been working with.

So that's really going to be our focus for this morning. Sarah will also give us an overview of the field trip that we're going to do in the afternoon, so we'll probably do that right after break today. So without further ado, I'm going to turn over the morning session to Meredith and Jocelyn.

MEMBER MOORE: Hello. I'm Meredith. You know me because I talk in every session. Anyway, so

I'm really delighted to bring or to introduce panels that we're going to have today. First, I thought I would take like 45 seconds to remind folks what the Climate and Ecosystems Subcommittee is trying to accomplish and how we think these panels are going to help us figure that out.

I was trying to think of the best summary of what we're up to, and I think it's the scene from Jurassic Park, where Jeff Goldblum is in the back of the car and the T-Rex is pursuing them, and he just keeps saying "must go faster, must go faster."

I think that's generally what we're trying to figure out how to help the agency with, is how we can go faster on climate-ready fisheries or addressing climate generally. And so that's what we're up to, is trying to figure out how we give some advice to the National Marine Fisheries Service, to accelerate the update of climate information in our management systems.

So that's the plan. We've sort of divided that into two mental bodies of work for ourselves. The first one is when you say "climate-ready

fisheries" or "climate-ready fishing community" to people, they don't know what you mean, because we haven't really clearly defined what that is.

And so one of the things that we're thinking about is that there needs to be more clarity on what we mean when we talk about these things.

The second thing that we're really looking into is how to bridge that science to management gap. We have even just yesterday, heard a lot of amazing science that's happening. How do we get it so that that is incorporated into our management decisions.

The last thing I'll note is we've been sort of very focused on maybe the wild capture fisheries piece of this, but recognize that aquaculture is facing other and slightly different problems, and will need a different approach.

So we do have -- some on our second panel will talk a little bit about aquaculture, but I think that's probably some future work for us. We don't want to presume that like anything we come up with through the fisheries space works for the aquaculture space. So we just want to be thought about that and

think about that in the future.

And so generally what we've asked our panelists to do is come and reflect some of their excellent experience to us, to help us sort of navigate these questions that we've put out for ourselves, and give us some thoughts and directions on the types of questions that we're looking into.

I imagine our panelists will have thoughts on both of the sort of key things that we're looking at and beyond, and we will take that in and learn from it and try to figure out what kind of supportive work we can do to help the agency in their very impressive work that they're doing, but again, must go faster, must go faster.

So that's what we're up to. Jocelyn, anything you want to add to that? No, okay. So far nailing it. So I'd like to quickly introduce our first panel. This panel is largely made up of like scientists, managers, etcetera, people who are embedded in the fishery management space and can give us their perspective on some of those barriers and challenges that they have experienced.

So they're going to introduce themselves. I'm not going to do a lot, but I'd like to welcome Anne Hollowed, Cody Szuwalski, Charles Kaaiai and Merrick Burden to the panel, and we will start with Anne, who has some slides. So thank you.

DR. HOLLOWED: These slides that you're seeing you saw yesterday. Cisco gave me a good shout out and how we didn't coordinate. But I thought I would keep them there, primarily because they provide an opportunity for me to start my conversation.

So I'm going to use the next five minutes or so to sort of go into what we were addressing, because it's so relevant to these trigger questions that we, the panel was given. So if you could put the first slide up. Just for a second.

MEMBER MOORE: Should I make some more movie references while we're waiting for the --

DR. HOLLOWED: Well, it's okay. I can go ahead and start. Well, it would be useful to have them up there. There we go. So I think most of you are aware that the National SSCs come together to coordinate our advice every two years, and we had a

longer hiatus than normal because of COVID, and so it had been several years since we'd come together.

And this meeting was hosted by the North Pacific Fisheries Management Council. It was in Sitka, Alaska, but there were representatives from all of the SSCs there. We asked ourselves really what were the most pressing questions that we're facing in the SSCs, and of course some of these issues had been addressed in past SSC coordination meetings.

For example, the one in San Diego, which was the sixth meeting we had, focused on management strategy evaluations under changing climate.

The difference between where we were last August and where we are when we met in San Diego is those models have been built now, and that kind of information was now entering into the SSC purview and the decisions that these models were providing information for were really something that the councils were having to struggle with.

The other piece of it, and Cody, I won't steal your thunder, but we had experienced a marine heat wave on the west coast, and it affected the

Pacific Fisheries Management Council as well as the North Pacific Fishery Management Council, and it affected -- we were seeing shifting spatial distributions of stocks in New England.

And so the reality of the effects of climate change were much more prevalent for all of us, and so we were feeling the pain of it. So we asked -- we came up with three themes for the workshop, and the first was how to incorporate ecosystem indicators into stock assessments.

So most of the councils now have Ecosystem Status Reports, and the core piece is well, what do you do with that Ecosystem Status Report? Right now, it's kind to inform the SSC decisions in the sense that it provides a framework for looking at what the current conditions look like and what the short-term forecasts look like.

But it wasn't really clear how we were going to be using that. So we wanted to share notes on how the other regions were looking at it and how we in the North Pacific were looking at it. The second one was to deal with interacting species. So the

advancements of multi-species model has been quite prolific in the last five years. Kirstin Holsman in our Center is really advancing a stock assessment framework for interacting species.

She calls it Seattle. There are models like that in other regions. The idea was how do we bring that into the purview of stock assessment advice.

The third was how do we assess fishing level recommendations under species that are experiencing distributional changes, and of course those of you that live on the east coast know that this is a big issue. In Alaska, it's all one big Bering Sea, so the spatial distributions were still in our FMP. But it was still a struggle.

So next slide, please. And this is a slide that Cisco put out there. The outcomes from the meetings were universally. It's -- all the councils were really feeling that we need to start now to prepare for climate change. Whether or not you are in a high latitude ecosystem or not, the implications of climate change are so real and the projections are so

compelling that the need for us to prepare for that now is on the, on the minds of all of the members of the SSCs, whether you're in the Caribbean Council or in the Bering Sea at North Pacific.

The investment in development of new tools for data collection and -- that are responsive to changing ocean conditions is also something that new technologies are really opening the door for us. In our part of the world, sail drones saved us. The marine heat wave hit when we were -- we were in an off year on our acoustic survey, and we were able to quickly implement a sail drone survey to at least give us an idea of where the fish were going.

So this was a very real piece for us, and I think there's a broad suite of new technologies that can really help us. We need to be -- this transition, and there were some questions yesterday that Cisco received about this more sophisticated toolbox, and this is really where that integrated modeling suite that Cisco showed us a slide from the ACLIM project.

We were looking at models of different level of complexity, to see what is the heavy lift of

trying to support a more complicated model, you know, and versus what is the trade off of not having all of the complexity of ecosystems incorporated into your advice?

And so this is where ACLIM-like projects of Future Seas, the work in New England, all of that is contrasting the information gained from different types of modeling structures that treat the ecosystem in different manners.

So we can begin to -- not that we need to carry forward all of those models forever, but we can certainly use that suite of looking at different perspectives, and how the futures play out under those perspectives to inform the management suites that we're looking at.

And then the last one, this issue of stakeholder engagement, I mean that's really why I accepted this invitation. There is no doubt that this, the planning for how you are going to address climate change issues in the future and how the regulatory and science should come together in terms of providing advice for what is the most sustainable

way to move forward, takes a conversation with everyone.

And so I'm hoping that I learn as much and the agency learns as much from us being here, as we hope to provide a little insight into where the science is going, and so I'll stop.

MEMBER MOORE: Thank you so much. That was great. Cody, go ahead. Thanks.

MR. SZUWALSKI: Hello everybody. I'm Cody. I do stock assessments at the Alaska Fisheries Science Center. Anne is my mentor, former boss and I guess aspirational position. I've got some slides too, but I think the reason that I'm here is that one of the stock assessments I do is for snow crab.

That's me. One of the things that I spent maybe the last 14 years or so trying to do is incorporate environmental drivers into explanations of the population dynamics of fisheries, and then incorporate those relationships into management.

I've done that to varying degrees of success, and if you can flip to the next slide. Oh, I can flip too. Sorry. So snow crabs is one of the

stocks that I have the longest relationship with, and it collapsed rather dramatically recently.

In 2018, there were more snow crab in the Bering Sea than we had ever seen in our surveys, and then 2021 there were fewer than we'd ever seen. You kind of see that or let's see. Is that, yeah. Oh shoot.

(Off mic comments.)

MR. SZUWALSKI: Yeah, I'm pointering. Sorry. Did I push a button? Yeah. So map over here, high red stuff are survey tows that have very high densities of crab. The top one is 2018, the bottom one is 2021. There's a very large difference. We lost a lot of crab.

I unfortunately was not able to predict this collapse. The stock was declared overfished in 2021. In 2022, it was closed, the fishery was closed for the first time ever with rather dire financial consequences for the fleet, and a rebuilding plan is underway.

Part of that rebuilding plan, for the last two years I've tried to understand what happened to

the stock. I considered a lot of different hypothesis and at the end of the day, based on the information that we've got, temperature and the population densities were the key factors in the collapse.

This suggests that the marine heat wave that we saw in 2018 and 2019 precipitated this collapse, and this is one of the largest losses of motile marine macrofauna that I found in the literature. This is a big deal, and I think it's a very motivating case study for why we really need to get a handle on climate's impacts on our fisheries.

And we heard a lot about -- I wasn't here yesterday but I tuned in. It was great to hear you guys talk, and we heard a lot about a lot of very smart people trying to predict the dynamics of the stocks using environmental indices, and I think that's a great pursuit, and it's one that I spend a lot of my time on.

It's not going forward. Could you click me? Thanks. But I think sometimes it's useful to take a big step back and think about what if we could perfectly predict all of the dynamics? What would the

responses of our current institutions be?

We have fairly explicit guidance from our national standards that we should set our management targets based on the current environmental conditions, and the current environmental conditions in Alaska are changing dramatically, which I think brings the question, should we be changing our management targets? I'm not going to go into the details, but I wrote a paper recently that's cited here, that goes through the stock experiment of what, what would happen if we changed our management targets in response to climate change?

The upshot of it is that oftentimes, if we respond to decreases in productivity that are driven by climate in our stocks and change our management targets, we will fish those stocks that are experiencing climate stress harder than we would if we did not, which is a bit of a counterintuitive management action.

Can you flip one more for me? Thank you. I've just got a few other points that I think it might be fun to think about together and chat through.

First is that I think that these widespread changes in productivity are going to be the challenge of natural resource managers for the next decade or two.

And thinking about how our current institutions will respond to those changes at a strategic is important, is as important as trying to think about how we're going to do it at a tactical level. Another example of trickiness within institutions is that if I could have predicted the snow crab fishery collapse a year in advance, the best advice that I could have given to the fishermen is diversify.

But our quota system in Alaska is fairly rigid. It's not as easy to diversify as it might be able to be. So I think that's one aspect that we need to consider going forward.

And just the last two points here are that I think the surveys are probably the most important thing that we do at NMFS, and support for those from every which direction, I think, is great, and I'm hoping that going forward we can develop languages for talking about the tradeoffs between fisheries.

So identifying tradeoffs, quantifying them and trying to communicate how we make decisions about that, and we can give some examples about why or how that -- we're facing that right now in crab fisheries in Alaska maybe later on.

But I really appreciate the opportunity to be here and probably answer some hard questions later on. So thank you for the invite.

MR. KAAIAI: Yeah. Hello everybody. I'm Charles Kaaiai. I currently am a contractor with the Hawaii Seafood Council, a 501(c) (3) project program. We deliver promotions, marketing and education and research to support our longline industry.

I retired from the Council about five years ago. On the Council, I was the community and indigenous program coordinator, so for all us wonkish people out there, this was Section 305 of the Magnuson Act. The Western Pacific Community Development Program, the Western Pacific Community Demonstration Project Program, and the Marine Education and Training Program.

So what I was focused on, I grew up in the

native Hawaiian community in Hawaii, so I got tagged immediately go out to visit these native communities in our area, which was Hawaii, American Samoa, Guam and the Northern Mariana Islands.

So that was my job, and in preparation for this I thought well, let me look at what I did. Actually, I looked at my old schedule. I've done hundreds of community meetings out there, and I think really that's -- that's what we need to do. We need to improve our communication and our engagement with the communities, because if everything goes bad we have to adapt, and the communities will adapt first, because they will be hit first.

So we need that adaptive management idea. I like that up there, and I like that you brought up the ecosystem principles, because I don't think we ever properly achieved those conditions that we wanted when we went through ecosystem principles.

I looked at them from 20 years ago, and they were to incorporate traditional knowledge and concepts into our management, and emulate the watershed councils. This is from 20 years ago.

Emulate the watershed councils. These are councils of private owners of land. They got together and decided which way they wanted that development of that land to be.

Ecosystem management is placed-based, so it has to be specific to that place. And we needed to establish regional standards that allow the discretion for local resource managers to develop effective and adaptive management measures, and facilitate consistency in regional fishery management programs.

So that's kind of like in conflict, but the adaptive management. One of the difficulties we have is that we create these FMPs, these great, huge management plans that's supposed to consider every consideration and then we crash fisheries, you know.

So what are we missing here? I think we go adaptive management, then we need to regulations that's sort of an experiment and is monitored a year from now, six months from now. Is it effective? Is it achieving what we want? And if it's not then change it. So put that, that process in place where you can begin to change.

Our FMPs, they're really hard to change. I mean we create a regulation in the council it takes us two years, three years. We've got to go through an EIS process. But could we establish regulations that is an experiment to see if we're on the right track, and then have in place ways that we can correct that or change it as needed.

But we need to monitor. The best monitoring we can have is the community on the ground. They are there. You have to train them, you have to educate them. One of the projects we did with the Western Pacific Council was we created permanent transects in certain areas, and asked the community to monitor them.

Now we had a real problem with the confidence level of the data that they were returning, but what that did was educate the community. One of the communities that we started a permanent transect project with has now formed into a community organization that is restoring the watershed in Hanalei Valley, and they've received a grant of about 10 acres of land there from a private owner to do this

project.

So there's other things that grow out of it, but also need to continue to engage the community. So when I went out to the communities and tried to figure out what was important to them, they came back with a bunch of things that needed to be addressed by the council. Its management of resource is about food. That was the main thing, it's about food.

We tend to forget that when we go into the council meeting right, because that is his bailiwick, his responsibility and it's going all around. But we forget that it means food for the local communities. Resources were managed to benefit the people. Conservation and exploitation were linked in the communities, and the way they were linked is you harvest the abundance and you conserve the scarcity, simple as that.

I worked for the longline industry. Its tuna, tuna, tuna, tuna, tuna. That doesn't sound right, right? We should have a variety of species that we're accessing, that we're eating. Resource management was conducted by cultural experts. So any

community I went into, if I wanted to find out about the halalu or akule, that's a mackerel that's harvested by the community.

I would ask the community, who catches your akule, and they will point that guy out. You can sit down and talk to him, and he'll give you the stories of bad years, good years, and good catches. In those stories is the information that the community needed, and he's the expert that has it, and you just ask the community for the expert.

Customary access to the resources was governed by native land tenure. So I'm not talking out in the pelagic area, but in all of those native communities in American Samoa, that ocean out to the outer reef right in front of that village belongs to that village, and they manage it.

If you swim when you're not supposed to swim in an area, then there's all of the sudden these magical flying rocks at you, you know. Get out of the water.

But the village managed that, and we had to work with the Fono in American Samoa to allow the

villagers to create a marine protected area for themselves, and then three-four years later we had to come back and say listen, the communities also want to change the rules.

So we had to work with the Fono, so they would allow that community to change the rules as time went on. So that was really adaptive, and that was at the village level. And I think for a lot of the resources that we're responsible for, we need to manage at that granular level. We need to talk to the fishermen, we need to talk to the communities dependent on it, and we just need to do that.

Let's see. Customary and traditional practice, okay, controlled the conduct of activities. So they had a code of conduct that supported the regulatory process. So they created a code of conduct that supported the regulatory process, and that's how those communities proceeded. So thank you, and thanks for keeping me online.

MEMBER MOORE: Thank you. We are having some issues with the mic picking up, so like get it right in there rock star style when you're giving your

comments.

MR. BURDEN: All right. Good morning, everybody. It's good to see some familiar faces and some new ones. I'm Merrick Burden. I'm the executive director of the Pacific Fishery Management Council. I appreciated all my fellow panelists' remarks.

It could be possibly because we've all worked together before on some of these questions. I've got a couple of thoughts that I hope might help frame how we think about, or as you put it Meredith, how we speed up and some of the thoughts about what we might also do.

Starting from the top, I was asked last week I think it was, to think about fisheries that have experienced climate change and what we've done in response to it. As I thought about that, my answer was what fisheries haven't, and I think all of them are.

I think that starts to give us some context to how we respond, because we're responding already. If we start to break down how we're responding, the way in which we're responding is in

pretty traditional ways. So we're changing the way in which we assess productivity and mortality, and we change catch limits.

We realized that fish stocks have moved somewhere, and so we're moving our management and governance, sort of the fleets are moving in response. These aren't really new problems. The problem is the scale, the frequency and magnitude, the speed. Those are fairly unique problems because of the where they're at on the spectrum of change.

So if we start to think about that, I ask myself what do we need to have in place in order to deal with these changes. So one of them, of course, hello? Is this working? There we go. I was about to say something smart, and then I forgot.

So dealing with these changes then, I think there are a couple of building blocks to think about, one of which is we need good governance and management institutions, and in the United States we're fortunate to have those. I think our council process is excellent. By and large our scientific process is excellent.

But as we start to think about the tools and models and things that we need to put together, I think we need to think about the building blocks of good fisheries, and where things start with institutions, good data. We can't sacrifice that foundation for something that we think is probably more sophisticated.

So right now in many places of the country, we are having a hard time with port samplings, things of that nature, and we can't lose that if we're going to get more climate adaptive. That's our foundation and we have to build upon it.

So there are a couple of questions, then, if we agree that that's our foundation and that these problems aren't new. It's the scope of them. There are two questions that come to my mind about how we think about moving forward. One is, as Meredith put it, can we go faster and how do we do that?

There are a couple of things that come to mind right away, one of which some of my colleagues here have already spoken to, one of which is the speed of scientific information and getting at it in the

management process. The other one is forecasting and anticipating change, and trying to get ahead of the curve a little bit, and in that way speeding up how we do things. Those are expensive tasks, but they are worthy tasks.

The other way to think about this is that we won't be able to anticipate everything, and we might not be able to speed up at some point. What I think speeding up implies is that we will be in a position to control the trajectory of things.

I'd invite you to think about this differently, and say what can we do to help fish stocks and the marine environment, and our fishing communities respond on their own, and are there things we can help put in place to allow their adaption and resilience? Cody already touched on one of these things. So if we think about the fisheries sector or the communities, one of those things could be diversity of fishing activity.

But that also exists on the biology side. So if we think about the aspects of resilience, for instance, we have diversity as a really important

factor, and can we, as fishery managers or scientists, help expand things like age diversity or genetic diversity, and those things can help make sure that that stock is ready and potentially can withstand some effects of climate change.

Diversity also matters in the human communities, and that takes place in many different forms. So those are two things that come to my mind as we think about dealing with this challenge. How do we address it? How do we channel our resources, one of which I think some of my colleagues have spoken to very well already of enhancing the scientific process, speeding up that process, bringing that into our fishery management system.

Rather than going through, you know, FMP amendment processes, can we framework our FMPs so that we don't have to have a three meeting process that takes a year or two to make a change. Is there something that we can do right away through a framework to plan?

And then there's thinking about what sort of characteristics can we make sure exist in our

communities and in our ecosystem, to allow those environments to withstand things on their own. So I'll stop there.

MEMBER MOORE: Thank you. Thank you so much to our panelists, and so we're going to do some Q and A here, and what I'm going to do is I have a few questions prepared just to kick it off, but then also excited to see how many tent cards go up, and then I'll try to moderate how much of my like pre-planned questions I think about, based on how -- and I have warned the panelists how feral the rest of you may be as far as questions are concerned.

So and I'm assuming somebody's helping me keep a list of -- okay, Jocelyn's on it. Perfect. And can I ask, I know some of our online participants have had trouble hearing. Is there anything we want to do or are we just forging ahead with the mics as is and I should just keep telling people to put it like literally into their faces?

(Off mic comment.)

MEMBER MOORE: Okay. Do you want me to try to like move this one? It's got a little bit of

give to it.

PARTICIPANT: Sure.

(Pause.)

MEMBER MOORE: All right. Well so we may have fixed it slightly for a couple of people, which is a good analogy for climate change. So all right. Well thank you so much for your comments, and I took a few notes. But in general, I just wanted to ask which one of these questions, because I do see we have a lot of cards up already.

Could you talk a little bit about in our kind of effort to think about what climate readiness means really specifically, in a way that we could help the agency sort of articulate it so it's meaningful for other people in the fisheries management space? Is there anything in particular you think we should keep in mind as we try to think about what climate readiness specifically means for communities or for the fisheries?

There's pieces of this that have certainly come up in your answers about adaptation and considering tradeoffs and those things. So delighted

to hear a little bit more specifics around that question.

DR. HOLLOWED: I can give this a shot. In my mind, it's a partnership between scientists and stakeholders and communities that are dependent on marine ecosystems, and the framework that I think would work the best or at least that we're striving for within the CEFI is that it is -- the decisions that are made by improved, best available scientific information.

That would include suites of climate scenarios, so that it was clear on what the tradeoffs are of current emissions versus alternative emissions scenarios, how those play out in terms of ecosystem function, the sorts of questions of where, when and how many species and of course which species are going to be thriving in the marine ecosystems.

But and then of course having the information on the future of markets, and we talked a little bit about this yesterday. But if we're looking out between longer time horizons, we have to also understand what the global fish markets are and the

local fish markets are going to look like, so that we can correctly identify the demand for fish.

And so in the ACLIM project and the Future Seas project and ACLIM, there are economists working side by side with us on, at every step of the way. I think making sure that that information comes forward in terms of the scenario-making is clear.

Those two pieces, understanding how markets are going to change and how the climate is going to affect marine ecosystems sets the stage for us to then develop fishing scenarios and how to respond to these future changes.

The beauty of that is that it allows us to begin a discussion of identifying what sorts of harvest policy decisions are the most robust to change and of course there are going to be tradeoffs. It might be great for Pollock and not so great for flatfish or something like that. So understanding and clearly articulating what those tradeoffs might be under different management scenarios.

But to use that platform of informed modeling and projections and scenario planning to come

up with a framework where the councils will have discussed already what the thresholds are for when -- if we are identifying the signals of climate change that are so compelling that some fundamental change our harvest policy needs to be implemented.

That can be done in advance, so that it isn't a surprise. It's something that everyone has discussed, that here are the key indicators of where we're going. And then to have a clear suite of management solutions that would go forward. I think that the idea of having it be nimble, that yesterday we talked about being nimble, which is really something that's critical in this.

And of course I worked for NMFS for 40 years, always on fishing oceanography, and my goal was to have the perfect prediction, you know, that if it got warmer or if the currents shifted, I was going to be to tell the council what that meant for my favorite fish. Those things hold up over time, but they -- ecosystems are complex, and so we emphasize the importance of maintaining a fisheries and oceanography science research piece in the rounds, because those

observations help us to understand if the relationships that we've seen in the past are beginning to shift.

So making sure that we are not hanging on to a historically valid harvest control rule that is climate-informed to our demise. Certainly I have experienced a few of those. And so -- and then the last piece is to make sure that we continue to review what we're doing on -- the Intergovernmental Panel on Climate Change updates its assessment every seven years.

The National Climate Science -- Climate Assessment updates its assessments every four years -- is that right? I'm looking to Cisco, yeah. So somewhere in that, we don't -- this isn't something that has to be reviewed every year. But it is something that I think these frameworks that we adopt, and everyone is agreeing on this is how we will move forward, need to be updated with the new science, because this science is moving quickly, and we do learn.

And as we learn, that can be incorporated

into the next phase of this. That would be how I would look at it.

MEMBER MOORE: Anyone else want to take it?

MR. SZUWALSKI: Sure. I guess when I read the question, the first thing that popped in my head were that I think I got into this work for food and people, and that's really where I think climate resiliency needs to come down.

I want to make sure there are fish in the ocean to harvest next year and the year after that and the year after that, and I want to make sure that the people that are reliant on those resources can maintain their livelihoods.

I guess the best way that I saw forward for that hope was a rigorous scientific process, and that's why I'm where I'm at and trying to do what I'm trying to do. It's been a little harder than I expected. Crab have presented their own challenges that I imagine we'll talk more about later, but when I think about climate resiliency, it's ensuring that there are fish in the sea down the road for people to

harvest.

We don't know if they're going to be the same species they are currently, but that the communities that rely on them can continue to fulfill their needs.

MR. KAAIAI: Okay. For us in Hawaii, lay and I, we're going to expect a big halalu recruitment this year, and it was because of the heavy rains that we got. Two years from now, we will have a bigger recruitment because of the heavy rains.

We know that kind of because we grew up there and that's the way it works. I did try to get science look at rainfall associated with the abundance of halalu, which is mackerel scad. We expect this year, if both of us can walk on the reef, we'll go fishing for halalu. Otherwise, I'll send our kids.

But knowing those kinds of relationships becomes kind of like a predictive model. We do know that when the sugar cane tassels in Hawaii, the he'e, the octopuses coming nearshore, and that's when we go get it. In about a week of diving, we can get enough of the whole year, salt them, massage them, dry them,

put them in the freezer.

So there are those kinds of predictive things out there that we can use. One of the great predictors of resources that I've across is Micronesian navigators. Micronesian navigators, this is a four or five thousand year system. They are the resource managers for their islands. If an atoll in Micronesia does not have a navigator, it ceases to exist.

To become a Micronesian navigator, you have to go through one of four full navigation schools. I've talked to these navigators. I've used them in some of my work. The way that they -- I've talked to Monope'i Luke, and he said -- he was talking about how he learns navigation and you learn about the stars, the fighting stars, one star sets and one star comes up. You can predict your spot on the ocean.

But also the resources are what he knows. What kind of fish where, where the turtles go, because turtles are an important food source for those people. If you don't have a Micronesian navigator on your atoll, that village disappears, and that's how

important this is.

I took the navigators to meet with some turtle people, just because they told me oh yeah, we'll do it. Finally. They refused all this time, finally they -- and they started to talk about they can recognize where turtles are from in the water and tell them where they are. They said that in Saipan, the resident turtles are mostly male, and all the females come from different natal areas.

They could point out, they could point at a field and say that's going there, this is going north, this one is going west, and the turtle scientists laughed at them. They said okay, we won't do this again. Ten years later, they started tagging turtles in Saipan, and they started going in all directions.

Now I understand that a satellite tag is expensive, but don't laugh at people that have 5,000 years of data backing them up. I ask Mol, you know, how do you keep track of all this information? He says well, you learn the chants, right? So I said well do the chants change or are they the same? Can

you add to them? He just said yes.

MR. BURDEN: Well, let's see. Your question was what does climate readiness mean?

MEMBER MOORE: Yes. (off mic)

MR. BURDEN: There are a couple of things that come to mind. So one is I think it's basically what Anne was describing, which is the topic of risk management. So we can look at climate change through the lens of risk management, and we've tried to do that on the Pacific Council in our climate-based scenario planning exercise.

That's one way to do it. If I were to do our scenario planning again, I'd probably do it differently and I'd be happy to get into details at the appropriate time. But that's one way to go about it. There are other ways, but the purpose there is, you know, you see a range of possible futures and you start to think ahead and plan for contingencies and ways that you might respond, and that makes everyone ready.

The other thing that comes to mind, which is maybe much less academic and much more gut-

wrenching, is that the future's going to look different and for, you know, many communities and societies, a lot of the identity and cultural ties to specific fish or marine mammals or what have you, and that might not exist.

So we have to own the next step, what does the next future look like. You could wrap that up into risk management I suppose, but I think it's a very unique type of visioning exercise and trying to own the future and wrap your identity around that future, and that's really hard, but that's something that I think will be necessary.

And what that process looks like I'm not sure, but that will help us plan for the future that we want. So those are two thoughts. I'll keep it brief.

MEMBER MOORE: Thank you so much. All right. We're going to the room for questions, and so I have Joe, Richard, Roger, Matt, Stefanie and Brett in order. If you're not on that list, wave your hand around, but we will start with Joe.

MEMBER SCHUMACKER: Thank you Meredith,

and thank you panelists. Really great, great talks this morning. I could go on and on, I've got so many questions, but I'm going to try to limit it. I'm very interested in the biology of the crab collapse up in the Bering Sea. I'm very interested in the adaptive management that we've discussed here today.

I'm very interested in the Pacific Islander indigenous knowledge and their means of adapting, and the on-the-ground knowledge that they have that is so important to realizing what's actually going on out there.

The parallels I have is I worked for a treaty tribe in Washington state off the coast of Washington that has a designated treaty box in the ocean that we co-manage out there. We're full managers, but we co-manage with our federal, state and tribal partners.

That box is where we can fish, and the parallel is with the Islanders that have that island area around them. We have to adapt. We're forced to adapt. The size of our fishing efforts, both commercial, subsistence, ceremonial, are relatively

small.

So it gives us a bit of -- a lot more nimbleness than what we're talking about when we get to what, as Merrick and Charlie have addressed, with the council process. And you know, as we go up the food chain, so to speak and the larger, larger fishing interests out there, it's much harder to turn the course on these fisheries than it is with the smaller groups.

I would suggest that, you know, the models that have been brought forward by our panelists today including Charlie from these -- from the smaller groups, these indigenous groups and others, should be brought up to the larger models if we can. I know that sounds difficult, but we're able -- right now in the council process, we're pretty good at doing emergency closures. We're pretty nimble at that, but how do you do other acts that have been described today?

As Anne's brought forward, scenario planning. How do we incorporate these scenarios into the, I guess into the FMPs, right? Is that the -- is

that the way we do this in the long run, and that's going to be my question in a minute here, is how do we bring those types of scenarios with the specifics that can guide management actions that can be nimble into that process effectively?

Is this something that can be done or is this something that we're kind of wishing for at this point? As a tribe, as the Quinault tribe, we're able to quickly make moves based on our on-the-ground or on the water knowledge from our fishermen that say we've got a problem, and we've done this.

We had a -- we have a large Dungeness crab fishery where we started to experience some severe hypoxia in our fishing areas, and it was noted first by our fishermen. We didn't have instruments in the water to tell us that this was happening. Fishermen came up and basically told us we've got limp crab and dead crab in our pots, and we closed an area, a large area immediately.

So we're able to make those kind of moves you know, for again closures, but we also adapt as well, you know. We're changing over time with how we

fish, where we fish, what we fish and that's just the only way we're going to survive as a tribe out there and make sure that folks have resources for the future generations.

So that's what I'm going to ask, is how do we move this forward? I've heard scenario planning. I heard FMPs, I've heard council process, I've heard two years to get a regulation done. What's it going to take to really get this to move forward through the -- through the great bureaucratic process we have? Thank you.

MEMBER MOORE: All right, at this point we take volunteers to take a crack at this question. It's an easy one, so we'll start with Anne and then we'll do Merrick next.

DR. HOLLOWED: So that is a challenge, and I think it's a challenge for all of the SSCs that are dealing with this and all of the councils that are dealing with this.

What we are considering, I mentioned yesterday in my response when Cisco phoned a friend, was that these scenarios that we're bringing forward

through the ACLIM-like project are being vetted through the council and discussed at the Ecosystem Committee as well as the council body itself. There are presentations to the SSC.

Those are brought forward in terms of here is how a particular response plays out, and these -- did it achieve the goal that we were looking at or not? And so that's a mouthful, because what are the goals of the council? Well of course those differ across the stakeholders that are looking at it.

And so we talked about the community being at the table. We certainly need that impacts and to come up with the correct response scenarios that we could come forward with.

The dream of how all of this will end -- I say dream, but it's more of a reality, you know. We are moving forward to make this happen. Like I said, it may take some tweaking every three to four, four to seven years, but the idea is to put something in place.

But the idea would be to use this framework of testing, council responses to a specific

phenomenon, and in our case it was the marine heat wave that hit crabs so hard, but it also hit cod. There could be other phenomena that are climate changes affecting more inter -- you have more bycatch than you expected, or you've shifted --

In your case, you have a shift out of the area that you're looking for. What is the response of the council and test whether or not that is efficient in place. And then the council would agree when that occurs, we are going to do these suites of management changes to try and enact a conservation response.

That has been agreed upon with the council family, and that would be the way it's currently -- we're envisioning that projects like the CEFI could provide climate-informed information that could help managers and the public understand how we -- and agree upon what the specific changes might be. That's, that's what we're working towards so --

MEMBER MOORE: Merrick.

MR. BURDEN: Yes, thanks for that question Joe. See in my opening remarks I mentioned that, I think I used the term "FMP frameworking," and as you

well know, I mean every time we try to change an FMP it will take us at least three meetings. If it's related to trawl rationalization, it will take seven years.

So a lot of these amendments, if we think about climate change or if we think about other things, I think would require, yeah, a framework to work within to adapt quickly. And so we do a little bit of this already. If you think about our salmon FMP for instance, some of our harvest policies for different salmon stocks, and they say this policy will be consistent with the Endangered Species Act.

That's one type of framework. Rather than a 16.3 percent harvest rate that you might have to change. That's fairly simple. If you think about climate change, you can imagine say in the case of a heat wave, we'll do something that looks like the following.

In a year where it's not a heat wave, we'll do something else, providing that structure rather than the specifics that require an amendment. So I think that framework is going to be really

important to do the speed that you're getting at.

MEMBER MOORE: Yeah, go ahead.

MR. KAAIAI: I think the way that we did it in the Western Pacific is we used the committee structure. So we created indigenous committees. We created ad hoc committees to address specific things and we use the committee reports to, I guess, participate, and influence the council's actions.

That committee process worked pretty good, but I think what we really needed to do was either have a regulation or codified in law that will give us space for that, for those indigenous voices and the community voices to truly participate in the council process. Because a lot of times, especially on the small islands, you'll get a leader that comes up there and you get the leader's opinion, but you don't get the community's opinion.

So if you create a committee and you ask this leader to people that committee with two people, you'll get an additional voice. One of the problems with creating the indigenous committees are you have to deal with the grievances, and that's just part of

the playing field. You have to deal with the grievances. There's a lot of grievances out there.

MEMBER MOORE: Great. I've just been warned. We only -- we don't get to do this all day. We have 30 minutes-ish left in this, so we're going to -- not every panelist gets to respond to every question, so I will require you to fight about who does it. We've got Richard, Roger, Matt, Stefanie, Brett, Natasha, probably no time frame for anybody else, and we need to go quickly. So Richard, please go.

MEMBER YAMADA: So my question is coming down to in the future, how do we adapt to this -- there's variability in our fisheries, and especially when you have a stock in decline. So you tend to use additional management measures and control your harvest and you take.

But you know, we did studies with halibut, that even if you had an unfished population, it's still in decline. So how do you, you know, and obviously, you know, the element of climate change is coming into play.

So coming to the question that Cody mentioned about what kind of flexibilities can we have in the future, preparing your community to be able to adapt to a stock that's in deep decline, not an official area but we don't make a livelihood anymore.

And just in lieu of stopping and closing the fishery, is there -- you know, we have a National Catch Share Program that has been, you know, it's in our policy and so a majority of the fisheries have gone to catch share programs to as a management tool. What kind of flexibility?

In Canada, they have a catch share program as well, but they can -- they trade catch shares. So if you have a crab catch share or halibut or rockfish and they're going to be in a season and they have a big meeting and they share, you know. They have to share because they take care of all their bycatch, you know.

You have to have catch shares to, if you have any bycatch in your fishery. So they have a real flexible system. I just wondered how flexible is our system to develop policies that would allow -- I mean

this is monumental, right? It's changing the whole catch share institution. But this is the kind of flexibility we need.

So if -- how can a halibut fisherman that, you know, doesn't have enough quota to make a living or untie his boat because it doesn't even cover his gas, and he switches over to sablefish, which is, you know, a fishery that's growing and is the only positive fishery I see in Alaska.

But those that fishery has catch shares in our area that are, you know, to be -- it's a quota share. It costs $450,000 to just buy into that fishery.

So how do -- but these guys are making money now, and maybe there was years ago that they never made money, you know. So they're kind of making money now where, you know, where the stock was in decline.

So is there a potential to have some kind of a more flexible catch sharing program, where you can actually trade catch share between fisheries? That would give some resiliency to the fishery,

especially the ones that are -- have stocks in decline. Thanks.

MR. SZUWALSKI: That I hope so. Something that Charles said earlier really resonated with me, that you should harvest the surplus and conserve the scarcity. I also said that diversification is the only thing that I could have told the crabbers to do, but currently that's difficult to do.

I'm not an economist, but we've got economists in ACLIM and social scientists that are thinking about these issues. I think one of the really tricky parts of it is that there is an enormous amount of political capital spent getting the rationalization programs in place. Reversing course or changing course, it's a big -- it's a big ask.

Everybody's got their piece of the pie and it's thinking about how to reallocate that is not -- it's hard scientifically and it's probably ten times harder politically. So I, I don't know what the answer is, but I think that it's the answer that we need to look for.

MEMBER MOORE: Wonderful, thank you.

Roger.

MEMBER BERKOWITZ: Thank you. I just want to make a comment, and please excuse me if this comes out rather unfiltered, since it's my last meeting. So I think too much management tends to screw things up, and I just want to underscore a point that Charles made, and I think he's spot on.

Oftentimes, the solution is with the stakeholders. They know more about what's going on than virtually anyone else, and they can adapt almost immediately. The problem is that no one tends to ask them any questions or ask them about potential solutions.

Now the reason I say that is because I have experienced that in business. Oftentimes, I've had issues and I'll throw it out to management, and whether it's a question of politics, you know, I just sometimes found it very difficult to move the needle, and out of sort of frustration I said all right, I'm going to pose the same question to non-management.

I'm going to pose it to hourly wage staff, bartenders, cooks, and I'm going to ask them the same

questions that I've asked the middle and upper management to wrestle with. Lo and behold, the feedback I got from people, in this case closest to the guest, was unbelievable.

I was able to change things to the positive very, very quickly. They were able to do things that management frankly wasn't quite capable of doing, or for whatever reason wasn't able to do. So I think that when you hear Charles talk about going out into the community and asking the stakeholders what they would do and having them come up with the answer, is spot on.

I think that that also applies to whether the fisheries in, you know, parts of Alaska, on the east coast or whatever. If you go directly to the fishermen and say this is the problem. How can we manage this scenario, you'll be blown away by what you see.

MEMBER MOORE: Thanks very much for those comments. Matt.

MEMBER UPTON: Roger just nailed exactly what I was trying to say, and to build on that, I have

a question for Charles. So I was really interested when you talked about how you need to have maybe a year or two to kind of see if something is actually effective, and maybe have a way to change that up.

Do you have examples of where you did that where there was a council action? Because what I struggle with, I think you commented on this, is that once the council has an action, it's just so rigid. In Alaska, I've seen us only be able to do what I think you're talking about, if just a fleet does it, or if there's an experimental fishing permit.

But I don't know if you had some examples of how the council was able to craft something where there was, I don't know, in-season management, because I just think that's spot on and I think Roger kind of built on it as well.

MR. KAAIAI: Yeah. The council itself was never able to do that. But one of the ways that we were able to affect regulations and affect access, and I hesitate to say this because we're not supposed to be lobbying. But it takes local government.

A lot of time you have to go to local

government, and the way that I did it was I would form a committee within a certain village or community, and we would learn about how we would -- what we needed and how we needed to affect the change, and they would go and lobby, to keep me out of it.

That was the only way I know how to do it. The council process is really cumbersome. It takes a long time, but I think you gotta -- maybe if you build into the regulation. We spend so much time on regulations in our FMPs, and we go through the EIS process and all of this. I don't know why we can't have in there something that says simply as if this doesn't work, we're going to try this, you know.

Why can't we do that? Why does it have to be a rigid FMP that takes forever to establish and takes forever to maintain, and then six months after we put it in place, it's irrelevant. So maybe we need to put into that environmental policy, EPA process or within the council process, an option to back out.

If it doesn't achieve what we want to achieve environmentally or in response to climate change, then we should be able -- as the council, you

should be able to pull it back and say hold on, hold on, hold on. We're going to make this adjustment, and then you go through the public process again and it may take another year to do that.

But you've done the groundwork and now you're out there. You're saying we're going to need to amend this because something happened and this is it, and we're coming to the community and we're asking you, okay is that okay with you. That may be the only way within the FMP process. I don't know. But thanks for the question.

MEMBER MOORE: And thank you for the answer. Stefanie.

MEMBER MORELAND: Thanks. I appreciate all the opening remarks with respect to priorities and framing for how to tackle this huge topic. Very helpful. I just have a specific question regarding direct observation.

We know that's important. I understand it was noted by several of you to maintain that, and we've been talking as a group about how to articulate the value proposition to the nation and continuing to

invest in serving and direct observation.

And so Cody, I'm wondering whether there is some deliberation yet that I've missed. The scenarios and what ifs, have there been 2020 surveys with respect to the crab collapse? Thanks.

MR. SZUWALSKI: So I think snow crab, missing the 2020 survey was probably the worse survey that you could have missed for snow crab. In 2018, we saw more crab than we've ever seen. In 2019, there was about half as many. We didn't know if that was a survey error or if that was a real thing. We needed 2020 to corroborate the story.

We didn't have it, so we ended up splitting the goal posts essentially between the high survey and the low survey estimate, and that resulted in a larger total allowable catch than probably should have been caught. So I think that it's -- snow crab is the perfect example for why we need annual surveys when things are changing so quickly in our marine environments.

MEMBER MORELAND: Thank you.

MEMBER MOORE: Brett.

MEMBER VEERHUSEN: Good morning and thank you for everybody for attending. You know, I really appreciate the panel's honest conversation and hard conversation.

I think this is a forum to facilitate operating out of silos and focusing on solutions, and you know I think sharing our lived experiences while also being open to new ideas was something that I was really privileged to do attending an aquaculture kind of field trip in Hawaii with Clay, where we visited local Hawaiian fishpond, Look Ea, and same with sharks under us around Blue Ocean Mariculture's Kampachi farm.

This was -- this was kind of a difficult thing for me to do growing up in Alaska, watching my family go bankrupt from the glut of farm salmon entering the market. But it also zooming out has me thinking about what are these tradeoffs? Where are we willing to give an inch to focus on -- what's the end goal?

And my thinking has evolved around responsible aquaculture done right, and you know I

guess what I learned was complicated and fascinating, and it didn't surprise any of us. But what really impressed me the most was moving away from the ''if you build it they will come'' model, so that you open these new pathways for community investment in wild capture fisheries and aquaculture and in mariculture.

It's a different way of framing within our own words of kind of a robust management framework that it provides assurances for all ocean stakeholders to be part of this process led by communities.

So I remember talking to Clay, and he was talking -- he was, he said something about when the cows are feeding in the pasture, the fish are feeding in the ocean and some really helpful local knowledge that, I think, I heard was frustrated was not incorporated in scientific management.

And so I'll give an inch and say my thinking is evolving with forms of aquaculture done right. I don't think that that can be -- what's been done in Hawaii can be replicated in other places in the world or other places in the country. But I think the process around, you know, the process around

management, modeling and monitoring that Blue Ocean Mariculture adheres to has worked, and I've heard it from the local Hawaiian people.

So my question to any of the panelists is either where have you seen stakeholders give an inch, or do you think stakeholders can give an inch to accomplish a more climate resilient fisheries management structure?

MR. KAAIAI: Well, I'm glad you brought up He'eia, because He'eia was funded through the community demonstration project program, and they were organized.

At the time that they were funded, the walls of the fishpond were collapsed. There was nobody to take care of it. It was on private property. It was a matter of organizing that native community in that area to go in, make the commitment to bring the pond back and then give them funding.

So for me, there's a process in place in the Magnuson for the western Pacific that we can give them funding and with the Western Pacific Community Development Program we can create regulations that

address native people. So we have, for the Western Pacific Council in Magnuson ways that we can benefit that native community.

If we don't do that soon, we're going to lose a lot of that knowledge, you know. So thanks for the question. I don't think I answered specifically the question that you wanted, but for bringing up He'eia, that's a good example of how the council can work to help a community develop.

MEMBER VEERHUSEN: And then I would imagine that that involvement, you know, harkens to when communities don't want something, listen to them. I know that there are -- it's within state constitutions. I'm speaking specifically to Alaska, the constitution on finfish farming. Listen to the communities, that was written in the state constitution.

But at the same time I learned in Hawaii, things were a little different. What I had learned and grown up as a kid fishing salmon, well things have changed. There's been a lot of changes and good community involvement, and your example shows this

bottom up approach that doesn't have to work somewhere if people don't want it, but it could work elsewhere if people do.

MR. KAAIAI: What came out of the He'eia Kea experience was that the state came in and decided on three tiers of management for fishponds, and the first tier is just preservation, preserve what's there. The second tier was to rebuild it to what it was in history. The third tier was to make it productive.

So there's three tiers of licensing and permits for fishponds now in Hawaii that was created from that original project.

MEMBER VEERHUSEN: And I'd be really curious to hear from the other panelists anywhere in wild capture fisheries, that you could identify where a community bottom up approach has identified tradeoffs that has successfully led to a more climate-resilient fisheries management structure.

DR. HOLLOWED: Hello, hello, okay. There is a good example when the marine heat wave came through. The Pribilof community recognized the

implications of climate change and they invested heavily in adapting their port to accept alternative types of fishing boats that would, could deliver there.

That investment is a good example of where there are -- that community is already planning for climate change and preparing for alternative product types coming into their ports.

MEMBER MOORE: Thanks. Next up is Natasha.

MEMBER HAYDEN: Thank you, Meredith. Thank you, panel. This has been really great. I have some comments and some questions. This is really difficult for me. Some of what I've heard is that there needs to be more engagement with, I'm doing to air quotes "stakeholders."

I think that as an Alaska Native person, that it is -- there's a little bit of a disconnect between referring to like the indigenous Hawaiian people, indigenous people across the country as stakeholders.

I think referring to them as community,

communities and indigenous knowledge-bearers and scientists is more in line with who they are. My brain just got flooded with adrenalin, so just bear with me. I was listening to a podcast about imposter syndrome this morning, and that really resonated with me.

So the different relationship with the resources, I think Merrick you had referred to and I can't remember what you said, as the catastrophic or, you know, what it's going to be in the future. Over the arc of my lifetime, the relationship of the people of my community, and I live on a rock in the North Pacific, in the Gulf of Alaska that has been fully dependent on marine resources for thousands of years.

I hate to keep saying that, but over 50 years the relationship of the people on that rock with the marine resources has changed so dramatically, and has -- and you know, I think Charles just said something. If you don't -- if we don't take care of it, you're going to lose it.

You know, we may be past that point where I live, where we have -- and Joe was talking about

what their relationship is with their box in the ocean, that they're clawing to try to hang onto what that is. But then the panel and, you know, SSC and managers talk about needing to be in touch with the community and with the stakeholders.

And okay, well that's been true for, you know, since there have been people in these environments. And I think that two things that I have a question about, and I don't really expect an answer, but you know like Brett has talked about having conversations and bringing stuff out of our silos.

You know, what is optimum yield? So we're here to advise NOAA. Optimum yield, I know participating in the North Pacific Fisheries Management Council has been heavily focused on the economic optimum yield. You know, what is the best way to get the most maximum economic benefit out of fisheries.

Well, is there room for optimum yield to maintain and restore, in some cases, the relationship between the communities and the indigenous people with those resources, as part of the need to have that

incorporated as informing management?

As you know, is that something that is considered to be optimum yield, is for the people who are living there and who are most knowledgeable about the resources, to be sustained by those resources?

MR. KAAIAI: Yeah. I don't know what to -- what I can comment on that. Optimum yield is kind of an economic measure, and that may not be something your community participates in. So I would -- I would think that they would have to -- you would have to advocate some position where you participate in that.

I don't know how you would do it because well, CDQ is under Section 305 of the Magnuson Act too, so maybe you need to look at that and examine how we can use that. Are there ways of getting your community into the council process, because that's going to be the overriding regulatory process for your fisheries.

And having that voice heard, and it's not an easy job, but it's achievable I think. I don't think I answered your question Natasha, but --

(Off mic comments.)

MR. BURDEN: Could you repeat the question?

MS. COIT: Apologies for being late to this amazing panel. Natasha, that's one of the reasons that I wanted to revisit the national standards, and your comments made me think about National Standard 8, because the councils are required to follow the national standards, the ten of them.

I believe there's court precedent that says sustainability is like the ring that rules them all. But that's a pat answer to a very involved question. So I don't feel like it fully answers it, but I think looking at how supporting coastal communities fits into our management regime is something that needs to be revisited.

(Pause.)

MEMBER MOORE: Okay, fantastic. We've run out of people but not out of time and not out of questions, so I'm going to ask one. You guys didn't think I wasn't going to ask a question, and then I'm going to give Jocelyn one and I'm cheating.

So my question is are managers in a

position, like are they having the right conversations about tradeoffs and future yet? Like in particular, because I think we've had a lot of conversation about how there are different tradeoffs to consider, and there are more things to think about here.

Are managers having those right conversations after you see that occurring at your fishery management councils, or is there more that needs to be done to kind of support those like honest and thoughtful conversations about what tradeoffs of different management approaches and as climate change alters things and we enter non-stationarity even more? Are we having the right conversations about that, is my question.

DR. HOLLOWED: In my experience in the North Pacific, yes. Climate change is alive and well in the Bering Sea, and everyone's feeling it, and so very much so if people are having this conversation. The SSC receives reports on this from the CCTF, as well as the ACLIM project itself, and those workshops are encouraged and broadcast through the council process.

So that even if you're in a remote community you can listen in, and there are facilitators in remote locations that can make sure that questions are brought forward. And so the only thing I can say is yes, in the North Pacific. I can't speak to other -- I mean Cody, you might -- is that your impression too?

MR. SZUWALSKI: Yes, it is. I think that we're definitely having the conversations. I think more -- the thing that immediately sprang to mind was some of the discussions for closures for the red king crab fisheries. So closures of other fisheries to promote conservation of red king crab and thinking about how those analyses and discussions are going.

So the discussions are being had I guess is the first and foremost. I think structure around how those discussions are had would be useful, and I think it's something that we're still figuring out how to do well. But it's definitely something that we're talking about, and I imagine Jamie Goen will speak more about this in about 20 minutes.

MR. BURDEN: So it might not be a direct

answer to your question, but I would characterize -- sorry.

MEMBER MOORE: Just lean into it a little bit more. You're good.

MR. BURDEN: Oh. I would characterize the Pacific Council's effort on this as, you know, we went through the scenario planning exercise I referenced earlier, and that was -- that was an attempt at a fairly programmatic view of the world, our world anyway.

And we went through that and it was a valuable exercise, and now we're asking ourselves what do we do now? We're taking a fairly -- our next steps now are fairly tactical as it concerns like climate change specifically, and that is trying to incorporate some risk measurements into our stock assessment process, and that's something that we just started.

But I don't view that as the more comprehensive view that I think you were getting at. Things that we are doing that, you know, kind of continue on with our day-to-day efforts, those often include climate change but not intentionally.

And so if you were to just track our salmon process, for instance, we're making decisions every year and those decisions are affected by climate change.

So we've shut down salmon fishing off the coast of California. Climate played a role in that. Not exclusively, but a role in it. So that's also not a comprehensive view. It's an adaptive response, reaction to it. But that's what we're able to do at the moment, and so maybe that answers your question a bit.

MEMBER HAYDEN: Thanks.

MEMBER RUNNEBAUM: Maybe this isn't a fair question given the last four minutes of our panel. So I really enjoyed this. Thank you. I heard a lot of key highlights. One was the need for diversification. One was the need for close partnerships with harvesters, and the recognition of the importance of indigenous knowledge that is over generations, in addition to place-based harvester knowledge that is gleaned from year after year of being on the water.

Then I heard innovation, we really need to

start innovating. I think our science is getting innovative, and I heard some really interesting comments about innovating in management. But I didn't hear how we connect the science to the management in an innovative way, and do we need to be innovative there, or do we just need to be consistent?

MR. KAAIAI: I think we have to integrate the indigenous knowledge with science but, you know, if your thousands of years of data is in parables and stories and songs and chants, that's not data that we can use in our science. But I think its important data that we can analyze and test in our process.

I think one of the things that if we want to be more forward-looking with our science is okay, the snow crab crashed, right after the Dungeness did, and now there's a lot of anchovies. What's the relationship? I don't know what the relationship is, but I think our science can figure that out.

You had a whole lot of water come out of California? What's that going to look like in one year, two years, three years? How has that affected it? I think that if we can point our science in that

direction that would help. I think if we can get advice from the indigenous practitioners on what they think and test that, I think that can help.

For me being with the Western Pacific Council, it was really obvious to me that the council is the socio-political forest in this big program, and you have science and you have the socio-political forest, and then you have headquarters, right, and that's the way it works. That socio-political stuff is really, really hard to do.

And maybe this shows my age, but I think Sol Lavinsky had something to do with you put everything in that pot and you stir it up, and what comes out is closer to right than whatever you can find. So that's my comment on that.

MR. BURDEN: Yeah, I appreciate the question. One of the things that I think we could do if we were to start with where we are now, a lot of the council has focused every year on how many fish should we catch this year. If I think about climate change and the ability of stocks to withstand climate shocks and climate change, I start to wonder if we

should be asking more questions than that.

So not only what is the acceptable mortality rate, but should we be thinking about age structure? Should we be thinking about genetic structure? Are there other factors that would allow that stock to be sustainable or more resilient or what have you in the face of climate change, and I think that's one place we could bring science in to help management discussions.

DR. HOLLOWED: I want to reiterate, support the comments that were just made. Yes, there needs to be a stronger partnership between managers, scientist and the communities and local traditional knowledge, all of the above, yes. We need everyone for this climate change impact.

But Janet's comments were good and timely, in that some of it is national policy. I mean our fisheries in the North Pacific are highly constrained. We have to go through the NEPA process. We have a two million ton cap in the Bering Sea.

There are the Magnuson Act constraints that are on all of our fisheries, and as well as the

constraints of the national standards, the other national standards which have protect issues like bycatch and fairness and equity. And so looking at all of the above within the context of changing climate is a bigger ask than just the councils, because that's a national discussion on how we might approach that.

We aren't really bringing that up now. We're talking about what we can do in our own fisheries management councils and our own fisheries dependent.

But there is a piece of this that, you know, from working on the IPCC chapters you realize this is a global problem. It takes all nations having open discussions about how we're going to approach it and fisheries needs to be part of that discussion.

You know, how are we going to have food security for generations to come under some of these scenarios that there's a constraint? So I think you're touching on something that's very important. Yes, we need all parties working together in a seamless way, and that's communication.

I think the North Pacific Fisheries Management Council is doing a good job of trying to improve that. But I do think there's another place for NOAA within the global discussion that is something that is even bigger than what we're talking about.

MEMBER MOORE: Thank you so much. We're going to leave it there. Can we get a round of applause for our panel?

(Applause.)

CHAIR DAVIS: Excellent panel discussion. Thank you all so much for participating and being here with us, and thank you MAFAC members for helping with your questions and for our chairs, Meredith and Jocelyn.

So we are going to take a short break, a ten minute break. If you all could be back here in about ten minutes? Ten to 10:00 would be break, and then we'll start up the next panel. Thanks.

(Whereupon at 9:38 a.m., the above-entitled matter went off the record and resumed at 9:53 a.m.)

CHAIR DAVIS: Okay. Just let everybody get a little more settled. Before we start off this session, Sarah is on the telephone, right Katie? Oh, there she is -- hi Sarah.

Sarah is going to give us a little overview of what to expect on our field trip this afternoon, and then we'll roll into the panel discussion. Thanks, Sarah.

MS. SHOFFLER: Sure thing. Can you hear me okay?

CHAIR DAVIS: Loud and clear.

MS. SHOFFLER: Great. Thanks for giving me a few minutes to give a preview of this. We're excited to have you. We have a good lineup of folks. I think Heidi and Katie shared the agenda with you. So we're going to be touring Tuna Harbor, which is really close to where you are, and it is -- it is where the majority of San Diego's active commercial fishing fleet is docked and where we have some aquaculture going on.

That area is really to me represents a microcosm of the challenges and opportunities the

seafood sector faces across the U.S. So like I said, there's an active commercial fishing fleet. It's mostly small scale. We have aquaculture going on and the recreational bait industry is right out of there.

So among the challenges and opportunities that they're facing is planned redevelopment of the working waterfront, aging infrastructure. There's few people entering the workforce. It's a historic fishing community, but there's very little communication about that.

Direct marketing is happening there. There's a fishermen's market that happens every Saturday, and that really bumped up during COVID. In addition, aquaculture is there.

I understand that the port is the poster child for how ports could engage in aquaculture, but of course there's placement challenges, permit challenges and of course wild capture industry is concerned about where those placements might be, as they are concerned about coming offshore wind on the coast.

On top of all that, we have climate change

and Elliott and Barb talked a lot about that yesterday. It's possible that -- it's quite possible that San Diego could be a climate change winner in terms of fisheries, if those tropical tunas move north. San Diego was once the tuna capital of the world, and you know, if they had the infrastructure, maybe that could happen again given climate change.

They're not really ready for it, but there's a lot of opportunity going on with the redevelopment, the planned redevelopment. It's a challenge and an opportunity, and also with aquaculture.

So there's a lot of challenges, a lot of opportunities. We're going to go to a processing plant which has not much in use because of many of the challenges I mentioned, workforce development, COVID, the planned redevelopment.

We're going to talk about a fresh catch option that the fishermen are interested in. My colleague, Steve Stohs is an economist at the Southwest Center and I am going to collaborate with them on a feasibility study. We're going to go check

out some of the aquaculture infrastructure.

We'll see the floating upweller system, meet with port and the NOAA Fisheries aquaculture coordinator and our local aquaculturist. You'll hear about aquaculture in San Diego beyond what's going on, right, in Tuna Harbor.

Then we'll with commercial fishermen and Sea Grant, and we'll hear from them challenges and opportunities associated with that planned redevelopment of the downtown San Diego waterfront, including Tuna Harbor. We'll also hear about the history of Tuna Harbor Dockside Market, which is right by the processing plant. We'll go see what happens every Saturday.

It's a nine year-old fishermen's market that inspired changes to the California Health and Safety Code to include fishermen's markets, and it's unique across the country and it's been going for nine years, and they've hardly missed a Saturday in those nine years.

So yeah, we have about ten folks joining us across commercial fishing, aquaculture, port, Sea

Grant, Southwest Fisheries Science Center, and they're all really looking forward to talking to you guys and sharing the San Diego story. And that's what I've got. Any questions?

CHAIR DAVIS: I don't see any questions, but I hear comments like sounds like fun. So we are very much looking forward to the field trip this afternoon. Thank you so much for organizing it, and we'll look forward to seeing you soon.

MS. SHOFFLER: Okay, great. Looking forward to bringing you along. Appreciate the opportunity.

CHAIR DAVIS: Thanks, Sarah.

MS. SHOFFLER: Take care.

CHAIR DAVIS: All right. We're going to move into our second panel discussion, and Jocelyn's going to be the lead moderator and facilitator, and I can turn it over to you.

MEMBER RUNNEBAUM: Great, thank you. So thank you MAFAC for your interest and participation in Panel I. This is our second panel, and we struggled with what to call it. I apologize.

That "on the water" adaptation seemed to be the best we could come up with, because we have a really diverse group up here of commercial, recreational fishers, people with fishing experience and an aquaculturist.

So we're first going to have Jamie Goen from the Bering, Alaska Bering Sea Crabbers go first, and then we'll have Katie Almeida, who is going to join us remotely. She will go next. She's with Town Dock.

And then we will have Bill Dewey with Taylor Shellfish, and then last but certainly not least, Captain Todd Mansur with Dana Wharf Sportfishing and all things recreational fishing in southern California is what I really understand and whale watching. So basically the ocean. So Jamie, I'll turn it over to you. Thank you.

MS. GOEN: Great, thank you and good morning. I'm Jamie Goen, Executive Director of Alaska Bering Sea Crabbers. We represent harvesters of king, snow and bairdi crab in the Bering Sea. A little bit more about my background, the lens that I come from.

I worked for NOAA Fisheries for 15 years before coming to the Crabbers.

I worked on catch share programs around the country, and I've worked with about half of the councils around the country as well. Before that, I did oceanography work, collecting data on carbonate systems in sea water around the world before turning to fisheries.

So this topic is near and dear to my heart on climate-ready fisheries. I think you're going to hear a lot from us on this panel what you heard in the previous panel, just more from this lens of on the water, and I loved Meredith's analogy of Jurassic Park with the T-Rex chasing us, and we need to move faster.

I would add to that that I feel like the T-Rex bit off the back of the truck just recently for snow crab, and so we definitely need to go faster. For Alaska crab fisheries, we're dealing with a climate-induced fishery collapse. There was no planning for it. In fact, our top notch climate scientists, which are doing incredible cutting edge modeling work, commented at a recent SSC workshop on

climate that they would not have been able to predict the magnitude of the snow crab collapse.

I want to take us on a quick video tour. If we could queue the video.

[VIDEO PLAYS.]

MS. GOEN: Thanks for that and a quick shout out to the SK Grant Program for funding that video. But you just heard about the devastating effects our fishermen and crab-dependent communities are facing. We're a mature, rationalized fishery under a catch share program that's touted to create economic stability, and yet our main fisheries are closed.

We estimate nearly 500 million lost over the last two years; that's 500 million. We were the third largest or third most valuable fishery in Alaska behind salmon and Pollock. After the stock collapsed, we were just awarded what is likely one of the largest fishery disaster allocations in U.S. history, at $191 million, which big thank you to Congress and NOAA for that lifeline.

But setting aside the health and

sustainability of the crab stocks and what this could be signaling for Alaska's ecosystem, which itself is a call to action, the financial cost to the country should also be a wake-up call for action.

The financial burden and losses for American jobs and equity issues for small businesses and rural coastal communities, environmental justice issues, devastating effects on second and third generation fishermen, loss of culture and identity, loss of revenue to the U.S. economy, food security concerns and the cost to the U.S. government.

These are all a call for urgent action, and moving beyond planning for climate-ready fisheries and into acting now, with the science we have, and learning and adapting as we go. I appreciate hearing a lot about that in the last panel.

So how do we move towards holistic management and call each other in and take responsibility to act within our spheres of influence? We can learn from the Alaska crab fisheries with what we're going through and create a roadmap to building resilient U.S. fisheries, so we can be used as a test

case.

I liked what I heard in the last panel about let's start testing some of this out. But we need partners at every level within industry, among managers and by scientists that are ready and willing to take responsibility for what's within their purview, and we need managers and decision-makers erring on the side of conservation, and acting on the science available, even in the face of uncertainty.

Because for crabs, status quo management is not working, and with that, if we could go forward two slides, I think. One more, yeah. So you probably saw in the press in the fall, this was what we put forward as a three-pronged approach to crisis management, because that's what we're in. We're in a crisis management mode.

I'm not going to go through this in detail. It's there for you to refer to, but it was rapid financial relief, support for research and responsive or adaptive management.

Recently, we're building on this and developing a resilient fishery road map or an action

plan. It's a working draft, and I want to -- if you could go on to the next slide. I want to give a huge thanks to Asia Sumulo. We had someone on detail from NOAA's leadership development program through the Intergovernmental Personnel Act.

So she was able to work with us for several months and draft this. She talked to our fishermen, she talked to scientists and managers. She pulled from literature around the country, and her experience across NOAA line offices. So it was an incredible opportunity to collaborate between NOAA and the fishing industry, to start working towards solutions.

Before I get into what the actual action plan is, just a note here on what resilience is. For us, it's adjusting to the changes. In short, it's the ability to bounce back from the disruption, whether it's climate-induced or COVID pandemic or anything. It's the ability to bounce back from a disruption.

A common theme we found -- oh wow. A common theme we found in the resilient fishery action plan work was the need for flexibility in the system

and the ability to diversify, which is counter to the direction U.S. fisheries have moved in the last several decades, with limited entry fisheries and catch share programs, which solved pressing issues at the time.

But now how do we evolve those to address the latest issues? I don't think that means getting rid of those programs. It's how do we evolve, and with that next slide. And just move on to the next one. These are just there for your reference. Those last two slides are the draft action plan that we have. We're looking for feedback.

We've binned into what managers need to be doing, what scientists need to be doing and what industry needs to be doing, and we've done it in different phases, to stabilize the fleet in the short term; medium term to create opportunity and then looking to the future over the longer term. And with that, I think we'll wrap it up there.

MEMBER RUNNEBAUM: Great, thank you. I think we'll have Katie up next.

MS. ALMEIDA: Hi. Can you hear me all

right?

MEMBER RUNNEBAUM: Yeah, that's great.

MS. ALMEIDA: Okay, okay. My name is Katie Almeida, a senior representative for Government Relations and Sustainability at The Town Dock, which is located in Point Judith, Rhode Island. We are one of the largest producers and distributors of squid in the United States. So if you've had calamari as an appetizer or a dish, it's probably coming from us.

We are also family owned and own five of our own vessels. However, we do take in from independents up and down the east coast. I'm responsible for attending the New England and Mid-Atlantic Council meetings, and keeping track of any management changes that might affect our fleet.

I also sit on several advisory panels as they relate to the species that we rely on, and I also sit on advisory boards dealing with offshore wind and -- excuse me, offshore wind construction. I'm one of the founders of RODA and ROSA, and I sit on both of those boards.

RODA is the Responsible Offshore

Development Alliance and ROSA is the Responsible Offshore Science Alliance. If anyone hasn't heard of them, I definitely suggest you have a look.

So there's a few things that are important to us in terms of responding to climate change and resiliency. To name a few, I'll start with flexibility, and I know it's already been mentioned. It's probably going to be a very popular term throughout this panel. But the ability to fully utilize our permits and the ones we already have, is very important. Diversification is also important. We need to be able to not just rely on one species.

Being able to switch to different fisheries is very important, especially when one species might be down in one particular year. A good example of squid. In 2016, we had for longfin squid what we called ‘‘squidnado’’. There was so much squid coming across the docks, and then the next two years, there was nothing.

But we had other species to rely on. We had elects to rely on. So for five great years we had illex. That's another squid, and then illex dropped

off, and then longfin kicked up. And in between that, if we might have great, not have great years with illex and longfin, we do have permits for flukes, scup, black sea bass, whiting.

So we have a lot of eggs in our basket that we can use to keep ourselves afloat. We, in my opinion, need to move away from more restrictive actions that prevent fishery, the fishing industry from fully utilizing their permits. We need responsive management, both on the side of policy and science.

A good example of that recently was there was a decent increase in the illex quota, and that has happened for the past three years, and that's helped the industry out greatly. We also need funding for research, and for exploring emerging fisheries.

With stocks shifting, it would be great to be able to take advantage of those that are moving in our area, while also for instance switching up and changing gear for targeting certain species. Right now, my company is working with the Commercial Fisheries Research Foundation out of Rhode Island, and

the Mid-Atlantic Council, exploring squid jig gear in the longfin fishery.

This idea came about when the wind farms started being talked about. Six or seven years ago, they first reached out to us that they were going to be building in the area where -- on squid fishing grounds. So we started thinking, you know, if we're not going to be allowed to fish in these areas, then how can we get in to target the squid if they're still there?

Then we thought about squid jigging. This would enable us to get in and around the turbines if the squid are still there, and hopefully continue fishing for them. It would also enable us to get out into areas that are gear restrictive against small mesh like George's Beck. We can't fish small mesh out there in George's Beck.

So if we can figure out how to use this gear properly and get this to be economically viable, and that's important, because we can't just -- I mean we catch tens of thousands of pounds.

So if all this is going to get us is about

10,000 pounds a trip, you know, that's probably not going to be worth it when we can bring anywhere from 30 to 60, or even if you're dealing with illex, which we would like to expand this project out to, you know, up to 100,000 pounds. It's got to be able to replace the gear we have now to be successful.

Another important thing, a very important thing is representation and meaningful participation on the management council of the fisheries we depend on. Being from Rhode Island, we depend mostly on Mid-Atlantic managed fisheries, yet we do not have any representation on that council.

Yes, we have a liaison. Yes, we're involved with the APs, but that does not give us full representation and full participation. And last what I wanted to bring up was as we implement alternative energy like offshore wind, we need to be able to track the changes to our ecosystem and fisheries before, during and after construction.

Those effects have been severely lacking. Excuse me, any of those type of studies have been severely lacking at this point right now in the before

time frame. We're going to need to be able to separate out the changes caused by climate change and the changes caused by construction operation.

We're also going to need to be looking into a replacement survey. We're going to be losing the survey trends from the New England Fisheries Science Center down in Woods Hole because they're not going to be able to fish in those areas anymore and conduct those surveys. So we're going to need to be able to replace that. Whether we do it with a bunch of small boats, industry platforms, we're not sure yet.

But we've got to figure out because that's going to come back on the fishing industry as more risk and uncertainty, and could you know, affect our quotas.

But those are -- those are the few highlights right now. I know we have some more questions that are going to be asked later of the panel, and I've got some more examples, so I'll wait until then. Thank you.

MEMBER RUNNEBAUM: Great, thank you Katie,

and thank you for joining from the east coast. So next up we'll have Bill, and I think he has some slides for us.

MR. DEWEY: I do have some slides. If you can bring those up, that would be great. Is this working, not working? Now it's working. Okay, good deal.

Good morning everybody. I'm Bill Dewey, Director of Public Affairs for Taylor Shellfish Farms in Washington State. Taylor's a major producer of clams, oysters and mussels. The Taylor family started growing shellfish there in Puget Sound in 1890, and now we're in the fifth generation doing it.

So we struggled, as some people know, with climate change's evil twin, ocean acidification about 15 years ago. It took down our oyster seed production on the west coast and we've learned a lot from that experience, and hopefully some of what I'll share from that may be applicable to fisheries and some of the topics you're talking about here this morning.

So next slide. Just to highlight the

different species that we grow on the west coast, the mussels, Manila clams, a variety of species of oysters in the geoduck.

Next slide. And as I mentioned with the ocean acidification, it impacted us in our oyster seed production in particular, so as CO2 is absorbed by the ocean, that chemical reaction that takes place reduces the availability of carbonated ions in the water, which are the building blocks of the shells of the animals that we raise. So in particular it impacted the Pacific oyster.

Go to the next slide. So this is a day-old Pacific oyster larvae, and on the left is what it's supposed to look like, and on the right is what it looks like if there are not enough carbonated ions in the water. What was happening is the oysters in the first 24 hours, they've got to two things with energy that's stored within that egg.

They've got to build a shell and they've got to build a feeding organ to get more energy to continue to grow. They ran out of energy trying to build that shell and didn't that get organ built, and

so they were dying on us. So and that's a story that came into focus for us, thanks to a wonderful collaboration with NOAA scientists, Dr. Richard Feely, the leading expert from NOAA on ocean acidification.

Other NOAA scientists, university scientists, there was a great collaboration that helped bring these answers into focus and get us adapted and next slide. So obviously with that story, once we learned what was causing the seed mortality being ocean acidification and carbon dioxide pollution, there was a lot of panic in the industry because this is well beyond our ability to fix this problem, you know.

We weren't going to stop the source obviously. But again with the help of scientists, we ramped up monitoring, ramped up research. Today we have sophisticated carbonated chemistry monitor and equipment in the hatcheries and treatment systems that boost the carbonated ions up in the water, so we're able to produce our seed again.

We're looking down the road to breeding ocean acidification-resistant oysters. A number of

us, we had a hatchery in Hawaii we were able to expand. Others have moved over there for that reason as well. We don't have the upwelling, the California Current upwelling there that causes the corrosive conditions for the oyster larvae.

We've been experimenting with seaweed, co-culturing seaweed or a lot of estuaries on the west coast, Humboldt, Willapa, Samish that have large beds of sea grasses which are naturally mitigating that water chemistry. If those are refuges and places we'll be able to grow shellfish in the future because of that. And then down the road, looking at, you know, that we may need to shift to less vulnerable species on our farms.

So next. We've been really fortunate to have a wonderful response from policymakers, both at the state and federal level. Governor Gregoire at the time when this crisis hit the west coast, she formed the Ocean Acidification Blue Ribbon Panel and came up with recommendations for Washington State to respond to ocean acidification.

That Blue Ribbon Panel report has served

as a template for other states and regions around the United States and other countries around the world at this point.

Next slide. So some of the other climate impact concerns we have, some great research done by the University of Washington shows that mussels -- in a higher CO2 warmer ocean, mussels have thinner shells and weaker byssal threads, which is a concern when you farm mussels, and also for the wild resource.

Sea level rise, you know, we're seeing more severe storms impacting on water quality as shoreline septic systems get flooded and shoreline infrastructure gets destroyed, more frequent and toxic harmful algal blooms. Fimbriae bacteria, a warm water species of bacteria, it's a human health concern, is becoming more prevalent in our shellfish growing areas. And then finally impacts on our animal health and shifts in dynamics regarding pests and invasive species.

So next. So another response we've had, in a great partnership with the Nature Conservancy, has been the formation of the Shellfish Growers

Climate Coalition.

Taylor Shellfish was a founding member of this, and has grown to almost 300 members now that are using our stories about how climate and ocean acidification is impacting our businesses, to try to educate policymakers and the public about the need to change our carbon policies.

Next. I just put that in the presentation. These are hyperlinked resources if people are interested. I'm not going to go through them, but it's just a resource for people. I'll stop there, thanks.

MEMBER RUNNEBAUM: Great, thank you. Todd, take us home. Not really.

MR. MANSUR: Hey guys. I'm Todd Mansur. Glad to be here. A very interesting panel that we had before and it encouraged me to tell you guys a lot about what I've been seeing and the changes that we've been made, making.

First I'm -- I'm not just a sportfishing captain. We've -- I've run charter boats for years and party boats for years, but I also come from a

family of commercial fishermen. We fish set gillnet, drift gillnet, harpoon swordfish, lobster, crab and I currently own Jon's Fish Market at Dana Point.

So I grew up as son of not only a fisherman, but we've owned fish markets. So I've seen, you know, how things have changed here over the years. We've been seeing changes for quite some time. Climate change is definitely affecting the way that we fish every day in southern California.

If you're not familiar with our southern California coastline, it can be very vulnerable because our continental shelf is only about two and a half to three miles from our shoreline. And so when we see years of water warming, I love the word "water heat wave" that was occurring here over the years, we start adapting differently now.

A lot of my colleagues on the water just look at it as cyclical events. I think I looked at it as cyclical events for quite some time in how we were adapting to our fishing year after year, because I've been doing this for 44 years. I started off instead of having a paper route being a deckhand as a kid, and

I've never seen two years the same. Every year is different.

So we get in our mind that there's, you know, a cyclical change in our ocean every year in southern California. We're fed by countercurrents, you know.

How is it that in southern California, when we're fed from the -- in southern California we're fed from the California Current which comes out of British Columbia and should be nothing but cold water, but yet in our summer months we see water exceeding the 70 degree mark, and this is because of our countercurrents.

So we always see cyclical change in southern California, but I can point out some things that have been significant. Since 2007, we went from having tremendous albacore seasons, where we were seeing albacore year after year.

Typically around the end of June we would have a trend starting off of places like Guadalupe Island as that fish moved in from the south to the north, coming across different banks and ecosystems

that allowed fishermen to easily find these fish as they migrated up our coast, to where we are today.

So today, those fishermen that would normally have gone out looking for albacore, since 2007 have been striking out. We haven't finding that albacore. If you look at albacore counts going back to the 1960's, albacore counts were in the hundreds of thousands. Now you go up and look at albacore counts in southern California, and they're barely breaking 1,000 or 2,000.

Last year we had barely over 2,000 albacore caught in California. However, if you go back and look at the yellowfin tuna counts, if you go back to 1960, it's zero. And then if you come back and look at it today, our yellowfin tuna counts are over 100,000 fish caught by the southern California fishing fleet per year.

You can do the same thing for dorado, a warm water fish that we in the 1960's had zero. Today -- last year we broke 101,000 albacore, or pardon me dorado caught in the California fisheries. It broke all records and it made no sense.

And so these are some of the adaptions that we make. We go from -- we've been going from what we thought was normal, catching albacore in cold water, to fishing these warm water species. I'm not even including yet bluefin tuna. The bluefin tuna fishery that we have here is something that we really start -- we need to start paying attention to how we manage this bluefin tuna fishery.

It's very vulnerable worldwide, and we've been given this wonderful fishery here that's taken the place of albacore. However, bluefin tuna stocks are still not highly sustainable. So we need to really watch how we manage that.

So these are some of the things we've done to adapt to climate change. We've gone from fishing offshore for albacore to fishing offshore for yellowfin tuna, fishing for dorado, which were more warm water species. This is something that you can look at for 50 years. We can, I can show you graphs. I should have put charts up, I should have done slides, but I'm not that organized all the time because I do a lot of different things for a living.

But those are the offshore events. The inshore events are even more dramatic. So since going back about a decade now, we started seeing our brown algae disappear along our coastline. One minute, and that has changed the way that we fish locally, because we need that habitat for calico bass.

So that brown algae has disappeared because it's very affected by warm water. But what's affecting its regrowth is a lot of things. It's climate. It's human population and pollution, and because we're losing those ecosystem to adapt to that climate change we're going in and we're fishing bottom fish, rockfish and things like that.

So I could go on forever. I'll yield now and as you can see, I have a lot to talk about in the fishery. Thanks for having me.

MEMBER RUNNEBAUM: Great, thank you. So we do have a few prepared questions, but it would be great to see from MAFAC who is interested in asking. So put your tents up. Really. Nobody's jumping at the gun here. Okay, okay. So I'll kick us off, and then we'll move down the line.

So in Alaska, we heard a lot about the need to diversify. We heard a lot here about adaptation and some strategies that you're already doing. I guess it would be helpful to hear a little bit more about how you guys are diversifying your businesses right now and really sort of seizing some of the opportunities in a situation that might be less than optimal and truly terrible.

MR. DEWEY: I can kick that one off. So you saw one of my earlier slides, a different number of species that we farm on the west coast. That diversification, you know, Taylor Shellfish has diversified in a lot of different ways, and in my opinion that has contributed to our resilience and our success as a business.

So multiple species. So if, you know, you have a disease outbreak or market collapse in any one of those, you know, or the inability to breed seed due to ocean acidification, then you have other species to buoy your business back up.

We're diversified geographically. Our company owns or leases 14,000 acres of tidelands. So

we've got farms all over Washington State, out on the coast, up in British Columbia.

So again, we've always got places to pull product from to supply the market if we've got pollution closures or red tide closures, etcetera. Then market diversity as well. So we sell product of course locally. We actually have our own restaurants as well.

But we sell, you know, in Washington State, a lot of product throughout the United States and then we export as well. So that diversification for us has made a big difference.

MS. GOEN: I'll take a stab at this one too. We thought we were diversified in crab because we have three major crab stocks that we fish, and while crab tends to be a cyclical species with boom and bust times, we never envisioned that two of our main crab stocks would collapse at the same time and be closed.

So we aren't as diversified as we need to be. We also, our boats participate in other fisheries like Pacific cod with pots. We also tender for salmon

and herring in the summertime. But those are diversifications that help us round out our business. They're not enough to keep a boat financially afloat, if you will. Now we're starting to explore crab mariculture.

This will be a new venture for us. We're looking for funding right now. There's been some incredible science going on for decades now around King crab mariculture, and the proof of concept is there. So now it's looking at how do we scale up and what that could look like in Alaska.

MR. DEWEY: So if I could just follow up real quick. Jamie's comment made me think of another one I wanted to make, is that you know, we heard a lot about diversification from the first panel, and it doesn't always have to be just diversification to another species for a wild fishery.

It could be diversification of fishermen into aquaculture as well. That's, you know, particularly if you've got fisheries moving, species that are moving and leaving ports abandoned, you know. You've got infrastructure that could be supported by

mussel farming or seaweed farming or fish farming, whatever so --

MR. MANSUR: Yes. So some of the other things that we've been doing to diversify in the fishing community for a lot of our fishermen, rather than going into something in agriculture, is we see a lot of our fishermen starting to diversify by getting into eco tours, starting to --

And what it does actually is it actually helps these fishermen that have gone from being fishermen to giving eco tours, learn more about that true ecosystem that they're showing people. Whether it be in whale watching, dolphin cruises and things like that. So there's been a lot of diversity there.

We have a very short season in southern California and I learnt very long ago that you really do need to wear a couple of different hats because of the cyclical changes that we see in southern California every year from winter to spring to summer.

However, it's become very difficult for newcomers coming into the industry being a fisherman, because there is a limit to what we're able to do

right now with the loss of our kelp forest, with the way that things have -- changes in our regulations and our fisheries.

So we see a lot more eco tours starting to show up than new fishermen. We're seeing people showing up buying eco tour boats, and we've done very well at Dana Wharf Sportfishing with whale watching, providing platforms for that.

So I think that that's another way that we've changed at Dana Wharf Sportfishing in my career there, is that we're not just putting all the pressure on our sportfishing industry, and we're taking away from that and we're working more on the eco tours as well, to show people, you know, ocean awareness and that's very helpful too, to the entire industry.

MEMBER RUNNEBAUM: Thank you. Katie, I see you have a response as well.

MS. ALMEIDA: Yes, thank you. I did mention that we made sure to, you know, basically divest in a lot of permits. Like I said, most of our species that we rely on are out of the Mid-Atlantic, but we also do have species and permits here for in

the northeast.

Due to the sectors that were formed, we did lose access to pretty much all of our groundfish, which is also why we are heavily dependent on Mid-Atlantic. But as -- along with having a diverse amount of permits, we do also have permits for species out of state. For instance, we invested in fluke permits from New York, Virginia, North Carolina. Same with black sea bass and scup.

So we were able to get into those fisheries. It basically gives you a landings license to catch and to actually land those species in those states. So that just gives us another avenue to stay afloat.

MEMBER RUNNEBAUM: Great, thank you. A resourceful bunch it sounds like. So I see there's a few folks on MAFAC that have questions. I have Matt, then Barry, Sebastian I see you, unless you have a direct response to something you wanted to intersect with, and then Brett.

MEMBER UPTON: Thanks panel members, for all the thoughts you shared. That was really

interesting. I wanted to speak a little bit more about diversifying and just kind of when that can happen and the incentives around it.

Because I guess I run a business and I struggle with these decisions as well, because it always sounds like a really good concept, but oftentimes people have like a primary fishery that they know really well, and if you're a business, the hardest decisions you have to make are how you allocate capital.

And so I don't know if you had any thoughts on that more generally, or just kind of examples of how you can incentivize for diversification earlier, or if it really actually works, because I think Jamie's comment in some ways is spot on, where if you know, you're not going to cover your mortgage on your vessel by tendering.

It's just not, it's not going to happen. Maybe it you would have invested in an entirely different fishery early on, it could have worked out. So I guess that's kind of what I'm getting at.

If you guys have some thoughts on that,

like how to get people to incentivize to diversify earlier, in a way that's meaningful versus just okay, you know, I'm really hosed here now. I have a small side thing that I guess I've diversified by. So that's what I was hoping to get at a little bit.

MR. MANSUR: So for me, I run a charter business and we've been very successful for years. I've been -- and I've been changing all the time, and I changed due to the fishery. A lot of things that we've been doing lately is we just, we try to read the conditions and change accordingly.

Now everybody -- this thing right here has -- it's changed the sportfishing industry. It's made it very, very difficult because everybody wants the picture of the 200 pound bluefin tuna to put on Facebook and Instagram, and if they don't have it they don't consider it good fishing.

However, it's communication with our people. So by communicating with our people, it's one of the things that I do. I call my customers. I communicate with them about where we're located, what we're fishing for, how things have changed, what our

weather has been like, what our season has shaped up to be like, and we start to change our fisheries.

So I offer people local California halibut fishing, which right now in California because of all the rain we have, is phenomenal. We went from having very low California halibut counts to right now if you looked from San Diego to the Channel Islands, the California halibut fishery is unbelievable.

It's because we've flushed so many nutrients into our ocean from all this rain that we had that now if you're paying attention, if you're analyzing things correctly, you know to call your passengers and say hey guys, the halibut fishing's really good.

Yeah, we haven't been doing so well with yellowtail yet. We haven't been doing so well with our kelp bass because of certain situations and conditions. But we're going to go ahead and go California halibut fishing, and they absolutely love it, because it looks really good on this. A halibut on this is amazing.

And so as a sportfishing captain or a

charter boat captain, that's what we do. We try to communicate well with the community that's coming out fishing with us, so that they understand that things are different. Now there's a lot of things that have changed in the southern California fishery.

For those of you just to get caught up, and I know I've got to be quick, we used to start off our seasons in May, and in May we would have -- the barracuda would come up the coast, and they would start spawning outside the kelp beds. They would use that kelp forest for that juvenile growth.

It was a habitat that was very necessary for that barracuda to survive, that short barracuda, that juvenile barracuda, sub-adult barracuda helped the black sea bass. That was their main diet, so we did very well with black sea bass. The calico bass, everything did very well in that kelp environment.

But our brown algae, that kelp is gone. But the other thing that we did in May is we started looking for barred sand bass that moved up the coast. Due to climate change and warm water, which has created traumatic changes in our ecosystems, we've

lost a lot of our digestives.

So if you go down and you sample the sediment, the digestives, the arthropods and the crustaceans that live in our sediment have been jeopardized by warm water, everything from brittle stars to razor clams, all the way into the shore crabs and the sand crabs have been jeopardized by warm water, and that is what's necessary for sand bass to find an area healthy enough to spawn, and they've been leaving us.

So we no longer have that fishery that we had for barracuda. We don't have that spawning sand bass fishery. So we adapted, this is going back now over a decade to fishing calico bass, and then we lost our kelp forest. So we adapted from fishing kelp to fishing ground rockfish, and we've very carefully fished ground rockfish because we know how vulnerable that is.

And then we have very little area to fish it because of MPAs and other restrictions. And so we're constantly talking to our people and telling them how we can still have a great day of fishing, how

we can make the mortgage payment, how we can get through these things by just changing species, and then gift of gab helps a lot.

MS. GOEN: That was great Todd, and I'm still thinking about your eco-tourism pitch earlier, so now I'm wondering how many people I can get interested in going in the Bering Sea in the middle of winter. I think that might be a future for us.

(Laughter.)

MS. GOEN: To your question, Matt, on diversifying and when and how to incentivize it earlier, I agree with Todd's comments about communication. I think its communication education about what's happening and changing with oceans and climate and how this may affect their businesses, so that they can start thinking about it and doing that earlier is better.

But shifting the question a bit to how do incentivize the earlier shifting it to how do we build flexibility in the system. I think part of that is having the councils rethink some of their guiding principles. So how can they be focused on, when

they're taking actions, think about does this action build flexibility in the system? Does this action allow diversification, and our country has moved away from that.

So how do we move towards it now and starting shifting that narrative? You know, in the North Pacific, there's been a couple of actions recently where it limited flexibility when it could have opened the door for flexibility. In particular, I'm thinking of the trawl rationalization program for Pacific cod.

That could have allowed gear-switching for pot vessels to go into that fishery, and allowed a little more flexibility. The other action was Greenland turbot, which locked down that fishery to a small amount of people. So I think it's having councils and NOAA Fisheries think about ways to include flexibility in the system and diversify.

MEMBER RUNNEBAUM: Katie, go ahead.

MS. ALMEIDA: Sure, yeah. Something that you said that was the last thing you just said, about having a fishery being locked down to a small amount

of people. That's one of the things that I fear for emerging species, is that there's going to be, you know, it might benefit a few, where either it goes right into limited access or you're going to have, you know, a few people or a group of people that, you know, they're the original prosecutors of these fisheries.

So you know, they're going to kind of stake claim to it, and that's just going to give us the same problem over and over again if we're going to lock other people out of fisheries. You know, we just went through something here in the Mid-Atlantic where we tried to -- there was an attempt to farther limited -- further limit limited access on an already limited access species.

Fortunately for my company, it didn't go through, but that's you know, it seems to be -- there's the -- it's just further restriction is what I'm seeing. I'm not seeing flexibility at this point right now for fisheries and people getting into fisheries.

That's what I worry about with emerging

fisheries, is that we want to see this as an option to expand, to be flexible. I just hope it -- I just hope that it will be open to all people, and that we can, you know, it might save some people's businesses.

So I just hope that we have the mind set and flexibilities moving forward and learning from our mistakes.

MEMBER RUNNEBAUM: Thank you. Bill, you look like you --

MR. DEWEY: Yeah. I just wanted to mention a diversification opportunity that's in Alaska right now. They just got close to $50 million of Build Back Better funds to expand mariculture. There's a lot of interest up there right now in seaweed and growing oysters and mussels and so on.

MEMBER RUNNEBAUM: Great, thank you. If I can summarize what I just heard, it sounds like a deep understanding of the ecosystem relationship, whether it's a species relationship with the ecosystem and flexibility to be able to capitalize on that knowledge is what sounds like what would be helpful.

So thank you for -- maybe I didn't get it

quite right, but that's sort of what I heard. I think, I think Barry was next.

MR. THOM: Yeah, and I think my first question was really answered with looking at just ways to build in more agility into the system, what are creative ideas to build agility. But maybe a different question for Jamie most and probably. For these fisheries where you can't, where you don't have other species available, where fisheries are going to be more volatile over time with climate change, are there other creative ways to look at how to get these fisheries through the bad times between years, when things -- and I'm thinking about the fisheries disasters?

Are there ways to mitigate that, so we don't have as many disasters where you're trying to just get through the rough times in a more stable way?

MS. GOEN: Yeah, thanks for that question Barry. It's a really good one, and we've been scratching our heads a lot, trying to figure out how do we stabilize this fleet? How do we create some economic stability? I think there is a way to do

that. Largely it's around how do we keep fisheries open.

I know that's a goal, you know. When you look at the national standards and achieving OY, the intent there is to have open and sustainable fisheries. For our crab stocks, you know, we heard from the scientists that they could have handled a small amount of fishing even in the situation we're in, because we have been allowing bycatch on those fisheries still to continue.

So how can we share that burden of conservation across fishing sectors, so that we can keep directed fisheries open while we're still allowing bycatch, and keeping all other fisheries open as well? But how do we get to some flexibility in the management system, to allow a margin of error of keeping fisheries open to keep businesses viable when there is a downturn?

I think there's some tough conversations that need to happen there, because some businesses are more diversified already and can handle a couple of years of closures, and then others like small family

businesses can't. So boats and my fleet's a perfect example. I have boats that are owned by corporations and CDQ groups, Community Development Native corporations in Alaska.

We have some processor-owned vessels, and then we've got some independent harvester vessels. And even within the independent harvester section of that, some have a little more flexibility in other fisheries than others.

So how do you look at that whole broad group and figure out who is the most vulnerable from being closed in a given year, and make some decisions about how to keep them in business or, you know, maybe there's a trust set up that can help protect independent harvesters when we're in a closure time, until we can get back to open fisheries.

So I think I threw several ideas out there, but it's how to create some economic stability in a time of downturn.

MR. DEWEY: Barry's question and a mention of agility sparked a thought for me as well on the aquaculture realm anyhow, to have the permits be

flexible so that if we, you know, got some sort of disaster impacting us or a shift in the environment, we've got the ability to shift gear or shift species within our permits on our farms.

MR. MANSUR: Yeah. So to touch on it one more time here with the way things that we've adapted to here, southern California is very different in that we do have a lot of choices. So we're not stuck with one species all the time, and it's been really helpful for our captains and our crews, as well as our community when they come out fishing, because they kind of are on the understanding that every year's a little bit different.

However, you know, they do look forward to our summer months where we have migratory fish move in. But I think the focus really needs to be on how we're adapting to our structured fishery.

So our local habitat and our local fisheries is something that we really have been trying to focus on how we diversify and how we take pressure off of those fisheries that maybe are either in relocation or maybe their habitat is suffering and the

fishery itself needs a little less pressure.

One of the things that we're up against unfortunately for local fishermen is that we have MPAs, and so we have certain areas that we can fish and others that we can. So we're still -- we're kind of focused into a little postage stamp sometimes. So we would love to diversify more by leaving one area to fish for another area, but we're in a smaller postage stamp sometimes.

And so to take the pressure off of those fisheries, one of the things that we do with our passengers, and this goes from the largest passenger sport boat to the smallest four-pack, no bait, lure only charter boat is we encourage catch and release.

We've mastered photographing fish these days. It's been very helpful for our passengers to have a good time, go out there and catch some fish off of our local habitats and release them with a great photo of that fish and that day, and then they can go visit me at Jon's Fish Market and buy something for dinner, which always works out good. But yeah, that was a joke.

But some of the things that we've been able to do has been very helpful, to take the pressure off of our local ecosystems as they recover, and we believe they'll recover if we take the proper steps. We have to start focusing on the fact that it has changed, and it's changed for a long enough time now that it may not be just one of those cyclical things.

I haven't seen kelp beds and such devastating my entire life. I've been doing this for a long time. Now it is primarily in southern California, and we basically live in a bay. So from the Channel Islands to Point Loma is a bay, and it drops in 50 miles. So what keeps everything moving around is like a swimming pool pump called the Davidson Countercurrent, and we rely on that.

But it's very different than say the Channel Islands or Point Conception north, where there is very strong brown algae growth still. Habitat is a little bit different in southern California. I believe a lot of the reason why we're not seeing our habitat growth has to do with what's entering our water. This year we had a lot of stuff in our water because of

rainfall.

We heard it at the last panel. It's going -- and I think Charles said it. It's going to be interesting to see what the next three years bring after we have this much rainfall, and how we adapt to that. So we need to be conscious of these local ecosystems, because they're the most vulnerable.

We're going to get pelagic fish. I told you about 1960 to today in albacore and 1960 to today in yellowfin tuna and dorado and how those changed based on warm water. It's always given us the target in the summertime. We adapt very easily. We just change species. It's the local fishery.

It's the local habitat that is most vulnerable and needs the most attention right now, and we're diversifying that through taking our people fishing for a couple of hours, showing them some ecosystem, whales, dolphins, things like that, take a little less pressure off or going ground rock fishing and fishing in a completely different ecosystem where we fish, rather than fishing in 90 feet of water or less, which is where our habitat is, grows based on

light through the water.

We go out and we start fishing 300, 240 to 550 feet deep for ground rockfish, which a sustainable temperature allows us to see a pretty healthy fishery.

MEMBER RUNNEBAUM: Great, thank you for that. So just a time check. We have about 25 minutes left. So we're going to go to Sebastian.

MEMBER BELLE: Great, thank you so much. Great panel, really interesting stuff. Question for Bill. You know, you guys have really been at the pointy end of the spear on this stuff for a lot longer than our folks have been on the east coast, and you've obviously figured out some ways to manage around some of the challenges, particularly ocean acidification.

In your mind Bill, what's the next thing over the horizon that's linked to climate change that you guys are worried about and are losing sleep over? Is there, you know, you've got ocean acidification, you've got temperature changes. Are there other things that you think are going to impact the sector as well that are linked to that challenge?

MR. DEWEY: Yeah thanks, Sebastian. You

know, I think from a climate standpoint, still ocean acidification still dominates. I mean probably the most -- Dick Feely, NOAA's scientist there was our keynote speaker at our conference in 2008, and what he presented what he thought was killing our oyster larvae.

That was a difficult message. What was most difficult was that he said oh and by the way, even if you can convince the world stop burning fossil fuels today, it's going to get worse for you for the next 30 to 50 years because what's already been absorbed by the Pacific Ocean and is in the pipeline in deep ocean currents coming your way.

So that's why we're so focused on adaptation, you know, with that Blue Ribbon Panel report. You know, there's a big section on adaptation and mitigation. I chaired the subcommittee on that, because our fate is pretty well sealed, at least for my generation of shellfish growers and we need to get focused on, you know, whether these Sea Grants or refuges or what, you know, how all those different adaptations, that's really a big focus for us.

You know, the broader industry, I don't think, thinks about this every day because we've addressed the seed emergency. They're able to get the seed they need for their farms. So they're not realizing the fate that we're facing with worsening conditions.

I think that some of the more recent science is actually showing, you know, we've been concerned that it's going to start -- as conditions get worse, it's going to start to impact animals in our nurseries and out on our farms where we can't treat that water chemistry, and not be able to do anything about it.

Some of the recent science is suggesting that we are seeing those effects already. We just don't monitor the growth of our crops close enough and the health of our crops close enough to realize it.

But some of the research now that's been looking at whether sea grass can be a refuge, for example, is showing that the oysters will grow faster in an adjacent sea grass beds because of that ocean chemistry. It's easier for them to build their

shells, you know.

So for me Sebastian, it's still ocean acidification still dominates, changing the ocean chemistry still dominates.

MEMBER BELLE: Yeah. Thanks Bill. Our mussel growers are seeing a huge benefit of co-culturing seaweed and mussels, and similar kind of effect on the pH around the mussel farms, and we're seeing much healthier mussels on mussel farms co-culturing with kelp, so a similar kind of thing.

The one other thing I would ask about is are you feeling like you're getting any sort of willingness from the permitting agencies to make the ability to shift species on leases or permits easier than it is now? Because I think you're right on the money, that's something that we're certainly contemplating here.

Our system here in Maine is so complicated and lengthy that in order to switch species it can -- you're almost going back to ground zero, step one in the process.

MR. DEWEY: Yeah. It's no -- I would say

it's no different in Washington, you know. We're doing our best to incorporate that ability into our permits. But for one example, right now we've got a historic oyster and clam farm in southern Puget Sound that we're trying to -- it's a 300 acre farm. We're trying to convert 25 acres of it to geoduck.

We're six years into an EIS and a permitting process to convert that 25 acres. You know, I was recently over in eastern Washington and had the opportunity to go out on a wheat farm that was using sustainable practices, with no-till drills and direct seeding practices.

I was thinking to myself what mayhem there would be if you told those eastern Washington farmers that it was going to take them six years in an EIS if they want to grow corn instead of wheat. You know, it's a different standard that we're held to in the marine environment for sure.

MEMBER RUNNEBAUM: I do have folks on the list, but I wanted to open up to the other panelists. Are there -- do you have any considerations or thoughts of the impacts of climate change that you

wanted to comment on, following Sebastian's question to Bill? So open up the opportunity.

(No response.)

MEMBER RUNNEBAUM: No, okay. Brett, you're up.

MEMBER MOORE: Don't ask my question, because I'm really smart.

MEMBER VEERHUSEN: Well, people probably -- if Meredith talks first, first most I'm probably second, and they're probably tired of hearing from me. So I'll be quick. I heard -- wow, first time I've ever been told I'm too quiet also.

(Laughter.)

MEMBER VEERHUSEN: So I heard some themes around, you know, the importance of communities having access to be able to kind of quickly adapt, you know, what's available. I really appreciated Todd's kind of narrative of how to change and how it's the community's responsibility to figure that out as well, and that it's empowered by whatever decision-making body is responsible for those resources.

And then I also heard a lot of comments

around pressure, and I think, you know, in the commercial fishing sector and that's -- this is one I can speak to best, you know, when Magnuson was enacted in '76 you know, consolidation wasn't necessarily specified as an outcome. But it was understood for increased conservation and safety, and there was -- a lot of some of those goals were met.

But if you think about it, the enormous amounts of pressure that the climate is producing onto the industry is enormous, and with consolidation comes less people fishing. When you have less people fishing, you have less people paying dues into the traditional trade organization management structure.

And so you have increased amount of work to do with less funding available because kind of the dues-paying structure system is decreasing under a system that is promoting consolidation.

So I guess, you know, I really appreciated Bill's comments around, just from my experience, Taylor does an amazing job at looking around and looking ahead and bringing other people, whether they're brand new shellfish farmers or established

shellfish farmers, into that conversation because everybody is important and plays a really important role, because the challenges are the same.

And so, you know, we're basically the Jeep Wrangler getting chased by a T-Rex has a, you know, the trunk bit off and the gas tank on empty. And so but I did hear an exhaustive list yesterday almost of the strategies that NOAA is finalizing, implementing, doing, thinking about. It's all seemingly come to a head, and I think we all feel it and see it and that's why my head's spinning.

So I guess question to the panelists, just open question, and I especially really appreciated having other people or having stakeholders around what the perspective that isn't the ones who have constantly had to be around, because the gas tank is on empty.

I really appreciate people within the marketplace, within restaurants, within grocers, access to customers, people that have a stake in the management structure that traditionally haven't been a part of the management structure. Really appreciate

kind of those people given a lifeline, because they depend on access from the people who harvest or farm.

And so given all of that, I could use some direction, and I think we're going to talk about that today and tomorrow. What can we do as MAFAC members for you? What is helpful given what you heard yesterday from the agency, what they are drafting or finalizing given what's coming down the pipeline from the ANPR, or anything else?

What would be helpful as an advisory body to, you know, to Rhode Island, to Dana Point, to Washington state, to Alaska Bering Sea? What can we do? Simple question.

MR. MANSUR: For my community and for the fishery that I support, in the sportfishing industry some sort of reach out to the community would be a big help. So if we had some sort of outreach program or somewhere -- this is funny.

So I called the United States Coast Guard the other day because I was wondering were my licenses being processed and how long it was taking, because I'm on my eighth issue and it's never taken this long.

The conversation that I had with the person on the phone was well, we posted on the website that it's going to take X amount of time for licenses to be processed.

I said well why would I go onto the United States Coast Guard website to see if you guys were backlogged? There's no reason for me to go there. So we need to have a platform that people would like to go to, to understand what's happening in our fisheries, in our changing climate that is inviting and maybe MAFAC can help with that.

So that people understand that it's not always the San Diego long range fleet that catches big tuna, or that everybody catches them when they find out what's actually just the San Diego long range fleet.

So helping us communicate with the community so that they have a better understanding would help our businesses do better, so that people understand that when they go to different destinations, there are vulnerabilities and there's exceptions to that where it might be an exceptional

fishery. But I think that would be very, very helpful.

MR. DEWEY: A couple of thoughts come to mind, Brett, is you know, continue to urge the agency to complete development of the National Aquaculture Development Plan, the revised plan and complete the third leg of this dual end economic development piece.

Continuing to help with science that helps us to understand the ecological effects of our different farming activities, and helping that to inform our permitting has been invaluable in the past and continues to be invaluable. And then encouraging that flexibility and agility within our permitting structures, so that as catastrophes happen, climate shifts or whatever, we have that flexibility to change species or change gear types and so on.

MEMBER RUNNEBAUM: Katie.

MS. ALMEIDA: Thank you. I would add -- I would add funding for offshore wind effects on fisheries for research for that. Support flexibility in management. Support representation for states on different councils. We're going to need that as

species are shifting.

Funding for more frequent stock assessments. Some of our stocks, especially on the east coast, I can't speak for anyone else, it can be every five or six years. I realize with that we need more updated data. So I would even say funding for things like the port sampling program out here on the east coast is suffering.

We're not getting as much data as we used to from that program, and that's very important for our age and growth studies out here. And support for access for emerging species. But I guess, you know, overall when I say "funding," I guess all of that goes for funding for NOAA in general. Then I guess you can advocate for things after that.

But I don't know if you can move the needle on that, but those are the things that are important to us.

MEMBER RUNNEBAUM: Go ahead.

MS. GOEN: And if I could just build off of what everyone else has said, I would say one of the things that could help is that within the disaster

funding process, there's an amount that's set aside for research, which is very important. But is there a way to take a component of that and help with more social science research?

So helping stakeholders diversify. Like is there -- can you use a portion of that money to help stakeholders adjust and diversify, so that they don't run into this stew loop again, and I think that gets back to some of Barry's question earlier. Hopefully, that's a tangible thing that could happen in the future.

Another thing is while we're talking about disasters is speeding up the fishery disaster process. So if you are in a climate-induced crisis, how can you get money into pockets within six months? We've seen from the USDA Seafood Trade Relief Program that they were able to do that. They got money into pockets within a couple of months.

Our fishery disaster process takes two to four years. We need something more on par with what farmers get, whether it's an insurance pool or something like that, where money can get -- money can

happen much faster. Another thing is stated values. Does the agency have a value in protecting small businesses, independent harvesters and rural communities, rural coastal communities that are not well diversified?

Does the agency -- does that tie in with the EEJ policy and is there a role there to create some protections for those groups that are more vulnerable?

I think another tangible thing would be to empower plan teams and SSCs and councils to not just focus on TAC-setting and stock assessments, but how do you do some more of this broad planning for climate and addressing the changes at hand?

And then finally, empowering the agency to act even in the face of uncertainty. You know, what we're doing with crab, we keep hearing that the agency can't act because there's just -- it's uncertain the impacts of the action. But at some point we know status quo is not working. So how do we empower the agency to act, even in the face of all the uncertainty with the science that we have?

And I liked that idea of, you know, is there a way to test this? Can we do -- that was talked about the last panel. You know, is there a way to kind of put in experimental regulations for a year or two years and see if it's working, and is there a way to do that?

MEMBER RUNNEBAUM: Great, thank you. So another time check. We have seven minutes, so Meredith.

MEMBER MOORE: Yeah.

MEMBER RUNNEBAUM: Be quick.

MEMBER MOORE: So we have three people left and I'm one of them, so I'm sorry. So it's Meredith, then Donna and then Tom, just so you guys know the list. So my question, and I will be quick here, and I think we can almost do like quick answers from everybody, just reactions.

But one of the things we heard on the previous panel and one of the things that Subcommittee's been thinking about is like what does it look like to manage for resilience, and what does it look like to get away from just thinking about

maybe maximizing yield, but thinking about things like we heard about age structure, genetic structure, those sorts of big questions?

Like what does it look like to think about this from a -- if we were in a situation where broadly productivity is declining, although there may be some species that do better, what does it look like to have to back off of some species in order to give them time to figure out how to adapt themselves through the climate impacts that are happening?

And so my question is, is like do you feel like the communities that you are engaged in are ready to have those sorts of conversations about what it looks like to manage for kind of different objectives because of how climate is changing all of our fisheries?

So do you guys feel like those conversations are happening? Are people ready for those? Bill talked about the fact that people don't really grapple with the fact that we've got 30 to 50 years of it getting worse before anything gets better. So are we in the right head space to have those

conversations in your communities, or does more need to be done to think about that?

MS. GOEN: I'll kick us off with a quick answer, and that for our industry anyway, I think it is taking this crisis that we're in to get people open to talking about how to move in that direction.

MR. MANSUR: I'd like to say something about that. So we've, we've actually had a positive result with our local communities in the reaction.

For example, our copper rockfish. When we started this new study on copper rockfish, and Donna Kalez did a wonderful job of reaching out to, you know, local fisherman, the general public and letting them know that we're going to be doing this study on copper rockfish.

We would really like to see everybody doing their best to release these copper rockfish with descending devices and photographs, and people got on board right away. And so I think people, fishermen in general, especially sport fishermen and I think commercial fisherman feel the same way, I want my great grandchildren to be able to go out and catch a

copper rockfish. I want my great grandchildren to be able to go out and catch a kelp bass or a yellowfin tuna or bluefin tuna.

And so respectfully, I want to manage this fishery to the -- to the peak of opportunity. So I want to make -- but I don't want to kill it. I don't want to kill the fishery to where it's not -- to where it goes into preservation. I love the word conservation and management. If we can manage it properly, make it fun for everybody to go do, we have sustainability in not only our economy with it, but the fishery itself.

And so we've seen positive come out of that, you know, reaching out to the community and I mean it happens with our calico bass and releases. We let people know we're going rock fishing and they come with, you know, all the gear for it. And so we've been able to be very diversified in that way, and the community loves it.

It's just finding a way to reach them. I've got to give you a quick example. Navionics is an app for people to use for navigating on the water.

It's a great app, and once the word got out that professionals and local fishermen were using it, everybody got it.

So if MAFAC or somebody could come up with something that was positive to where they're like oh my God, you have to have that app, because it helps you so much in your fishery and understanding, you know, the sustainability of that fish, then it would be very helpful to us.

MEMBER RUNNEBAUM: Great, thank you. We've been blessed with an additional five minutes, so thank you Madam Chair. Donna.

MEMBER KALEZ: Okay, hi everyone. Thank you so much. Thanks to the panel. My first question is for Jamie. I wonder if you could like explain to me what happened to the community? Because we talk about the fishermen and the fishing boats and all of that. But when I hear about the crab fishery shutting down and I saw that video, I feel like that could be any one of my captains. They could see their whole season go out because you only fish for crab, and so that's very devastating.

And I think about the employees and how much it takes to train the employees and they're entering this fishery and they have no idea. It was so great in 2018 and then in 2021 it's not there anymore.

So it's very hard to explain it to the workforce and then to keep them, and then when the crab fishery opens again, I'm hoping that it's opening again, will they come back to work or just explain a little bit more about the impact on the community and the $1.9 million that you get, does that go to the community or just the fishermen? Just the owners? How does that happen?

MS. GOEN: Thanks for the question Donna, and I'll start with your last one. So it was actually not 1.9 million, it was $191 million.

MEMBER KALEZ: Okay, sorry.

MS. GOEN: And that will get shared between harvesters, processors, communities and what we have called CDQ groups, community development quota. They're Native corporations throughout the Bering Sea. So it will get shared among all of those

participants.

To your first question, it's been devastating on our community as you saw in the video, and I've focused on the harvester perspective, because that's who I represent. But there's also the rural communities as well that have an incredibly devastating story, especially for the folks on St. Paul Island in the Pribilof Islands.

I can touch on that a bit in a second. But for our fishermen, many of the crew in the crab industry, as you can imagine because it's such an extreme work environment, it takes a special person that is willing to work in that environment, and many of our crew have been with the fishery for 10, 20 years.

We have long-time crew in this industry, and part of that is because it is so valuable. So it's a good job when things are good. We are losing those crews. They're finding other jobs thankfully. When the collapse hit, we had to put out suicide and crisis hotline information, because people were that devastated.

We've put out job retraining opportunities, unemployment information. So they've shifted out of this work. They're looking for things that are more stable. I personally am terrified when our fisheries do open back up, we've lost that skilled workforce. So it's going to be hard to -- and it's hard to attract new crew coming on if the fishery is a small quota and not very valuable.

Our markets for crab right now are also not good, kind of putting salt in the wound. So it's going to be hard to find good crew when we do open our fisheries back up. So that's going to be difficult.

Focusing a little bit on the community of St. Paul, they're very remote in the Pribilof Islands, and I may not have my numbers right here. But I believe about 70 percent of their city's economy relied on our snow crab fishery. That was their schools, that was their police workforce. I mean it was the lifeblood of their community.

So they lost that instantly. So it's been devastating for them. They're quickly trying to adapt and diversify their economy, but it's not -- it's not

quick. So it's a great question, and thanks for recognizing that.

MEMBER KALEZ: Thank you so much, and my follow-up is can you go out and see orcas on the crab boats, because that would be amazing.

MS. GOEN: You can, if you cannot be seasick.

MEMBER KALEZ: Okay, thank you so much. I just really like the human impacts, because it helps as managers and what Todd was saying, when I do get information, I am the person that has to disseminate all the information to my captains and my crews, and then trying to get them to care to do the extra step is a lot.

So I, you know, I thank the industry for giving me tools to explain it. But it is hard and if the outcome -- if they put a lot of effort into it and the outcome is still that a fishery is closed, it's really, really hard and yes.

So and then Bill, thank you so much. I learned a lot about Puget Sound and the oyster business, and I'm sorry it's taken you 14 years to get

a permit to keep that business going.

But I would love to visit and then finally Todd, thank you so much. You put a lot of effort into this, and I think that as fisheries change and we have to adapt, something that I've learned is it's hard to market fish that no one has ever heard of, and Joe talked about it yesterday.

Like I didn't even know what a black cod was until I got in MAFAC. And so when we're trying to tell people oh, that fish, that white fish tastes really good. They don't know. That's not what they see on TV. They don't hear about it. So when people go out on our boats and, you know, they want to get something that they know and they want to eat that fish.

So it's hard to adapt the things that no one's ever heard of. So thank you all for answering all my questions, and have a great one.

MEMBER RUNNEBAUM: Great, thank you. Tom, do you have a quick question, recognizing that we're butting up against our time?

CHAIR DAVIS: We can't hear.

MEMBER RUNNEBAUM: Tom, we can't hear you.

PARTICIPANT: Poor Tom.

MEMBER RUNNEBAUM: Tom, I'm so sorry. Okay.

MEMBER FOTE: Can you hear me now?

VOICES: Yes.

MEMBER FOTE: Okay. I've listened to a lot of this over the last day and basically I'm going to check back with you.

MEMBER RUNNEBAUM: Oh Tom. Tom, I'm really sorry. We can't hear you and I feel like this keeps happening, and that's really unfortunate.

MEMBER FOTE: Well I'm on the phone now. I'm not even on the computer. So can you hear me on the phone?

MEMBER RUNNEBAUM: Try one more time a short question. You're coming in and out.

MEMBER FOTE: Okay. Basically what I was going to say when you have a study that was done in 1955 of the recreational fishing industry in New Jersey. It was expansive. I've never seen another study done for those years like that. We could not

afford to do one.

But what is amazing to me when you look at that study, you find out what Katie was talking about, the disappearance of fish. A lot of those fish that we basically targeted during that period of time are no longer even in New Jersey.

I mean lyme have gone. East shore mackerel are gone, and you know we used to call whiting frost fish because they used to wash up on the beach and people would collect them because the water was so cold.

Well you know that's not going to happen when the water is 42 degrees in the winter, in shore. That's why we've got the whales, that's why we had the big striped bass population, because the -- about the wind there. So we've been going through this for probably about 30 or 40 years, because some of this -- I started some of this from that in 1990, for glofish and sand eel. Lobsters the same thing; we started losing that in the 90's.

So we are way behind the curve, and I'm sorry I couldn't get these -- my microphone to work or

the telephone to work. I tried five different ways and five different microphones. Okay, thank you for that.

MEMBER RUNNEBAUM: Thank you, Tom. I would like to take a moment to thank the subcommittee, Clay, Tom, Sarah Schumann, Pat, Matt, who else? Oh Sara, sorry. I looked right at you and skipped over you. I'm sorry, Sara, and Joe. I think that's everybody. So thank you very much for helping us organize this panel, getting the questions and our continued work.

We'll dive in on Monday. Thank you so much to Katie and Heidi for pulling this all together, and a huge thanks to our panelists for coming all this way, talking to us and spending time with us, and Katie for enduring another Zoom call, and thank you to our other panelists that came. So let's give these panelists a round of applause.

(Applause.)

CHAIR DAVIS: Thank you, all. It's been a wonderful and very interactive, very good discussion this morning. So thank you all. A couple of

housekeeping things. If you didn't sign in this morning, please sign in on your way out.

The lunches are out there. They all have your names on them, and try to eat before you get there if you can, because it might be a little difficult once we get there. We're aiming to be there at 12:15, so thanks again for the terrific morning. See you at the field trip.

MS. LOVETT: Yeah. So people when you, you know, I would say like ten to 12:00, start gathering downstairs and we can share rides most likely.

(Off mic comment.)

MS. LOVETT: 12:15.

PARTICIPANT: You said 12:20.

MS. LOVETT: Or 12:20 it says, but yeah.

(Whereupon at 11:22 a.m., the above-entitled matter went off the record.)

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C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: MARINE FISHERIES ADVISORY COMMITTEE SPRING MEETING

Before: NOAA

Date: 06-01-23

Place: San Diego, California

was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate complete record of the proceedings.

Neal R Gross

Court Reporter