2015
Canadian/U.S.
LOBSTERMEN'S TOWN MEETING

March 20-21, 2015 – Saint John, New Brunswick

Hosted by the

ATLANTIC LOBSTER SUSTAINABILITY FOUNDATION | FONDATION POUR LA PÉRENNITÉ DU HOMARD DE L'ATLANTIQUE

1865 THE UNIVERSITY OF MAINE

LOBSTER INSTITUTE

Moderated by

The Reverend Ted Hoskins

Full Transcript

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Acknowledgements

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Planning Committee

The Lobster Institute would also like to acknowledge the hard work of the Planning Committee, comprised of representatives from the Atlantic Lobster Sustainability Foundation's & the Lobster Institute's Board of Advisors:

Jean Lavallee, Co-Chair, PEI
Dana Rice – Co- Chair, Maine
Bill Adler – Massachusetts
Dr. Bob Bayer – Lobster Institute
Michael Chadwick – New Brunswick
Sheila Dassatt –Maine
Rick Doucet – New Brunswick
Kenny Drake – New Brunswick
Mike Sirois -- Massachusetts

EXECUTIVE SUMMARY

The Lobster Institute's 2015 Canadian/U.S. Lobstermen's Town Meeting took a comprehensive look at issues surround ocean health and advances in marketing, which are both cross-border key areas of interest in the lobster industry.

The one and a half day event; which brings lobstermen and others connected to the fishery together to share ideas, questions, and concerns; was held in Saint John New Brunswick on March 20 and 21. A major goal of the Town Meeting is to foster collaboration and communication between all geographic areas and all sectors of the fishery; and this was evident as fishermen, processors, dealers and managers traveled from Massachusetts, Maine, New Brunswick, Prince Edward Island and Nova Scotia... With about 65 people in attendance, the discussions were at times lively, at times humorous, yet always focused on the good of the fishery – reinforcing the fact that all share and rely on a common resource that must be protected.

The conversations on ocean health included an exercise that asked each person in the room to write their own definition of a healthy ocean, and to share that with the group. Such words as clean, resilient, biodiverse, valuable food chain, and many others. The discussion then shifted to specific challenges to ocean health such as ocean acidification, changing water temperatures, pesticides and other pollutants. Maine State Senator Chris Johnson presented findings and recommendations from a recent report from that states Ocean Acidification Commission, which he co-chaired. Such recommendations included aggressive monitoring of acidity changes, conducting additional research on how ocean acidification affects different species (including lobster) throughout the ecosystem and several others. He noted next steps in Maine call for a $3 million bond referendum to enhance monitoring and other efforts.

Marketing discussion focused on the demand for a quality product both oversees, and locally. Recent efforts to increase funding for marketing in both the U.S. and Canada, as well as the research findings and plans that have arisen as a result were also examined. It was noted that the responsibility of delivering a quality lobster to the end-consumer must be shared all along the chain of custody – from harvesters, to transporters, to dealers, processors and distributors.

Another goal of the Town Meeting is to help set the agenda for research and education for the lobster fishery on an industry-wide basis, geared toward the responsible use of the resource while maintaining the vitality of the industry. The lobstermen in attendance suggested priorities should include: a cross-border effort to further advance studies on ocean acidification; training in quality control for all handlers beyond the boat, and several others.

The 2015 Canadian/U.S. Lobstermen's Town Meeting was held in honor and memory of Klaus Sonnenberg, a respected fisheries advocate who was the director of the Grand Manan Fishermen's Association, a member of the Lobster Institute's Board of Advisors, and a frequent contributor at past Town Meetings. Sonnenberg was killed in a plane

crash on Grand Manan this past summer as he was returning from an air-ambulance run. Sonnenberg was honored with the establishment of a scholarship fund in his name initiated with a $1,000 check presentation by Michael Tourkistas of East Coast Seafood, Paturel International, & Maine Fair Trade Lobster. The Town Meeting was co-hosted by the Atlantic Lobster Sustainability Foundation. The event was co-chaired by Lobster Institute Board members Dana Rice from Maine and Dr. Jean Lavallee from PEI. Primary Event Sponsors were Luke's Lobster and Cape Seafood, with featured gold level sponsors East Coast Seafood/Paturel International, Craig's All Natural, and the New Brunswick Department of Agriculture, Aquaculture and Fisheries. The Grand Manan Fishermen's Association sponsored the traditional seafood reception following day one of the meeting.

All discussions at the Town Meeting were recorded and a transcript follows Copies will be available (written or mp3) by contacting the Lobster Institute at 207-581-1443 or lobsterinstitute@maine.edu; and will be posted on the Institute's Web site at www.lobsterinstitute.org.

Transcript
LOBSTER INSTITUTE
CANADIAN/US LOBSTERMEN'S TOWN MEETING
March 20 – 21, 2015
Saint John, New Brunswick

Town Meeting Co-chairs: Jean Lavallee and Dana Rice.

DAY ONE: MARCH 20

Bill Adler, Massachusetts Lobstermen's Association: Okay, first of all bonjour and welcome to the 2015 Canadian-US Lobstermen's Town Meeting. We do thank you all for coming and most of you know me. My name is Bill Adler and I am the Chairman of the Board of Advisors of the Lobster Institute and I also fish out of Green Harbor, Massachusetts. It's hard to believe that this is the twelfth time that I have been doing this. Twelve years. Wow. Encouraging communication within the lobster industry is just one part of the Lobster Institute's mission. The Lobster Institute was started by fisherman and focuses on four core areas: conversation, outreach, research, and educational programming. Our goal is to sustain the lobster stock while maintaining a successful and vital fishery. We share this part of our mission with the Atlantic Lobster Sustainability Foundation. Last year, the Lobster Institute welcomed the Foundation as a co-host for the annual town meeting. We are very pleased they have worked with us again the year to bring this event to you. As we always say, we are in this together and we're glad the alliance is growing strong. I'd like to invite Jan Spinney, the executive director of the Sustainability Foundation, to say a few words at this point.

Jan Spinney, Atlantic Lobster Sustainability Foundation: Thank you, Bill. I must say it's wonderful to see everyone here. Welcome to Canada, Welcome to St. John. Bienvenue. It's really good for me to be back for a term as the Executive Director of the Atlantic Lobster Sustainability Foundation after a few years of being back in the industry and it's really a pleasure to be here with Cathy and Bob and all of you with the Lobster Institute. As Bill said, there is one lobster and it's the North American Lobster. We are all concerned with it. We all make our living on it. We believe in it. We have a responsibility and a duty to protect it and preserve it and that's what both of our organizations have in common and, as Bill said, we are working on an alliance so that we can do more to preserve and protect and push forward the agenda of science and sustainability within that resource for the good of all. I would like to say how proud we are to be fostering this alliance with the Lobster Institute and that will only continue to get stronger as we move forward. Welcome again and have a couple of days of really good discussion and we look forward to hearing what everyone has to say. Thank you very much.

Bill Adler, Massachusetts Lobstermen's Association: Thank you Jan. Don't go away. We're going to bring you up again. Before we get the Town Meeting started, I would like to have you join the Lobster Institute and the Atlantic Lobster Sustainability Foundation in thanking some folks that made all this possible. Thanks to those who donated door prizes, which you will hear more about this afternoon. I encourage you to take a look at the door prizes during the breaks over there and make plans for which ones you're going to take when you win. I know I did. We also have several generous sponsors we need to thank. Some representatives are with us today and I will ask these folks to stand to be recognized. I ask you to hold your applause until I read all their names and thankfully it's a lengthy list this year. We thank our general sponsors, the Downeast Lobstermen's Association and their executive director Sheila Dassatt. We thank High Liner Foods, the Maine Lobster Dealers Association and their director, Annie Tselikis, and True North Salmon. Our silver-level featured sponsors include the Grand Manan Fishermen's Association, which is sponsoring our reception this evening and represented by Melanie Sonnenberg. And Orion Seafood. Also, our gold-level featured sponsors are Craig's All Natural, East Coast Seafood, and Paturel International with Spiros Tourkakis, I know you're here, and the New Brunswick Department of Agriculture, Aquaculture, and Fisheries represented by Kimberly Watson. I know where you are. Now a rousing applause for these generous folks please.

Applause

Bill Adler, Massachusetts Lobstermen's Association: And of course an immense thank you to our brand new primary event sponsor this year. We are pleased to thank Luke Holden who, with his brother Brian, own Luke's Lobster, a cluster of restaurant in New York, Philadelphia, and the D. C. area. And they also have Cape Seafood which is a lobster processing plant in Saco, Maine. Luke, will you come up and say something?

Luke Holden, Cape Seafood: It's an honor to be here, I'm really excited to be a part of the discussion.

Bill Adler, Massachusetts Lobstermen's Association: Alright, well thank you. Thank you very much for the help here. Where are you in D.C. by the way? I go down there every so often.

Luke Holden, Cape Seafood: Bethesda Maryland, right next to the Verizon Center and also in Georgetown.

Bill Adler, Massachusetts Lobstermen's Association: Okay, how about Boston? Can you put one in Boston?

Luke Holden, Cape Seafood: We have location opening in July.

Bill Adler, Massachusetts Lobstermen's Association: Alright. Okay. Well thank you Luke. Very good. Thank you.

Applause

Bill Adler, Massachusetts Lobstermen's Association: Now on a more somber and yet hopefully uplifting note, it is our honor to dedicate this year's Town Meeting to the memory of Klaus Sonnenberg. Klaus was an amazing man. He was a true friend to the fisherman throughout New England and the Maritimes. He was a dedicated advocate, a valued member of the Lobster Institute Board of Advisors, and a welcome addition to past Town Meetings. Klaus would fly in for the meeting in Orono and there was one time I had to drive him back to the airport. I didn't know there was an airport in Old Town but I drove him back. He was an amazing guy. His input at meetings was always straightforward, very insightful, and he also had a touch of humor in all of that. And he kept us all honest. Now I felt very deeply the loss of Klaus when I was told and he's going to be missed, Jan, you wanted to say something, too? So at this point, Jan.

Jan Spinney, Atlantic Lobster Sustainability Foundation: It's sort of hard to know what to say about Klaus because you know there are so many stories; and I didn't know him really, really well, but I have known him for a long time. When I came over to New Brunswick from Prince Edward Island, that was about 1980. And I started working for United Maritime Fisherman. And so I had 2900 fisherman bosses so that was a really interesting time. And of course I'd go to meetings and Klaus would be at the meetings and that's where I first time him. Meetings on (because it was a fisherman's group that I was working with) meetings on the fishery, meetings on quotas for off shore, meetings on all kinds of different things. And Klaus would be the one who was sitting either at the back of the room or over in the corner or over on the side and he would always look like maybe he wasn't listening, you know. He'd be reading a paper, he'd be thinking, or something like that. And then there would be question period. And he would stand up and he would say something profound. (Excuse me, I'm soft on the inside.) But anyway, so everybody would start thinking about what Klaus was saying and more discussions all the time. He would bring out the best in people, good ideas, and occasionally, you know, controversy. I mean, what is the lobster industry if there is no controversy. But somehow he brought people together with ideas that got things done. A little while later, in the last years, I started flying with Klaus in all kinds of weather; and, you know what? I always felt safe. I want to read something here. This is Cathy's publication for the Lobster Institute, Summer of 2014. And I thought this was very apt too because a lot of us think like this. This says, "Words from Klaus Sonnenberg on marketing: 'The fact that it's a Canadian-American product and it is not created anywhere else in the world, the whole world, and believe me South Koreans, Indians, Japanese, Germans, I don't believe for one second that we have exhausted the possibilities. We should somehow bring it up to another level and say that this is beyond each individual fisherman, fisherman's group, country, or buyer. It supersedes that'." And I don't think there is anyone in this room or in the industry that doesn't believe this. And I think that's one thing that Klaus lived. He was a great friend of the fisherman and the industry. And I'm thankful for him.

Applause

Bill Adler, Massachusetts Lobstermen's Association: Thank you Jan. As a special tribute to Klaus, I'm going to ask Spiros Tourkakis to come up. He has a few words and a presentation. Melanie would you join us up here, too, please.

Spiros Tourkakis, East Coast Seafood/Paturel International: Good morning everybody and thank you for the invitation. This is a large participation that we have. We know for some it is not as easy to travel to St. John but it's always a great thing to see everybody together. I mean, I think Jan, and everybody, and Bill said exactly what Klaus was about. I think he was a friend to everybody, particularly to the fisherman, and he did really care about our industry. Our president, Mike Tourkistas, who unfortunately was unable to be here today, came up with the idea of creating a scholarship in his name which everybody found as an exceptional idea. I am very pleased to present the initial deposit for the scholarship fund on behalf of Maine Fair Trade, East Coast, and Paturel. And I know some of you might not know, but Maine Fair Trade is a new and upcoming operation in Maine which is a partnership between Garbo Lobster and East Coast Paturel; and I believe it is probably the largest employer in the lobster processing sector in the State of Maine. So we are pleased to present this check on behalf of Maine Fair Trade, East Coast, and Paturel and we hope that the industry will follow suit and we are going to get a great result of the sacrifices and support that this man gave us all these years.

Applause

Melanie Sonnenberg, Grand Manan Fishermen's Association: If I could be so bold as to say a couple of words and that's all I am probably going to be able to get out. I keep thinking over and over in my head, Klaus wouldn't even believe this. When you get up and go to work in the morning, you just go and you do what you believe in and, if you're lucky enough to have the kind of job that you love and you feel passionate about, you just don't give it a second thought – and he didn't. And so, as I sit here today, I'm thinking wow this is a wonderful tribute to the work that Klaus has done and I am very, very appreciative of this gesture with the scholarship. And I know my kids, who aren't here today, they too, say thank you. It's very gratifying and it's been a very difficult time for us, but thank you to the people in the industry that have reached out to us in so many different ways and kept us basically propped up through a really difficult time – and we still have a lot of difficult days ahead. So, for that, I thank you.

Applause

Bill Adler, Massachusetts Lobstermen's Association: Thank you Melanie, Spiros. And I'm going to bring the clapping back because I am going to say instead of the traditional "Lets have a moment of silence" I'd ask everyone to join us in a standing ovation in honor of Klaus.

Lengthy applause

Bill Adler, Massachusetts Lobstermen's Association: Now we are going to move on to the business at hand. Our planning committee for today's event was co-chaired by

two volunteers, one from Canada and one from the US, and both members of the Institute's Board of Advisors: Jean Lavallee from the Aquatic Science and Health Services in Prince Edward Island and Dana Rice from D. B Rice Fisheries in Maine. And now I am going to turn this over to them. They are here. I know they are.

Jean Lavallee, Aquatic Science and Health Services: I think it's the first time you actually didn't butcher my name too bad.

Bill Adler, Massachusetts Lobstermen's Association: Well that's good, Jean.

Laughter

Dana Rice, D. B. Rice Fisheries: Morning.

Jean Lavallee, Aquatic Science and Health Services: Good morning, Dana. Nice to see you.

Dana Rice, DB Rice Fisheries: Good to see you. Thanks Bill. Morning. I'm Dana Rice and, on behalf of myself and my fellow chair of the planning committee, Jean Lavallee, I would like to add my thanks to Bill and Jan to all who made the trip to be a part of our Town Meeting. A special welcome to those who are attending their first Town Meeting – and we understand that there is a group from the Future Fishers Program from Prince Edward Island here this morning. Are they here yet?

Inaudible

Dana Rice, DB Rice Fisheries: Welcome. Coordinated by David MacEwen and that's a great thing when you hear about future fisherman. Most of us around this room are, well, the future is shorter then it used to be, I guess. We really appreciate you coming and encourage you to get involved in the discussions. Feel free to speak right up. We've got several fisherman here who have attended all or nearly all of the Town Meetings from the start and they can tell you it's important to hear from you all, if they let you get a word in edgewise once they get started. As always, a lot of thought and hard work went into the planning of this day and there are several people I will recognize very quickly. Jean and me and the planning committee and several members of the Lobster Institute's board. If you're here, please stand when I call your name and, if you will, hold your applause until we will get them all standing up. Bill Adler. He's here. Alright, Bill. Bob Bayer, Executive Director of the Lobster Institute, Bob. Mike Chadwick from New Brunswick, Mike. Sheila Dassatt from the Downeast Lobstermen's Association. Sheila isn't here yet. Kenny Drake from Prince Edward Island. Morning, Kenny. Mike Sirois from New Hampshire. Mike isn't here. Anyway, please help me thank all these people.

Applause

Dana Rice, DB Rice Fisheries: And now I will turn this over to my co-chairman and he can take care of it.

Jean Lavallee, Aquatic Science, and Health Services: Thanks Dana. It's so nice to see you this year. I don't know if anyone remembers but last year I had to take on this dual personality role because Dana had to be called away from the Town Meeting as he was welcoming a new grandchild in his family. So it's nice to actually be myself a little bit today. I don't have to pretend that I'm you. I think, in addition to the planning committee, I think it's important that we also give our thanks to the staff of the Lobster Institute, the associate director, Cathy, if you want to stand up, and Deb. I think Deb is probably at the desk over there so if you just want to thank these guys.

Applause

Jean Lavallee, Aquatic Science and Health Services: Don't sit down yet. If there is anything wrong going on, if you have any questions for the next couple of days, she's the go-to person. Don't come to me or Dana because we don't know anything. So she's the one you want to talk if you need any help with anything or if you have any questions.

Sustaining a shared resource and a successful industry. I think that's what we want to do and I think that requires a lot of constructive and positive sharing of information and that's exactly what we're asking you guys to do today. I think, if you have your packet here, you have the agenda. That would be the sheet with Luke's and Cape Seafood logos at the top. We're gonna have a series or several presenters that are going to start the dialog, and there's going to a lot of opportunities for everybody to jump in and share their opinions and their thoughts. And we are going to do that all day. There's going to be also a special session later on today if there's any topics that were not covered by the presenters then that's going to be your chance to stand up and talk about that. Also in your packets, there's a blue sheet: and the blue sheet has the list of the presenters and all these people are going to be introduced when it's their time to talk. We're going to break for lunch around noon. I'm hoping we're going to be on time. We have a fantastic moderator that usually keeps us very much on time and on schedule so we are going to try to break around noon for lunch. We are going break for an hour and a half, reconvene around 1:30. At the conclusion of the day, we are going to ask you to fill out an evaluation sheet for day 1 and that's also in your packet. And that's very important to do. It's important because it gives us the feedback to try to improve the Town Hall Meeting very year. And also it's important for you guys to do it because, if you want to have a go at one of the door prizes, you need to fill out the information sheet. So you need to have that done if you want to be entered in the draw for the door prizes. I think I'm done, so I'm just going to give it back to Dana. He didn't run away. Where did he go? He did go, oh no, he's right there. I will let Dana introduce the moderator for the day and get us going.

Dana Rice, DB Rice Fisheries: Well, I did not have this on my script here so we're winging it folks. Again thank you all for being here today and it is my pleasure to introduce the moderator who has been a friend of the fishing industry and everybody in general for a long, long time, a good friend of ours, Ted Hoskins. Would you please

come up and try to keep this herd of cats straight? Don't let them wander off too far, Ted.

Ted Hoskins, Town Meeting Moderator: Thank you Dana, thanks Jean, and thanks to all of you for coming here. I just keep on getting déjà vu. A week ago today, I was sitting in Belize City with a group of commercial fisherman from all over the country and we were talking exactly the same things you are. And they're different lobsters. What we got down there is not this *Homarus americanus* with all these choppers there (although they're very jealous of your choppers because they don't have any on theirs), but they are concerned about precisely the same things down there in Belize as you are here. I started this organization about four or five ago and it's grown. And we now have representatives from all the communities around and it's just amazing to me to listen to you because you have, you have a focus on exactly what they need to focus on and will continue to do so more all the time. One of the things we get to do today is talk about it. And, as you have heard, we have people that are going to talk to you but maybe most important is what you have to say to us. And my eyes aren't good enough to catch all the name tags. I can barely see mine down here. But, when you do have an opportunity to talk, they are going to have a couple of people around here with microphones – and you just take that microphone, wait until you have the microphone, tell us who you are, where you're from, and then tell us what you're concerned about, what you want an answer to, what you want to raise up, what you want to deal with. We want to hear from all of you and as, I can't remember which of you said it, one of you said that we will have an opportunity later on to pick up things that are not on our agenda. So whatever's bugging ya, it's your responsibility to get it up here and get it out. Take a good look at those pages in your folder about the different zones and areas where we fish, both in Canadian and the United States. That helps you get oriented as to where people are talking about and, they say where they're from, you'll be able to figure out how that goes. That's important for you to have an awareness of that. We are going to be recording this. It's all going to be on record. I was listening to the news this morning up in the room there and they were talking about everybody what they said a year ago, five years ago, ten years ago…Watch out what you say but the good part of that is that they are paying attention to what you have to say and that's so that we can make a record of it so that we can take advantage of your thoughts and ideas and questions and get from where we are to where you feel we need to go. And it's in our talking together that we get the value of this. This is why we do this. Because we need to get together on both sides of this border, where somebody drew some lines somewhere, and figure out how we do it and how we are going to continue to do it – because this is a changing world and we are most aware of that. You may have noticed it's a little chillier in some places this winter and I hear tell that there's been some snow in the State of Maine and up here in Canada. And, for all I know, it'll keep right on going. But it is a changing world, and we need to be aware what makes the changes and how we participate in those. And it can't happen unless you people who are right on the ground tell us what's going on. That meeting I was at last week just reminded me, there was a presentation by one of the people in the fisheries department about what was going on in the lobster industry down there and they had it all straight lined out. We're doing fine, doing fine. Trouble is, we're getting too many fisherman and the fisherman were all sitting there shaking their heads because what

they saw was the number of lobsters going down as well as the number of lobsters going up. They know, you know, the fisherman know what's going on down there. But we have to hear from you. It's not just what you sell and get into the books. It's what you know and what you see going on that becomes extremely important to all of us as we try to move ahead. The recording will continue throughout the time of our session. I will remind you of it each time we begin a new major session. But that's merely because we really, really want to get this down. Now we are going to have official break about 10:15. Boy, we're close to time. I'm just supposed to start talking about two minutes but I will finish by then. But at 10:15, we are going to break. You know there are all kinds of food back there but don't wait for the break if you're hungry. Go back, get your coffee, get whatever they got for you to chew on, and come back in and join in. And we will take an official break at 10:15. Look at the focus of the day. There we go, oops, had it there. Anyway, these are some of the things we are going to be dealing with and the hours –I mean the sessions that go along there. So you can see what's going to come up. And we will have presenters and focused discussion. But, again, let me remind you, it's your meeting and the only way that's really going to happen is for you to make it yours. Let us know what you're thinking, what you're questions are, and where you want to go with it. Okay, basic ground rules. You know them, but I will go over them anyway. One speaker at a time, use the microphones. And don't be afraid of talking right into them and scaring everybody to death. It's much better then not being able to hear anything. I'm going deaf anyways so it's a good thing. Everyone gets a chance to speak so, if you still got your hand up, we're going to get to you before we move on. Don't fear you're going to be left out, we want to keep the discussion. This is the one that's in your packet (holds up Focus of the Day sheet). It gives us an idea of the focus and the things we're going to do – but remember the focus is not only what they've decided. It's your meeting. You decide what we're going to focus on, okay? And keep the meeting belonging to you. We have already had an opportunity to give some thanks to our supporters and those who have made this meeting possible and now we are ready to move right into the first session, okay? Alright, let me see what we got here. The first session is on labor issues and we've got two lobster processors who will share their experience and get the dialog going. You've already met both of them. Michael Tourkistas, his groups of companies have two processing plants and Luke Holden, from Saco, Maine, and I guess we will turn Michael to you first and let you get us going.

Inaudible

Moderator: Spiros, okay. Come on up and it's yours. You can say anything more about yourselves if you want to. If we didn't give you enough of an intro, go for it.

Luke Holden, Cape Seafood: Spiros is a bit of a legend in the industry, so I'll start.

Moderator: Pull the mic right up so we can hear you.

Luke Holden, Cape Seafood: So, my name is Luke Holden. I'm in two businesses. I'm president and founder of a restaurant group that's based out of Manhattan. We've got 15 fast, casual, quick-serve restaurants where we're serving high quality lobster, crab, and

shrimp rolls, chowders, bisques… basically exporting that lobster shack experience that you have in coastal towns all up and down the Eastern Seaboard. We're doing it in urban environments. So that restaurant group started in 2009 and then my family, in 2012, decided to build a processing facility to help facilitate the growth of the restaurant group. So the processing facility is in Saco, Maine. It's called Cape Seafood. This year our goal is to process between 4 and 5 million pounds of lobster; and we produce about a million pounds of Jonah crab as well, for the restaurants. I'm a second generation. I grew up lobstering but second generation processor as well. My father has been doing this for close to 35 years. It's something that I'm very proud to be a part of and have experience in operations now for 3 or 4 years – but it's been in my blood and my family for a long time. I've grown up around it.

Spiros Tourkakis, East Coast Seafood/Paturel International: Good morning, again. Spiros, East Coast Seafood/Paturel and Maine Fair Trade. I don't think that, on our part, we are doing anything different than everybody who is working hard in this industry. We're just like a lot of other company's who try to take our product and get it as far as possible to the best markets in the world, so we can get the best return to our suppliers, the boats, and the buyers and our employees. To get into a discussion starting with that, I would like to say that we have a major obstacle in doing that because the areas in which we operate, we have labor shortages comings. And that can be of multiple natures: either from lack of people, or government restrictions, or facilities where people can stay. In Maine particularly, we have besides some competition for labor from other industries like blueberry industries and wood industry. We have lack of housing that even if we bring employees, we don't have places to put them – and we're talking with the State of Maine to find some solutions. In fact, we had some meetings at the Seafood Show to find some solutions to house the people. In Canada, the issues are a little bit different. One is more remote areas, and competition from other species like aquaculture or other fisheries. And, at the same time, in our particular area, one of the problems we are facing – something that in the United States is unconstitutional – the government is telling us what we have to pay for labor. Something that has never happened before. Such an effort was in the United States last year, and it was voted and it was actually the courts that called it unconstitutional – that the federal government can tell you the minimum you pay but it is the supply and demand market that will decide what is being paid. In Canada, particularly right here in this area where we are today, New Brunswick, the government is coming in and telling us we have to pay 30% more whether we like it or not – although we meet every other condition and requirement. Obviously, there is a lot of uproar because of that. Because you have Northern New Brunswick for example that pays $3.00 an hour less and now in this area, here in New Brunswick, where we have to pay $3.00 an hour more. That's going to make it very difficult to operate. So these are, in a quick summary, some of the issues that we have. I wanted to tell everybody to keep in mind that unless we have the people to process the product you cannot get it to the market, whether it is Luke's product or whether it is live lobster or processed lobster. In order to be able to get the best return to the community, in order to do that, you have to be able to process the product. Whether it is live, whether it is frozen, whether it's pasteurized, whether it's meat, or whole frozen lobster, you need to have the access to the labor and these restrictions make it very difficult for us. Another quick example before I

turn this to Luke is, because of the lack of labor this spring in Prince Edward Island and in New Brunswick, we're going to be forced to make products that are a little bit different than what the market demands. For example, if you don't have a lot of people, you cannot do the most labor intensive job which is a cook and pick the meat or cut lobsters for tails. That means that, because of lack of people, we're going to be forced do a lot of whole frozen lobsters, whole cooked, whole raw or whole blanched. Likely the inventory of those is low and there is some strong demand right now. But, if you are forced in this industry to do something other then your normal, it eventually results in some kind of trouble sooner or later. So we have some serious challenges ahead of us and we are trying to work with the State of Maine and with the government of New Brunswick (who have been very helpful) and among others in the industry and the federal government in Ottawa to resolve it. But we do have some serious challenges.

Luke Holden, Cape Seafood: So directly tied onto that, when we see the bigger processing facilities shifting their production off the labor capacity that they've got, it completely changes the dynamic of the market. The 4 or 5 days we were in Boston at the Seafood Show and meeting with 20 to 40 different potential customers (a lot of them overseas), and the pattern that we see is that they want to see a lot of stuff going to the Far East and they want to see whole raw frozen and whole cooked frozen. In return, that market has almost developed *because* that's the products that the processing facilities have been able to produce because of labor shortages. They have not been able to produce as much meat and tails. They produce more whole raw frozen, whole cooked frozen. So that's what their big sales force has been out selling and building markets for. Well there's now a market for it and there's a demand for it and the trouble that I see in this whole thing is that it takes less labor and the markets are paying these high prices for those products so it's going to screw up the processing market for meat and tails. People are going to start paying more for that raw frozen, that whole frozen lobster, so that it makes it impossible for us to take the extra labor that it takes to cook, snap the claws off, cook, pick, take the tails off, clean, grade, size, freeze. So that all of those extra steps that go into further processing lobster are not going to get appreciated by the market because such a high percentage of the production is going raw frozen, going cooked frozen. We are going to be sitting there trying to make the raw material costs after production and labor work but they're not going to work because people are paying for a less processed product, if that makes sense. So that's sort of… I mean everything has cycles but that's some of the struggles that I'm worried about this season – where our business model is going to suffer and the cost of our finished raw materials are going to be too high. We have different problems in Southern Maine than certainly Maine Fair Trade has Downeast. We have access to great labor in the Portland area. It's very skilled. It's very loyal. We can pay fair wages, very fair wages, during the season; but because we have access to such great labor it comes with the challenges of being competitive with other industries that are in the area. So, by that, the challenges that present are the seasonal pieces of the business. When we're going like crazy in May and June with Canadian lobsters, and then August through November in the Maine lobsters, its all gravy; but then December through really April… that's partly why we brought on the Jonah species was just to kind of keep folks employed and keep the plant going. Because, if we don't keep them going, then they go somewhere else and they develop new trades and new skills and

it's very, very expensive and difficult to think about re-starting a plant and re-training folks when the season reopens.

Moderator: Thank you very much, both of you. Now we are ready to catch up with your thoughts. If at any time, you can't hear, raise your hand and we'll help the speakers get closer to the mics – but I think we got a good hearing on that one. And what we really heard was the connection. If you can't move it, it doesn't make much sense to catch it. And these are the folks that have to do with the labor and keeping this whole process going around. I'm talking now because I'm waiting for somebody to put their hand up and you can shut me off by putting your hand up and raising a question or making a comment. Alright, I think they just felt that you solved all the problems. Where's a hand, oh there we go! Dana. What's your name?

Dana Rice, DB Rice Fisheries: Dana.

Moderator: Dana who?

Dana Rice, DB Rice Fisheries: Dana Rice, thank you, Ted.

Moderator: And where do you fish?

Dana Rice, DB Rice Fisheries: I don't fish. I stopped that several years ago. I'm a lobster dealer in Gouldsboro, Maine, the town that Maine Trade Lobster is in. First of all, I want to say that everybody in the Town of Gouldsboro is extremely happy that Maine Fair Trade is there. They have been very good neighbors and created a lot of jobs. Unfortunately… Gouldsboro is the largest town area-wise in Hancock County. Unfortunately, we do not have enough local labor in basically a 30-mile radius of the town to keep the plant going. One of my other hats is Chairman of the Board of Selectman for the Town of Gouldsboro. I've had that dubious honor for a lot of years, and one of the things we are trying to do is work with Maine Fair Trade Lobster, and basically entities around or in the State of Maine, to create a place… if Maine Fair Trade is going to have to import people, we are going to need a place for the people to stay. Bunk rooms or rentals or whatever. It's a different world for us and Maine Fair Trade to work together and there seems to have been a little, not a little, but quite a lot of interest in a couple of agencies within State government – but putting this all together has been difficult and I think that's one of the things that needs to be said. Luke's situation is different but, as this stuff happens and things change, I think we all need to be working together. It's important to have this conversation here today so that people in Augusta and people everywhere … we all have to come together and help recreate this labor force that we once had. Maine Fair Trade is in the old Stinson Sardine plant that usually had 100 employees and they were all local people. Now a lot of them are my age or a little older. They're retired and not able to work in the workforce. Younger people need to come in and that's an important thing for us to be thinking about, too. (I'll stop rambling in a minute.) Because the towns, the communities that these industries are in, it's important to have young people there. And you know… It will be interesting to see what the comparison is to some of the other towns. It is a problem, a positive problem,

for us in Gouldsboro; but, trust me, it's a lot nicer problem to have then to think there's nothing here for young people to do. 200 and some odd jobs, 225 jobs, I think, is the average at this processing plant so far. And, without those, the town of Gouldsboro would be a much, much different place. Thank you.

Moderator: Thank you Dana. What I hear you saying is that this is really all our problems. We can't just say that it belongs to the people who are making the hiring and running the plants. We have to make sure that people know about the opportunities and find ourselves, in some degree, if I hear that correctly, politically active in our own communities. Is that right, Dana? To really be participants in what's going on because the whole process has to work for the process to work at all. Some more comments. Yes, Bob?

Dr. Bob Bayer, Lobster Institute: Question for Luke and Spiros. How do these labor issues affect the boat price of lobster?

Moderator: You want to take that on Spiros? Or Luke? You might want to repeat the question. Did you all get the question?

Spiros Tourkakis, East Coast Seafood/Paturel International: The question is, how does it affect the boat price? I think Luke answered it very clearly without numbers; which is, you cannot produce the items that you want to produce if you are forced to produce something that is going to stay in the freezer. I'm just describing it in a nutshell. You're creating more product that you don't have the market for, so you put it in the freezer and you hope you're going to sell it. At the same time, you don't satisfy the customers that count on some of the products like Luke explained. So eventually that comes back to bite you, because you're not going to be able to satisfy your markets. So it might look good for a few days up front that… okay right now the whole or cooked market looks good because of some Asia demand; but after you fulfill it, you haven't satisfied the demand for let's say tails, claws, or meat. You're going to go back there and say okay what are we doing now? It creates a dis-balance which prevents you from producing what the market wants. And that, as a result, is going to force the processors to stand back and say nope, I can't do this… I don't want to do this. So that has as a result again in the long-term – a negative impact to what you are going to pay for product. Now it's very difficult to put numbers into it, but I can assure you that it's a negative result and it's going to rethink what the acquisition cost is going to be. Just to give you the challenging situation that we have in Southern New Brunswick since a lot of you are from Southern New Brunswick. The average processing plant, for example, pays about $11 an hour plus, you know, benefits and everything that you have to provide in one part of the state. In Charlotte County, we are going to have to pay $14 an hour. That's $3.00 an hour more on a 200-person workforce. You're talking $600 an hour more on an 8-hour day – which most of the time is a 10- hour day – but say an 8-hour day: you're looking close to $5,000.00 a day on 200 processing days a year. You're talking about a million dollars that the federal government is trying to impose on companies. Thanks to the government of New Brunswick, we have a lot of ammunition and we're fighting it; but obviously you see that if some companies are forced to pay,

over the competitor's, a million dollars more… that's something that the processing plant does not make in a year. It's a big challenge here that makes it very difficult to cope. I think we want a smooth operation, which starts from acquiring the product and putting it properly through our plants so that it can reach the market. Lack of labor disrupts this chain and that's going to have serious implications on both ends of the chain. Hopefully, we will be able to resolve these issues and a lot of effort is being made as we speak with lawyers and with government officials, both in New Brunswick and Maine, to resolve that. So I'm a little bit optimistic that we are going to make some progress, maybe not 100%, but some progress. That's how I explain the boat.

Moderator: Luke, did you want to add to that?

Luke Holden, Cape Seafood: Not substantially. I mean, I just entirely agree that, when you don't have enough labor to make the business decisions that you want that are best for the market, it's going to cause you to work inefficiently. And if you work inefficiently, then you are going to have to back down the risk. In a processing world, that means that you are going to have to pay less for the product because you're going to have financing costs of holding inventory, cold storage costs of holding inventory, plus uncertainty of where the market is going to pay on that price on the finished product. Obviously if you can't manage the business the way you want to manage it because you don't have enough labor then that creates less viability.

Moderator: Thank you. Most of you folk are out on the water fishing and you have labor problems, too, unless you are just a solo fisherman. You've got to get a stern man, and that's not always the easiest thing to get a stern that will really be there for you and know what's going on. So you get some feel for the necessity of all this working together and our working with the young people. Glad to have a young fisherman over here. And I know down in our way, down in mid-Maine coast, we are working on a marine pathways program for high school kids to get them into understanding what's going on in the marine trades and get them all set up so they can be good stern or play any of the other roles including in the processing. Alright yes, Cathy?

Cathy Billing, Lobster Institute: Just some perceptions that I have in talking with folks: one being that, because of the seasonality of the catch, sometimes it's difficult to keep employees because you can't have them full-time. So what do you do when there's nothing to process? And jointly with that is what happens when, as we saw a couple years ago, there was a massive catch of soft shell lobsters early on and, as I understood it, processes weren't even geared up to process – and what might happen this year if the catch comes later because of the cold water. It seems like a real delicate balance that has to be danced there and I don't know how you all do it and how that impacts your businesses.

Moderator: Thank you Cathy. Yes?

Kathy Heanssler, Conary Cove Lobster Company: We have lobster pounds and we're wholesale dealers. We have two lobster boats now – and we will have 20 or 30 come

mid- July, mid-June – and we have carried a few people through the years, given them housing so they will work through the winter. We even had them sweeping floors and mending nets because we really don't have work in the winter. The lobsters are in the pound waiting to come out. What we do in the spring and what we are doing right now is hire laid-off stern men – and they love the work. We have four right now helping us. But, come June or July, they're all gone. Last year we hired a man to help, we kept him all winter. He would eventually have gotten a bonus and gotten health insurance but he left because he got an offer for three months. He thought he was going to make a lot of money being a stern man. And that's what's happening to us. We're losing good help because they are going to make more money for three months and can play for the rest of the year. So we are in the process of hiring foreign help. And it's not easy. You have to navigate the government. Last year I tried it. I started it and, talking with the labor people, they gave me the wrong forms, told me the wrongs forms to fill out. so, after passing the first stage, I moved on to the next one and they said, well you aren't supposed to do that. So this year, I have an agent working for us and we are in the process of bringing three people over from the Philippines. And he said I can get you people from Jamaica easier. And I said well they are going to living with us. We are going to be taking care of them. We want people we know and this is my daughter-in-law's brothers. And they are excited to come to the US because they will make in three or four months what it would take three or four years in the Philippines to make. I'm just hoping that it works out because we can't keep people – and we're working 10 hours, 12 hours a day, six days a week. I'm down there (I'm getting old, I'm getting ready to retire) but I'm down there loading trucks at night and stuff because we don't have enough help. And we can't get them and we do pay them good. We also have put a number of kids through school because we had hired in the past local high school kids and kids from the church. And they were great workers but they do leave in September. And, because they were good kids and they worked hard, we have given them scholarships and bonuses and they come back. But then they eventually leave.

Moderator: Thank you very much. That introduces a whole concept of immigrants and people coming from outside and the idea of getting someone to help you go through that process is very good.

John Williams, lobsterman, Stonington: Can you talk more about the pasteurization process and what level of product that it puts in the market place. Is it an expensive product? Is it a cheaper product? All I do is hear about it and read it in the paper, but can you explain some of that?

Luke Holden, Cape Seafood: What was the word that you used? Pasteurization?

Spiros Tourkakis, East Coast Seafood/Paturel International: We have created pasteurized lobster meat, which we are doing here in Deer Isle, and it's a new product. It's going to two supermarkets in the United States. It has very good success so far. And it is patent pending actually. It gives a six-month shelf-life to the product. It takes a little bit longer with that. I don't know exactly the technical details but I expect to see more of that coming up in the market, particularly to areas through the supermarket stage and not

the restaurants, but the supermarket stage. So that's everything I can tell you right now. But it's a good product. Obviously it's not fresh and not something that you can use for two years or even a year but it's a good addition we expect to expand.

Moderator: Thank you. Right, yes?

Laurence Cook, fisherman, Grand Manan Fishermen's Association: Laurence Cook, Grand Manan Fishermen's Association. Right now, the unemployment rate in New Brunswick is 10.4%. Last month, in the State of Maine, it was 6%. If we have this number of people on the government dole so to speak, on unemployment. It seems to me that it would behoove the government to slack up on the unemployment and put people back to work. There's no need of having a shortage of workers in New Brunswick when 10% of New Brunswick's population is unemployed. It seems like this might be a government problem and I was wondering how other people felt about that. I bet, if the unemployment checks stopped coming, you'd have some workers in your plants.

Moderator: Thank you Laurence. Others? Yes?

Luke Holden, Cape Seafood: That was well said by the way. I just think the reality is that a lot of people don't want to work. In our facility in our company, we've got 80% of our workforce that is very stable and very hardworking, very loyal. And then we've got 20% that explains the unemployment rate.

Laughter

Moderator: Okay. Alright John?

John Nicolai, Lulu, Inc, Bar Harbor: John Nicolai in Bar Harbor. I'm not a lobsterman. I play one in the movies. I have a tour boat and I demonstrate lobster fishing. One of the big challenges we have in Bar Harbor for tourism is to find affordable housing for employees that come there that are seasonal. And I think a lot of industries face the same problem, like the blueberry industry, and housing seems to be a big issue. How does that factor in as far as processors go to attract people to come to their area as a labor force and provide them with housing that they can afford? For example in Canada, your seasons are kind of reversed with ours. Housing that's used for tourism may be used for people that work in processing plants, and swap that housing out between a collaboration between the tourism industry and fishing industry. Is that a complicated issue for you?

Moderator: One of you want to speak? I think you mentioned that earlier about housing. But would you like to speak to that?

Luke Holden, Cape Seafood: Labor is not as big of an issue as far as access to labor down in Southern Maine. I mean, speaking from a facility in an area of the state that doesn't have problems with labor, I still know that the margins in the processing business are razor thin. It's kind of a silly business. It's high risk, low reward in every sense of

the word – whether it's the oversight that we've got on regulatory boards or it's just the high financing cost that go into having infrastructure to properly produce lobster to be competitive. It's super thin. So, for Maine Fair Trade thinking about how they would not only support a processing facility but then also erect housing so that they can put folks in housing, I don't see where the economics are as it is now.

Spiros Tourkakis, East Coast Seafood/Paturel International: It is awfully difficult and actually I have been talking to the government. We've even been thinking of putting them up in a motel so we can help to keep the people there. But like Luke said, everything is up and so expensive. But we've got to keep going one way or another. The only thing that I would like to encourage is it seems this directly benefits not only us but the shore and the fisherman. We would like to see the fishermen's organizations on both sides of the border to exercise as much power as they have on their local and State or Provincial or Federal government particularly in Canada in order to help resolve this issue because it is going to benefit them directly, I think.

Moderator: Yes.

Melanie Sonnenberg, Grand Manan Fishermen's Association: I just want to let you know that we have…

Moderator: Your name please?

Melanie Sonnenberg, Grand Manan Fishermen's Association: Melanie, Grand Manan Fishermen's Association. We have actually, just as recently as last week… the fishing industry has come together with Jerry and _____ and we will be reaching out and working collectively in a coalition formation here in Canada to put a little… not a little… a lot of pressure on government in terms of some of these issues. So I just thought, if you weren't aware of that, I'd let you know that the Maritime Fishermen's Union, the Eastern Fisherman Federation, the Prince Edward Island Fishermen's Association are all coming together to have this discussion under the guidance of Jerry and to reach out to government.

Moderator: Thank you. Just pass it right down to the end of your row right there.

Kimberly Watson, Province of New Brunswick: Thanks, Melanie. That was actually something that …

Moderator: You want to give us your name, please?

Kimberly Watson, Province of New Brunswick: Oh, sorry. Kimberly Watson with the Province of New Brunswick, and, with the labor issues…

Moderator: Lift the mic up so we can catch it all.

Kimberly Watson, Province of New Brunswick: How am I doing now?

Moderator: There we go.

Kimberly Watson, Province of New Brunswick: So the labor issues… Absolutely this is a concern. There were a lot of discussions that happened in Boston this past week, around that. Certainly Minister Doucet is very aware of that. We're struggling with a recent change in temporary foreign workers policy that is under Federal jurisdiction. This is having huge spillover for the labor markets as they exist… so there's a lot to that. As Melanie mentioned, there certainly is an effort to pull together all of the industry and all aspects of the industry. Jerry Amirault has been really great on that. Geoff you've been very involved in that as well. And we're doing what we can to get through this first year of a change in policy that, from the Federal government perspective, is having spillover onto the regular workforce. A very difficult time and I just wanted to continue to say to people like you, Mr. Tourkistas, the Province continue to be very dedicated to trying to address this situation. And we certainly do hope that it is a temporary situation and some of these federal policies will be altered so that there are not things like a prevailing wage in one part of the Province that does not match the reality that exists in other parts of the Province. Thank you.

Moderator: Thank you very much. That's very helpful. Right up over here.

Geoff Irvine, Lobster Council of Canada: Geoff Irvine from the Lobster Council of Canada. We have been very active with this but the lead on this has been Jerry from the New Brunswick, Nova Scotia, Lobster Processors Association, and he's been working every day by the hour on it. One thing that we are asking for is an exemption like the agriculture workers have in Canada. The agriculture sector has an exemption that can bring in an unlimited number of foreign workers. We need that for the seafood sector. Not just the lobster sector but the fish and seafood sector. And we need to apply political pressure at every level as someone said earlierm and we are not very good at that in Canada. We are very lousy at it. And I encourage everyone to, through their associations, put pressure. It's a federal program change. It's very much linked to what Laurence said. The Federal government wants to lower… believe it or not, they want to cut back on EI claims; and they are trying to do it through lowering foreign workers, which really kills us in the seafood sector. So we need an exemption. That's what we're working hard to get in Canada. We need more foreign workers because we don't have the local workers, and we need political pressure. We need everyone in the room to apply it.

Moderator: So we are all in this together and we need to keep at it. Alright, over here on this side. Two. One here and one here.

Dennis McNally, fisherman, Prince Edward Island: Dennis McNally, fisherman, Prince Edward Island. I was just wondering, there's a difficulty sourcing labor, is there not any room for enhancements in mechanization? I realize that you are always going to need some people and hiring people is never a bad thing. But I just thought that might lead to enhanced mechanization and a little of relief in labor shortage. Thanks.

Moderator: Okay, we are going to have a response to that and then we will get over here.

Geoff Irvine, Lobster Council of Canada: It's Geoff again. The second thing I forgot to mention is we are very active working on automation. We did a project last year with five plants, three in New Brunswick and two in Prince Edward Island where we sent a consultant in to analyze their processes to see where automation could take the place of people. And we are working on the second phase of that now. Another project that we're funding right now to go and look at all the available equipment around the world, see if it can be used in lobster processing. And also to take a look at the intellectual property issues… so we are chipping away at that as well. So it's automating. It's figuring out how to pay people more money. It's getting an exemption for foreign workers. There's a whole bunch of solutions but automation is a key one. Just wanted to make sure that you know we are working on that too.

Moderator: Thank you for that response. Yes, over here?

Christopher Johnson, Maine State Senator: Thank you. Chris Johnson. I'm not a fisherman actually. I'm used to be on the Marine Resource Committee. I'm here for the panel, but I just wanted to make an observation and pose a question. Maine's blueberry industry is a highly seasonal harvesting activity, attending fields, even a shorter season than we have in lobstering. And, in addition to the direct market they have, they put up a huge amount of blueberries that they flash freeze in bulk; and then do more processing and adding value in a much longer season than their harvesting activity. I was wondering if you are doing any thinking about what sorts of products strategically you might increase demand for through targeted marketing that would be amenable to doing something like that, having processing over a longer period of time of something that you have frozen in the harvest season.

Moderator: Spiros? Luke?

Spiros Tourkakis, East Coast Seafood/Paturel International: A good point from Geoff and the gentleman from Prince Edward Island who was very right. Automation becomes more and more a part of our lives but, of course, it cannot resolve all the issues. We have to take into consideration that the lobster is much more expensive then the blueberries and it is not as easy to store for a later use. But we do do that. For example, when we have a lot of product in the month of May and June, we cut the lobster and put parts of it in the freezer only to reprocess it at the down time. Normally that happens between the Canadian season and when the Maine season picks up. Also, at the same time, when we have a lot of lobsters in December, we do exactly the same process; and we process them in January and a little bit in February. I don't know if I answered your question but that's what we do. Maybe not as sophisticated or as well as the blueberry.

Inaudible

Moderator: Just a moment, get a mic so we can... Right. There you go.

Christopher Johnson, Maine State Senator It just seems that part of your difficulty with your labor is the risk from their perception of working for you and being unemployed part of the year. So I understand from earlier statements that's part of your challenge. You want to keep them on and I was just curious. Obviously I don't have the solution to that. It is different, lobster processing and blueberry, but whether you are trying to find ways to increase the stability of the employment so that it would positively impact your operations.

Luke Holden, Cape Seafood: We certainly are, I think the two big differences between the blueberry.

Moderator: Excuse me. This is Luke responding.

Luke Holden, Cape Seafood: The gigantic differences between the blueberry and the lobster industry is first: there are ways to freeze parts and then thaw and process them in the future. But they are not as high quality so you are taking a degradation on quality. And then the other piece is the pure capital that goes into holding inventory and then thinking about further processing it. Margins are thin so, if you are going to touch things twice, you are going to need to turn it into a higher value product then initially. And, again, if you are doing…. And these guys do an enormous amount of lobsters. For us, if we do 30 or 40 thousand pounds of lobsters in a day, I mean that's 200,000 bucks in the freezer. We don't have that type of money. So we have relationships that spin this stuff as soon as it's produced. So to think about holding that product so that you can then touch it down the road is not in our capabilities. And the way most processing facilities are set up is similar to us, where there's big marketing firms that have huge lines of credit that can hold inventory and it's part of the system. They buy inventory at 'x' and they have the ability to hold it and to sell it at 'x plus a percent'. There are not very many processing facilities that have those extreme lines of credits or financial ability to hold inventory. The long-term solution, because this is what we're thinking about… (I mean the automation we're thinking about)… the further value on production is what we're thinking about, and the only way to do that is to is to look at your lower value proteins and find ways to get more value out of that. Whether it's meat from the legs or the mince or any of the byproducts of lobster that's not the meat, not the tails. If you get more value out of those and you keep people busy even it's making key chains out of the crusher claws, stuff like that is the way to kind of keep people busy for a hot minute. Those are the issues that we are trying to solve as well so it is a good question. It's just probably not totally relatable to blueberries.

Moderator: Thank you very much, Luke. Some more questions. These are good points that we're raising here. Over here, Dana?

Dana Rice, DB Rice Fisheries: Well just quickly…

Moderator: Who are you, Dana?

Dana Rice, DB Rice Fisheries: Dana Rice D. B. Rice Fisheries.

Moderator: I want to make sure you know.

Dana Rice, DB Rice Fisheries: Gouldsboro, Maine. Home of Maine Fair Trade Lobster among other things. Just a quick point. This has been a good conversation. Labor is obviously an issue. It doesn't make any difference whether you're processing lobsters or whether you're a lobster fisherman. You can always find somebody to go in the stern of the boat but finding a good labor force is something quite a lot different. The point that I am going to try to make here obviously is, as I said before, is it's important to the Town of Gouldsboro because it creates a labor force. These are good neighbors, tax payers in the Town of Gouldsboro, and otherwise. If the lobster industry left the Town of Gouldsboro right now, there would be absolutely nothing left there. There would be some retired people and summer people there that would be paying the taxes – and schools would suffer and the whole infrastructure would suffer and that's the point that I am trying to make. And in the paper in the last month or two, the impact of the lobster industry on the economy of the State of Maine has been publicized a little bit. What people don't realize – and it doesn't make any difference whether its Maine or Canada – what people don't realize is how important the fishing industry, or the lobster industry and it's related industries are to the economies of New England (Maine especially because that's where I live) …New England and the Maritimes. And we are all in the same boat. Whether Luke is looking for labor, his labor problems, or Spiros is looking for a place to house labor; we all need to be paying attention to this issue. And it is critical that we all get together. And, if you are a lobster fisherman, you want to go to haul and catch lobsters and come in and sell them to someone like me and give me hell because I'm not paying you enough and all of that…but my point is, whether it's Luke or Spiros or whoever it is that is in this chain that's supporting the economies of two countries or the maritime Provinces and the New England states, it is incredibly large and we need to take credit for that; and we all need to work together to get the assistance that we can from our government representatives in making sure that this thing lasts. We are all in the same boat. If fishermen are making money, everybody else will. Thank you.

Moderator: Thank you Dana. One comment there and then we are going to take a break.

Brian Guptil, Grand Manan Fisherman's Association: First I would like to thank…

Moderator: Name?

Brian Guptil, Grand Manan Fisherman's Association: Brian Guptil, Grand Manan Fisherman's Association. I would like to thank Spiros for admitting for once, the only time I have ever heard it, that there wasn't piles and piles of lobsters frozen in his storage. But to Dana's point, we shouldn't be asking the government for assistance. We should be demanding the governments remove their restrictions to our development. Thank you.

Moderator: Thank you, that's a good point to get off on and we can go demand some coffee and good breaks. We have 15 minutes. We're going to be back here in 15 minutes. Oh Spiros has one last comment.

Spiros Tourkakis, East Coast Seafood/Paturel International: The only thing I'm saying is the tough battle that we have, I want to thank very much Kimberly and her colleagues in the New Brunswick Government who have done a great job supporting us in the labor issue. Thank you, Kimberly.

Moderator: Thank you, Spiros. And I will thank both of you for this leadership you have given us in thinking and say, go get it. 15 minutes and we'll be right back here. Thank you.

Break

Ted Hoskins, Town Meeting Moderator: Newspaper man here. You probably saw this Fisherman's Voice out there and that's Mike Crowe right back there underneath the sign right there. Wave to us, Mike. He runs the Fisherman's Voice and has been with us for a long time and does a good job for getting the word out. Okay, this next session is going to be led by Cathy Billings of the Lobster Institute and it's going to do with ocean health… and that's something we are all concerned about. Cathy, it's yours.

Cathy Billing, Lobster Institute: Alright, thank you, Ted. So I am actually going to try to lead you all in some discussion as opposed to just saying some remarks from up front. We all know that the oceans are as complex as they are vast and the whole concept of what a healthy ocean is can be kind of mind boggling, but I want to use this session to sort of get us trying to wrap our minds around that so that when we go into the sessions this afternoon that get more specific about certain topics directly related to ocean health, maybe we will all be kind of thinking along the same lines, moving in the same direction, and so forth. But I want to first run through just a very small little exercise just to kind of loosen up people's tongues, get the wheels moving a little bit. What I would like to see first off is a show of hands….how many people own a truck? Truck? Okay. Now here is the question I'm going to ask you. Ford or Chevy?

Unknown 1: Dodge

Cathy Billing, Lobster Institute: There you go, everyone's got a different opinion. Why Dodge?

Unknown 1: Service, warranty, and all that. I've got about 15 of them.

Cathy Billing, Lobster Institute: Who would not own a Dodge for the life of them? Anyone? Who's got a Chevy? Why do you have a Chevy?

Unknown 2: Best truck going, only had one.

Cathy Billing, Lobster Institute: Ford? Got a Ford fan here? Would you own a Chevy?

Unknown 3: If the price was right, I would drive anything.

Laughter

Cathy Billing, Lobster Institute: See? So, you all have different opinions but you can all vocalize them, so that's what we are hoping to get out of everybody this morning. A lot of times, we have the same guys that talk – but everybody has an opinion and everybody can vocalize it. So that's what we are looking for. So what I would like you to do now is take that Lobster Institute pen or your own favorite out of your pocket, find a piece of paper in your packet and, on the back of it, write what you think is a healthy ocean. It could be a couple of adjectives, it could be a sentence, you can talk to your neighbor about it, compare some ideas. Just take a few minutes for this exercise and then we will go over it all as a group.

Cathy Billing, Lobster Institute: You can write about your particular coast line, harbor. You can write about generalizations, try to get the big picture out of this as well. Just a few thoughts. What is a healthy ocean? What kind of factors go into creating a healthy ocean? What's healthy?

Cathy Billing, Lobster Institute: This will not be handed in and graded. Just to get your thoughts collected a little bit. So I've enlisted Deb Seekins here from the Institute. We acknowledged her earlier but she was outside. Can't run the show without her. She's going to do a little bit of typing so we can get your thoughts onto the screen, onto the PowerPoint and capture them for later on. Darcy, I am going to ask you to join me in the circle and we will just go around and check in with folks what they think a healthy ocean is? Anybody want to go first? Raise their hands before I just start calling on people. Alright.

Brian Newell, RBN Fisheries: You have the City of Halifax putting millions of gallons of sewer into Bedford Basin every day. You have a lot of other cities, too, dumping their sewers. How can you have a healthy ocean doing that? You have a lot of ships doing the same thing. All their sewer pipes from the bathrooms go directly into the ocean. They don't have holding tanks on them boats, so that's why you've got a real mess.

Cathy Billing, Lobster Institute: So we're talking free of pollutants? Free of dumpage, sewage. Anyone else? Who's next?

Unknown: The bait industry. They're using plastic to wrap this bait and how much of this plastic is going overboard? I think that's something that needs to be changed so that there is a biodegradable material used to wrap this bait so that, if it does go overboard, it will take care of itself.

Cathy Billing, Lobster Institute: So plastics is a problem, bait bags, etc. Gentlemen over on this side?

Peter Holt, St. Andrews, LFA 36: I'm concerned about the pesticides that are going to go into the ocean or already has gone in.

Cathy Billing, Lobster Institute: Okay free of toxins and pesticides. Herb?

Herb Hodgkins, lobsterman, Hancock, Maine: A normal oxygen content saturation…normal oxygen content in ocean water is between 8 and 8.5 parts per million. And, of course, it will fluctuate a little with the temperature of the water. The higher the temperature of the water, the less oxygen there. I think that influences a lot on the movement of crustaceans on the ocean floor.

Cathy Billing, Lobster Institute: Okay, proper oxygen content.

Ted Hoskins, Town Meeting Moderator: Where there's a balance of species, pray and predator, on all levels, plant and animal at the micro and macro and a lack of toxins and negative pH in the water.

Cathy Billing, Lobster Institute: Okay, so we have had toxins come up again, that's already on there. A balance of species, macro and micro level, pray and predator.

Jean Lavallee, Aquatic Science and Health Services: I think mine is very similar to Ted where I think diversity of the ecosystems and also sustainability.

Cathy Billing, Lobster Institute: Sustainability. Good new addition along with diversity. When you say sustainability, Jean, can you elaborate a little bit on what you mean by that?

Jean Lavallee, Aquatic Science and Health Services: I'm thinking carrying capacity of the ocean in terms of fishing, in terms of all activities happening.

Cathy Billing, Lobster Institute: Okay, who's next? Someone down on this end.

Tammy Blair, St. Andrews Biological Station: Hi, I'm Tammy Blair. I'm from the St. Andrews Biological Station, and I also had diversity down as one of my criteria for a healthy ocean. I'd add to that productivity. I think that the species that live in the ocean are a reflection of the condition of the ocean. If they're healthy, if they're productive, then so is the ocean that they live in.

Cathy Billing, Lobster Institute: What do you call productive?

Tammy Blair, St. Andrews Biological Station: Productive, well in terms of a population stand point, there is, you know, continuing generations of that species and, in terms of an individual stand point, a healthy growth for an individual.

Cathy Billing, Lobster Institute: Anyone else?

Eugene O'Leary, Lobsterman, Whitehead, Nova Scotia: Hello.

Cathy Billing, Lobster Institute: Gene, what do you have?

Eugene O'Leary, Lobsterman, Whitehead, Nova Scotia: Eugene O'Leary, Eastern part of Nova Scotia, where it is clean, pristine, and forever productive as a provider for all.

Laughter

Cathy Billing, Lobster Institute: Okay. Now we heard one definition of productive over here. What do you mean by productive?

Eugene O'Leary, Lobsterman, Whitehead, Nova Scotia: Basically the same as what she said really.

Cathy Billing, Lobster Institute: Chris, go ahead.

Christopher Johnson, Maine Maine State Senator: One of the things I'm sensitive to is just based on some science that's been done lately is what the marine microorganisms are and the balance of those. Some of the things happening in the ocean, whether it's the changing chemistry or temperatures, can throw off the cycle. Some of the marine microorganisms being available when another species needs them in their reproductive cycle. So you have things going on that might not be disastrous for any particular species alone but how they influence each other changes… and that's a problem.

Cathy Billing, Lobster Institute: So like a balanced food chain progression?

Christopher Johnson, Maine Maine State Senator: Yes.

Cathy Billing, Lobster Institute: Dave?

Dave Casoni, **Mass. Lobstermen's Association**: Proper pH of the oceans. I think that's going to be a problem we are going to be facing in the future, the very near future.

Cathy Billing, Lobster Institute: Thanks. Anyone else on this side, that side? Ya'll have something written down so. There's a gentleman over there, Darcy.

Dave Thomas, lobsterman, Cranberry Isles: Dave Thomas, Cranberry Isles Fishermen's Coop. To me a healthy ocean starts and begins with us, with man, inhabitants of this planet. A healthy ocean has to be free of all man-created pollution whether it be plastic, toxins, or anything else, sewage. We have to stop using it as a dump.

Cathy Billing, Lobster Institute: So, if we have man having an impact, is that something that you see as… if there were no humans on the Earth, would the ocean be normally just healthy?

Dave Thomas, lobsterman, Cranberry Isles: It certainly wouldn't have little pieces of plastic and microorganism sizes floating around in it. It wouldn't have oil platforms burning and killing various whatever, be it the tuna that bred there or whales that bred there. We don't have a very good history of what we leave behind us, whether it's on the ocean or on the earth itself, the planet, where we walk.

Cathy Billing, Lobster Institute: Okay. We'll talk a little bit more about human impacts because obviously we aren't going away so we are going to be here. We are going to impacting the ocean. The ocean will impact us in our lifetimes. How about somebody over here?

Unknown: I think there's a degree to which it's all a moving target because of all the change that the oceans are experiencing and will continue to experience. And so I think part of the definition of ocean health is its ability to maintain these functions and productivity despite the changes that it's experiencing.

Cathy Billing, Lobster Institute: So, if you capsulate that in a word….resilient, perhaps? Resilience?

Carol Guptil: I'm Carol Guptil and I'm just the wife of a fisherman and my son is a fisherman but, what I think of as an indicator of a healthy ocean is a lot of bird life and activity up over the ocean. Qnd that's something I have noticed in the last few years, especially in the Bay of Fundy, that we don't see.

Cathy Billing, Lobster Institute: Okay. Proper bird life, again going back to that balance of species. Right over here?

Unknown: My idea of a healthy ocean is full whether it has animals to catch or something for them to eat. One of the things I have seen disappear since I've been ground fishing in the 80's is the small bug-eyed shrimp, we used to call them. I don't know what the technical name is for them. We didn't catch those but they did disappear. And every fish we ever caught in the summer time, especially inshore, was full of them. They've gone because whatever they didn't want to live there anymore but, until they come back, our fish won't be back inshore I don't believe. They've gotta have something to eat.

Cathy Billing, Lobster Institute: So we are bringing in the human factor again. Not only are we looking for a balance of species but we're looking for those species to support our fisheries and to provide us with a food source. So that's another component of the healthy oceans.

Mike Chadwick, Atlantic Lobster Sustainability Foundation: Mike Chadwick of the Lobster Foundation. The healthy coastal areas – and, here I'm thinking of estuaries, the movement of sea in and out of our rivers, the mangroves, wetlands, and marshes and so on – I think that's very key because most our fishes, 90% of them, are coastal. So 90% of our livelihoods are coastal. So I think that the oceans are a vast place and I was going to say it later but I will say it right now… that we are worried about man's domination of the planet. There's more humanity than the weight of the fish in the sea and there's more humanity than our farm animals, than 20x all the terrestrial wildlife. So we're a huge impact on the planet. Secondly, the ocean, we worry about the ocean but the ocean is 400 times bigger then the atmosphere. And the atmosphere is a thin little onion skin around the planet. And it's what causes the storms, its water vapor generating energy which gives us the grief we had earlier this week. But the ocean is 400 times bigger then that, and anyone who does scuba diving knows that 10 meters down is one atmosphere and the average depth of the ocean is 4,000 meters. So the big ocean and the coastal areas, I think it's good to distinguish them and there you are.

Cathy Billing, Lobster Institute: So ecosystems within ecosystems. Anyone else want to share? Well then let's put up what we have and see our slide show. Okay, a little bit small but we have: no city or ship sewage dumping; be aware of plastics, bait wrappers, etc; free of toxins and pesticides; a proper oxygen content; balance of species, prey and predator; diversity of the ecosystem; sustainability; productive species, healthy growth of species; clean, pristine and a provider for all (from our emperor in the back.) Microorganisms – temperature change throws off their reproductive cycle; balance of food; proper pH. Healthy oceans start with the humans…we must stop pollutants, oil, and plastic problems; a resilient ocean is a healthy ocean…ability to remain productivity in spite of changes; proper bird life, again balance of species. A healthy ocean is a full ocean and many of our species have disappeared so we are looking for that balance again. We also have to be aware of the rivers, marshes, mangroves, etc in the immediate coastal regions, and those areas that lead into the ocean are also part of maintaining a healthy ocean. So we heard a little bit of your definitions. Here's one from a gentleman named Sandifer. He says "For millennia the oceans have been perceived by mankind as a producer of essential protein, a vital transportation artery, a source of great danger, and the greatest mystery on the planet. We are just beginning to understand the numerous and complex ways in which humans can affect the oceans and the oceans in turn can affect human health." So we are seeing an interrelationship here according to this definition and you all brought up the same thing. Most everything you mentioned… there was a human connection between what's going on with a healthy or a non-healthy ocean. So how would we then quantify this? What would you measure to determine if a body of water is healthy? We can say what's healthy, what's not healthy but, if you're going to find solutions, if you are really going to understand the complexities of what makes an ocean healthy or not healthy, you're going to have to be able to measure something. Anyone care to build on that theme? I know that the gentleman mentioned pH, mentioned oxygen.

Laurence Cook, fisherman, Grand Manan Fishermen's Association: Laurence Cook, Grand Manan Fishermen's Association. I think one of the things we all need to realize

here is we don't know really what a healthy ocean is. Did anyone predict a steady increase in lobster production like 10 years ago? Did you think it was going to get a lot better than it was then? I didn't. Nobody predicted it. Nobody in science said, "Boy the ocean's really going to start producing and we are going to have a lot more of these." Two years ago, three years ago, there wasn't a scallop anywhere to catch. Now people who have never done it before can go out and catch them anywhere. The beautiful pearly white meats. They are very healthy. We are seeing a return in ground fish in lobster traps. Haddock, pollock, it's coming back against the negative pressures that are on it. Is the ocean healthy or unhealthy? Well, it may not be pristine nor is anything else. The foot print is already there. But we can't get to the point where we say the ocean is desperately unhealthy because it's still producing a tremendous abundance of life. I'm more worried about toxins then I am sewage, for example. We think things that are bad for us are bad for everything because we are an arrogant species. The fact is a lot of algae blooms and things like that come out of waste, right? And then krill, small animals, feed on the algae and bigger ones and so on up the food chain. We think we'll chlorinate the water and kill everything in it and that's healthy. Well, it isn't. So we have to be careful when we're saying what's healthy and what isn't healthy. Do we really know what we are talking about? Is it healthy for us? I mean, I can't have a fecal content in my water but shrimp can't have any chlorine in theirs. So when we're making our decisions about what is healthy and what isn't healthy remember it's not just this big arrogant species sitting in the room that we are talking about. And a lot of the things that are good for us are bad for them and visa versa. So I think you have to think carefully when you say, a little of sewage is horrible. It doesn't look very nice but did it really do damage to the environment? Not nearly as much as if you dip a buoy in Javex and throw it overboard. Not nearly as much. Some things will actually feed on the waste. Nothing will on the Javex. So think when you say this is bad for the environment… is it? Or is it bad for people in the environment? Is it really bad for the ocean? I think we all have to be careful in our assumptions. Most people thought that the ocean is in much worse shape than it was 50 years ago but species declined steadily, whether they were fish species or not fish species in the Bay of Fundy; and now they are rebounding, even though they are being fished against fishing pressure. It is healthier or unhealthier then it was? And where's the evidence to say so other then we all assume it. Thank you.

Cathy Billing, Lobster Institute: Thanks Laurence. Excellent points. There's no one size fits all answer to what a healthy ocean is. It's very complicated and how can we not come from a human perspective? Because after all that's who we are. Bill?

Bill Adler, Massachusetts Lobstermen's Association: Bill Adler. Boston Harbor, they decided that they had to clean it up under the Clean Water Act. And what they did was put a lot of chlorine into the area so they could say that it was clean water. It was clean water alright. It's like your swimming pool. The bottom became a moonscape according to the local fisherman in Boston Harbor. They couldn't catch anything. But even some of the creatures that they don't catch or they don't keep were gone. And it was reported that you could put your traps down there and you pull them up the next day and they are all clean. All the growth is off the traps. That's wonderful. And you'd go out and you would smell chlorine in the area and the water department, sewer department, whatever

they are, MWRA, admitted they were putting a lot of chlorine in so they could comply with the Clean Water Act. Well, they've put the super pooper scooper line out… ten mile line out to way out; and they now pump the stuff out there. But they do do the secondary treatment before they discharge it out into the ocean. It seems to be better but when they started to do that it wasn't dumping the stuff in the harbor….the clean water in the harbor. Now life is back. Things are growing again, fish are showing up, lobstering is back. One other issue had to do with Salem Sound. They had a treatment plant up there. The fisherman out of Beverly and Salem were noticing that "Gee, things look like the moonscape on the bottom. Can't catch it here anymore. Come to find out, about several years late, that the Environmental Protection Agency fined the sewer plant for excess of discharge of chlorine. So these were the things, it wasn't dirty water, it was too clean. It was like a swimming pool. Nothing lives there. And so we have to watch out because people want to go by the Clean Water Act. Okay, but what does that do to the environment? It's clean alright but what does it do to the environmental aspects of what lives in that world – whether it be eelgrass or fish, lobsters, whatever. And you have to be careful when they say we have to clean the water. Clean it with what?

Cathy Billing, Lobster Institute: So Eugene, clean and pristine? What does that exactly mean? That depends on where you are, and what's going in, what's surviving. Anyone else? Chris?

Christopher Johnson, Maine Maine State Senator: I think you have to go back to the ecosystem and look at what you have from the base of the food chain up for a working diversity of organisms, because a healthy ocean isn't just one that produces what we want for species for a while. A healthy ocean isn't one we can go jump in like a swimming pool. A healthy ocean is one in which the organisms as they've evolved over millions of years and have relationships with each other and niches in the food chain are working. So it's healthy from all those prospective and there are lots of threats to that. But I think someone earlier mentioned arrogance. I think throwing chlorine in to solve the problem of throwing sewage in is a great example of a presumptive arrogance. We can fix that. Simple problem by another simple measure and it's ignoring the real importance of the ecosystem that they are impacting in doing it.

Cathy Billing, Lobster Institute: Excellent, thank you. We have some of your comments from earlier back up if you want to refresh your memories. Add on to those. Take a look at those, expand them. Again, how are we going to quantify this? Any thoughts on that?

Mike Chadwick, Atlantic Lobster Sustainability Foundation: Mike Chadwick, Atlantic Lobster Sustainability Foundation. You're second question was how to monitor the healthy ocean and that's complicated. Because, what we observe one year, we have to get the same way of observing the next year. And if we are going to say something's changed, we need to know what we are talking about. Now the atmosphere is easy because it totally mixes so you can measure the carbon dioxide on top of a mountain and it's going to be the same around the planet as it is with CFC's or all these other contaminants in the atmosphere. In the ocean, is not so simple. And so even measuring

temperature or measuring oxygen, which are key things to look at, to do that properly requires fixed stations or a survey where you are using the same method. You're sampling all the water layers and you're doing it seasonally, and year after year and so on. To look at the life and measure the diversity of the ocean is extremely complicated and requires very, very expensive surveys ,which are generally only done by Federal governments, whether Canada or the US. And those data become sort of the fodder for everyone who says the world is falling apart. They are using federal databases which, by the way, are very hard to fund. And it ends up the Federal government (I can speak for Canada) the only thing they're left doing is monitoring the environment. The scientists can't do anything with the data because all they are doing is collecting it, which others come and use. Somehow, if we could support that process, I think it's a Federal responsibility because it needs to be something that can be there for a hundred years – because you gotta see these trends over a long period of time. And only things like governments are institutions so long lived that that stuff will be available to anybody. And I think it's kind of… anyway, I have a lot of issues sometimes… and people say, "there's a lot of jellyfish"and so on and I say, "Well how do you know that?" Well you know, because we didn't really sample jellyfish until quite recently and even they're hard to sample as well. So I would say monitoring healthy ocean is really a bit of a dilemma and that's all I can say. Thank you.

Cathy Billing, Lobster Institute: Dana?

Dana Rice, DB Rice Fisheries: Well, Dana Rice again. Maybe just to back up a little bit here. A lot of good comments here and this is going in a good direction and everybody has a different take on what is a healthy ocean. And they tend to agree, but I think one thing I need to throw out here. Probably it's not important to anybody else but me, but what about when you are creating a balance to have a healthy ocean, and looking at it in an ecosystem approach, the big fish eat the little fish all the way on down to the krill and all of that. In the meantime what are we going to do about the well meaning eccentric people that are backed by millions of dollars that want to pick a couple of species that are extreme predators and just take them off limits when you are trying to balance this out. I'm talking about probably the cormorants, the shag and most of us would call them, and the seal that you'd probably go to Leavenworth if you attempt to hurt one of those things. And if you add up the numbers of fish that the seal and the shag eat and especially in these near-shore systems…but they're off limits. They're sacred just because somebody thinks a seal pup is cute. It is. Why they want to protect the damn shag, I have no idea. It's the ugliest creature on the face of the Earth.

Laughter

Dana Rice, DB Rice Fisheries: But it eats tons and tons and tons of parts of this ecosystem. I think everyone knows what I am saying. Thank you.

Cathy Billing, Lobster Institute: So natural selection. Are we injecting the human impact too strongly into that. How's that impacting the health? Melanie's got some words.

Melanie Sonnenberg, Grand Manan Fishermen's Association: Melanie, Grand Manan Fishermen's Association. I just wanted to go back to Mike's comments and some of the people in the room from the Canada side will likely know where I am headed with this. Sometimes it appears to us that the Federal government doesn't always want to do any monitoring. Because I think it puts them in a difficult position when we're talking about the kind of uses that the ocean is being suggested for these days – and that's a corporate industrial kind of environment. And so, by monitoring, you might actually have some datasets that are going to indicate some of the things that you are willing to risk manage right now, with some information but not great. Then you would really have to explain yourself and I think that's our problem in terms of long term datasets.

Mike Chadwick, Atlantic Lobster Sustainability Foundation: That was perfect. But know my plea. I wasn't as articulate as Melanie. Because that's exactly what's happening. If you don't monitor, you can't say anything is happening. A good example: lets go to the Tar Sands and then the pollution caused in the Athabasca River and so on… and so, if the programs aren't well designed, you're not going to find anything. And maybe the proponent doesn't want you to find anything. So yes it's a very, very key point. And I noticed today that yeah it's expensive so, therefore, those are the kinds of things that get reduced. And it's all a balance. So what do we want government to do? I would say we would want them to do proper monitoring programs, and that would be a priority. But that's my voice and I'm afraid they are shrinking.

Kristian Porter; F/V Whitney and Ashley: Kristian Porter from Cutler, fisherman out of Cutler. I think like you were talking earlier about Fords and Chevys and Dodges, that it's perspective. And I don't know that an ideal, pristine, healthy ocean is what everybody wants. I know that, because I lobster fish. I don't want… I think if there were a whole bunch of other predator fish, we wouldn't have the fishery we have. And if the lobster industry goes, that might mean that groundfish come back. So I don't think there's this utopia of the ocean full of everything. I think that when one thing is up, something else is down. So I guess it's perspective of what is healthy. If nobody had to make a living off it, then everybody would like to see the ocean in equal balance. But I think we're in a situation where you ride the highs and lows of what happens to be around at the time. So I think a healthy ocean, at least an economic perspective, is, you know, different for every person.

Cathy Billing, Lobster Institute: A very interesting point. We're by nature, we've said it a couple times, we're self-centered. We have to be because we're human ourselves, it's survival of our species. Survival of our selves oftentimes does come first. It's hard to be the altruistic person that wants everything to be in harmony. But we often look to our own benefit first. Let's delve into that maybe a little bit more. Here's another definition. This was from a Strategic Plan for the Assessment and Prediction of the Health of Oceans, United States Educational Scientific and Cultural Organization. "The condition of the marine environment from the perspective of adverse effects caused by anthropogenic activities… {Those are those that are instigated, impacted by humans] …such condition refers to the contemporary status of the ocean and the prognosis for

improvement or deterioration." So another way of wording that is a coupled human-natural system, recognizing people as part of the ecosystem. Ocean health is our health. It's another way of looking at it. So again if we bring in, as Laurence said, the arrogance of our species, it's really the only way we know how. How else are we going to look at the ocean? We can't necessarily look from the perspective of the creatures there, the plant life there. So we have to hopefully find a balance that's going to keep it in a status that's going to be equitable and service everyone. So this same organization has developed this Ocean Health Index, the things they are trying to measure; and, again, it's all from pretty much a human perspective. You are looking at the ability to provide food through fisheries or mariculture, aquaculture. The opportunity for small-scale recreational fishing opportunities or small-scale commercial opportunities. All the natural products that come out of the ocean. So, this, again, is what it's giving to us. Looking for carbon storage, coastal protections, tourism and recreation opportunities. All these things that the ocean can provide. Coastal livelihoods and economies, a sense of place, iconic species, the lobster being probably one of the prime examples of the iconic species that links in with the tourism and the coastal livelihoods… so lasting special places that people want to come to again and again and the traditions that have built up around those. Clean waters, biodiversity, which was mentioned in both the habitats and the species. So this is one way an organization has looked at trying to quantify it. They have put a point value on each of these and tried to measure ocean health in that regard. So let's throw it back out. Any other comments, looking at some of these factors that people have put as an index for monitoring and measuring. Anyone? Rick?

Rick Wahle, University of Maine: Rick Wahle, University of Maine. You know we can't help but bring a human perspective to this. That's our bias. But one of the other biases we bring is what's often been called the baseline or the shifting baseline – where our perception of what's pristine or unexploited is a topic relative to our time frame on the planet. And so a lot of our monitoring programs started in the sixties, seventies, and eighties. That's become our baseline. And granted there's been a lot of change since then, but there was likely a fair amount of change before that even going back to pre-colonial times. We have evidence in the Gulf of Maine there had already been a fair amount of exploitation of coastal habitats. We see that through evidence in the size of cod bones in shell middens, for example. So we need to admit to: number one our human bias, but also the bias that is presented by simply the timeframe we are here on the planet. So just another perspective.

Cathy Billing, Lobster Institute: I've often wondered about baselines. Who's to say when you start the measurement that you're looking at a healthy ocean then. So if you're looking at a change from this baseline is that a good thing or a bad thing, you know. And trying to look as far back historically as we can seems to be an important component and a difficult one. Others?

Tim Bowden, University of Maine: Just to kind of add to Rick's comment and what Cathy was saying, we talk about baselines. The ocean isn't static so it's always under change. But I kind of wanted to make the point that one of the issues we have now is not the fact that it is changing, it's the rate of that change that's causing the problems.

Cathy Billing, Lobster Institute: More comments? Got Mike in the back, Darcy?

Mike Chadwick: Anyway, Cathy, it's interesting because your questions… I thought oh this isn't going to be really good, ya know. But it's a good discussion. At least you have to start somewhere for Rick. A baseline, even it's only 10 years, of the same kind of sampling, you can extend that by other methods. Because you can compare what you find in one data point to another way of obtaining information in the atmosphere such as bubbles in glaciers. We've added actually 800,000 years to our series on carbon dioxide in the atmosphere because we've taken bubbles of different depths in glaciers, and it matches up our observations in real time today. I think that I don't worry about the actual. To me, it's important to get a baseline. Even if it's today, five years down the road, you're going to have 5 years; and that will be useful because, if you don't have it, you're not even going to start to do the mitigation that's required. To me that's… And , of course, the rate of the change is all the more important because things are changing very rapidly today.

Cathy Billing, Lobster Institute: Chris?

Christopher Johnson, Maine Maine State Senator: And the oceans don't exist alone. It's really the rest of the planet. There are influences as well, like volcanoes going off. That affects how much sunlight reaches the ocean. It might affect primary productivity for a while. It might be particular elements which are more prevalent and are dropping into the oceans from the plumes. And then there are ways that, once we get a sense of a baseline from whenever we have the ability to measure it. We can go back and measure other things to compare and get some sense of what might have happened in the past as well whether it's from sediment cores, bottom of the ocean – whether it's from samples into several thousand-year-old bogs and what's captured there, whether it's looking at the ice cores in glaciers. There are a lot of things we can do to compare what might have been different back then to how it is now. And if we do work, experiments, to understand the relevance of the phenomena that we can show happened long ago from those other samplings, then we can have some sense of what it's influence might have been on other things that our experiments show us relationships on. So no, we just can't go back in time and take those samples we really want of what the ocean looked then. But there are ways to look back and get a little greater understanding of how things related to the way they are now.

Cathy Billing, Lobster Institute: Thank you. So we've actually now brought in the non-human components of a healthy ocean. Things that impact ocean health, not all necessarily humans. We were not always here through the evolutionary stages. As you said, we're a part of an entire earth and, not only that, we are a part of an entire universe. And there are things out of our human control that also impact the ocean. Any more thoughts on what is a healthy ocean? Anything specific to your own harbors that you want to discuss as far as health?

Kenny Drake, Prince Edward Island: Kenny Drake, Prince Edward Island, fisherman. What I have to say is probably not as sophisticated as some of the science explanations but I can recall in the early 1990's when the cod industry pretty near collapsed. And I can remember a student from one of the schools around home wanted to talk to some fishermen because he had to go into a debate over some fishing issues and the cod collapse and things like that. And he actually came to my house and he wanted an answer out of me. I kept thinking, if I tried to explain to him what happened to the cod when we don't have a true explanation to this day of what happened (we just have theories) that I would mix him so bad that he'd go back with less information then he came looking for. Anyway, basically all I told him was just go back to basic thinking and instead of thinking of the ocean, reduce the ocean to the size of a pond. And what would you do with that pond? Would you allow somebody to put a net all the way around the pond, take everything that's alive in it out in one sweep? Or would you try to keep some fish in it alive that you could catch one day so you could eat it and things like that? And if you had old dirty gas in an old gas can, would you dump it in the pond? So I think that the ocean is just a very basic ecosystem of water and that the very primitive things that you can think of. I think it's education more than anything – that, if the ocean is what it is today, if there are things that we can do to make it better tomorrow, then lets educate the youth to not do what we did.

Cathy Billing, Lobster Institute: Others? Anymore Dodge owners out there that haven't spoke yet? No more hands? Okay I'm going to go back to the beginning when we all wrote something down. Is there anything that hasn't been said that you wrote that you would like to add?

Inaudible

Cathy Billing, Lobster Institute: Okay so, when we get to the afternoon discussions, we are going to be getting into a few more specifics. We are going to talk about ocean acidification. We're going to talk about pollution. We're going to talk about the effects of temperature change, all these bigger picture things. But are there any smaller picture items that people want to bring up now, again, relating to their own harbors or bays? Any thoughts on how we as humans can impact the health of the ocean in a positive way? Is fishing a positive way?

Moderator: I think the thing I noticed in the discussion here.

Laurence Cook, fisherman, Grand Manan Fishermen's Association: Who are you?

Laughter

Ted Hoskins, Moderator: You can or you can't. Well I'm deaf so I can't hear myself so there we go. What I noticed as the discussion went along was more and more we remembered and focused on what we were doing in the anthropogenic area of effect on it. And I think, as we focus down on our on wharves and boats and harbors, we are going to see more and more that what we do makes a difference. And we will become the agents

of change if there is going to be change. And we have to find out how we not only make changes in ourselves but get into the system in an active way and allow that system to change and on up through the governmental levels.

Cathy Billing, Lobster Institute: Thanks Ted. Anything else going forward? Chris?

Christopher Johnson, Maine Maine State Senator: I just, I'm not quite sure what to do with it but I think that there's something caught in my head around the transect study that Bigelow Laboratories did from Portland to Nova Scotia: sampling well over a decade, the sea water, both chemistry and the microorganisms. And they noted, just from doing that over that period of time, there was a collapse. And, if I remember correctly, I think it was over seven years, the number of marine microorganisms in their sample was 1/5 of what it was when they started. That to me is a sign of a serious problem and it's a serious problem that we don't yet know the actual causes of… the contributing factors. But just from measuring, we now know that there is something else that we really ought to be looking at and trying to understand. Because that's pretty serious to see that happen to part of the food chain.

Cathy Billing, Lobster Institute: Any other comments?

Mike Chadwick, Atlantic Lobster Sustainability Foundation: Mike Chadwick, Atlantic Lobster Sustainability Foundation. Going on what Ted said is that I'm a strong believer in local indicators, where the community sees the barometer on the wall together collectively and agrees that this indicator is telling you something. And, if the federal surveys are shrinking, I think its very important to build the local indicators and a very simple way, as long at it's the same way of observing from year to year. Very simple things can be done to build up very meaningful information on your communities. I already said earlier that the coastal areas are the most critical areas and the ones that are the most damaged areas in the ocean – and we could be doing that collectively. There isn't a better fishery for that because we are already sampling the bottom for one species that we are interested in, but there are other things that get into our traps and so on. If it was done methodically the same way to observe, it would be very powerful in forcing change on improving things that are degrading and so on. So anyway, I think we're missing… being a Federal guy, I'm sorry, I'm trying to blow the horn on Federal stuff… but, in fact, I just wanted to point out that isn't the only way of doing things. Thank you.

Jan Spinney, Atlantic Lobster Sustainability Foundation: Jan Spinney, Atlantic Lobster Sustainability Foundation. Following up on what Melanie said earlier about not wanting certain information to necessarily be public because of certain repercussions that may or may not happen, but it is a real concern. And what Mike was talking about, I think that was one of the ideas behind the Atlantic Lobster Sustainability in the first place, that we could help people or groups or harbors with particular problems to do some of this monitoring or solve some of their problems that they had in particularly areas. That would be an industry-funded thing. The information would belong to the group that wanted it done or funding. There are many, many ways to do that but I think was one of our initial aims when we started this group in the first place. And we could work

together, as we have discussed many times, on projects in different areas – maybe too, on both sides of the borders – to solve some of these problems. Or at least look into them and see what the causes are or what the indicators are to help pinpoint what the problem actually is and go on and work from there. Because, if you don't know you've got a problem, you certainly can't solve it. Or if you know you have a problem but you don't know what it is, you can't solve it either. So I think that's where our organizations can both be of help.

Inaudible

John Nicolai, Lulu, Inc, Bar Harbor: John Nicolai from Bar Harbor. I was just going to say that the ocean would be a far better place if other fisheries would emulate what we are doing in the lobster fisheries, whether it's in Maine or in Canada, because sustainability has been in the forefront of how people fish. And there are other fisheries that aren't doing as good of a job as we are. So I think we've got to give ourselves a lot of credit and thanks to the input the science community has been giving us and our fishing practices. I think we are doing pretty darn good, so we ought to give a lot of credit at least for that.

Cathy Billing, Lobster Institute: Go ahead Rick?

Rick Wahle, University of Maine: I guess I'd just add… Cathy you asked earlier what should we monitor and that could open a whole can of worms, a whole laundry list of things. But I think it boils down to the essence of being that we should monitor the key physical and biological parameters that are the best predictors of change. And I think that sets a criterion for what we should really focus our monitoring on. And of course we have to address the question of "change in what" then, and we could get into a whole laundry list of that too. So I don't want to go on and on here.

Cathy Billing, Lobster Institute: Others? Rick or Mike or even Jean or Bob. I have heard it said that lobsters are a good indicator species. Is that an accurate definition?

Inaudible

Jean Lavallee: Usually you pick something that's really fragile, you know, the canary in the coal mine, it's something that's kind of vulnerable, like monarch butterfly as an example. I would say that the diadromous species, the ones that are coming into fresh water, they are having to go through the gauntlet of fresh water issues, coastal issues and they're a good indicator species. And, by the way, we have a half dozen that are on an endangered species list in the Gulf of Maine and the Scotian Shelf. And they are all diadromous species. When you get into the full marine species, yeah there's threatened species but there are still millions of individuals around. So it's kind of a scaling thing. So it's all very complicated but I think we have enough evidence right now if you just look at your species at risk list. And you got all sorts of fauna and flora there and you can say gee there is an issue here. It's the amphibians and stuff like that. It's less the

marine fish which would include marine invertebrates. I don't know if you get my drift there but that would be where you want to look, if you're trying to assess vulnerability.

Cathy Billing, Lobster Institute: We have Laurence over there.

Laurence Cook, fisherman, Grand Manan Fishermen's Association: Laurence Cook, Grand Manan Fishermen's Association. I knew somebody was going to bring up species at risk. Before we list things, we have to be careful that we've done actual science. I remember not too long ago shark was listed; the study was done in Australia. And the shark was listed a species at risk in Canada, which immediately I thought they should list blue spruce because there are none in Australia. So when we talk about ocean health and we talk about species at risk, there has to be some limitation to the area we are looking at. Because, if you look, for example, in Long Island Sound, lobster should be a species at risk. Certainly not up the coast of Maine or here in the Bay of Fundy. But that's much more local. But, if you study that body of water, you'd think man, lobsters are really in trouble here, we gotta do something. So when we list a species, we should be careful to know in our own backyard whether that's actually true or not. Now I made a bit of a joke about the blue spruce, but the study on the shark listed as threatened was done in Australia. What are the big determiners in ocean health? Temperature and salinity. Are the temperature and salinity similar here to what they are there? Not even close. But nobody even blinked at them listing the shark off a study done in Australia. So, if we are going to talk about ocean health, yes it's one ocean all around the world, but as we all know it's divided in very different areas and some of them not all that far apart. So is a lack of a particular animal in Boston Harbor indicative of the entire East Coast? Or is it more likely that a harbor off a big city is more polluted then the ocean is say off Kittery, for example. So when we are talking about that healthy ocean, you can't narrow down the areas you're looking at, nor can you look at it as an entire puddle; but we have to have some area to say this area we'll study is going to be healthy. It won't necessarily have anything to do with the coast of Florida. So I think our ocean here is fairly healthy. There are spots where it is very much not so, so overall ocean healthy would be very, very hard to monitor. And we need to deal with ocean health in our backyard first and then we can look at it on a larger scale.

Cathy Billing, Lobster Institute: Okay, do we want to let Laurence have the last word on that or does someone else? Rick?

Rick Wahle, University of Maine: With respect to the question of lobsters as an indicator species, I guess you'd have to set up a couple criteria as to what's an indicator species. And a few I would list right off the bat would be first of all that it's sensitive and responsive to environmental change, but also that it is conspicuous and relatively easy to sample. And I think lobsters definitely fit all those criteria. We see that it's been very responsive to changes in the temperature environment, questions about acidification. The jury is still out on those, but certainly the collapse in Long Island Sound is a perfect example that Laurence pointed out. And we have been seeing changes in, for example, Narragansett Bay from the 90's where it used to be a wonderful nursery habitat for lobsters and the distribution of lobsters in the nursery habitats has really receded to

deeper outer coastal locations over the course of 20 to 25 years. So, by several criteria, I would call lobsters an indicator species for sure.

John Nicolai, Lulu, Inc, Bar Harbor: John Nicolai, Bar Harbor. Rick, do we really know what happened in Long Island Sound? Because, depending on the scientist that you talk to you (I talked to Dr. Bayer about this) I think we mentioned that hypoxia might have been an issue, and pollution may be an issue, or run off from pesticides they were using from spraying for West Nile Disease. Do we really know what happened? Is it really that tough to determine what are the causes of a species practically disappearing in one given area?

Cathy Billing, Lobster Institute: I'm going to put a hold on that question for the afternoon. Because that's a pretty complex one. We are going to be going into a lot more detail on specifics of ocean health. That can be a great starter question after the presenters speak. I'm actually going to shift gears now and do a little housekeeping for before lunch. We are going to call an end to this ocean health session and have a lot more opportunities to speak about it later this afternoon. So switching gears as I said. As you saw we had the presentation this morning of the check to establish the Klaus Sonnenberg Memorial Scholarship Fund and the proceeds from that fund are actually going to provide money for a fisherman who might not otherwise be able to come to the Town Meeting to be able to attend. So we are hoping to eventually be able to award scholarships of up to $500 that would cover transportation, hotel accommodations, and the registration. Should the Town Meeting ever not be held, that money will go toward other educational opportunities, things like the Maine Fishermen's Forum, Fisheries and Science Research Societies Annual Meetings, and so forth and so on. So we are very pleased that Mike Tourkistas and the folks from East Coast/Paturel established the scholarship. We have already had two other donations coming in to build that scholarship up. It will be maintained at the University of Maine's Foundation, hopefully eventually as an endowed fund so we will have continuous funding for this scholarship going forward. I will mention that in your packets, if you are interested in being a contributor to the fund, there is a form that allows you to do that. We encourage anyone who wants to help support scholarships for young fisherman or others in need perhaps to come to this event...we encourage you support that. One other thing before we do break for lunch, we have a special presentation and I am going to call Dr. Bayer up to make that award.

Dr. Bob Bayer, Lobster Institute: This is our industry partner award that we give really as a token of appreciation to folks that have been involved and have played an important part in the lobster industry over a period of time. And I would like to present this to the Heanssler Family. Basil and Harriet are not here today, but Kathy, if you would come forward. The Heansslers have been involved a variety of lobster research projects probably going back even before the Lobster Institute began, and this is given with appreciation to them for all that they have done. They have also been major supporters of the Lobster Institute, including a couple of gifts of land. One of the interesting ones that Basil Heanssler gave us a few years ago….for a while, we were land owners in Nova Scotia. We owned 200 acres on McNutts Island, which is an absolutely stunning piece of

property. We did sell it and that's the basis of our Basil and Harriet Heanssler Endowment Fund with the University of Maine Foundation. So Kathy, I would like to give this to you. If you would pass that on to your folks, we would appreciate it.

Applause

Cathy Billing, Lobster Institute: Okay, we will find time to visit with Basil and Harriet when we return. And share some stories with them and memories as well. So again, thank you. So, it is time for lunch now. I have taken over Ted's duties. But the lunch is in the Trinity Room, which is across the hallway. We are going to allot an hour and a half for lunch because people have always said they want time to visit and network, and just again share stories and so forth. So you have and hour and a half, and we will convene back here at 1:30. Thank you.

LUNCH BREAK

SESSION IIB

Jean Lavallee, Aquatic Science and Health Services: Alright everybody. If you want to take your seat, we're going to get started again. Alright. Welcome back everyone. We're going to dive right back into the Town Meeting. Same as this morning with the format with the presenters and then time to share with your opinions and thoughts and whatnot. If you didn't speak this morning, this is your chance to do so. If you did speak this morning, I'm sure you're going to speak again this afternoon and we are going to welcome that as well. So we are going to do this for the afternoon. We're going to try to wrap it up around 4:00 and then we'll go through the evaluation form for day one. And I guess without further ado, Ted, the floor is yours.

Ted Hoskins, Town Meeting Moderator: Thank you. Thank you. We're ready to get started and we're just about all seated. That's just fine. We are going to continue, of course, our work with ocean health. We hadn't solved all the problems this morning so we will keep at it a little bit. And we have some people to give us a hand with that. Senator Chris Johnson is going to get us started and he has been chosen as the Ocean Acidification Commission Chairman for the State of Maine. We also have two specialists from the University of Maine, Dr. Rick Wahle and Dr. Tim Bowden, and also Dr. Mike Chadwick. He is a retired ocean scientist from the Department of Fisheries and Ocean. And I will let them introduce themselves and what more we might take advantage of knowing about you. With that, we will let you head off and then we will get into questions. And let me remind you that there is a microphone that is recording this. But the good part of that is that you will be able to go back and get the minutes of this and catch up on what you might not naturally just remember. And, when we get to the question part, remember to give us your name and we will have time to move into an open session after we finish on this session on Ocean Health. And with that, I will turn it over to the panel. You may come here or you can stay there.

Chris Johnson, Maine Maine State Senator: If I can make this work, I think I should probably try to stay here so I can manage everything but let me know if you can't hear me. I'm Maine State Senator Chris Johnson, and I was the Senate co-chair of Maine's Ocean Acidification Commission that met this past summer and fall and produced a rather sizable document. Actually, it was a big challenge for our technical staff that supported that work in publishing this because they had never had to get clearance on so many figures and diagrams from people's research. We have quite a good many pages in here just of the citations from a 60-page appendix of this, which is an analysis of the existing scientific research. And so it was a challenge but it was also really interesting work. We had several legislators. We had a couple of lobstermen. We had some folks working in aquaculture. Quite a few scientists and some of those were from research institutions around the State, but some of them were also from our departments in Maine – of Environmental Protection, Marine Resources, and Agriculture and Conservation Forestry. We ended up, after many hours of working on this, with this report; and it includes specific recommendations on things that we should be focusing on in the State. It makes clear that we don't have all the answers but it has a pretty good analysis of what we do know now, and not only recommending some actions to help address what we know but also monitoring. As it was spoken of earlier, there's a section here prioritizing recommendations for monitoring and for further research as well. It ended up with unanimous support of all the people on the commission, both from the departments across State government, from fisherman and scientists involved in the project, and folks working in conservation in the watershed. I'm going to start off trying to make clear some of the impetus for us doing this in the State of Maine. We were concerned whether the increasing acidity or the lowering pH of ocean water is a serious threat to commercially-valuable species for the State of Maine. Alright. One of the things that was pretty eye opening as we were looking at this and looking at what we had for research about various species as well (and I will talk a bit more about that) is, looking at this chart. We identified several major factors that the science supports on causes of acidification in the ocean and the one which is a dominate effect in the open ocean is CO^2 levels in the atmosphere. And this is a chart which combines, in recent times, the figures taken in readings in Mauna Loa on the top of the mountain, of atmospheric CO^2 levels. This particular chart, and that's after 1958, also combines what all of the cycles were in CO^2 levels in the atmosphere as measured by going back to glacial core samples that are dated and examining the air bubbles trapped within those ice cores. What looks on the right hand side as though it might be another axis is actually where we are right now. We are up here and so we've taken off in such a very brief amount of time compared to this 800,000 year cycle, not only way above the levels that the cycles have gone through before but at a rate of change that is far higher than the slope on any of those past cycles looking at the ice core results. That's an eye opener. It says this is something that is definitely out of the norm and, in looking at what the atmospheric CO^2 does that ends up chemically reacting when it's absorbed into the sea water, in fact any waters, you have reactions producing carbonic acid. Consequently the other thing it influences greatly besides the pH shifting, and this is where it starts to be rubber meeting the road, is that is starts to affect the availability of calcium. And there are different calcium-based compounds but this is a mapping taken of the omega, which is omega aragonite, so the aragonite form of calcium's saturation level in the ocean water. In simple terms what this

means is how available, how much energy is involved for shellfish to take calcium from the seawater to form its shell and the more energy involved in that, the more its going to inhibit growth, the more its going to cause stress for the organism. It may well cause them to die at various stages. In fact, I don't have those pictures to show you but we actually have photographs of what happens to very early-stage clams when they are subjected to pH levels that exist on Maine clam flats and it actually starts to dissolve the shells, alright, so this is a problem today and we've also seen this,… we had aquaculturists involved because there are hatcheries in the State of Maine for several types of shellfish. But it supports an industry, not only in clamming and sea clams, but also oysters. The Pemaquid oyster is cultured a lot in some of our rivers and we are at pH levels now where that culturing can fail because of the pH level in the intake for the ocean water being used in those hatcheries. So we are at the point now where it is affecting Maine. It's rarely affecting Maine it terms of a total failure of a type of shellfish but the effects that I spoke of, of the greater energy requirement reducing the rate of growth, reducing the health, reducing the numbers of surviving organisms, those are things that are inhibiting the productivity level on our clam flats or mud flats in other ways as well. This is charting because, in the Casco Bay, we have friends of Casco Bay that does a great job of going out and sampling and they've spent considerable effort improving their method of measuring pH and working with scientists. It's a great quality program for that work because it's not easy to get accurate pH measurements, but they've charted here what they have gathered for information about Casco Bay's calcium saturation levels in the aragonite form. And what you can see is that… I'm not used to this pointer but…what you can see is that, coming out of the river, you've got this plume, and the pattern of where that goes is affected by currents; but you've got variation in what the calcium saturation levels are in the vicinity of that. This is just one of the phenomena because of the lower salinity and because of the greater acidity, the lower pH of the river waters. And that's one influence. Actually if I run through quickly then the atmospheric CO^2 level is one influence that is slowly, compared to these effects, but unerringly increasing the acidity of open ocean waters. Then we have two affects that are primarily in the near-shore and, in looking at what this chart is showing you, we have the more acidic fresh waters entering the Gulf of Maine. And obviously the effect is greater and more local to near-by in the shore, but we have a considerable contribution to the pH of the Gulf of Maine from all the waters on the Scotian shelf entering the Gulf of Maine. Because there is some degree of isolation from the ocean currents, we only have certain places where the ocean waters come in in the low areas heading into the Gulf of Maine in normal cycles in parts of the year; and we have this fresh water entering so it's slightly more isolated than some other parts of the Eastern coast. So the pH of that water and obviously the greater volume that we are seeing now...and we've charted that as well in the report… of total precipitation in a year and severity of rainfall events are both important. So we've got more of this fresh water that's a lower pH entering the Gulf of Maine than we used to and the trend is increasing on that was well. And the third factor is one that relates to that last comment, the severity changing. We found that another affect on pH, and this one is quite drastic but very localized, is the nutrient levels in our estuaries. And, with greater severity rainfall events you've got a lot more soil erosion going on and things washing down. We're seeing that in terms of bacterial levels after storms causing closure of clam flats. Alright. That's this kind of effect that folks in the

communities already recognize; but it's also causing, because of the nutrients in there, blooms of algae which, after the storm event when that supply of nutrients is not maintained, its causing them to decay, eutrophy. So wherever you have – because of your tidal patterns and currents – more of that algae accumulating, when it decays it is releasing the carbon into the water. It's having that same affect of carbonic acid and more acidic waters in that area. So you have some of these effects that are more of an impact on the pH of mud flats themselves than in deeper waters. So those are the three major contributing factors that we identified that actually are affecting pH of Maine waters today and the Gulf of Maine in general. The 60 pages takes a look at what we know about the effect of pH on different marine organisms that are important and some of them we have good data on. I mean, we have pretty good data on the effect on various shellfish; and we know that's already a problem so that's a good thing. We have almost no experiments that show the effects of pH on lobsters. And the ones we do have, we consider to be of a poor match, poor quality, because they are in temperatures and in ocean conditions that don't match Maine's. So there's obviously one area that, in our recommendations, we need a lot more research on the various life stages and on the ecosystems that, you know, at various stages of life lobsters are dependent upon. And we've got recommendations for the State's involvement in monitoring, the State's involvement in helping support research to answer those questions that we don't have answers to yet; and to work on these influences to better reduce the nutrients going into our watersheds; to try and have more absorption or uptake in the land of the precipitation. In other words, not having zoning and planning that puts more pavement out there, causing more of the storm events to not be absorbed into the soil. And, of course, anything we can do to reduce the CO^2 contributions through energy efficiency and other policies is important as well. But it's a thick report. I hope I have given you some sense of the broad effort that went into it and some of the conclusions. I am glad to answer questions when we get to that stage.

Moderator: There will be questions after all the presentations.

Rick Wahle, University of Maine: Let me just plug in my laptop here. Alright great, thanks. When I told my colleagues I was coming to St. John, they enviously looked at me thinking I was coming to the Caribbean. And I did nothing to dispel that notion. Okay well, Chris did a great job sort of setting up, setting the stage, and I think I'm going to expand on some of these points a bit and bring them out to the Gulf of Maine and Scotian Shelf scale, talk a little bit more about temperature. And there are a few take-home messages I think are worth considering. And so I am setting the stage first to talk mainly about the temperature and acidification effects, and then Tim's going to take off with the discussion on the biological effects with a particular focus on lobsters. And we also have a handout here of some those studies that Chris referred to that are referred to in his report. I also belong to a group called NECAN, Northeast Coastal Acidification Network, and we just produced a review of impacts of acidification on invertebrates and fish of commercial interest to the US, Northeast, and Atlantic Canada. And that's in review right now in the Journal of Oceanography. It's still in revision form. Otherwise, I would make that available but stay tuned on that. But these key take-home messages here… First, it's important to emphasis is now in this sort of ground fish-free world we

live in where things are dominated by crustaceans and shellfish and mollusks, these are marine calcifiers and the extent to which they are vulnerable to ocean acidification affects is still very much in question, as Chris pointed out. But our part of the world, the Northwest Atlantic and in particular the Gulf of Maine, is not only warming but it's also acidifying faster than most other parts of the world; and it's really important to know that we know very little about their joint effects. We certainly know a lot about temperature effects – those kinds of things have been studied for a long time. but we don't know how acidification is influencing the performance of other then a few, a very few, well-studied organisms like oysters. But lobsters are still very much a black box. In terms of lobsters, I can't think of a better illustration of how things have changed for the lobster population than this image which basically captures the how… from trawl surveys, federal trawl surveys… how the center of lobster abundance has essentially moved up the coast over the past say forty or fifty years, going back to 1968, so that now really the center of abundance for the American Lobster is positioned right in our backyards off of Maine and Southern Nova Scotia. And this may be, in fact, happening in the Southern Gulf as well, which I haven't really captured here. But the Gulf of Maine is an interesting story because of the rapid rate of which temperature is changing. This is a temperature time series going back to 1980. Over the past thirty plus years, temperature has been increasing at a rate of about 1 degree Celsius every twenty years. That's sort of the long-term average over those several decades. But, in the past ten years, that has really accelerated to the point where we are looking at about one-degree change every four years. And, in fact, this is a map of temperature rate changes over the past decade over the entire planet. And you can see how ours is a particular hot spot and, in fact, we're warming faster then 99.2% of the world ocean. And this is from a paper I co-authored with Kathy Mills, Andy Pershing, and others in 2013, and Andy Pershing has continued to follow. So there area some pretty dramatic changes going on here. The other thing about our coastline here is the dramatic temperature gradient from North to South. Most of you guys as fishermen are intimately familiar with this, but on a global basis this is one of the steepest North/South gradients in sea temperature on the planet. So we are looking at summer warms only at about 12 degree Celsius in the Bay of Fundy; whereas, off Rhode Island, we're looking at about 23 degrees Celsius, or up well into the 70s Fahrenheit. And that will have consequences for the impact of acidification for the solubility of shells that we will get into in a second. But let's just look at how temperature isotherms are migrating up the coast. There are two important thresholds I wanted to point out. One is the 20-degree threshold and these are particularly relevant to lobsters in that 20 degrees is about the upper thermal limit for the lobster's physiological comfort zone, if you will. They will do okay a little bit above twenty degrees but the scientific consensus is about twenty degrees. Developmentally they don't do very well below 12 degrees. The embryos and larva just won't develop well. And so those two isotherms have been there for some decades but they're advancing. And so what this is doing then is making for excessively warm conditions in Southern New England. And we're seeing the consequences of that maybe with the Long Island Sound die off being one example. Shell disease may be another. But we are also seeing things becoming more favorable up North, and so it may be that part of the reason we're seeing this surge in lobster abundance, especially in Eastern Maine and Southern Nova Scotia/New Brunswick, is because of the increase in those bottom temperatures. Maybe not the only

reason but one of the reasons. So the projections… what's it going to look like in the future? Well, a lot of the future is very much up to us: in the kinds of choices we as a human population make about the emissions, carbon emission scenarios, where we'll be seeing in the next decade. Here's the temperature increase over the past hundred plus years, since 1900. Definitely going up. But whether we take this path or this path very much depends on how quickly we clamp down on our carbon emissions. So let's talk about acidification now. Again, our part of the world is acidifying faster than most of the other parts of the planet. And the North Atlantic is acidifying faster than most of the other parts of the planet. The thing is, the biological impact of that is really poorly understood. The interactions of acidification with other stressors like warming temperatures, for example, are even less well studied. But what we do know of the very few studies that have been done is that the impacts on different species are very species-specific and even life-stage specific. So, let's look at the Gulf of Maine a little more closely with respect to acidification – and this is from that review that I just mentioned – and this is a map of the average monthly minimum pH over the course of a year on the Scotian Shelf down to the Southern New England Shelf, Georges Bank, and the Gulf of Maine. And you can see that pH, as our indicator of acidity, varies quite a bit. Normal ocean pH falls right around 8 on a global basis. But there is a lot of variability here, and especially on the Scotian Shelf. Chris pointed out the influence of river run-off, for example. He was looking at Casco Bay here and the effluent of the Androscoggin River and Kennebec River, which come out right here. That was his scale of image here, but we have other river mouths that are strongly influencing acidification along the coast. This big yellow patch off of the Scotian Shelf is related in part to ice melt from the poles coming down with the Labrador current as well as the additional effect of the massive plume of the St. Lawrence River also acidifying these coastal waters. So the sources of acidification are not only the atmosphere, which is having a global impact; but river discharge of fresh water is an important piece, and nutrient loading as Chris mentioned. Those are the three key ones. And then another source is upwelling, and that's especially happening on the West Coast where you have more of coastal upwelling system. But these, especially the nutrient loading and upwelling, impact local coastal productivity – cause plankton blooms as Chris pointed out. Those plankton blooms are actually good in that they consume carbon dioxide, but when they die they decay and that process consumes oxygen and produces CO^2 again. So it's a question of, over the course of a year, what is your net balance of CO^2 in the system. So this is why it's important to look at this other variable, this saturation state for calcium carbonate – because this is an indicator of whether calcifying organisms like oysters and clams and lobsters; whether their shells are going to dissolve under these conditions, and whether the animal's actually going to have to work harder to produce those shells energetically. And the saturation levels for calcium carbonate is indexed at 1. And, in fact, a clam's optimum saturation state to create a shell is at around 1.6. Coral's is up around 3, a little above 3, which is a big reason why we don't see corals around here – because our average saturation state in our waters falls in this, mostly in this between 1 and 5 range. We'll never be able to grow corals in this part of the world. And the decreasing temperature, colder temperatures (and we have a cold regime here) and diluted salinities force that saturation state down and make it harder for shellfish to make a shell. So you see these differences between the simple basic pH that I showed you before and the saturation state

for calcium carbonate… Our coastal zones are particularly at risk with respect to depressing that saturation state. You see this nice blue area here that seems to be very good conditions for growing clams, for example; and that it's in part because of the warmer temperatures and higher salinity that you get with the Gulf Stream that's coming up the coast there. Now we could look at this over the course of the season and see where, how this pattern changes but I don't have that here. So just to wrap this up then… What are things looking like for the future? This is from a paper by Mel (it's a few years old at this point, 2007) it's one of the contributions to the IPCC working group, the International Panel on Climate Change. We already saw this temperature projection. Here's the CO^2 projections that are really the emissions scenarios, the carbon emission scenarios that we could be seeing depending on our choices. And this is the trajectory of pH changing acidification over that time – out a century from now or so. But, as Chris pointed out, we've crossed an important threshold just over the past ten years. We've crossed this 400 part per million CO^2 threshold, measured in Hawaii, at the Mauna Loa Laboratory. And our pH levels are declining pretty monotonically. So, here we are: 2015 at this red line here. So that's all I have to say. I'm putting a couple resources up on the board here. You might want to jot them down. These are mostly US-based but NERACOOS is the Northeastern Regional Association of Coastal and Ocean Observing Systems. Within that, they have lots of good information on real-time and long-time series of temperatures from all the monitoring stations in the Gulf of Maine and along the Scotian Shelf. NECAN is, as I mentioned, the Northeast Coastal Acidification Network. There are a series of webinars there that go through all the physical oceanography, carbon chemistry, biological impacts. You could sort of consider it a crash course in acidification if you went through all of them. I think there are about a dozen different webinars. And then this Gulf of Maine Council Climate Network produces a quarterly outlook on the conditions around the Gulf of Maine. So that's all I wanted to say and I'll pass this on to Tim.

Tim Bowden, University of Maine: All right, good afternoon. My name's Tim Bowden. I'm an assistant professor at the University of Maine and I work for primarily the Aquaculture Research Institute. So I wear an aquaculture-biased hat here. It's interesting that both Chris and Rick have kind of given a good preamble on the acidification issue. I think my inclusion on the panel was that we've been running a couple of trials in the last three or four years on the impact of ocean acidification on lobster larvae, which was an issue that Chris raised. So, if you look at your sheet if you have one, and on the top, you'll see two studies, one by Justin Reese in 2009 and another one by Elise Kethel in 2012. We got picked to the post by Elise. She grilled my grad student at a lobster meeting a couple of years ago about his work, and they managed to get their publication out before we could which meant we couldn't publish. So we kind of got cut at the knees for that one…nature of science. But it's been an interesting period. My grad student was a lobsterman, son of a lobsterman, and he was keen to get into studying environmental impacts on lobsters. So we designed a study to look at ocean acidification impacts on larval development. And I don't know how many of you understand the kind of basic developmental process for lobsters, but as larvae they have four primary stages. So they have four molts as larval animals before they molt into what is effectively is a miniature adult about half an inch to an inch long. But, in those larval

stages they are planktonic, which means they float in the surface layer of the water. And so we were interested in how changes in pH in the water that they develop in impacts that growth cycle. And so my grad student got some larval lobsters in. We put them in tanks. We tried to set up a system that was lowering the pH, which is a tricky situation to kind of recreate in a scientific environment and have it stable. And we were using (money being an issue) we were using cheap ornamental aquarium systems for putting CO^2 into water. They cost about $400 each. By most scales, this is cheap. We looked at how those changes in pH impacted growth and development. So we were looking at size of the animal, the weight of the animal, and the developmental stage of the animal over time. Development usually takes about two to three weeks through the four stages. And, at stage four when you have the miniature adult, the animal falls out of the water column and sinks to the seabed. Part of the reason for that is that it goes through a metamorphosis. Its physiology changes dramatically. And one of the prime drivers at that point is that the shell becomes highly calcified. And there are a lot of biological reasons for that process. What we found was that as you lower the pH the time to each developmental point got longer, so the animals were taking longer time to get to the next molt point. One of the things that we also noticed and I needed to go back and check. We thought we were finding what they term as intermediate stages. This is listed in the literature. For a hundred years, people have understood that you can get what you call intermediate stages in larval development in lobsters. If there's a stressful situation, and temperature is being seen as one of these stressors, pollutants is another stressors, then the animals will put in an intermediate stage in it's developmental process. So we thought we were seeing some of these intermediate stages in lower pHs. Ultimately, what we saw was an elongation of the time to the next developmental stage, a reduction in the size of the animals at any given developmental stage, and potential intermediates. Questions were raised over some of the validity of some of this kind of scientific study, the water quality issues. So in 2013, I repeated the study on a bigger scale, more thorough. We haven't seen the intermediate stages in the second study. What we have seen is confirmation that in lower pHs these animals are taking longer… they're smaller. And then you try and kind of figure out what are the biological impacts of that. One of the main things for a lobster is to get out of the planktonic zone. In that region, it's prey. Its open to being eaten, consumed by other predators that prey on the plankton that live in the zone. So the lobster is trying to develop as fast as it can and then drop out. If there is something that's slowing down that process, in this case reduced pH, then the animal has to take longer in that environment. So its potential to become prey goes up. And what the animal is trying to do is get to that end point as fast as possible; but its being restricted by the availability of the calcium, which is what Chris and Rick were basically giving you the background for is that with the acidity, the amount of calcium available in the environment is reducing. And so, in order to get to the point where it can calcify its shell, sink to the seafloor, and be protected; it's taking longer. So that's the kind of quick run through, the kind of biological processes that sit behind the work that I do. My background is aquatic animal health, so I look at how healthy these animals are given changes in their environment. And clearly in this case it's an interesting situation looking at changing the pH and the kind of development of lobsters into their miniature adult forms.

Moderator: Good. Thank you.

Mike Chadwick, Atlantic Lobster Sustainability Foundation: What I did to do this. I said okay, we've got two Maine ecosystems we're interested in: Gulf of Maine and we've got the Southern Gulf of St. Lawrence and the Scotian Shelf between. In each of those regions, they've done a review of the ocean health. The Gulf of Maine… and I said, "what did they find as the priorities"? I did the same for the Southern Gulf which was done just last year. And then I took, to fill in the gaps, a report done for the President on Ocean Health – and there they listed six priorities. So I'm just going to go through them quickly. I'm not going to touch acidification anymore. So Gulf of Maine, we have climate change, fisheries, and aquaculture. Fisheries being changes in the fisheries; aquaculture meaning the impact of aquaculture on the ecosystem; coastal development – aquatic habitats, eutrophication, chemical contaminants, invasive species, microbial pathogens like harmful algal blooms, hydrocarbons like either the extraction or the transfer of oil – and then marine energy, either on the bottom of the ocean or, you know, the wind-powered ones, and ocean mining. So those are the issues. So I thought I liked the discussion this morning, because we covered a lot of these and I'm just going to quickly go through them, why they are considered issues in the Gulf of Maine; and then flip over to the Gulf of St. Lawrence where the list is a little shorter and that's it. By the way, I have one other thing that I should mention. I do teach a course on environmental impact assessment so this kind of stuff is on the course. So it's not like I'm a total greenhorn, but it means I have no deep expertise in any of this stuff. So climate change – I think we've talked about that. One thing that we didn't mention is that the infrastructure, more storms as I mentioned this morning, more energy in water vapor, bigger storms, and all the business with more rainfall, more floods, and so on. And here, just to show you, when we're talking about environmental data for the areas here, we have stations like Station Prince, which is in the Bay of Fundy. We have been sampling that station, getting profiles of temperature, oxygen, nutrients, and so on for a long time. It must be almost a century. And then these lines, like Browns Bank Line, Halifax Line, these are sort of cross sections through the ocean water which are done as many times a year as Department of Fisheries and Oceans can do them, usually three or four times a year. And there you are. Notice the currents, too. We aren't isolated, you know. Rick mentioned that the Gulf of Maine is very much influenced by the Scotian Shelf. The Scotian Shelf, as you can see, is very influenced by the Gulf of St. Lawrence. Now here, water level. So this station here, I believe it's Charlottetown, but the point is, over the last one hundred years a marked rise in water level like we're talking about 148 to 178, so that's 30 centimeters which is a foot. and these areas in red are identified by Natural Resources Canada as being areas being very vulnerable to storm surges. Here, again, air temperature… We've talked about that, but the point is it's wide spread. Rick covered that. And that was air temperature. Here's water temperature, and again, you can see that it's rising. And in the Gulf of Maine and particularly the Bay of Fundy one of the advantages for an oceanographer is it's totally mixed. So, if you take the water temperature in January, which is, let's say it's 5 degrees top to bottom, so it's easy to sample that. You just have to put… just like in Hawaii, take one sample and you take the whole water column. It's not often like that. Here these are our data. You take the state prints and here's looking at bottom temperature now. And essentially, from 1970 to

the present we can see a rise from white and blue up to red. So it's a rise in temperature. Essentially that's consistent throughout the whole area. Now, in terms of fishes and aquaculture with regard to pesticide use with agriculture and the impact on the ecosystem, there's a very excellent review of this by a guy called _____, it was done last year in Sanders. And takes all the pesticides…it has the lethal dose, called LD50, for each of the pesticides. Like, you can see for yourself what ones are dangerous and which ones aren't. For example hydrogen peroxide is not dangerous. Others things are and I'm not going to dwell on that more. I wanted to mention it because I know it's a concern for many of our fishermen. In terms of the overfishing of target species and so on, I think what we want to point out is the fact that we have three groups of fish. In red is our ground fish in what we call sort of the established fisheries. Big decline since the 1970's. Whereas the blue, so that's essentially crustaceans and mollusks and how that's increased. And in green is emerging fisheries like sea cucumbers and stuff like that, and it's also increasing. And here you hear a lot about this trophic level change, well this has been calculated for the essentially for the Scotian Shelf right around into the Bay of Fundy; but not the entire bay. But the point is that the mean trophic level back in the 60's was 3.6 – meaning that most of the fish harvested were top predators. Like a 5 would be swordfish, so a 3.6 would be a cod. But anyway, today that index has dropped down quite a bit. So that concerns a lot of people. And here we have the size of ground fish in the Western Scotian Shelf and the Eastern Scotian Shelf has declined dramatically in the last 40 years; so there's big, big changes in the organisms that we harvest. In terms of coastal development, here there's a whole series of things. Essentially, we're all aware in my area, my watershed group, our big concern is people building on the shore – usually on sand dunes, pretending that it's stable ground and then filling in around to make, you know, their colossal homes safe against storms. The thing is they cover in marshes and so on, and that affects your water quality and your biodiversity and so forth. And here's an example, this is Halifax, but we forgive them. Now in terms of aquatic habitat here I'm referring more to salt marshes, eel grass, mud flats, that type of thing. And again they're very sensitive. These are habitats which are very much part of the ecosystem, very important, very highly productive. And, by the way, biodiversity and productivity do not mean the same thing. Productivity is generally, a very productive area is generally only a couple of species like a spartina marsh is very, very productive; whereas the tropical rainforest is very biodiverse but not very productive. And we can talk about that after if you want, but that's… Anyway, I mentioned this morning the fact that species at risk, I'm sorry… I'm sorry you didn't like me mentioning this but I felt that the fact that we have so many species at risk in our coastal zone, the diadromous fish, is something that is an indicator of change. Eutrophication has been mentioned several times and the mechanism is there but it's an issue. Now here is a water environmental quality map for Nova Scotia. In red are dots were nitrogen levels are considered to be very high. In green, they are considered to be okay. The point is that we are finding the very high concentrations of nutrients tend to be in our cities and _____in our harbors in Halifax, Sydney, and so on. Again, when we look at our stations like Prince Station, Browns Bank, Halifax Line…if you look across time, we don't see a change in nutrient or chlorophyll when we are out. So, in other words, if we get away from the harbor and go off the coast we don't see a change in nutrients or chlorophyll again. So it's very coarse but it's all we have. You've got your chemical contaminants. We have some

pictures here. Okay, this is the Scotian Shelf where work was done in the gully area looking at the contaminant inputs to the Scotian Shelf, which in turn are going to come down into the Gulf of Maine. Snd, what's surprising … Okay… So look… This is a sample in the sediments of the gully, which is sort of like in the middle of the Scotian Shelf; and here's the origin of those contaminants. Copper in the Gulf of St. Lawrence. Like ten times. 90% of the copper found there is from the Gulf of St. Lawrence, which is from perhaps upstream somewhere. We'll go into that in a second. Lead, same thing; zinc, same thing. So we have contaminants; but they are very mobile and keep moving around and they are coming down your way, you know. And down here we have what I'm going to talk about a little later on, is ocean debris. Anyway there is no change in what we find ocean debris. Again, these samples are kind of… I would say not very…only one decade there. Here again now, with contaminants, what we find is that the main worries are in Halifax Harbor, Canso, Sydney where we have what we consider levels that exceed what is acceptable; whereas we move away from those harbors… Green, the levels are acceptable. So again you can only infer that offshore contaminants may not be an issue relative to other things. Here is, over time, and again, you know, what we see, in fact, is a trend towards less contaminants today than we did in the past. In the past, we were a lot less worried about heavy metals. Today we are much more concerned; and, as a result, the levels seem to be going down. If we look at things like DDT in seal blubber, there's a good way to sample DDT, you can see since 1974 to present it's declined a lot. If you look at PCBs in seal blubber, it's declined as well. So looking at organic contaminants I think the trend is that it's cleaning up rather then getting worse. Invasive species, a big issue. We have things like tunicates, the top left, sort of oyster thief, sort of algae in the bottom. Snd, of course, our famous green crab very much on the rise. And its all theses microbial pathogens. Here we are talking about harmful algae blooms and coliforms seem to be increasing. Here's an example in the Gulf of Maine showing in black arrows the water currents and in orange where PSP outbreaks can occur. I couldn't get a feel for whether these are getting worse or not but nevertheless it's a concern. Hydrocarbons… Here we are looking at… I mentioned what we… what I meant either extraction or transport, if we look at dispersed oil in the ecosystem: we have a series of data, only in the 1970's, showing a decline in oil that's being dispersed into the marine environment. Again, it ends in 1976. That's not very, you know, it's not very recent data but it's the best we have. Marine energy and mining… I think here we have… There are potential sort of impacts. We don't really yet know what's going to happen, but we, you know, we've tried the putting in... I teach this in French so it's moteur; but in English, you know what it is, a turbine, yeah, an ocean turbine. And it goes in and it comes out and they don't tell you why they brought it out. So if it did go in and stay in, we would see a lot of them and we would probably be studying the impacts of them because I'm sure there would be. And the Gulf of Maine group is concerned by that because of changes in energy flow and so on, and how organisms on the bottom would react to these things. Now going to the Gulf, we have one, two, three, four, five, six things: hypoxia, acidification (our worry is ice cover and not for the reasons you think. We like ice cover), nvasive species, impact of fishing, and _____. So there's the Gulf of St. Lawrence for those that don't know. I'm going to put this back up on here, but I'm going to talk a lot about the… like in the deeper waters, are different from the shallow waters in the Gulf of St. Lawrence. And we have three

relevant… remember in the Bay of Fundy it goes straight down the same temperature… in the Gulf, look at the top in let's say the spring or lets say the summer or let's say in September. In September, it's 15 degrees on the surface and then you go down to 50 meters it's almost 0 degrees; and go to down 100 meters, its almost 0 degrees and then on the bottom it's about 7 degrees. So there are three water layers: and what this water here is essentially winter water. That's just sort of … like right now the water is -2. And then that layer, it's -2 down deep a long ways. And then the part at the top warms up and the other part just stays cold year round. And what we've seen over the years is that the middle layer, the cold intermediate layer it's called, has declined in volume over time. And the surface layer, which is the top line here, has increased. So this water is getting warm at the top, the volume of cold intermediate water is going down, and the bottom water such as like here – it's about 4, 5, 6 degrees at 200 meters in the dark green, 300 meters in the light green. But there's a trend to increase the temperatures there. And what this mean boiling it all down for lobster, we have more habitat which is suitable to lobster because of the increase in temperature in the spring. So looking at oxygen levels on the bottom, we know the reason. It's because algae blooms sink to the bottom, they rot, and then they move oxygen out of the water. In red is a bad thing. Its oxygen levels around 20% saturation. In blue is 100% saturation. We find in the St. Lawrence River in the deep water we have a lot of oxygen depletion, and we see this trend over time since 1930 to present. This, okay this pH. It's important to note that, in the Gulf, the deeper water has a different behavior from the shallow water and our pH acidification problem is in deep water. And you can see it here. Here's depth and pH: so deep is acidic, surface is alkaline. And then we talked about the omega so anything in the purple or this color purple like in here is where you start to see the sort of erosion of calcified tissue. Here's our sea ice and this is funny because, here's our maximal sea ice area, you _____ in 2011 and, as we know, in the last 2 years it's jumped way up again. So anyway… It's something people watch because the amount of sea ice determines the harp seal. I'm going fast. These are six invasive species: all appeared in the last decade and four of them are tunicates and green crab and algae and oyster thief. The blue is ground fish and now we have crustaceans and _____ fish in the Southern end of the Gulf. And here's our grey seals where the population is now 500,000 animals. Each animal eats 2 tons of fish a year on average, so that's a million tons of fish being eaten. And this is the mortality of cod, winter skate, and white hake. Natural mortality in all stock assessments, when I was doing it, was generally 0.2; and now it's gone up to 0.6. And that increase in natural mortality is attributed to grey seal predation. And I'm going to go fast. And the last point is the National Academy of Sciences and their issues were: oil spills, nutrients, industrial contaminants, noise, and plastics. And I just wanted to point out a few things out here. In terms of oil, the pollution caused oil slicks and such are from land; 87% of that oil that we found in the ocean is from lawnmowers, automobiles, highways, parking lots, and jet skis and stuff like that. Not from spills at oil sites and so on. The noise is an issue in the ocean – and transportation, dredging, oil drilling, surveys, ocean research all cause noise. And we don't know much about that, but it's a concern. We know whales can communicate over thousands of kilometers. Noise is an important thing. Trash. I believe I heard this here: 600,000 tons per year and all of this trash is land-based. It's blown off out of the parking lot and eventually to the ocean. And here's a study that I

found interesting: here's a sample from one shearwater which is an ocean-going sea bird. That's one stomach.

Laurence Cook, fisherman, Grand Manan Fishermen's Association: Yeah, but they're not very smart…

Laughter

Mike Chadwick, Atlantic Lobster Sustainability Foundation: Another thing about the debris, it carries contaminants as well. And so here's a sample around the world where we are looking at the concentration of PCBs in the plastic pellets I just showed you. And you can see it's another issue. And there you are, so the thing is that we are trying to cover all the bases in ocean health.

Moderator: Very good. Thank you very much to all of you.

Applause

Moderator: And we have some time now for your questions and comments. And then at the end of that session, we'll move off into other areas that you may have a particular interest. But right now… David? Remember to give us your name and where you fish and then go ahead with your question.

David Cousens, Mid Coast Maine: David Cousens, Mid Coast Maine, lobsterman. I thought it was a great presentation. The take-home message I got from that was that we have reached the tipping point for the ocean being a buffer. You know, you want it back 800,000 years – but, you go back 50 million years, the range is the same until about 200 years ago. And in the last 50 years, it's gone straight line up. That's not a positive. And I think that we need to dispel… all the people that think this is a hoax… I would love to see a slick presentation of this be mandatory for every legislator and every person in Canada that's in government just to see it. because, in the United States we still have a bunch of people that just say this is a hoax, it's not true… it's pseudo-science. Well it's not; and our livelihood is at stake here, and my fear is that we are going to reach a point where the larvae aren't going to make it in the top of the water column because that's where it's most acidic. And when you reach that point, we re done.

Moderator: And not only you but a lot of the rest of the people, too. I don't think we recognize how broad-spread this whole issue is. Not just for fishing.

David Cousens, Mid Coast Maine: My point is I think we need to do a better job to put pressure on our officials to educate themselves that this is real and it is scary. When I was a kid, science was king. You didn't argue with science. Science was like how you based everything on. Now it's like if you don't like the science, you just say ahh it's not right; and if you say it enough, people start believing you and that's not how it should be.

Moderator: Thank you David. More comment, question, input, yes?

Ali Kokut, Luke's Lobster: I'm Ali. I work at Luke's Lobster. Can you explain why the North Atlantic Ocean is warming 99% faster then other oceans?

Rick Wahle, University of Maine: Hmm, good question and I'm not sure I can answer that question because I'm not a physical oceanographer. But yeah, well there's several factors at play… and, you know, the North Atlantic is this really steep gradient … has this really steep gradient. And so we've got the Gulf Stream coming face-to-face with the Labrador Current right off our coast here. We do have the, you know, the polar regions warming faster than the equatorial regions. And a lot of that water is being pumped by the Labrador Current from the North Polar areas down into the North Atlantic and I think that may be a big piece of it. A big a piece of the explanation is that we've got this warming happening rapidly at the North Pole, melting and impacting the North Atlantic. But it also has a lot to do with the position of high and low-pressure systems, the ocean-atmosphere interaction. And I have to confess I'm not really in a position to address that question totally.

Moderator: Thank you.

Inaudible

Moderator: Would you repeat the question so we can all hear.

Ali Kokut; Lukes Lobster: Sorry I was just wondering if you think it's more those natural causes then human activity.

Rick Wahle, University of Maine: Well the localization probably has more to do with natural causes but the overall global warming is pretty clearly impacted by post industrial carbon emissions.

Mike Chadwick, Atlantic Lobster Sustainability Foundation: I could add one thing that, air borne contaminants… (and, I didn't mention mercury which comes from coal-fired generating stations, that's a big issue. That was also)… I said industrial contaminants…that was essentially mercury. Same thing, the polar regions are condensation zones alright; so everything that goes in the atmosphere condenses in the Arctic. That's why none of the food up there that the Inuit eat is edible because it's contaminated with organic and heavy metals and so forth. Acid precipitation, as well, I would suggest, sulfur dioxide… And then, when we do fresh water studies, snow melt is very, very acidic. So essentially it might be along those lines that Rick was talking about, the melt in the spring and that could be part of it anyway.

Moderator: Thank you, Mike. Some more comment question. Yes?

Allain Barnett, University of New Brunswick: So before we talked about..

Moderator: Give us your name please?

Allain Barnett, University of New Brunswick: Allain Barnett, University of New Brunswick.

Moderator: Thank you

Allain Barnett, University of New Brunswick: Before we talked about what is a healthy ocean and, if we were to think of the ocean as a human, right now he would be smoking, drinking, maybe doing some illegal drugs, and in pretty bad shape from what I've just seen. So looking at now, knowing the baselines from before, and knowing that we have limited capacity to change what we have now, what should our priorities be and what role does the fishing industry play in having a saying in what those priorities are?

Moderator: Yes, Chris?

Christopher Johnson, Maine Maine State Senator: Chris Johnson. We identified a number of things to focus on in the report. I would say people from here and from your industry need to be making the case for policymakers that we are at a point where it is already having an effect on the productivity of species that you harvest; so something needs to be done before its worse, before more species don't survive the larval stage and we have large collapses. But we have to get serious about alternative energy that doesn't have the carbon footprint of our fossil fuels. That's what that nearly vertical line on the end of the chart is. That's how much we have been relying on fossil fuels in the industrial age. We need to get more serious in realizing that we have a pattern, at least in this part of the country, of higher total precipitation and severity of precipitation… about what we do for land use practices. The ability of the land to take up that precipitation is really important. So what we do around impervious surfaces, in how we plan our towns and cities, what we do with storm water management, what we do with best practices in agriculture – all affect the nutrient loading and what happens with that water going into our ocean. And we have an opportunity to address this directly and try to have a healthy way of dealing with these things. Like we can work with farmers to help them expand the local food production, which is both a lower-energy footprint and healthier for you then lots of what we bring in from miles away. And improve their practices in reducing their contribution to the nutrient loading in the watersheds. But we can do that sort of thing by either setting regulations that impose burdens on farmers; or we can work with them and help them make more land productive, without having the impact that would be harmful, and help both industries at the same time. And I think it's really important for policy makers to be involved in finding those intersections that do good things for our ocean and our land use.

Moderator: Thank you Senator. Yeah Rick? Tim?

Tim Bowden, University of Maine: Tim Bowden. Since you put it into a human context, it reminded me, a couple years ago I was at a conference and we were trying to simplify the concept of what does ocean acidification actually mean? And this was the back of an envelope exercise. You have to take this with a large pinch of whatever. But

somebody came up with a number that if you wanted to neutralize the acid in the ocean as a consequence of ocean acidification currently, that would a 4-billion ton Alka-Seltzer tablet. And all that would do is neutralize the existing acid problem in the ocean, not the problem that exists in the atmosphere that is still to contribute. And I thought that put it in perspective for me.

Moderator: Thank you. There's a comment/question over here. Yes?

Brian Guptil: President Grand Manan Fishermen's Association: I'm all for.

Moderator: You are?

Brian Guptil: President Grand Manan Fishermen's Association: Brain Guptil, Grand Manan.

Moderator: There you go.

Brian Guptil: President Grand Manan Fishermen's Association: I had that coming from you. I'm all for trying to clean things up and pushing law makers towards that, but you want to very careful what you ask for. We've complained to the Canadian Federal government about the sewage from cities just being untreated and dumped into the ocean; and their response is that we need to put a holding tank and all kinds of stuff, have a stability test because you added a tank aboard your boat. And, instead of cleaning up the city that's dumping it, they're worried about what the little lobster boat is doing. And just be careful what you ask for because it's going to come back and bite you. I don't really want to put up a sail and have electric hoister to haul my trawl with, so just temper it.

Moderator: Okay, thank you. Over here, Cranberry Iles.

Dave Thomas, lobsterman, Cranberry Isles: Dave Thomas, Cranberry Isles. Chris, when was this study done to pay for the booklet? I've gotten so much information here I think my head exploded a while ago.

Christopher Johnson, Maine Maine State Senator: We actually conducted a study and this wasn't an experiment. It was analyzing what the science out there is that's been published and whatnot. It was actually published this January. The work compiling it was done over late last summer through the fall.

Dave Thomas, lobsterman, Cranberry Isles: My next question is, when this was presented to the powers that be in the State, whether it be the Governor or the policy makers, how was it received?

Christopher Johnson, Maine State Senator: It has yet to be presented to the Governor but it was presented to the Marine Resource Committee and the Legislature. I think it was well-received there. The difficulty is figuring out how to move forward on some of

the recommendations in this; and that we have yet to see, whether we will succeed in that. There are quite a few of us that won't be giving up on it, but how quickly we make progress is the real question.

Dave Thomas, lobsterman, Cranberry Isles: Thank you.

Moderator: Laurence? Name please?

Laurence Cook, fisherman, Grand Manan Fishermen's Association: Laurence Cook Grand Manan Fishermen's Association. I have a few questions. I would like to start with the gentleman on the end, I'm sorry I don't remember your name. I have a glitch. Names come and go and they're gone.

Moderator: Tim Bowden.

Laurence Cook, fisherman, Grand Manan Fishermen's Association: You said that you lowered the pH but you didn't say how much in the tank where you saw the lobsters start taking longer and longer between molt stages. How much did you lower that pH relative to where we are in the ocean now?

Tim Bowden, University of Maine: We did three pH's. We did just over 8, and I'm just hedging my bets because the two studies had two different pH sets. The first was 8.15, 7.9, and 7.6. And the reason for that was 8.15 was kind of classed as about normal pH. Looking at Rick's data, it's a little bit high. 7.9 was forecast to where we would be in 2050 if you started at 8.15 now. And 7.6 is forecast to where we would be in 2100 on the same kind of scale. The second time we ran it we ran actually lower pH's: 7.9, 7.6, and 7.4, and that was a reflection of actually the difficulty in maintaining accurate pH in these systems, so it was experimental error. But we know that the pH's were better than the first trial.

Laurence Cook, fisherman, Grand Manan Fishermen's Association: Okay so you saw the molt stage change smoothly relative to the pH's as it dropped? Or was there a point where it suddenly accelerated.

Tim Bowden, University of Maine: Hard to interpret because we only have three pH points so you don't get a sense of rate of change as you decrease the pH. I would say that is hard to interpret on our data. But the lower pH's all show longer times to the molt point and reduction in size at that molt point.

Laurence Cook, fisherman, Grand Manan Fishermen's Association: Okay I'll ask one more and then I will quit. But I could ask questions all day. I know that oxygen is less well absorbed by water as water temperature increases. Is carbon dioxide? The warmer the water is, the less oxygen that it will absorb, right? Cold water absorbs more oxygen. Does cold water absorb more carbon dioxide?

Tim Bowden, University of Maine: Yes.

Laurence Cook, fisherman, Grand Manan Fishermen's Association: Wouldn't that make sense? That the North Atlantic would be warm and faster then all on its own?

Rick Wahle, University of Maine: What was the last part of your question?

Laurence Cook, fisherman, Grand Manan Fishermen's Association: If the water… colder water will absorb carbon dioxide faster, won't it warm faster than the water that's already warmer.

Rick Wahle, University of Maine: So the water temperature is not affected significantly by the water CO^2 it's absorbing. That the partial pressure of CO^2 is only a fraction of the atmosphere, atmospheric gases. So it's more the temperature of those gases in the sunshine and the currents entering at the temperature of those, all of those factors that influence the water temperature. So the biggest influence of the CO^2 is forming carbonic acid, which changes the pH directly.

Moderator: Over here.

Dennis McNally, Prince Edward Island Fisherman: Dennis McNally, Prince Edward Island fisherman. It's my understand then that mollusk and crustacean shellfish require a certain amount of calcium to be in the water for it to molt and continue its life cycle, and we've got a pretty good idea from your presentation how the ocean is becoming more acidic. So, on the opposite side of that, where would the ocean at least supposed to be or where does it get it calcium content? And just a thought on the matter and I'm sure it's localized and maybe even irrelevant but, in terms of harvesting product, everything from lobsters in this case and I'm thinking about millions of pounds of mussels out of Prince Edward Island and oysters taking that product and it's shell out of the water, would that have any impact on it's pH in the area?

Rick Wahle, University of Maine: We actually took a look at that. We examined some possible mitigations in our study as well. And as a localized affect because you'd have to use, as you point out, many, many, many, many tons to deal with the changing pH of the open oceans; but in the near-shore where you may actually have much worse acidity because of the algae blooms and decay phenomena and the pH of our rivers entering, that's an area where you may be able to mitigate the effects on individual mud flats by using crushed processed shell. You have to be careful, you can't… I mean, you have to have a process for doing that so that you are not going to spread pathogens between shellfish species and the flats and into the new developing ones – but that's the sort of thing that has some promise. Another thing is macro algae….macroalgae, large seaweed. If we were to cultivate that in some of the near-shore waters where there is a particular problem with the pH and then harvest it... Macroalgae, some kinds are very adaptive to the level of nutrients; so unlike microalgae which will bloom, will reproduce drastically and then they will all not have enough nutrients and die, your macroalgae will actually adapt to the nutrient levels. And so you can have a kelp that will grow faster when there's more nutrients and take up more of that and bind more of the carbon into

their physical structure, and then will just slow down their growth when there's lower nutrient level so you have a window of opportunity to cultivate those, harvest them so you're taking that carbon out of the system and use it for, you know, land-based fertilizer or food or other things. So the report does take a look at some possible mitigation that deserves pilot projects, people measuring carefully how effective these are and implementing them.

Moderator: Thank you, Rick.

Rich Wahle: I would add that we pointed to the aragonite saturation potentials or states that different species required it. For example, coral require really high saturation states, up around 3, to properly lay down a skeleton. Clams require a much lower optimum at about 1.6 but we don't know what lobsters need yet and so that's one of the critical questions.

Moderator: Cathy?

Cathy Billing, Lobster Institute: Cathy Billings from the Lobster Institute. For those of you who received the *Lobster Bulletin*, you'll see that there is a summary of some of the findings and recommendations of the commission that Senator Johnson chaired. Also there is a link there to the full report. And if you don't get the *Bulletin*, we can get that link to you today if you want to come up to us afterwards. But that leads me to a sort of two-pronged question for Senator Johnson. Can you tell us a little bit about how the commission came to be? What was the process, in case other States or Provinces up here want to do something similar. And, following up on that, the recommendations that you've put forward…are there any strategies coming up down the road that hopefully will get those implemented?

Christopher Johnson, Maine State Senator: Okay, so the first question, how did it come to be? Some folks for whom this is on the radar worked with Representative Mick Devin who is also a marine scientist working at Darling Marine Center; and he put in a bill. And, working on this in the Marine Resource Committee, which I was on in the previous legislature, we actually got extremely strong support. I think it was unanimous out of our committee and very strong support in the legislature overall for passage. The Governor was a bit hesitant; but some conversations between aquaculturists who are actually concerned and saw pH levels that would cause collapse of their hatcheries present in the waters they draw from for their work part of the time, convinced him that this is something of economic importance for our marine resource industries. And so we moved forward with that study. And it was a great bunch of people. As I mentioned there is a list of participates here, how diverse participation was. I think that was really important. Because the scientists would gather what we have for experiments, the lobstermen would say, "well yeah but how does that apply where I fish? These waters aren't like where that experiment was done. Is this relevant?" And so I think we had a good, sound basis for the conclusions because of all the representation we had in that and thinking this through together. In terms of how to move forward, in each of the issue areas that we identified, and we made some general recommendations, we also followed

those with a series of specific things, suggestions we had for how to implement them and what to do to move that forward. One particular thing that we are working on trying to get passed this session in the legislature is the creation of an Ocean Acidification Council that would be trying to coordinate the monitoring; and making that data available to everyone involved in this effort of the findings the research, updating what the plans are based on what we know as we learn more, and working to spread the word. Someone said that we should all be talking to our legislatures. Yes. One of the recommendations in here was communicating and advocating for this. Communicating what we know to policy makers and to students in our education systems. Really getting the word out to people to understand this issue – that now we are at a critical stage in. And that group to continue that effort we felt was important, because no one of the three departments in the State of Maine that had representation on this commission wanted to own the responsibility for moving all this forward – particularly because when you are dealing with nutrient loading then you are talking about, depending on where it is in the watershed, it might be the Department of Agriculture policy issues. It might be the Department of Environmental Protection. It might be the Department of Marine Resources. So we wanted to have an independent entity to try to get a cooperative effort among scientists, among citizen monitoring groups, and among state agencies and policy makers; and work to move things forward. So we will see how that works in this legislature and if we manage to accomplish that; but that's one particularly important element, trying to keep this conversation going.

Moderator: Thank you very much. I think this last point Senator Johnson made is important for all of us because it's sort of hinting at how we can get things done. How you can move from an idea, to gathering people, to gather expertise, and then moving it through whatever process is required. So I thank you for that report. I know it will be available if anybody wanted to question further. Yes? Just a second right there?

Bill Coppersmith, Portland, fisherman: Hi, my name is Bill Coppersmith, I'm from Portland, a fisherman, and a member of the Maritime Lobstermen's Union. My question is for the Senator. Could you bring up that Casco Bay map that you have on the screen, please?

Moderator: You just want to know if he's not only a good legislature but he also can run this fancy machine stuff.

Christopher Johnson, Maine State Senator: I tell you what, it's in the report.

Bill Coppersmith, Portland, fisherman: I'll come to the question. Who did that report? The Friends of Casco Bay?

Christopher Johnson, Maine State Senator: The Friends of Casco Bay gathered the data.

Bill Coppersmith, Portland, fisherman: And that was done last year, the summer?

Christopher Johnson, Maine State Senator: 2008 in this particular case.

Bill Coppersmith, Portland, fisherman: That was done… we had dredging in 2008 and of course the river is…are the dredging projects going to change the salinity levels and the pH levels?

Moderator: Why don't you borrow that mic to answer that question. The question is an inter-relationship between what's going on now and the report.

Christopher Johnson, Maine State Senator: Well it is, of course, going to have impact for a period of time. I mean, you're raising silt and whatever you've got in the dredge going in. But, long term it's not, other then the shape of this might change slightly because of a change in how the currents travel around the bay. I mean, if you're directing more of the flow directly straight out into the bay because you're dredging a channel out there, then you would have an effect on the shape of this salinity and the omega value in the bay.

Bill Coppersmith, Portland, fisherman: You have the dredging and then you've got where they dump the spoils, too. So…

Christopher Johnson, Maine State Senator: So unless what you're dumping for spoils are influencing pH or depositing available calcium carbonate then it's not going to change these omega values. But it does have other impacts. I mean, if you're putting nutrients into the water column, and that's a similar effect but for a shorter duration than upwelling events on the west coast, you're bringing up nutrients.

Bill Coppersmith, Portland, fisherman: I don't know if you can answer this or not but I remember reading an article in the Press Harold where the acidity levels are good for lobsters.

Christopher Johnson, Maine State Senator: Okay so that's… if you check our report that one study that says that it might be slightly beneficial, we actually cite that. And the biggest problem with that report is it was for a species and a temperature that is not the same as what we have in the Gulf of Maine. So what the stressors were on the lobster development was entirely different then what they are facing in the Gulf of Maine conditions. We shared that that was the results of one of the scientific studies, but also because it doesn't compare well with our circumstances it is not very useful data. Somebody would need to conduct an experiment in our conditions in order to determine if that's a realistic expectation. It was one of those points that came up but it was also only a very slight advantage proposed in that report for pH effecting the calcification of the shell.

Moderator: Thank you on that. Did you have further questions? That just points out the need to be careful in our work on this and to track these things down. It's an important question to ask and an important answer to hear on how these things interrelate. They are all important, and if we're going to get our work done and make

things move, we've really gotta pay attention to that stuff – so that's good. I'd like to sort of morph into a general question and answer and inquiry time, where our time is going to end, believe it or not. Although we don't have a specific coffee break, the coffee is sitting right back there and it's mighty good and get it anytime you want. But this is an opportunity to raise other questions. You may go back to an earlier talk that we had this morning, or somewhere else, or move us into an area where we have not yet gone. But this is your time to push us a little bit, push all of us into thinking and dealing with questions or concerns that you may have. Yes? Mr. Bar Harbor.

John Nicolai, Lulu, Inc, Bar Harbor: John Nicolai, Bar Harbor. Have you ever quantified the effects…because it seems like we're talking about North America, Canada and the US…quantify the effect that developing countries have on the problems that we're facing with ocean acidification? I mean especially maybe the lack of conservation rules that they have in place. It has to affect us. And what kind of pressure can we put on countries that are actually not following, you know, conservation efforts that we are trying to practice here in North America?

Moderator: Okay, Mike?

Mike Chadwick, Atlantic Lobster Sustainability Foundation: Because this is a part of my course material, it's a good question. What you will find is that the human development index is highly correlated with CO^2 emissions. So, in other words, in North America we emit what, 20 tons a piece, and our economy is very strong. And in, lets say, Burkina Faso, the economy is very weak and they emit almost nothing. And you can plot countries in terms of their GDP versus CO^2 emissions and it's a perfect straight line almost. The only difference is that it does asymptote at a certain value. And those sort of people thinking about policy on climate change are saying once our economy is at full throttle we should be reducing our CO^2, whereas the countries that are poor and because not only GDP but your human development… other words your social infrastructure and health and so on, you need a certain amount of emissions to reach a level which is… So, it's complicated; but the onus is on our shoulders, by the way, not on the poor countries. And to add to that when we are driving our trucks, okay, of the all the emissions, half go to the atmosphere and then half of the other half goes to the ocean. The other half of the half goes into the forests. And so that's pretty well how the pie works. And, by planting trees in marginal lands there are ways of mitigating CO^2; but it has to be done, you know, very, very… it's not the end of the world. As you saw, it goes up and down all the time; but we could certainly bring it down to below 300 parts per million, you know, which is kind of what we should be aiming for. And it seems to be the trigger for many, many problems as we heard this afternoon, because no one expected… acidification was something like I think five years ago we didn't really talk about it much, you know.

Christopher Johnson, Maine State Senator: And if I might add to that quickly, although it's more of an emerging contribution, from China for instance, some of those other nations are actually… in spite of all you hear about China's increasing burning of coal and things like that… they also have some pretty aggressive energy efficiency work that they are doing. So when you look at the big picture, in spite of their energy

consumption and the resulting CO^2 emissions going up significantly, we still are using a lot more energy and producing a lot more CO^2 in the atmosphere per person than the rest of the world. So although people might say, "well aren't they to blame and we can't fix it," they are partly the blame and we should be trying to encourage them to fix it. But we are the bad guys here. We could be doing far better then we are and we need to.

Moderator: Thank you Senator. Yes once again, John.

John Nicolai, Lulu, Inc, Bar Harbor: The forecast that you are giving.

Moderator: Who are you?

John Nicolai, Lulu, Inc, Bar Harbor: Oh John Nicolai of Bar Harbor. The forecast that you were giving earlier, are they based on technology…today's technology? Are you taking into account future technologies like hydrogen fuel cells, electrical, and alternative fuels that we're developing right now. And I would say probably in ten to twenty years the picture will be a lot different than what it is today.

Rick Wahle, University of Maine: Right, so those were different scenarios created by the IPCC panel assuming different levels of emissions, given different strategies. And, as you saw, there's a whole host of different strategies: some of which assume certain levels of conservation, reduced coal burning, you know, adoption of other alternative energy forms. So of course those models are being tweaked all the time. What I showed you were projections from that 2007 document. The basic substance hasn't changed but you know they're varying from one model to another.

Moderator: Thank you, Rick.

_____: I think I heard very recently news that, in spite of the energy production globally having increased once again in the last year, I think I heard news that the CO^2 production, however, held pretty much level. In other words, it proved that we could have a significant effect and could actually reduce it if we went more strongly into the alternative energy sources that don't produce as much CO^2.

Moderator: Thank you. Further thoughts? Questions? Yes?

Spiros Tourkakis, Vice President, East Coast Seafood/Paturel International: With all due respect to the scientists….we talked about global warming, the temperature of the ocean moving up. In the meantime, we are freezing to death the last couple of years around here. And, as far as I know, the ocean water the last couple of winters has been holding. My question is, this increased temperature in the Gulf of Maine again, with all the respect, how real it is? for how long has it been monitored? so that we can say really that the temperature is increasing faster then any other water body in the world. Is it something that would… maybe we pick a spot, you know, and certain time and when we measure it. It shows an obvious increase or is something taking place enough, over an extended period of time that we can draw a sound conclusion.

Moderator: Thank you Spiros. Dr. Wahle?

Rick Wahle, University of Maine: I can start to take a stab at that question. There are some long-time series that go back about 100 plus years from different ocean or coastal observing stations. I know, for example, Boothbay Harbor, Maine, has a time series that goes back about 100 years. Mike talked about the Prince Station. There's a station at Woods Hole. Narragansett Bay in Rhode Island also has some records that go back about 100 years. And all those show temperature increasing over that time significantly. Somebody gave me an analogy once because there's always this question about, well yeah but look at this year…it's so cold. How could climate change be happening? And the metaphor that was used was think of a guy walking a dog and the man with the leash is leading the major trend. He's the major force. But you've got this dog who's got his own mind and his own little temporal and spatial dynamics who's going back and forth along that lead. But the overall trend is being determined by the walking man. And the metaphor is actually sort of accurate in that the man walking is the larger scale process, both in time and in space, whereas the walking dog is a smaller scale process if you will. But it's being constrained by the bigger one. It's a metaphor but I think it helps us understand the difference between the climate trend and the local weather. I don't know if it helped you but…I don't know if that helped you…

Moderator: And occasionally you're dog who is that high sees a rabbit and pulls you over. And then you get him back and go on your way. Okay. Alrighty. Good, good question. Yes?

_____: In the recent few years there is that large discussion regarding the great slow-down of climate. To what degree does the ocean temperature explain what was perceived as a slowing and or is it more an El Nino/El Nina effect?

Moderator: One of you want to tackle that? And respond to it. Comment on it. Let it go by?

Rich Wahle: I'm not sure I can tackle that. I know there has been a slow-down in the overall ocean warming but the long-term trend is still there. It probably has a lot to do with the deep water formation that happens as water is pumped from the tropics to the poles and then recreated again as it sinks and freezing occurs. But I'm not sure I can really tackle the mechanism behind the slow down.

Moderator: Okay let me interject a thought here. I've left these good consultants for us up here and that may have inferred to you that we needed to focus our questions to them rather than open this up as an open forum for anything and then maybe take advantage of some of their insights and expertise. But this is a time for you to be thinking about your issues where you fish, where you work, what you do, and things that you might have thought, "well I wonder if they could talk about this or help us with that or have some comment on the other thing". This is your opportunity and you can go all over the map and in your mind and this is your time. Yes?

Kenny Drake, Prince Edward Island: The guy with the dog he was just on his way to…

Moderator: What was your name?

Kenny Drake, Prince Edward Island: Kenny Drake, Prince Edward Island.

Moderator: Thank you

Kenny Drake, Prince Edward Island: The guy with the dog. He was just on his way down to a fish plant. He's the clean up guy. And there's a pipe running from the plant out into the water where people fish. What would he use in his plant to clean it that would be okay to go out through that pipe?

Moderator: Anybody else got a good answer on that one?

Laughter

Moderator: We will take expertise from anyone of you? Yes? Stonington has got an answer.

John Williams, Lobstermen: John Williams. No, I do not. I have another question though.

Moderator: Okay.

John Williams, Lobstermen: We're not supposed to use bleach aboard the boat. It's against the law. Will something else kill algae and grass on our buoys and stuff that we could use? I have heard hydrogen peroxide mentioned. Is that true? I don't know.

Moderator: I don't know.

John Williams, Lobstermen: I haven't tried it. And I don't know where you would even buy it in any quantity.

Moderator: How about that? Cleaning your boat? Good ideas? Maybe we need to press that as something we ought to look into because you are quiet right. I mean we always use that and now we don't. And the grass still grows on the bottom of most boats that aren't going as fast as Andy goes, and so that might be a good question to address at some point. Here and then there.

_____: Real quickly, I don't design environmental solutions for things. I'm sorry but that's not my area of expertise but it strikes me that there's always another way to tackle something. And pressure washing it with a capture system and filtration and doing something with that algae that's responsible is probably one of the ways. But I guess the

important thing is, if you ask the question and work to find a solution from somebody that does have expertise in that area, then the right thing will happen.

Moderator: Yes?

_____: You could use a high salinity solution or vinegar. But I think the vinegar will change the pH levels.

Moderator: I hope you're still thinking about the answer to our question over here. We haven't gotten one yet. Cathy?

Cathy Billing, Lobster Institute: I am going to take a 90-degree or 180-degree turn perhaps. We mentioned earlier that we were expecting a group of young fishers from Prince Edward Island and we were fortunate to have one. Some of the others were caught up in weather, I understand. But perhaps that young gentleman or some of the other folks from Prince Edward Island could explain a little bit about that program. I think it's kind of novel and a good model.

Inaudible

Laughter

Moderator: I know some good questions have come from over here through the session here so it's good to see that happen.

Bob Creed, Director of Marine Fishers and Seafood Services: My name is Bob Creed. I am the Director of Marine Fishers and Seafood Services with the department that the delivers the program that Dennis referred to this morning, and it is called the Future Fisher Program. It's been around in Prince Edward Island since 2009. We have had about 135 or so new entrants to the lobster fishery go through the program. It's a three year program, it consists of a mentorship-type program approach where someone like Kenny, Mr. Drake, who's been in the industry a number of years, can relate his experience and know-how and knowledge through to the new fishers. As well, there is a training component to it. For example in Canada, Transport Canada requires new entrants to have certain training certificates, whether that be small vessel operation proficiency or MEDA1, those kinds of programs. So we encourage and support the fishers to take those programs. And the third component of it is that there is a financial remuneration to it – and the program provides $10,000 over a period of three years to new fishers to take training in the programs. And the training also goes into running your own business if you will….so the mechanics of how you actually operate a business successfully. So we have accountants come in and talk to the new fishers. We offer biology of lobster and so we have some staff biologist comes in and provides a workshop, a one-day workshop. Our own lobster biologist does some workshops as well with the future fishers to help them understand the handling of the lobster, the quality impacts on the lobster, the does and don'ts, if you will. Department of Fisheries and Oceans also

comes in and explains the laws that these fishers must abide by, and licensing requirements. We have had Geoff Ervine come in from the Lobster Council of Canada and talk about their programs and services. We provide marketing information to them as well… so how does their lobster move from the boat, if you will, to the plate and take some of that mystery out of it for them. The program is evolving. The program has been well-received by industry. It's not compulsory. You don't have to be involved with it in order to enter the fishery in Prince Edward Island. You must be a resident of Prince Edward Island and you must not have owned an enterprise prior to 2008. So it is a popular program and we encourage all new entrants in our Province to partake in it. And, in all honesty, it was modeled a little bit after the Future Farmer Program that we have in Prince Edward Island as well. And it was strongly advocated by the Prince Edward Island Fishermen's Association so we are very proud it. Any questions?

Moderator: Thank you very much. Now what is the age group for this? Is this for guys that are out of school and going into fishing?

Bob Creed, Director of Marine Fishers and Seafood Services: Yes, you must be 18 years of age; and we do encourage all entrants to complete their high school and further their education even beyond that. So if you are not a high school graduate then there is a limit of $4,500 over the three years. So we don't want to attract anybody out of high school to buy their uncle's enterprise prematurely; because we know that today with the finances that the investment requires, you have to understand, you know, the basics.

Moderator: Thank you very much. There's a program – I may have referred to it earlier or maybe not – Marine Pathways, which is for high school students; and it incorporates about 90% of what you're doing into that program. So the kids, when they're in school, they get to go out on the water and they do navigation and all the stuff that you're talking about. But it's through that program. Do you know a good deal about that, John? You want to talk about it a bit. I think it's a great program. What I would like to see is the two groups' leaders get together and talk about what they're doing because they both have something… a great deal to offer.

John Williams, lobsterman, Stonington: John Williams, Stonington. Yeah, we've been lucky. We have a teacher that went through the Marine Trades Program in Rhode Island. He's been in our high school for 20 years. But our principal is very ambitious and started this Marine Pathways Program. It's a lot more involved now. There are seven schools. I think 70 kids are in it in Eastern Maine. So that's basically what they're doing. Some of the teachers are doing this. They're all volunteer. They're not getting paid. They have no background in the fisheries but they are trying to set up a curriculum so that any school could come in and do this. They are actually down in Massachusetts somewhere talking about it the last two days with other schools down in that area. But, like I said, he's very ambitious. They are going to start a Nursing Pathways in our high school and they're going to start an Arts Pathways. So, like I said, they are doing this way above and beyond their extra curriculum. I'm very proud of what they've done, and the kids coming out of there. I hope the future of this business is going to be better than what it's been in the past. Because I hope they are going to look around at the other kids

in these towns and say wow I know that guy. He's not my enemy just because he's from someplace else. I hope the future is better for business because these kids have done this.

Moderator: Thank you very much. John. And Tom Duym is the guy you're referring to and Mr. West is the principal, am I correct in remembering that, at Stonington High School? I'm taking him, I think…we're trying to work this down in Belize. I mean it's that good a program. I've talked to them down there and I got the education minister and some others down there to say yes, they would like to get a pilot project. And so, it's an awesome way to get people to know what needs to be known, and to get thinking through some of the questions that need to be questioned as you get into the fishery/ because we've gotta get a lot of smarts going into the future and it's a great way to do it. I think it's a wonderful program. Some other questions, thoughts, ideas, queries? Wonderments? Acclamations? Yes?

Mike Chadwick, Atlantic Lobster Sustainability Foundation: I'm wanting to answer Kenny's… Mike Chadwick. I want to answer Kenny's question. I think the long term is to try and not put it down the pipe. You know, like that's the hard part, is having screening…rotating screens or whatever, to try and reduce what we put out in the ocean. Because I know fish plant effluents are an issue in the Southern Gulf. And I understand that… anyway, even at home you've gotta try and not rely on chlorine to blow out the hole there. You couldn't be…keep… don't put stuff down the drain if you can, you know, and that's the hard part.

Moderator: Very good, thank you?

Kenny Drake, Prince Edward Island: What would be the best way to handle it? Would it be a smaller...

Moderator: Here comes a mic, Kenny.

Kenny Drake, Prince Edward Island: Sorry, Kenny Drake Prince Edward Island. What would be the best way to handle it? Like I know the pipe is the extreme part of it but is there a solution to… well, we'll just shut down the pipe. What would be like a small lagoon to look after that, or…

Mike Chadwick, Atlantic Lobster Sustainability Foundation: Well, we had a workshop on seafood plant effluent back in 2006 and ideas like that were discussed. There's a report on that. I can give you a copy of that. There's ideas there. So that's probably the best way to do it.

Kenny Drake, Prince Edward Island: Alright, thank you.

Moderator: Okay, we got a mic over here. Your name?

Dennis McNally, Prince Edward Island Fishermen: Dennis McNally, Prince Edward Island Fishermen. I'm just wondering, why is that even allowed? Why can a processing

plant take some of their waste and just pump it out to make someone else's mess? Like, if they want to take that pipe and put it on Main Street on the nearby town or put it in somebody's potato field or out in the middle of a forest everybody would cry foul. I don't understand why it's any different for them to run effluent onto somebody's fishing grounds. It doesn't seem right. In this day and age, I can't understand why that's even permitted.

Mike Chadwick, Atlantic Lobster Sustainability Foundation: Okay, I'm not trying to defend it. I know what the thinking is, that it's from sea to sea. We took it from the ocean. We are just putting… it's just organic material, okay. And so I agree with you, but there is still an inherent, deep-rooted thought that it's just putting nutrient back to the water. It's going to be picked up in the food chain. And that's generally true in areas where we have lots of current. In areas where we don't, we end up with eutrophication and blooms and such. And anyway there you are.

Moderator: Okay, thank you. Yes? Kristan?

Kristan Porter, Cutler: Yeah, Kristan Porter, Cutler. Maybe I was just dreaming this. I visited a plant somewhere and maybe Luke can… he's up on the technology. Isn't there some ozone technology or something like that that they clean plants with it that is even cleaner than bleach and it's not, it's not as pollutant. Am I wrong in that or is that something?

Luke Holden, Cape Seafood: I mean, ozone you can… it's 200 times or something like that. It depends on the concentration but it's 200 times stronger than bleach and you can drink the stuff. And it does the same… has the same properties as bleach. But as far as sewage stuff, I mean, we spend anywhere from $1500 to $2500 a month to send our waste water to the waste water facility in Saco. And we end up getting charged on flow and we get charged on TSS which is the measure of suspended solids, and BOD which is, I believe, the amount of oxygen that you need to reintroduce to the product to make it safe. So we literally, we've got a sewer system. So because we are putting it in the sewer system, we needed to pay surcharges that enabled that town to absorb the cost of us throwing all of these organic materials at them so that they can remediate them and then discharge them. But I mean, in the State of Maine, I don't think there are any… well maybe there are but I don't know of any facilities that are allowed to discharge into the ocean. Maybe there are some that have grandfathered permits but it's a huge expense, especially in some of the bigger cities, to actually take care of your waste water properly.

Moderator: Senator?

Christopher Johnson, Maine State Senator: I wanted to add to that that one of the observations in our report is that finding ways to mitigate issues identified in this report is actually an opportunity. I mean, if we develop good ways of dealing with these problems then other people that need to deal with those problems will want to use our technology and what we have developed for methods – and it's actually an opportunity. There probably is an opportunity around your problem with someone finding a way to process

that for use in agriculture as a fertilizer or an amendment, you know, which would be more suitable than trying to treat to it to reduce its impact so you can release it into the ocean. But nobody's… until somebody tackles that and figures out a way that would make sense from a business perspective to make a better use of that. I mean it's as old as native Americans planting fish with their corn seed. But you know we aren't doing that today. So there are opportunities.

Moderator: Question. It's back there just keep going straight? Spiros? Oh you didn't. I'm sorry, I thought I saw your hand up. Cathy?

Cathy Billing, Lobster Institute: Maybe Darcy can hand her mic back to John Nicolai because I cut him off before lunch. You're question about… about Long Island Sound question? Okay.

Moderator: Okay we're just getting close right on top of moving along here and I don't think I see anyone with a burning question that they can't wait to get out in front of everybody. So I'm going to turn. Did you want to go again?

John Nicolai, Lulu, Inc, Bar Harbor: Yeah, yeah.

Ted Hoskins, Town Meeting Moderator: Yeah, yeah he says. What's your name, John?

John Nicolai, Lulu, Inc, Bar Harbor: No, my question before … I'm sorry… before the break we were talking about Long Island Sound and the die off, and how there were certain theories, you know, why this die off occurred. Was it pesticides running into the water? Was it hypoxia because of back-to-back hot summers? Has it ever been determined what actually happened and is there any degree of certitude about what happened in Long Island Sound with the die off of lobsters?

Rick Wahle, University of Maine: Right, well in 2005, there was a report of… actually, a full volume of the Journal of Shellfish Research that was dedicated to summarizing the research that had been conducted on that Long Island Sound mortality event. The lead author was Pearce et al, 2005, I think. And it seemed to be, you know… Here's the consensus – the scientific consensus that seems to have come together on that: first of all, there were, as you point out, a couple years of back-to-back really warm summers, so that summer of '99 was excessively warm. Normally lobsters during the summer in Long Island Sound move from the shallows into deep water where it's cooler and seek refuge there. Sort of a safe place for the time being until the fall cooling happens. That summer though happened to be when Hurricane Floyd was moving up the coast. It started to disaggregate around the Mid Atlantic but it brought a really strong wind event combined with torrential rainfall, you know, something like 11 inches of rain fell in that New York/Connecticut area. So a huge amount of runoff. And, during that wind event, there was mixing of the warm surface waters down into the deeper parts of Long Island Sound – combined with the fact that you've got this low-salinity runoff also being brought down to deep water. It was sort of the perfect storm for lobsters and it

caused something on the order of 75% drop in the fishery there, collapse of the fishery. And at the same time, yeah, there was this issue about pesticides as possibly being an agent. The scientific consensus on that is that the evidence just isn't there, that the concentrations of the pesticides that would have been in the water that the larva would have been exposed to weren't causing mortality. That's not to say there weren't sub-lethal effects and those things can be long-term and chronic but the weight of the evidence seems to suggest that just the weather event, the combination of warm waters mixed down deep, low salinity, and winds created the cocktail that was lethal.

Moderator: Bob, did you have a comment on that?

Dr. Bob Bayer, Lobster Institute: Bob Bayer from the Lobster Institute. One of the problems with trying to figure out what went on in Long Island Sound stems from the fact that most of what happened, most of the mortalities, took place in about ten days after Hurricane Floyd and nobody was paying attention. We got down there as quickly as we could and got organized and took a few samples and we really were too late. Here are a couple of bits of information that I think add to the picture. One is talking with fisherman. And, in talking with fisherman that were hauling up dead lobsters, those that had lobsters that were still alive showed the behaviors, classic behaviors, of pesticide poisoning – which is hyperactivity. It's like they're trying to jump out of the trap and jump out of their own shell. And the other thing that happened, there was a lawsuit, a class action on behalf of virtually all the full-time fisherman in Long Island Sound, about 300 of them; and in looking at some of the information that was developed for that lawsuit, a couple things came to light. Malathion was the pesticide in question, and malathion is not suitable for non-agrarian surfaces. That is, where you've got a lot of black top and you're spraying malathion, it doesn't break down as it does if you were to spray it on the grass or any sort of agricultural surface. So one of the things that may have happened, you've got an accumulation of malathion on massive amounts of black top in and around Long Island Sound. I mean you got the megalopolis right there. So when Hurricane Floyd came, it may have all washed in all at once and killing the lobsters very quickly. And lobsters are sensitive to malathion in parts per billion levels. Anything that kills an insect will kill a lobster. We say this over and over and over again because they are so sensitive. So even though there is no real data on this because nobody measured what was happening right after Hurricane Floyd, I think there is some likelihood that malathion had a role in this. And unfortunately, when this was settled, when the class action was settled for I think it was $14 or $16 million (I don't remember, what's a few million dollars among friends. It was really not that much. It didn't pay for their livelihood ,but) there was no admission of guilt on behalf of the pesticide applicators or the manufacturer. I don't believe this is a pesticide that's in use for this type of application any longer and this may be one of the reasons why, but pesticides are still a concern. And the other thing that I saw in looking at some of the corporate data as part of the trial, well it wasn't a trial but the deposition process, was that some of this malathion that had been stored in various places around Long Island Sound and even before it got into storage was improper. It was improper storage of the pesticide. It got hot – and so another issue is they don't really know what they sprayed. Because the malathion chemically changed from being improperly stored. So it's a really complicated

picture. In addition, there were salinity issues, temperature issues, and oxygen issues. But I think many of those issues may be after the major die off occurred in those first few days after Hurricane Floyd. Wow, that was long winded. I didn't have any slides.

Laughter

Moderator: Thank you Bob. Bill, behind you?

Bill Adler, Massachusetts Lobstermen's Association: Thank you, Bob. Bill? Behind you.

Bill Adler, Massachusetts Lobstermen's Association: Thank you. Bill Adler. On the same note, Long Island Sound… what besides what you just mentioned and the mixing of the fresh water, I guess…it was also talked about that it was on the bottom and it was oxygen deprivation or something like. What is that and how would that have happened? This is probably beside the pesticide issue because it's on the bottom. What is it?

Rick Wahle, University of Maine: Right, so as sea water warms the…

Moderator: That's Rick Wahle. Rick, introduce yourself.

Rick Wahle, University of Maine: Rick Wahle, UMaine. As seawater warms, the solubility of oxygen decreases, so there's less oxygen actually in warm seawater than there is cold seawater. And so, if that water is mixed down to the bottom plus you're in a, you know, near the muds or relatively low oxygen levels as well, especially in Long Island Sound because of the decay going on down there, if it's cool enough though, you know, lobsters can do okay. But if those waters warm and they're low oxygen and low salinity, it's like a triple whammy.

Moderator: Okay? Herb?

Herb Hodgkins: Lobster Products Inc & Lobster Institute Board Member: Herb Hodgkins. I used to troubleshoot lobster, lobster pounds up and down the coast and over here in New Brunswick, too, with my oxygen meter with me every time like a doctor with a stethoscope, having that around his neck all the time. When there's trouble shooting, you've gotta do that. Anyway, I went to that hearing in Stanford, Connecticut, I think. It was testified that after Hurricane Floyd there was a measurement of 2 parts per million in oxygen. At that rate, things are dying because the normal oxygen should have been up around 8 parts per million. Also, another indication is low oxygen will kill algae and, when that happens, you can look down through the water. They said they could see bottom 25 to 30 feet down after that. So that was an indication of it. And then, when things start dying off and everything, the fermentation of those plants and animals take more oxygen. So the thing just spiraled right down hill fast.

Moderator: Yeah, John?

John Nicolai, Lulu, Inc, Bar Harbor: John Nicolai, Bar Harbor. The reason I asked the question was because, can those conditions be duplicated in the Gulf of Maine if we had sort of the same situation where a hurricane came in and we had the conditions you just described? And since Maine is especially dependent on lobster fisheries, practically all the fisheries are based on Maine's lobster fisheries, could we see a potential downfall of the lobster industry due to one storm like what happened in Long Island Sound? That was the basis of why I was asking.

Rick Wahle, University of Maine: Well, as I showed in one of my slides, we've got this really steep North/South gradient in seawater temperatures, summer seawater temperatures. You move, especially around Cape Cod….so the likelihood of that kind of thing happening diminishes pretty quickly as you get, get further north. And especially the Bay of Fundy, it's like no chance given the summer highs are around 12 degrees. But there might be pockets you know. Great Bay, New Hampshire, pretty isolated from you know except for one small connection to the ocean, warm up dramatically, to some extent Casco Bay. So some of these more protected less tidally mixed, you know, estuaries could be, could be at risk. But nothing to the scale of Long Island Sound, even under the next coming century scenarios of ocean warming add to that.

Ted Hoskins, Town Meeting Moderator: Thank you Rick. This has been a very good discussion. I'm glad we've had opportunity to do it. Unless I see some hands coming up, I'm going to turn this over to Jean. And let him move us from here.

Jean Lavallee, Co-chair: These Town Meetings never disappointment. There are always great conversations, even though we may not always agree, it is very useful to hear from everyone.Let's all thank Ted for the great job he is doing as our Town Meeting Moderator.

Now, please take a minute to pull out the green colored evaluation sheet from your packet if you haven't already. We'd like your input on the day's activities before you leave today. In fact, we'll reward you for filling out the evaluation forms by making anyone who hands in the form eligible for the doorprizes we'll be giving out in just a few minutes. We're reserving some door prizes for tomorrow for those who stay with us for both days.

Again, it is the green form in your packet with the door prize ticket attached. The Lobster Institute staff will come around and collect those from you.

Once again, our special thanks to our primary sponsors, Luke's Restaurants and Cape Seafood – and to all our other sponsors. Please join me in recognizing all of these generous folks.

Applause

Now remember**,** the Town Meeting will reconvene right here tomorrow morning at 8:30. There will be a breakfast available at 8:00. Once we finish up this afternoon, you are all invited to a reception sponsored by the Grand Manan Fishermen's Association. The reception will run from 5:00 to 7:00 in the Trinity Room**.**

DAY TWO, MARCH 21

NOTE: THERE WAS A MECHANICAL FAILURE OF THE RECORDING SYSTEM ON DAY TWO AND NO TRANSCRIPT IS AVAILABLE.

The half day discussion on Day Two focused on two session:

- Quality& Demands of European Markets, with presenters: Spiros Tourkakis and Geoff Irvine

- Innovative Marketing & Market Access, with presenters: Luke Holden and Geoff Irvine

Discussion focused on the demand for a quality product both oversees, and locally. Recent efforts to increase funding for marketing in both the U.S. and Canada, as well as the research findings and plans that have arisen as a result were also examined. It was noted that the responsibility of delivering a quality lobster to the end-consumer must be shared all along the chain of custody – from harvesters, to transporters, to dealers, processors and distributors.

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