

AHAB Monthly Call – April 14th, 2022

Participants: Thomas Farrugia (AOOS), Dean Stockwell (UAF), Gay Sheffield (UAF/AK Sea Grant), Emma Pate (NSHC), Katherine Newell (CDC/ADPH), Jeanette Gann (AFSC), Annette Jarosz (APMI), Charla Hughes (PWSSF), Jasmine Maurer (KBNERR), Chris Guo (KBNERR), Dom Hondolero (NOAA), Kris Holderied (NOAA), Varis Ransi (NCCOS), Caroline van Hemert (USGS), Patryce McKinney (ADEC), Naomi Bargmann (USGS), Gay Sheffield (UAF/ASG), Natalie Rouse (AVPS), Lori Verbrugge (CDC/DHSS), Hanna Hellen (St Paul), Veronica Padula (St Paul), Evie Fachon (WHOI), Emily Bowers (NWFSC), Anne Garland (ARIES)

Thomas' updates (more details on AHAB website: <https://aoots.org/alaska-hab-network/>)

HAB Science

- HAB warning system based on machine learning

Harmful algal bloom warning based on machine learning in maritime site monitoring⁶

Jiabao Wen, Jiachen Yang⁶, Yang Li, Liqing Gao
School of Electrical and Information Engineering, Tsinghua University, Beijing, China

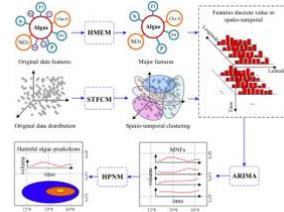
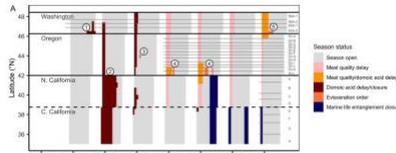
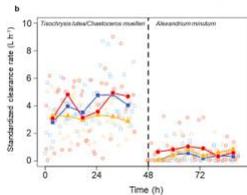


Fig. 1. The proposed framework for real-time monitoring of HABs based on machine learning. The framework includes data preprocessing, feature extraction, and model training. The model is trained on historical data and used for real-time monitoring and prediction.

- The value of testing for biotoxins in marine fisheries

The value of monitoring in efficiently and adaptively managing biotoxin contamination in marine fisheries

Christopher M. Free^{6,7,8}, Stephanie K. Moore⁶, Vera L. Trainer⁶



- Immune defense response of scallops to PSTs

Physiological and comparative proteomic analyses reveal immune defense response of the king scallop *Pecten maximus* in presence of paralytic shellfish toxin (PST) from *Alexandrium minutum*

Yasmine Even^{6,7}, Emilien Paves⁶, Caroline Chappereau⁶, Sébastien Artigaud⁶, Hélène Bégin⁶, Sarah Bernay⁶, Vincent Pichereau⁶, Jonathan Pige-Sainte-Marie⁶, Fred Jean⁶

HAB News

- EPA has a new report out on harmful cyanobacterial blooms
 - There is a 2-part webinar on “Strategies for preventing and managing harmful cyanobacterial blooms” Apr 26 and 28.
- Other conferences coming up – see list on the AHAB website
- Reminder that Bigelow Labs has their Taxonomic ID course in August (applications due May 31, 2022)

AHAB work

- Meetings/conferences attended
 - HAB Observing Group Webinar (Mar 16), Kodiak ComFish (Mar. 24-26), Mariculture Conference (Apr 12-14), APIA Food Security Symposium (Apr 12-14)
- Working on outreach materials on HABs and the work of AHAB members
- Messaging about field tests – their benefits and disadvantages
- Razor clam fishery might restart, ADFG is sampling for them – seeing if they can also sample for toxins
- CDC putting out an Epi bulletin on HABs. They saw a decrease in the last 5 years – has there been a decrease in HAB formation?

Emma Pate: So in regards to these field tests, and all the information available for them, is there any way that an area like our region, for example, can gather those field tests to apply them not necessarily to have official valid test results, but as a part of contributing to using them in the field and providing, you know, the information that will help improve these tests?

Thomas: That's definitely something that you can look at. It just needs to be clear that this is done within a research context, and be very clear that it's not for food safety decisions. It can be coupled with samples being sent to labs to verify and compare. This kind of messaging I'm talking about is for the general public to present clear answers. These field tests are not meant to determine whether or not something is safe. But we can definitely talk about potentially developing a research project where we would use some of these field tests in conjunction with sending samples to labs in a kind of a research setting in order to see if they can work. And some people, Steve Kibler, have been working with some companies on seeing if they can develop some tests that are a little bit better. The problem is that the number of people using these tests is probably going to be quite low in the grand scheme of things. And so companies don't really see it as economically viable to put a lot of money into developing these tests, for the few number that they would probably sell. So that's really the message we're trying to get across. But as a larger discussion about what these tests, whether or not we can try out these tests in Alaska, we can definitely talk about that.

Katerine Newell: Regarding the Epi bulletin, I'll just leave my email in the chat. And then if anyone has any kind of feedback or suggestions, that would be really great. So yeah, thanks for mentioning.

Dean: Thomas, this last five years decrease is that Alaska only? Is it west coast? US?

Thomas: What Katherine is talking about is Alaska specific - that there has been a decrease in the reporting of a PSP cases in the last five years or so in Alaska. And so her question was, could that be due partly to a decrease in HAB formation in Alaska?

Dean: So you're saying that this is only reported cases, like at hospitals, and it has nothing to do with the concentrations of HABs that like SEATOR has been showing over the last several years?

Thomas: Right, right. Katherine's question was, we've seen a decrease in the number of reports, and what could explain that? And so her question was, has there been a decrease in

HABs that could explain the decrease in reporting of PSP? There are other things that this could be due to as well. But that was her question to me. And, and I was kind of putting it out to the group in case anybody had any additional thoughts on that. What the overall feeling, has there been more or less HABs in the last five years? My feeling is no. But I don't know if that's everybody's feeling as well.

Naomi: Having worked at Sitka tribe and ran that lab for a couple years, I would say no, to a decrease in HAB events. We had a huge bloom in 2019, when it was hot everywhere in Alaska, it seemed like and I think it's interesting that it coincides with the setup of SEATOR and that monitoring lab. I know the partners that we worked with across Southeast Alaska, were extremely diligent in keeping their citizens informed and as safe as possible. And I don't think that should be discounted in that equation.

Gay: So it's really good. But be aware though, in Alaska, if you're just looking at hospital reported cases, which you would do normally anywhere else, that may not give you the full story of what's underway here in the State. So western Alaska, there's been all kinds of developments in the research arena regarding potential problems and actual data that show an increase from no data to data that indicate we do have clams that are over the seafood safety limit, and that a lot of the animals here which are consumed. You know, we're seeing where there was no data now it looks like there's potential for some really tough times, especially up in the Ledyard Bay, Northeastern Chukchi Sea. So just as cautionary, I guess, please know that western Alaska is really remote. And, and we have really not a very good trans boundary communication system, especially nowadays. But even so, they have had HAB events but we can't get much data on those. So it might be misleading, if you're just looking at hospital, and to say, well, the cases have been down not to be a gloom and doom, but there's a lot of information coming to this region that may warrant adding those or some of these different metrics like we're remote, and we don't have good communication with the whole shared ecosystem on the other side, when it looks like they may have had events. I hope that helps.

Katherine: Thank you so much. I really appreciate it. I probably should have clarified. So I am technically CDC, but I'm based at the Alaska State Health Department's so this is going to be very Alaska specific. This bulletin that's coming out. But yeah, it is reported cases, which we've seen a decline in, which obviously can be affected by numerous factors, including, for example, things like healthcare seeking behavior, which we may have seen a decline in during the pandemic, as people sort of didn't really want to go to hospitals, given the situation that we were in and kind of the non specificity of symptoms that PSP causes. There's a lot of different factors that could potentially explain this decline. That's not just an actual decline in cases.

Gay: And I would hope you maybe break up the state into different boroughs or in a case of the Bering Strait non boroughs. It helps for Alaskans, I think to be able to zone in and see what's going on in my region versus sort of a statewide blanket statement, because we're so big and we're so different in each region.

Emma: I worked for Norton Sound Health Corporation, and we are our Regional Hospital for this region. So I would want to ensure there's no miscommunication on that information. Because I wouldn't want our medical side to downplay the importance of monitoring for harmful algal blooms, just because the medical side is seeing lower or decreased cases. Because in our region, we have a lot of people that consume traditional foods from the marine and freshwater. And they are very interested and serious about water sampling and starting this

program in our region. So I just want to ensure there's no confusion on the medical side between our traditional food sources and consumption and interest in what we're starting here with the Norton Sound area and the medical side.

Katherine: katherine.newell@alaska.gov or rjz9@cdc.gov. In case anyone else has questions or thoughts. Thank you all, appreciate it! Emma we are definitely going to emphasize that this decline does not equate to playing down the risks of HABs and PSP and we have really emphasized the need for continued monitoring of HABs and prompt reporting of PSP symptoms to Alaska Section of Epidemiology. Thank you for your thoughts!

Round Robin Updates (going by region of work)

SOUTHEAST

Jeanette Gann

I haven't gotten any monitoring recently. But I did want to let folks know that we, we finally got our IFCB kind of up and running and figured out how to work that thing. And we're sending it out to Dutch Harbor, where I'm gonna meet it for the spring survey in the Bering Sea. And then we're going to try and keep it on board the Dyson for the entire summer to get a complete seasonal succession of phytoplankton and then we'll go back out in early fall, and then finish up and pull it off. So yeah, happy to share any HAB information from that cruise once we figure out how to do the post processing on it. But hopefully, that'll be a good a good first use of it.

Thomas: That's awesome. So for those of you who who may not know, IFCB is an image flow cytobot. It's basically like a little camera that flows water through and takes pictures of each individual plankton cell that comes through it, and then and then there's kind of post-processing afterwards that can identify some of the species. And so it gives you a great idea of the phytoplankton in general, but it can be used to kind of see how many HAB specific species there might be. We have one in Alaska that's with the Alaska Fisheries Science Center, and Jeanette runs it.

SOUTHCENTRAL

Annette Jarosz

Not too much to report, we're still unfortunately waiting for lab equipment or centrifuges still probably a month or two months out. So we're waiting on that. But we are hosting a training workshop at the beginning of May. So we're getting ready for that we're having some people come up from NOAA, people from all around the Kenai, and 10 are coming. So we have better participation than we did last year. So that's really exciting. We're really hoping to get a lot of our community members come up. And then right after that, we have our climate change workshop, that CRRC puts on. So we have a lot going on at the beginning of May. That's about it.

Jasmine Mauer

Yeah, good morning, everyone. We also are getting things going here at the Research Reserve for our sampling efforts. And Chris is also on the line, so he might want to add some things from his project. We are definitely downsizing as Rosie might have talked about last month with

Rosie moving on. So we're going to be focusing our sampling here, right in Kachemak Bay. And our boat is not yet in the water. So when we do have our research vessel in the water we'll be getting out in earnest, do more samples. And we'll be doing our monitor training May 4. That's coming right up.

Dom Hondolero

We're we got some pretty good weather down here, so we're expecting to see the spring bloom starting up. But yeah, we don't really have any updates at this time.

Kris Holderied

I will say Dom and Chris got out the last couple of days to do our or quarterly oceanographic and plankton sampling. So the boat based work off of our Kasitsna Bay Lab boats. And I did hear that from those guys that there was a lot of copepods out there. So the zooplankton side is popping, which is kind of expected this time of year. Nothing more on that other than you know, it's the start of everything cranking up on the on the field work side, which is exciting. Also, Steve Kibler that I think a bunch of the folks on here know from our Beaufort laboratory in North Carolina. He has been working now for a long time on HAB toxin transfer in the food web and other things. So he is coming up to the state in June and going to be in Kodiak but also a couple of days in of Anchorage. So it'll be towards the end of June. I know he's going to be in Anchorage like the 28th and the 29th. So I think he's reaching out to folks that if anyone's interested in talking with him he'll be in the state in June. And I think they're coming back in August as well. Thanks.

Varis Ransi

We have our web page for the sea surface temperature model that's going live on May 2. And I'll send you the link Thomas. And also my email address and Bob Daniels address for maybe for people will want to check it out and maybe give us feedback. You know, I'm sure we can use some feedback and improve on it. So the SST part, which is kind of like the, the nowcasting phase is going live, but we also have an additional component where we're going to incorporate the NCOMM model to it, so that thing is coming up as well. But so we're going to go roll out in phases, we have separate temperature parts from satellites going up. And the modeling part is going up, hopefully, in a month or so. And I'll share my link maybe you can put up that up in your newsletter, and ask folks to check it out and give us feedback. This is for everywhere in Alaska but we divided up Alaska into 6 regions.

Kris: I'm gonna add to what Varis said – part of what they are looking for in feedback is if there are other areas, we basically took the initial feedback that came from this group and others and to pick areas to kind of zoom in for the higher resolution SST improvements, sea surface temperature information. If there's other areas that folks would want to see that then that would also be good feedback to give back to this. Thanks.

Patryce McKinney

Good morning. For the most part, things are just business as usual. I think the only thing that's interesting at this point is we did get a small amount of money from Department of Commerce and Economic Development, I believe it was actually funded ARPA fund before that, but I'm not

sure. But to try to validate a faster method for wet storage samples. Although for most people on this group, we're talking subsistence, you know, wet storage isn't necessarily on their target list. But it is a small progress, I guess. So we'll try to validate that over the next year and see if we can speed up that testing a little bit.

Caroline van Hemert

I can jump in and just give a quick update. I'll let Matt give the full update, he's out this week, on the captive work we were doing with the Alaska Sealife center. But that wrapped up recently and went really well and have some pretty interesting results. So excited to compile all that information. And for those of you who hadn't heard about it before, we were doing some controlled trials with common murre. And trying to understand the effects of saxitoxin ingestion, both in a more acute setting and then over repeated dosing, so a chronic exposure. And then we were able to work with Don Anderson and other others at Woods Hole to acquire some naturally grown toxin. So that's also really interesting, and some pretty intriguing results there. So we'll have more to share on that. But just that the at least this phase of the study is all wrapped up and was successful. And then we recently submitted a paper that I think some of you have probably seen us present on in the past on the 2019 bloom in association with arctic tern mortality. So hopefully, we'll be able to share that before too long as well. That's all on my end.

Naomi Bargmann

I can go next. So I ran three plates with the new DA kits from Abraxis. I put on a smattering of samples from across years and locations. And interestingly, what hit was Cook Inlet prey and some Unalaska prey samples (mysids, forage fish, euphausiids, anything eaten by seabirds). And what's even more interesting is that they mirror the values reported in Van Hemert et al. - their highest concentrations they found a mysid from Cook Inlet and I found the same thing and pretty much the same level. So I must have done something correct. But I really liked these new kits for anyone interested out there. It's a lot easier than using the Biosense kits. It's a lot less waste, it's just like the regular saxitoxin Abraxis kits. The only hiccup was that the last one went seriously wrong. I'm not sure what happened. The control came out half of what it should be. I had ultra high CVs across the plate and I emailed Abraxis about it and they just sent me a new kit. So just to confirm that, whatever it was if it was the kit or user error or whatever, which is weird because I've never ran a plate like that and had that many high CVs across a plate. So I just don't know what happened. Unfortunately, I can't rerun that plate right now, because and I've emailed Miley and Annette about this down at Alutiiq pride. But there's a shortage on capillary piston micropipette tips. I know that's a mouthful. But they're positive displacement pipette tips that we use during diluting the unknowns. And yeah, they're on serious backorder like Matt ordered some back in October, and they're still not here. And I've been in talks with the company. And hopefully coming here in May or June. I think May is a dream, but probably June or July is when they would actually get shipped up here. And so that is on hold.

Katherine Newell

My name is Katherine. And I'm the Epidemic Intelligence Service Officer from CDC that is assigned to Alaska for the next two years, in their section of epidemiology, which is where we

get our PSP cases reported to. So yeah, we last put out a bulletin on PSP, I believe in 2014. And so we thought with the new shellfish harvesting season coming up, now, we would put out an updated one through to 2021. Just describing kind of the descriptive epidemiology of reported cases that we've had. And that's when we kind of saw that we've seen a considerable decline in recent years. So that's, I just thought of just pitched why that might be to Thomas. And yeah, thank you for all your feedback. I really appreciate it. We hope to get it out in the next couple of weeks

Dots Sherwood

I'm a One Health student at UHF and I'd be interested to get feedback from people I can share my email, but I'm doing the science communication class actually this semester and Currently, I'm working on developing, targeted audience information about harmful algal blooms in Alaska. And like, specifically, I'm focusing on visitors to Alaska at this time, rather than there are so many different audiences that information needs to be very specifically targeted to their needs and expectations. So that's what I'm doing at the moment. Thanks for having me here. dotsvet@gmail.com If anyone interested in social media and other communication methodologies to engage different audiences for messaging on HABs.

KODIAK

ALEUTIAN AND PRIBILOF ISLANDS

Hanna Hellen

Yeah, hi, everyone, Veronica's on as well, but she had to hop off for another call. So I'll just give a little update. We're just getting ready to get started on our sampling project. Veronica and I will be heading out to St. Paul, on the 19th. Veronica will be up for a couple weeks. And I'm going to be out there until the end of May, and for most of the summer, so just getting ready for the summer season and are sampling projects.

Veronica Padula

Our team of five has had to be in two places at once. Just wanted to give the update that we signed our agreements with Sijo and ACF for the pilot project. And so we are kind of set on that end. I just can use this moment because I keep forgetting to email you, Thomas. We leave on Tuesday for St. Paul. So if there's gear we can grab from you. Maybe we can make an arrangement to pick that up and packed away? And then, part of our team, me, Hanna and Emily are heading out next Tuesday, fingers crossed that we make it. And we'll sort of start reconing good sites for sampling for the AHAB pilot project and doing some on site training on how to collect the samples. So I'm excited for that, to kind of get out there. And Hanna and Emily haven't been to St. Paul before. So I'm really excited to show them how cool it is. And like they get to work for such a cool place. So it'll be great. I'm really looking forward to the trip next week, except for the whole packing part.

NORTHERN BERING SEA

Gay Sheffield

The ice cover image (below) was taken about a week ago, that's the sea ice. And just you know, the melts really underway, and we didn't freeze last night, we had rain on and off. And we are going to have East 20 to 25 gusting to 40 to 45 at times into Saturday. And temperatures the low be like 31. So we have lots of daylight, even if it's stormy daylight. So just wanted to let people know that for what was supposed to be a "fairly good" ice year, we're not holding on to

it. And it is very, very thin. The other thing I'll put in the chat was the links to both Kathy Lefebvre's paper from this region. And also a new a bulletin that went out to address specifically for subsistence users or Western Alaskan and northern Alaskan individuals who are utilizing the marine resources here. It has a little bit different language, which it should, for people's food security concerns out here, not just solely sort of an academic write up. So anyway, I'll put the links to those in and spring is sprung here. So good luck to everybody. Thank you so much.



Lefebvre, K. A., E. Fachon, E. K. Bowers, D. G. Kimmel, J. A. Snyder, R. Stimmelmayer, J. M. Grebmeier, S. Kibler, D. Ransom Hardison, D. M. Anderson, D. Kulis, J. Murphy, J. C. Gann, D. Cooper, L. B. Eisner, J. T. Duffy-Anderson, G. Sheffield, R. S. Pickart, A. Mousney, M. L. Willis, P. Stabeno, and E. Siddon. 2022. Paralytic shellfish toxins in Alaskan Arctic food webs during the anomalously warm ocean conditions of 2019 and estimated toxin doses to Pacific walruses and bowhead whales. *Harmful Algae* 114: <https://doi.org/10.1016/j.hal.2022.102205>

Saxitoxin in western and northern Alaskan food webs + estimated doses to walruses and bowheads during warm ocean conditions of 2019. Alaska Sea Grant, University of Alaska Fairbanks, MAB-82, 2 pp. <https://seagrant.uaf.edu/bookstore/pubs/MAB-82.html>

ARCTIC

Evie Fachon

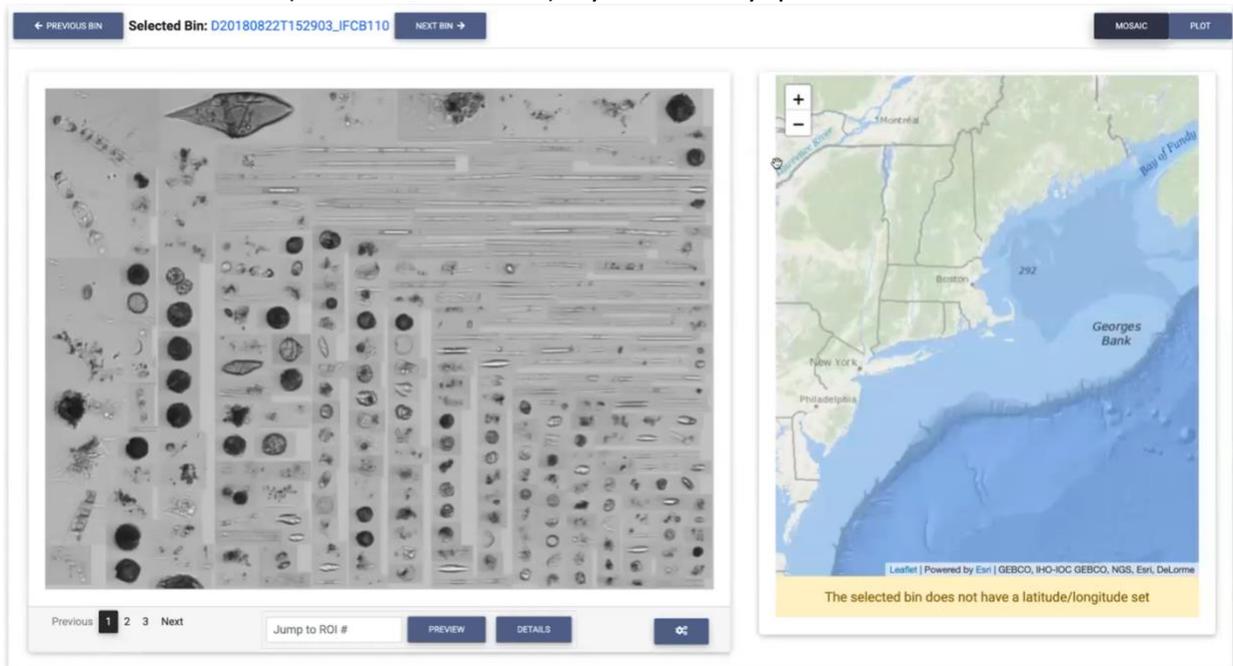
No big updates from us. We're just getting ready to be sampling on cruises this summer, will be up offshore in the northern Bering, Chukchi, and a little bit into the Beaufort in July and August and also September. So got a lot of sampling planned. We'll be doing cell sampling for *Alexandrium* and *Pseudo-nitzschia*. And looking for other HAB species. We'll be taking clams and worms to do toxin analyses at some of these offshore locations and kind of like Jeanette was talking about earlier, we'll also have an imaging flow cytobot onboard. So we'll be collecting underway imagery of cells all along that track. So looking forward to being able to share some of those results next fall once we start working them up.

Thomas: That's great, and you just reminded me that you had sent me a link to the output of the IFCB that was really cool. It had all the pictures of everything that was going through it. Is that publicly available?

Evie: Yeah. Let me dig that out for you guys. I'll stick it in the chat. I don't think it's geo referenced at the moment. So right now, it's a lot of images of cells. But I don't think it says where they're from. So feel free to like message me if there's a specific spot that you're curious about. And I can take that out for you.

https://ifcb-data.whoi.edu/timeline?dataset=arctic&bin=D20180818T154814_IFCB110

Feel free to email me (efachon@whoi.edu) if you have any questions about these datasets!



This is actually from the Chukchi shelf in 2018 (ignore the map). But this was one water sample. It was about five milliliters of sample, the IFCB scanned and took images every time it detected some sort of mass moving through the flow. So you can see we've got a lot of *Alexandrium* cells here. There's also some *Pseudonitzschia*. But yeah, it can take like 1000s of images per sample, depending on how dense of cells there are in the water. So I'll yeah, I'll drop this link in the chat. It's a data dashboard, and you can kind of click around and look at some of the different kinds of images that we collect.

Dean Stockwell

No updates, be we have a sample coming in from a hot spring in interior Alaska. They were having a lot of algae growing up in their hot springs. And their concern was perhaps that could be toxin producing algae. And these are primarily most probably blue greens in this freshwater system.

Emma Pate: I was in Elim last week. And they we have a lot of hot springs in our region, and in Elim, they have like three different areas. One is warm, one is hot and one is very hot. I don't know the exact temperatures. But there was a concern about the excessive load of algae at one of their hot springs I'm not exactly sure which one. But they offered to let me snow machine to go out and collect samples, but I didn't mind at the time. Because it didn't appear to be a concern. But next time I'm around the hot springs, I can collect samples and send them in.

Dean: Well, ideally, if you collect those samples and you have a microscope, you can take images and probably send the images out for people to identify. Primarily what you're concerned with are several types of blue greens that can produce toxins one of which would be similar to Paralytic Shellfish toxin, saxitoxin. But there are a host of other potential blue greens and that's why a lot of freshwater systems are monitored, you know, for public use of drinking water. So I think that's what set Alex Whiting off initially, is they were getting large blue green algae concentrations in their drinking water, and that's why he was sending materials out. So yeah, just give me a buzz.

Anne Garland

The ice is still there. We're trying to figure out the educational outreach with the advisory group. I'm going to be going up this summer. So I'm going to try and work on that, along with my other projects, because we also do erosion stuff. You know, being there is a lot different than constantly calling or texting, so hopefully I can make that happen. Laura works for the Public Health Department and she's worried about bringing this up. Right? Basically, she doesn't want to get in the middle of it. I don't blame her. So maybe I'll be the scapegoat. But anyway, thank you for all the literature that you're putting out, I can at least take that with me or point to the website and have them read about this stuff. If they don't know anything about it, which is what she thinks. She thinks the Public Health Department is unaware of this. It's a long learning curve. So recruiting as best I can. So I'm wondering, Laura already has a microscope. Could you send me specs on microscopes? I do have a budget with this NSF grant. I could maybe buy a couple of more. I can get some students to work on it to some

OUTSIDE ALASKA

Emily Bowers

The lab is going pretty well. Nothing super groundbreaking to share. But we're kind of pausing lab work the last week or two to focus more on cruise prep and packing, making sure we have everything. Yeah, we're sending gear out to go on, hopefully six cruises, and then several more where other folks are supplying what we need. So we'll also be collecting samples on the cruise Evie was mentioning, and then should hopefully get samples all throughout the Bering Sea from southeast to Northern and hopefully Chukchi and a little bit of Beaufort as well, but kind of to be determined on that one. We're waiting on some domoic acid kits to come out from Abraxis. So our lab has used the Biosense ones traditionally, as we have a long standing dataset with the more sensitive kit. And so hopefully Abraxis should come out with more sensitive kit in the near future, sometime in May, or June is what they've told us their target is. And so at that point, we'll be able to dive back in seriously to sample prep We also sent some gear up to some of the walrus hunters on St. Lawrence Island, who graciously agreed to collect some tissue samples for us as they are doing their harvest. So yeah, that should hopefully come back sometime this summer as well.

**NEXT AHAB MONTHLY CALL WILL BE: THURSDAY May 12TH, 2022 AT 9:30AM AK
(The meeting schedule for 2022 will remain the 2nd Thursday of every month)**