

AHAB Monthly Call – June 9th, 2022

Participants: Thomas Farrugia (AOOS), Patryce McKinney (ADEC), Stephen Payton (Seldovia Village Tribe), Kathleen Easley (DHSS Epidemiology), Anthony Chesney (Seldovia Village Tribe), Emily Bowers (NOAA NWFSC), Nyssa Russell (ACF), Darcy Dugan (AOOS), Courtney Hart (UAF Fisheries), Bill Carter (USFWS Selawik), Sarah Schoen (USGS ASC), Shannon Davis (DHSS Epidemiology), Natalie Rouse (UAA/AVPS), Matt Smith (USGS ASC), Muriel Dittrich (UAF Juneau), Veronica Padula (Aleut Community of St Paul), Emily Mailman (APMI), Annette Jarosz (APMI), Charla Hughes (PWS Stewardship Foundation), Teri King (WA Sea Grant), Maile Branson (APMI), John Harley (UAS), Robb Kaler (USFWS), Steve Kibler (NCCOS)

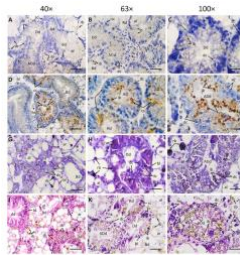
Thomas' updates (more details on AHAB website: <https://aoots.org/alaska-hab-network/>)

HAB Science

- Subcellular localization of domoic acid in bivalve tissues

First subcellular localization of the amnesic shellfish toxin, domoic acid, in bivalve tissues: Deciphering the physiological mechanisms involved in its long-retention in the king scallop *Pecten maximus*

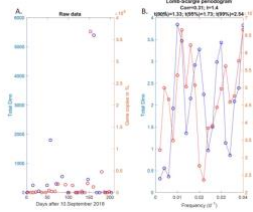
José Luis García-Corona¹, Hélène Hébert², Margot Deléglise¹, Adeline Marzari¹, Carmen Rodríguez-Jaramillo¹, Valentin Foulon¹, Caroline Fabious^{1,2}



- New qPCR assay to detect *Dinophysis* blooms

Mapping the development of a *Dinophysis* bloom in a shellfish aquaculture area using a novel molecular qPCR assay

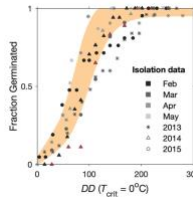
Penelope A. Ajani^{1,2}, Hernan F. Henriquez-Nunez^{3,4}, Arjun Verma^{5,6}, Satoshi Nagai¹, Hajime Uchida¹, Matthew J. Tesoriero^{7,8}, Hazel Farrell¹, Anthony Zammit¹, Steve Brett¹, Shauna A. Murray^{1,2}



- Growing degree-days of *Alexandrium* cysts

Growing Degree-Day Measurement of Cyst Germination Rates in the Toxic Dinoflagellate *Alexandrium catenella*

Alexis D. Pacheco¹, Michael L. Brussaferri²



HAB News

- Review of HAB impacts, management and technologies in aquatic systems

Review
Perceived Intensification in Harmful Algal Blooms Is a Wave of Cumulative Threat to the Aquatic Ecosystems

Syed Shabi Ul Hassan Kazmi^{1,2}, Nofamania Yapa³, Samantha C. Karunanithi^{4,5} and Nankin Suwanarat^{1,6}

Western Lake Erie Harmful Algal Bloom Early Season Projection 01 June 2022, Projection 04

The Western Lake Erie Harmful Algal Bloom Early Season Projection gives an estimate of potential chlorophyll concentrations based on time-series and forecasts of air discharge and phytoplankton loads from now through July. The severity of the western Lake Erie cyanobacterial harmful algal bloom (CHAB) is related to the amount of total phosphorus (TP) from the western basin during March - July 21. TP is the sum of dissolved phosphorus and the portion of particulate phosphorus available for algal consumption.

With observations through May 20, we expect a bloom that is likely less severe than 2021 (40) with a maximum range of 0.8 micrograms per liter (µg/L) in comparison to the rest of the spring season the early season forecast of water temperature, a maximum of 16.0°C, and the amount of total phosphorus (TP) from the western basin, which is 0.0001 mg/L. Larger rain events may produce larger TP loads, resulting in a 0.2 µg/L increase in water temperature and a 0.0001 mg/L increase in TP. The amount of TP from the western basin will vary throughout the season and may be affected by the amount of rain that falls on the basin.

More than 100 miles with the actual and likely best time we will provide information on the presence and location of the bloom throughout the season. The TP loads are provided using modeling uncertainty data and our forecasts from the National Weather Service Ohio State Forecast Center (Ohio State).

R. Stumpf, J. Near (NOAA), and L. Johnson (Humboldt University) with assistance from E. Clawson, A. Hurlbert, and M. Stumpf (NOAA).

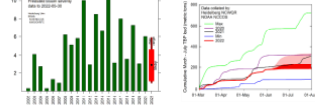


Figure 1. Projected chlorophyll concentrations (µg/L) based on time-series and forecasts of air discharge and phytoplankton loads from now through July. The severity of the western Lake Erie cyanobacterial harmful algal bloom (CHAB) is related to the amount of total phosphorus (TP) from the western basin during March - July 21. TP is the sum of dissolved phosphorus and the portion of particulate phosphorus available for algal consumption. Figure 2. Cumulative total phosphorus (TP) load for the western Lake Erie basin in 2022 in µg/L. The right side of the graph shows the likely range for the remainder of the loading season, and the left side shows the possible range.

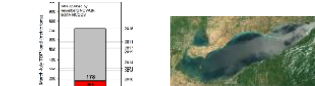


Figure 3. Total phosphorus (TP) load for the western Lake Erie basin in 2022 in µg/L. The right side of the graph shows the likely range for the remainder of the loading season, and the left side shows the possible range.

Figure 4. True color image of Lake Erie on 30 May 2022 derived from the Landsat-8 satellite. The image shows the western Lake Erie basin is likely due to sediment from heavy rain and wind resuspension. The water is turbid and the sediment is likely to be suspended in the water column.

- NOAA produces weekly projects of HABs for Western Lake Erie

- Alliance for the Great Lakes report shows the cost of HABs in drinking water is \$10/person/yr

- NHABON Webinar: Monitoring HABs for Aquaculture – June 22, 11am-12pm AK time

HAB work

- Developing AOOS budgets and spend plans
 - For FY22 – can expand the HAB community sampling efforts
- HAB sampling training for the community pilot project started
- Messaging about field tests – their benefits and disadvantages
- Putting together the map of sampling locations – will share for feedback

Round Robin Updates (going by region of work)

SOUTHEAST

Courtney Hart

Good to see everyone. Sorry, I've been out for a while. I've just been trying to write my thesis really. We're still working with Mehta at Salty Lady seafoods at their oyster farms and doing weekly monitoring. Right now, Jordan Hollarsmith and Becca at NOAA have mostly taken it over. And we did see a couple Alexandrium cells on May 24th. They were down in the mid water column, not the surface interestingly enough. We didn't pick them up in a tow, we picked them up in our discreet water sampling. So that was pretty interesting, but no changes in oyster toxicity. So I don't know if that was our bloom for the year or not. We've had really warm weather, really calm, warm weather, which I know some people in the past have said kind of are the conditions that precede a bloom here. But nothing yet. So that's interesting.

I personally am working with some satellite sea surface temperature data in southeast Alaska, to see how it relates to the past 20 years of shellfish toxicity. And I'm seeing some patterns but nothing obvious. It's very clear that it's not just the surface temperature, or even water temperature that is the predictor of blooms or my case toxicity, but it's obviously really region specific. So I'm working on that data right now. And I'm looking forward to presenting it at some conferences this fall, including the harmful algal bloom conference in New York. I've also been working with some folks down at University of Washington and Steve Kibler, and they're doing a roundtable discussion about methods for sampling, especially quantitative and genetic methods for sampling and counting cysts, that they can start moving on to a genetic process or using qPCR instead of manually counting cysts, and what the differences are between the results in Alaska and the Gulf of Maine. So I'm looking forward to those conversations, and hopefully see some of you back east this fall at that conference.

Thomas: Quick question about what you've been looking at in the past 20 years. So just because there's high temperatures it doesn't mean toxicities increase or there was a bloom, but are you seeing a minimum temperature below which you would never see a bloom or toxicity increase?

Courtney: so I'm kind of exploring, not necessarily the sea surface temperature, but looking at defining the bloom window, like some of the literature has shown in Washington, up north in Kodiak, and then here, and I'm looking to see if there's certain proportion of days in the summer that exceed, say, 10 degrees Celsius, or 12 degrees Celsius, and that number of days, is correlated with more toxicity. And I should say, I'm looking at geoduck toxicity, I'm not looking at any bloom priors, there isn't enough sampling over the last 20 years to really tie it all together. But there is enough toxicity data from the geoduck industry. So I'm kind of skipping over the whole bloom part, but seeing if temperatures are related to shellfish toxicity, if there's a relationship there, kind of ignoring this big black box in the middle. I'm looking not only at temperature, and I'm hoping to look at some other data that's used to define this bloom window. And I don't have anything yet, I'm still coding everything in our which is like pouring molasses. It's really slow. so yeah, but if anyone has any suggestions or ideas of parameters to look at, I mean, it's Southeast Alaska, and I do have some satellite data for sea surface temperature, but it's not like I have wind data for 20 years every day. I'm really looking forward to these monitoring programs as they start growing and start collecting baseline data and more discrete data over time.

I should mention we didn't see many Alexandrium cells. Muriel had mentioned we saw 2 chains 2 cells long, and that was it. So it was there. But it was not much, which to me is very surprising. But we'll see what happens the rest of the summer.

John Harley

It's really interesting to hear the results that that Courtney is getting. One thing I will say is, in terms of like, Alexandrium, this year versus in years past, it has been really warm here recently, which I think is a pretty common theme throughout the rest of the state. But up until probably about a week ago, our water temperatures were actually a little bit below average, for the time of year. In contrast to say 2019, which at this point in the year, we are seeing sort of the initiation of that huge bloom that we had in northern southeast where the water temperatures at this point in the year were already two degrees C above where they usually are. So we're actually kind of just catching up to our normal water temps right about now. We have kind of a good forecast, stable air starting maybe middle of next week. I would expect that if there was to be a bloom, that would be the time when we might see one. Keep an eye on the water.

SOUTHCENTRAL

Charla Hughes

No updates from us today. We already have some volunteers who've been in touch with us about collecting samples this summer in PWS.

Annette Jarosz

We don't really have any updates. We haven't been seeing too much in the water. We have pretty warm waters, and we've seen pretty low diversity too. And we haven't had really any rain in the last month. We're still waiting on the centrifuge. It has shipped. It shipped a couple of weeks ago. We were expecting it to come in last week, but we still haven't seen it yet. So hoping any day now.

Stephen Payton

Good. getting settled back in here at SVT we're gonna get on collecting samples again. This is Anthony Chesney. He just started with us here. So he'll probably actually be collecting the samples.

Matt Smith

Not a lot of updates from me at the ASC. Working through the murre captive project data and will be presenting the results at the wildlife disease association conference and the US Harmful Algae Symposium in Oct. We (Caroline, myself, John Harley) also just had a manuscript on an STX die-off in terns in Juneau in 2019 accepted at Harmful Algae. Folks can expect that to be available sometime later this summer

Sarah Schoen

I don't have a lot of updates. But just wanted to mention that the highly pathogenic avian influenza situation is kind of putting a damper on our field season. I see Robb Kaler is on here, so I'll let him talk about it in more detail. But Fish and Wildlife Service did just put out some guidance two days ago about handling presumably healthy birds. And there's a whole lot of suggested PPE and precautions to try not to spread highly pathogenic avian influenza amongst bird populations, and also not to get it potentially transferred to humans. So we're kind of waiting on more guidance on that to see what our field season will look like. But we're thinking we're not going to be handling dead birds this summer, and probably not collecting any birds. So if we do anything, it'll be with presumably healthy birds.

Robb Kaler

Yeah. Well, actually, Megan Boldenow has really taken over the lead for HPAI for all water birds, which, you know, marine birds. So there's waterfowl. We've got geese being reported. And we haven't seen it leaking into the colonies, with the exception of maybe some glaucous gulls up in the Bering Strait region. So I'm not a great resource, but I am somewhat looped in. But with regard, I think right now we're asking external partners not to handle any birds. So if you see dead birds, mainly report any observation, so if you have offshore surveys, near shore surveys, whatever you see. And then in terms of handling birds, the guidance right now is don't handle any birds and information is coming down about how to go about if you do observe birds that are spinning, acting, unusual, you know, we're trying to get communities to report that but we are asking, including our coastal observation and seabird survey team partners who work here in Alaska, and that's kind of beach cast bird carcasses, not to handle anything right now. But we want the public and the communities to remain vigilant. We might ask partners that our agency or state folks to collect, but right now, I guess we're kind of asking everybody to stand down, but definitely report and be vigilant. Many thanks to Megan Boldenow, she's Fish and Wildlife Service with the southern Alaska field office. But Megan has really stepped up, she's on a detail out of the ecological services program, and really helping coordinate on that. And that includes eagles consuming birds that might be HPAI positive, that's kind of where it's focused when we're working with Bob Gerlach (state vet). Of course, we're working with Andy Reamy at the USGS Alaska science center. If I can help communicate reports, and that kind of thing. I'm here to help.

Thomas: There's a sick and dead bird hotline to call for reporting. The early symptoms of HPAI can be weird behavior like a bird walking in a circle and head bobbing and other neurological stuff. So that might look a bit like the beginning of PSP-related symptoms so that might be confusing. But if anybody observes anything weird, just call the hotline and don't handle the birds.

Robb: Exactly and we have not heard any reports from Southeast Alaska, but anybody that sees anything or hears anything from community members, please let us know. But, yeah, remain vigilant. That's what we're asking if you see anything unusual report it, please videos of birds is really helpful. And then with regard to testing and mapping it, it's hard to test everything. And again, I mentioned that we're not asking anybody to handle birds unless they're folks like Gay Sheffield at Alaska Sea Grant, that are trained and have a freezer to store that bird in before you can get it to Anchorage. And then we can work with Bob Gerlach. So anyways, happy to answer any questions.

Sarah: 1-866-527-3358 is that sick and dead bird hotline. The Alaska Science Center is working on getting a freezer that could be used to store dead birds that might have HPAI but haven't been tested yet.

Patryce McKinney

The health lab here is as boring as usual. Just plugging along. Everything's going fine. I do have a small report from Carol Brady, though she's not able to join. And it's kind of a follow up on I think what I previewed last month was there was a small hot period for oysters out at Benton Island East and it started out around 370 units. It is coming down now. It's had a couple of samples now clean under the 80 threshold. So whatever that little blip was, it lasted a couple of weeks and it seems to be playing itself out. I think one more clean sample is required before they can reopen that commercial fishery.

Brock Tabor

No updates, things are still pretty quiet. From the freshwater point of view. I haven't had any reports from any of the different regions and hopefully it will stay like that, at least in the interim. But again, if anyone sees anything, feel free to reach out to me.

Kathleen Easley

Nothing really to share other than thanks for and inviting us and letting us listen and learn.

Shannon Davis

I am a new epi nurse with the section of epi. I don't have any updates. Thank you for the updates.

Natalie Rouse

We don't have any updates. I definitely expected to see a few more strandings and with the warm weather, but we've actually had very few marine mammals lately, so yeah, it is good news.

Nyssa Russell

Nope. Nothing from us. Just want to introduce myself. I'm the new Western Alaska Partnership Coordinator with the Northern Latitudes Partnership with ACF. So you'll probably maybe see me a little more round in here for me, but great to just listen and learn.

KODIAK

ALEUTIAN AND PRIBILOF ISLANDS

Veronica Padula

Our biggest update is that we've been doing the HAB sampling training yesterday. And we'll be training on Monday. And we're getting ready to take samples. We started practicing out on St. Paul in April and have a site that we want to use. We got the net in the water, we had a spare microscope in our offices, so we looked at things under the scope. But we're getting more comfortable with that type of sampling. And I'm really excited for Hanna to be able to do that when we can next get back out to island. We had to cancel our June travel because there is a high rate of COVID cases at the moment. And we don't want to add any pressure to the island. So we're hoping for a July trip out there. They went into hunker down mode. And to keep research relationships positive with the island and the community we have to make some hard choices sometimes. But if it means that we're welcome in July, then I'm gonna take it.

NORTHERN BERING SEA

Gay Sheffield and Emma Pate

Gay and Emma are out sampling for HABs so can't make the meeting.

ARCTIC

Bill Carter

Finally, back after three months of jury duty. So yeah, unlike the rest of the state, it is still kind of spring here, we still have ice going out. And I was actually supposed to be heading over to Selawik by boat this weekend, and that's not going to happen. So lots of ice around still. But we're starting to gear up for putting our mooring in. Actually, right here behind me in Hothman inlet, and that's gonna be the last week of June. Ajit from Columbia University and Alex whiting with the Native Village of Kotzebue, I'm kind of just ancillary to the project.

OUTSIDE ALASKA

Emily Bowers

Nothing really new to report. We should be hopefully getting walrus samples from St. Lawrence Island soon, the walrus hunt is just wrapping up. So that will be cool, the ultimate goal being to try to characterize especially saxitoxin, but saxitoxin and domoic acid toxicity of different tissues for the tribes to be able to use that information. So it's a little ways out from having

definitive results with that, but we're working with Steve Kibler's lab to test for the suite of toxins for PSP.

Thomas: Were able to get those Abraxis kits in?

Emily: We've still been using the less sensitive ones. And I think we're kind of resigned to just use these for now, because the more sensitive ones are not out yet. And we just don't want to have to wait around for them. And the less sensitive ones are still sensitive enough to be biologically significant. We have a long term dataset of a lot greater sensitivity. But yeah, these will do for now. So we're plugging along with the less sensitive ones for now. All right.

Steve Kibler

Yeah, the only thing I had to report other than struggling with this stupid net that's in my office at the moment, which has me tangled, is we're ramping up for some fieldwork in Kodiak - June 20 is when we leave will be with Julie until the 28th. Trying to get some more samples for food web analysis (fish, plankton, and inverts). Because last summer was a little bit underwhelming, from my perspective, in terms of the amount of toxins around, the signal was very low in shellfish and everything up the food chain. So we're gonna give it another shot. And then we'll probably swing by Anchorage, on the way back by 28 and 29th. Yeah, if anybody's trying to catch us, just shoot me an email or something. And I will try to make time to meet with you. Thanks.

Teri King

I'm Terry King with Washington Sea Grant here in rainy, rainy, rainy Shelton. We've got two inches of rain coming today. So we're really excited. I just wanted to make sure that anybody that is using the SoundToxin database, the harmful algal bloom data system, notice the three new maps systems that we have for the three shellfish killers that we've got. So when you enter your data, it's going to ask for that data to come in. And then there's a new portal also for bloom. And so we're working on the mapping feature of that now, but that's another one of the required elements of whatever in your sample is blooming is to note that and we're on visualization, and if anybody has any suggestions on that, just pop us an email at SoundToxin@uw.edu. And we can take care of that but I will say the enhancement to the map is amazing and will really help folks, especially in the industry and the tribes, as they try and figure out what might be killing some of their products, some of their resources. So it's pretty amazing. And Jeff Hetrick, are you on the call? Or is it your team on the call? Jeff, hey, I'm going to be reaching out, I'm seeing a new problem that I think you also might be seeing. So I want to make sure we can connect and maybe preempt some problems and get some data for you. It's just that hatcheries are starting to see problems already down here. And you're going to be a little lagged. And I want to make sure we catch you before. We're just seeing problems with cells themselves, getting through mechanical filtration, and causing some problems. And, yeah, I just want to get some surveillance in if you're willing, and see if we can actually demonstrate it. We're too late here. But we might be early enough there.

Maile: I think Jeff has left, but I'd totally be happy to chat with you a little bit more.

**NEXT AHAB MONTHLY CALL WILL BE: THURSDAY July 14TH, 2022 AT 9:30AM AK
(The meeting schedule for 2022 will remain the 2nd Thursday of every month)**