

AHAB Monthly Call – August 19th, 2021

Participants: Thomas Farrugia (AOOS), Michelle Morris (ADFG), Gay Sheffield (AK Sea Grant), Chandra Poe (Qawalangin Tribe), Grace Ellwanger (KANA), Andie Wall (KANA), Michael Opheim (Seldovia Village Tribe), Dom Holdero (NOAA Kasitsna Bay), Kris Holderied (NOAA Kasitsna Bay), Annette Jarosz (APMI), Patryce McKinney (DEC), Matt Smith (USGS), Caroline van Hemert (USGS), Naomi Bargmann (USGS), Robb Kaler (USFWS), Courtney Hart (UAF), Muriel Dittrich (UAF), Anne Garland (ARIES), Alex Sabo (NOAA NCCOS), Jasmine Maurer (KBNERR), Danielle Gerik (USGS), Sheyna Wisdom (AOOS), Molly McCammon (AOOS), Darcy Dugan (AOOS), Lori Verbrugge (CDC), Evie Fachon (WHOI), Kathy Burek Huntigton (AVPS), Natalie Rouse (AVPS), Bridget Ferris (AFSC), Rose Masui (KBNERR), Teri King (WA Sea Grant), Tim Lydon (USFS), Julie Matweyou (AK Sea Grant), Morag Clinton (UAF), Claudine Hauri (UAF IARC), John Harley (UAS)

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

HABs in the News

- Cyanotoxins preparedness and response toolkit – EPA
 - Tools to assist states and tribes mitigate and respond to freshwater HAB events
- NOAA report on defining a research agenda for HABs and OA
- Middleton Islands seabird die-off
 - AI ruled out
 - STX ruled out, DA?

<https://www.epa.gov/cyanohabs/cyanotoxins-preparedness-and-response-toolkit-cprt>

<https://repository.library.noaa.gov/view/noaa/30908>

<https://news.uaf.edu/scientists-look-for-cause-of-recent-kittiwake-die-off/>



Cyanotoxin preparedness and response toolkit – good tool, especially for fresh water HABs.

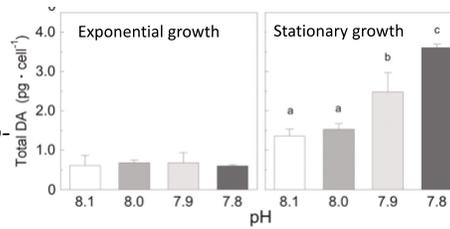
NOAA report on defining a research agenda – Report from a workshop held in August 2020, with the goal of identifying research needs and priorities at the intersection of OA and HABs. Top takeaways at the nationwide scale are: the need to recognize that OA is a multi-stressor, it occurs along with other factors that all have their own impact on HABs, and co-monitoring of OA and HABs is desperately needed to discern relationship. This could be a great resource to cite when developing proposals!

Middleton Island seabird die-off – For those who haven't heard, in mid-July some researchers on Middleton Island noticed around 50 dead kittiwakes as well as others that were weak and unable to fly. They collected samples to USGS and FWS to analyze. The first priority was to rule out Avian Influenza. That was done, and then the samples were analyzed for STX. None of the samples came back with detectable levels, and they are going to test for DA as well. If anybody has any more recent update on this, please let us know.

HAB Science

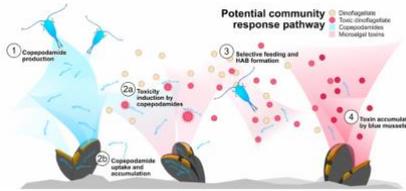
- Ocean acidification conditions may increase DA acid production of *Pseudo-nitzschia*

• *Wingert and Cochlan, 2021*



- Including zooplankton biomass in models improves accuracy of HAB toxin forecast

• *Trapp et al., 2021*



- Study on the appropriate whale feces sample storage conditions for DA analysis

• *Bowers et al., 2021*

OA increase domoic acid production – Samples taken during 2015 bloom along US west coast and grown in the lab. The PN were subjected to various pH levels. Exponential growth rate of the PN was not affected by lower pH, but during the stationary growth phase, total DA was almost 3 times higher at pH 7.8 than pH 8.1.

Zooplankton abundance improves HAB forecasting – including the abundance of copepods in the models increases accuracy of okadaic acid in the mussels compared to phytoplankton alone. This seems to be linked to the level of copepodamides (an exudate of the copepods known to induce toxin production) in the water.

Whale feces sample storage – Looked at the stability of the DA levels in bowhead whale feces samples stored in 50% methanol and raw feces. Evaporation of the sample during storage seems to lead to an increase in the DA concentration when not stored in methanol. This is important information when developing sample storage protocols for HAB work.

Work Updates

- AHAB Action Plan
- List of AHAB Network members and expertise database update
- Description of HABscopes and DA field test kits



5. ADD SUBSTRATE

Add SIX drops of the SUBSTRATE solution onto the SPOT PAD.

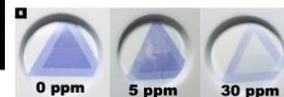
Wait ten to twenty minutes for a color pattern to develop.



6. OBSERVE COLOR PATTERN

Compare the pattern that develops on the Domoic Acid SPOT PAD sample with the reference chart in this User Guide.

Determine which pattern most closely matches the test result to estimate the concentration of Domoic Acid in the sample. (See examples shown below.)



Round Robin Updates (going by region of work)

ARCTIC

Kathi Lefebvre (NOAA) through email:

Things are going well for the ECOHAB sampling effort. A main cruise is set to depart Sept 2 and return October 2. HAB samples and food web samples will be taken at DBO stations in Chukchi and Bering.

Evie Fachon

No longer able to go on the cruise, but we will be sending somebody else on the cruise to take HAB samples on the DBO lines in the Chukchi and Beaufort. We received samples from Gay from Nome and Diomede, and we'll be looking at those for Alexandrium and Pseudo-nitzschia.

NORTHERN BERING SEA

Gay Sheffield

We are having a comprehensive seabird washup event, and the commonality is poor body condition. It's involving adults, and there's concerns for chicks as well. I don't have a concern right now that the issue with birds is HABs, but it is comprehensive and throughout the Bering Strait region.

We remain cold, we've had 3 frosts in August. The NOAA RACE bottom trawl survey just finished and here's a link for their preliminary results for bottom temperature:

<https://www.fisheries.noaa.gov/alaska/science-data/near-real-time-temperatures-bering-sea-bottom-trawl-survey>

Kris: Thanks Gay! We're going to have to ask them to change their scale, since we care about details for temps above 8C.

Gay: They've had to change their scale already, they used to only go to 6C.

Claudine Hauri

This is my first HABs call, and it's the first time I'm really thinking about HABs. I'm more in the OA field, and I have 2 models (panarctic and gulf of Alaska) to look at inorganic carbon patterns, OA trends and extreme events, etc... and my research group is beginning to think about how we can use our model setup to get a better understanding of HABs. I'll be joining these meetings more often to learn, and open to ideas for working.

ALEUTIAN AND PRIBILOF ISLANDS

Chandra Poe

For Unalaska, our toxicity numbers are down since June but they're still high. Blue mussels range from 300 to 800 ug/100g. It's been a bit of a challenge to get samples because of staff availability and other events. So we don't have a lot of samples coming in from other communities. Sarah Schoen from USGS came out in July and collected samples from across the food web with the help of one of our summer interns. Unalaska is back to high risk for Covid, there's community spread again. So the lab equipment that could one day be used for analyzing HAB samples is now back to being used full time for Covid at the moment (monitoring wastewater).

Robb Kaler

We are getting reports of shearwaters from Cold Bay from Allison Williams at Izembek. We're working on getting carcasses, to send them down to NWHC. The description is "emaciated". It's likely connected to the Bering Strait washup event. Thanks, Gay, for sharing that link with the bottom temperatures.

Gay: Ya if anybody can tell us why Norton Sound has the highest bottom temps in the Bering Sea.

KODIAK**Julie Matweyou**

I am continuing to collect samples for qPCR analysis at the Beaufort lab, and also collecting opportunistic samples for Steve Kibler's food web study.

Grace Ellwanger

Saw high toxin levels at end of June and beginning of July. Blue mussels up to 1300 ug/100g, highest seen since we started monitoring. Followed by the next samples 2 weeks later at 560 in blue mussels. They have gone down since then. All the samples last week came back below the regulatory limit. These data are lining up well with phytoplankton data as well. Saw the phytoplankton rise 2 weeks before we saw the shellfish toxins.

There was an oil spill in Women's bay. Ship wreck that was turned up by the earth quake, released oil and other harmful substances into the bay. It's a critical habitat area. If anyone needs observations or samples from that event, the KANA team can help. We're not doing a specific response but can assist others.

Andie Wall

The AHAB Action Plan looks great, and it will be a very helpful tool going forward.

SOUTHCENTRAL**Kris Holderied**

Talked to Jamie O'Connor on Sen. Murkowski's staff at beginning of August, particularly around the question of HABs. It was a great discussion and included Kathi LeFebvre and NCCOS people. Discussed networking through AHAB.

Grace: The KANA team is wondering who met with Murkowski's ocean team? We are set to meet with them next week.

Kris: Hi Grace - the people who met with Jamie O'Connor and Sen Murkowski's ocean team were NCCOS (Ruth Kelty, Kris Holderied, Marc Suddleson, Tod Leighfield) and NMFS (Kathi Lefebvre and Penny Swanson).

We haven't been seeing a whole lot. There was a dead kittiwake at the lab but no testing results back. On the oceanographic survey this week we got some live phytoplankton samples for Steve Kibler and those got shipped out recently.

Rosie Masui - KBNERR

We've been having a very busy summer. Not sure if any other monitoring programs are feeling this, but going from last year where we helped fill the gaps for a lot of samplers due to covid, we're now still trying to get back in the swing but not as many samples coming in as regularly. We've been talking about reconnecting with our monitors and being aware that sometimes sampling for HABs is not people's top priority. We've seen covid numbers go back up in Kenai Peninsula and we're still working in a hybrid set up.

Got out yesterday and collected a lot of samples. Starting to see higher levels of Dinophysis in August/September in last few years. It's not looking like a full on bloom in one of our locations, but it is present.

Usually by end of August we'll have monitors returning kits for us. We used to have community presentations at the local college regarding what was being seen locally for HABs, and we will resume these virtually.

I'm wondering if anybody (Patryce at DEC?) are able to test for okadaic acid. Last year we had to send a sample out of state to get tested for that.

Patryce: Sorry, we haven't brought on any okadaic acid methods, but I will add it to my wish list.

Michael Opheim reached out because he saw a bloom at the head of Jakalof Bay that had colored the water green. Rosie and team didn't see it yesterday but were sampling in a different spot in Jakalof Bay. Dominic is going to get a sample today.

Michael Opheim

The bloom in Jakalof Bay was a pretty unusual color for out there. Didn't have a bottle to collect a sample so just took a picture (see below for Michael's picture of the bloom earlier in the week (left), and a picture of it still around on August 19 (right)).

Other than that, just continuing to sample for OA and HABs. It's been a busy year, with a lot of camps too. We also grabbed 10 blue mussels from Jakolof the day after the Kittiwake died. We have not gotten those sent off to get sampled yet. We are trying to get it to Bruce Wright.



Patryce: The EHL did have a commercial PST from Jakolof this week and it was ND for PST.

Annette Jarosz

Maile and I have been doing a lot of grant writing, so lab work has been a bit on the back burner. But we validated saxitoxins ELISA for blue mussels, and working on doing that for other species as well. Also working on domoic acid validations, and streamlining protocols. Hope to be working on backlogged samples by next month.

Patryce McKinney

Business as usual at DEC; we're helping with Aleutian samples and anything else that comes our way. Karen Pinchin (the reporter writing a story about HABs for Scientific American) came by for several hours last week. We're looking forward to seeing what she writes up.

Thomas: I heard there was another heat wave in the Pacific Northwest, might that potentially endanger our supply of mice for the toxin bio-assays?

Patryce: We're hoping that we dodged the heatwave by having shipments before and after. As long as the weather resolved by next Tuesday, we should be fine.

Matt Smith

We got tissue from 4 kittiwake carcasses from NWHC and analyzed for STX. All came in below detectable levels. Will also run them for domoic acid as well. Also glaucous wing gulls will be tested. But so far, we have not detected any HABs in birds. The body condition reported by the pathologists at NWHC were poor or fair, though not emaciated.

Naomi Bargmann

On Tuesday afternoon some USGS folks when to UAA for a necropsy training. The first bird was a glaucous winged gull and it was covered with parasites. Horrible condition, there was no subcutaneous fat, barely any muscle. Frederique Tremblay was there too, and she was doing her research at Middleton this summer and spear headed the collections. It was good to speak with her about what happened. The glaucous winged gull dropped dead but the other kittiwakes took days to die. That could be why they were in such poor conditions cause they were on the ground and took days to die. One other thing to note, there are a lot of urates coming out of its vent and that is a potential sign of botulism. The NWHC was supposed to run tests for botulism as well, but haven't heard if they did.

I'm currently working on puffin samples from a long time ago, and I've been consumed in that to meet some deadlines.

Gay: Question for USGS and USFWS. We've been seeing birds that are in horrific condition for the 5th year in a row, and that is not normal for the Bering Sea region. But on a bigger scale, looking at it wholistically, our salmon runs in this region are grim. Silvers also looking grim. Is USGS or USFWS looking at food availability at a system level?

Robb: As a management agency biologist, our colleagues rely on working with partners. It's on our radar. There's enough overlap with land-based and at-sea research. Becoming more pressing that they coordinate better with partners.

Caroline van Hemert: a big part of USGS seabird group work is looking at those forage fish and food webs and other things that would be directly contributing to starvation. Most of that work is focused in the Gulf associated with some of the die offs that happened. Yumi Arimitsu is

leading a lot of that work for USGS, maybe we can get an update about this at some point. Short answer is yes, that avenue is being investigated as much as HABs.

Gay: Thanks Robb and Caroline. With comprehensive poor body condition and fish that aren't returning, food availability on a system wide level is a huge concern in this region. Talking to people on the Bering sea trawl survey made the comment that they were shocked by how few seabirds they were seeing. These surveys have been going since 2017 and this was a surprising comment.

Naomi: I wasn't able to go on the cruises but Yumi did send an update that corroborates what you just said Gay. It's weird cause there's a lot of sandlance out there apparently, and they collected a bunch, so I'll be running them for HABs analysis this winter.

Robb: Testing for botulism and avian cholera could be something to follow up on with USGS lab in Madison. I'll follow up with National Wildlife Health Center about that. Also, if birds are exposed to HABs, they might be immune compromised and more susceptible to disease. Just as a note, the NWHC usually wants to hear about 3-5 kittiwakes before they investigate.

Caroline van Hemert

Shout out to Matt and others that collected common murre eggs and they are currently hatching at the ASLC. That's really exciting because hopefully they will help us understand some of the sublethal impacts of toxins on their physiological parameters.

Natalie Rouse

Regarding what Rosie asked about earlier: we ran 20 samples for okadaic acid mostly from 2019 and 2020 with Spencer at Florida International University. This was because we saw a lot of Dinophysis in Resurrection bay in the past. We thought we should be looking for it, so we took extra samples, and there were all negative. The samples were from all over the state; southeast, Aleutians, a lot from Cook Inlet, 2 historical samples from Hooper Bay from Laurie Quakenbush. So we wanted to do a little survey from all those samples. Spencer has been running an ELISA and has grant money so he ran samples free of charge. I can pass on his info if anybody is interested, but we will try to give him samples every couple years.

Molly McCammon

In the infrastructure bill that passed the senate, there was funding for Ocean Observing Systems, and did include money for the National HAB observing network. Has a long ways to go to get passed but currently in the bill.

SOUTHEAST

Kari Lanphier (SEATOR) through email:

None of our communities in SE have submitted blue mussel samples that have exceeded the regulatory limit in July or August. However, butter clams throughout the region have remained above. We're on the lookout for a fall bloom, in previous years this has occurred in September and October. Communities have continued to have very routine sampling, despite the Covid outbreaks.

Michelle Morris

Limited number of people who applied to be invasive species monitoring and plankton monitoring. Lower than usual, so less monitoring going on around the state. There is more activity as far as aquatic farming, so people are getting stuff in the water, and there will be more opportunities to get samples maybe around the state.

Thomas: Axiom just put out the AOOS mariculture citing tool; now live. Geared towards people applying for permits and for permit review folks. Here is the link:

<https://mariculture.portal.aoot.org/>

Courtney Hart

We're slowing down our monitoring at oyster farms for the summer. We didn't have an Alexandrium bloom in Juneau, which was a bummer for us, but great for people selling shellfish. And now we have a year of baseline data for a year where there was no bloom. We did see a fairly large Pseudo-nitzschia bloom and we saved some of the oysters and sent them to the Sitka lab for analysis. We have also seen a huge Dinophysis bloom here too. We haven't ID'd them yet. But we now have a pretty great 1-summer long record of what's going on out at the farm. There's some pretty big tidal fluxes so the water column changes drastically from day to day and influences what they see out there. Also collected water for OA sampling with Natalie Monacci and just sent those off to her. This has been a side project with Muriel but we're trying to get NOAA or one of the new Sea Grant fellows to continue monitoring for another year and maybe capture a bloom. I think it'd be great to use this farm site and work with oyster farmer to see what they're seeing on a daily basis.

Muriel Dittrich

We're kind of wondering what exactly is a bloom? We see a lot of something, but does that constitute a bloom? At the farm, the water changes so much that it's hard to tell if there's an effect of all the organisms in the water on the shellfish.

Thomas: That's a good question, even in the literature there's no clear definition of what constitutes a bloom.

STATEWIDE

Bridget Ferris

We are starting to put together this year's Ecosystem Status Reports for the EBS, AI, and GOA regions. We look forward to including a summary of HABs monitoring data as we did last year, with Thomas helping coordinate. We really appreciate being able to include these data and are happy to respond to any questions.

Teri King

I've been the program manager for the Puget Sound monitoring program since 2008. And we have got a series of things happening related to databases so there are organizational changes happening at the Northwest Fisheries Science Center, so some things they used to have under their guidance is moving under the Sea Grant program. Hopefully that is seamless but anybody entering things into the portal may notice small changes. One of the biggest ones is the addition of 3 new toxic species that are not harmful to humans but toxic to shellfish and other sea life. Thanks to our relationship with our farmers and people who are monitoring, we were able to

figure out part of what has been causing some of the unknown mortality we've been experiencing here in Washington State for the last 90 years. And it's related to a series of toxins called yessotoxins that are produced by *Protocerratium reticulatum*. It will actually kill the shellfish species, and here's a new paper we've got out about this organism:

<https://doi.org/10.1016/j.hal.2021.102032>

If anybody has any questions about SoundToxins, let me know. We're undergoing staff turnover, so I'll be very busy being on call for a bit.

NEXT AHAB MONTHLY CALL WILL BE: THURSDAY September 9TH, 2021 AT 9:30AM AK