

# Climate Change and Sentinel Monitoring Workgroup Meeting Summary

## Tuesday May 21, 10-12PM

### Teams Meeting (Link in Meeting Invite)



#### Attendees

Samarra Scantlebury, NYSDEC (Co-Chair), Kathleen Knight, CTDEEP (Co-Chair), James Ammerman (NEIWPC), Juliana Barrett (CT Seagrant), Lauren Barrett (), Genevieve Bernatchez (NOAA, Fisheries), Sarah Crosby (Norwalk Maritime Aquarium), Gregory P. Dietl (Cornell), Melissa Duvall (EPA), Richard Friesner (NEIWPC), Mariah Kachmar (NOAA, Fisheries), Shauna R Kamath (NYSDEC), Madeline Kollegger (UConn), Kyra Lenderman, Katie McFarland (NOAA, Fisheries), Esther Nelson (EPA), Katie O'Brien-Clayton (CT DEEP), Owen Placido (UConn, CLEAR), Matthew Pruden (Cornell), Kelly Roper (NOAA, Fisheries), Paul Stacey (Footprints In The Water), Kelly Streich (CT DEEP), Evelyn Spencer (EPA), Cayla Sullivan (EPA), Elizabeth Tanzi (EPA), Penny Vlahos (UConn), Gary Wikfors (NOAA), Harry Yamalis (CT DEEP), Manhasset Bay Protection Committee

#### **Introduction**

Samarra Scantlebury called the meeting to order at approximately 10:00 AM. Samarra provided an overview of the Climate Change and Sentinel Monitoring Work Group's (CCSM) purpose and, the agenda and goals for the meeting.

Samarra shared a brief recap of the last meeting. This included:

- Shared the results of the informal expertise poll to assess our diversity in workgroups expertise,
- Shared the proposals for FY24 that would be related to CCSM work,
- USGS shared the current status of the Meta-Data Database project and how it can/may relate to our own sentinel monitoring database,
- Shared a briefing on the workgroups Special Meeting, Fish Communities of LIS.

Samarra and Kate then shared the ground rules for the workgroup and a reminder to the team was shared that an update to our Sentinel Monitoring Strategy is being worked on as well as our annual workplan. The information from this meeting is intended to feed our decision making for as it relates to shellfish health, one of the sentinels identified in our current Sentinel Monitoring Strategy.

#### **Long Island Sound Oyster Health Assessment. Effects of Climate Change on population dynamics, disease proliferation and reproduction on natural and restored oyster beds. *Mariah Kachmar and Katherine McFarland of NOAA Milford Lab***

Mariah shared an overview of the economic and habitat value of oyster populations in the Long Island Sound.

Mariah then introduced an overview of the project's intent and purpose:

The project has focused on three main diseases: Parkinsus Marinus, Haplosporidium nelson and Haplosporidium costle. Impact east coast and are similarly impacted by environmental factors (specifically salinity and temperature). There is a decrease in pH and Argonite impacting shell growth.

Objectives of this project:

1. Establish baseline measurements of infection prevalence and intensity.
2. Describe key environmental and biological factors associated with observed burdens of disease.



- Photographic evidence of the fouling on shells to illustrate the oysters need to re-repair shells and these environmental conditions can impact their ability to do that.
- There is significant daily variation in pH at CT sites too. While they are currently surviving, there is a downward trend that may hit the tipping point and impact survivability.
- July to August period is seeing an increase in temperatures at all sites. This can impact spread of disease. The warm temperatures into October extending the disease mortality into the fall.
- Shifts in earlier warming waters is indicative that there may be a shift in spawning season too.
- The studys' extremes in both temperature and pH were noted at the Fence Creek location.

Mariah then shared the projects future direction:

- Continue monitoring local water quality
- Identify how water chemistry and physical characteristics related to overall oyster health.
- Data could help inform future restoration sites
- Host-pathogen-environment dynamics.

#### Q&A

Q: How do you plan to broadly communicate with partners and share information learned.

A: Partners will be receiving the reports for these sites specifically. Also working to develop a risk assessment for disease spread and climate impacts to begin initiated in soon with a student now that we have a full year of data collected and plan to continue.

Q: Noted a consistent difference in two pH methods (similar trends though) have you been able to resolve that offset?

A: One thing is the Aqua Trols are new devices; we did an experiment with the sondes to try to understand the offset and we do have a correction factor established now.

Q: Ash creek received CSO and wastewater discharges too, have you overlaid that data to inform your trends? Fence Creek I believe is in Madison (?) with no discharges so perhaps a control?

A: We should consider the discharge data. Yes, the fence creek site is in Madison.

#### **Long Island Shell Day, 2023. Lauren Barrett, University of Connecticut Avery Point, 2024 NOAA Knauss Marine Policy Fellowship Finalist**

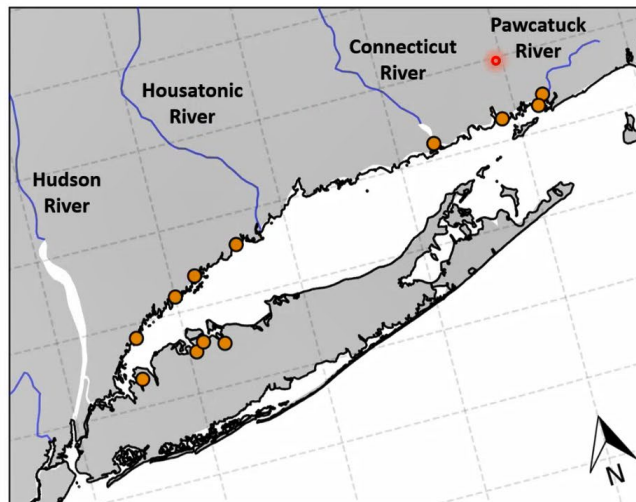
Lauren presented an overview of the event and the results of this event.

Overview:

- The event was a collaboration with 9 organizations and Penny Vlahos Lab at UCONN.
- The goal was to get a snapshot of alkalinity and other WQ parameters across the tidal cycle. To have samples taken at same time and focus on spatial variation.
- Sampling occurred August 2023
- Coastal environment is especially important to track. Ocean change will be 0.1 pH units over years where you will see magnitude higher fluctuations within a daily period. In theory the species in these areas should be more resilient but this is yet to be determined and this poses difficulties for tracking long term trends. It was found through the Dempsey data that the Sound is experiencing acidification and warrants further investigation.

- The buffering capacity of LIS coastal areas is being explored. The ability to resist change in pH.
- Empirical relationships between salinity and alkalinity can be determined, but they location specific.
- In 2019 there was the original shell day. LIS was important to the 2023 study, because the salinity and alkalinity relationship was well developed from 2019. However, something different was going on in LIS and was not able to develop the relationship for the LIS.
- Therefore fore 2023 the monitoring in LIS was enhanced with additional LIS sites:

## Shell Day 2023 Sample Sites



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### Results:

- With the sampled sites above there was good linear relationship between salinity and alkalinity.
- However, could use some additional samples in the low salinity range and Milton Harbor, NY did appear to have its own relationship.
- Without Milton Harbor  $r^2$  was 0.94 with good p value as well.
- Observed significant alkalinity differences at the tidal cycles at river locations, as expected.
- Western sound saw far less alkalinity difference (also expected).
- By comparing 4 stations to 2019 data:
  - The differences observed at Milton Harbor in 2019 against the other sites, say this same relationship in 2023 so view this as real local different relationship.
  - Compared to USGS data and Western CT/Eastern NY area also observed higher alkalinity in that river and this could impact Milton.
  - There is also greater development in this area which typically is greater ion activity and less infiltration which can buffer the alkalinity.
- Looking forward to refine this relationship and add other parameters that are known to have relationships with alkalinity.
- A more detailed study of TA in NY metro area would be helpful. Expect this is already a part of the LIS coastal acidification project.

### Q&A:

Q: Noted that this study was during hypoxia season. How might this influence this study? Would you recommend another sampling period?

A: The first thought is that the co-occurring hypoxia shouldn't be impacting the alkalinity. But good to have this end member conversation if one of the things we are concerned about is this co-occurrence but it would be good to have the background when they co-occurring hypoxia isn't happening. Penny noted doing something in the Winter would probably increase the linear relationship and doing it in the summer was intentional for observing period with high stress period for oysters etc.

Q: Did you look at the sampling station location relative to the reefs? How does having all the data (shellfish beds, full coastal acidification data suite, this studies sampling stations) to make those connections more so?

A: Penny agreed we would want to make those sorts of maps next.

Q: We know during nitrification alkalinity is consumed and denitrification alkalinity is released. Is it worth looking at eutrophication rates, N loading and metabolism to see if those outstanding ones might have something going on with N cycle that would flip that relationship?

A: Agreed that is good proposal. These waterbodies are shallow enough there would be interaction with what is going on with sediment. Penny added in open LIS it would be a wash, but in coastal embayments it would probably be evident and probably see a diurnal cycle.

Q: What depth?

A: Right at the surface.

Q: Can you speak to some of the changes related to intercalibration?

A: We know all the alkalinity data is really good because it's measured by singular lab, but the salinity is measured on location and may be calibrated differently. We did attempt to cover that in 2023 sampling with a shared salinity standard with an independent sample and wasn't fully executed. However, the few that did participate in that part had really good agreement. But there are limited comparisons so we have less confidence in those salinity measures.

Q: Are you thinking of keeping a 4 year interval? or other?

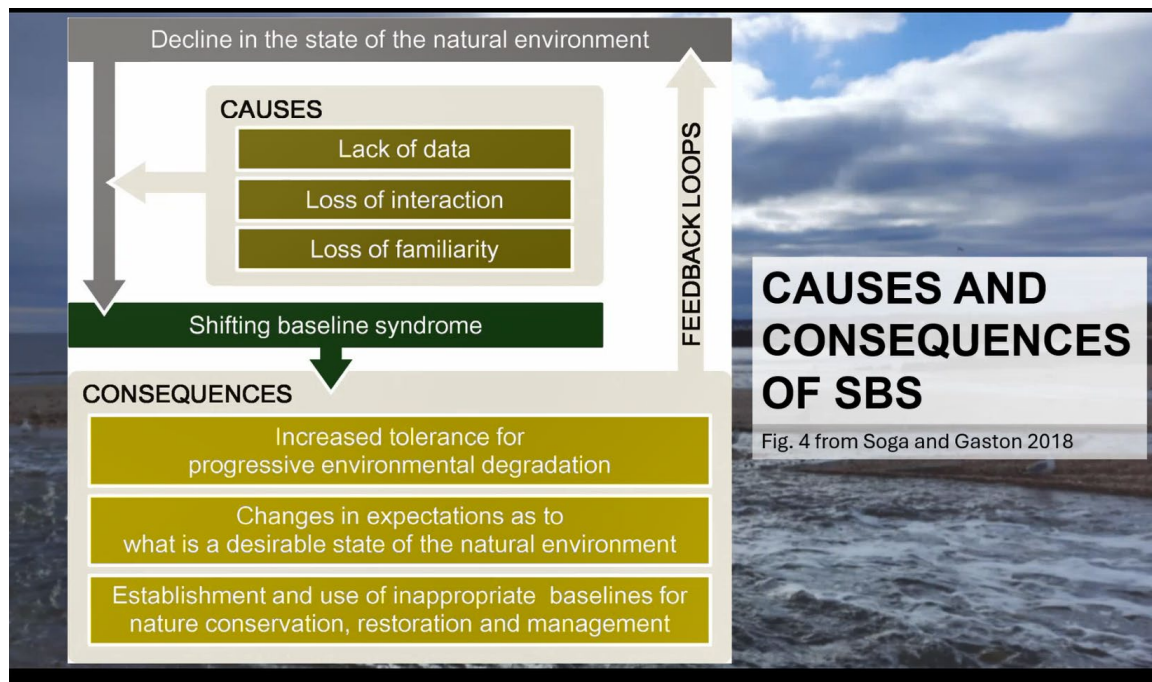
A: Yes, we do want to keep doing. They take effort and are an excellent outreach opportunity. There are a lot of questions we could address. The awareness alone and increased understanding of local challenges is great benefit.

### **A Primer on the Use of Molluscan Death Assemblages to Reconstruct Past Biological Conditions in Long Island Sound. *Matthew Pruden, Cornell University***

Matthew shared the methods and what opportunities are available through this methodology.

Overview:

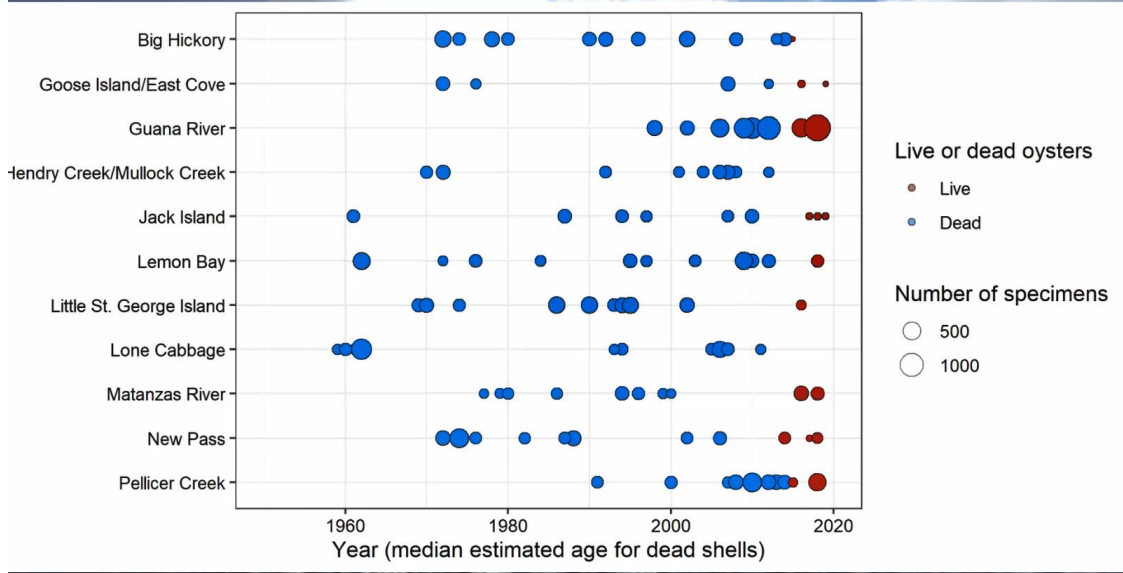
- The importance of long-term data for management strategies but inability to monitor due to cost or even being able to anticipate the need in future.
- The risk of this is shifting baseline syndrome – our observations (time limited experience) skew our perspective of what natural conditions should be.



- The field of conservation paleobiology can help add data to avoid shifting baseline syndrome in your management strategies.
- Conservation paleobiology includes: sediment samples, geochemical and biological.
- This data is not meant to be a substitute but rather integrated.
- The death assemblages of the upper sedimentary record (upper 20cm) will retain a memory of what the abundance of species looked like and they can be easily retained as residuals.
- Comparing the living assemblage to the death assemblage gives us a good understanding of the change.
- Some of the challenges are:
  - Limited to species that will still exist, molluscs have that harder shell that will be available. Do the molluscs represent the other species?
  - A recent paper (2021) we compared the M-AMBI (EPA's index) to what we get from using mollusc only and it has a very strong linear relationship.
  - Mixing of multiple generations. While we know exactly how old a living assemblage is, the death assemblage is averaged over a period of time. So, review the period you are interested it can be done by radio carbon dating ( this requires a local calibration curve).
  - Determine if molluscs are appropriate to be representative. There is a need to evaluate changes in structure in abundance and richness. If we are looking at larger time period, species richness increases because more time is needed for rare species to accumulate.
  - Abundance will change with greater span too, but dominate structure will remain consistent between death assemblage and the living assemblage if there was not a change observed.

Highlighted Projects:

1. [Statewide Ecosystem Assessment of Coastal and Aquatic Resource](#). Specifically for Oyster Reef health they assessed oyster body size. Monitoring began in 2015 and sought to build baseline with a paleological project.



3. Everglades Study. [Comprehensive Everglades Restoration Plan](#).

Goal: Restore salinity zones of the Everglades. To understand what the zones should have looked like without the redirection of flow (due to development) they did a paleo-salinity time series with a series of cores and mollusc- salinity relationships. From this they build a set of models for salinity regressions.

### Coupling Paleo-Salinity & Hydraulic Flow Models

- Marshall and Wingard 2012
  - Paleo-salinity time series
  - 5 Sediment Cores
  - Molluscan – Salinity relationships
- Salinity linear regression models derived from monitoring records
- Natural salinity - 3-9 psu lower

4. Long Island Sound. Determining Geohistorical baselines of benthic conditions. Feasibility Study for determining pre-TMDL conditions with molluscan assemblages.

By establishing pre-TMDL conditions the reductions can be inferred due to the TMDL have benefits the benthic communities. Project is on-going and future update to be shared.

Benefits of this sampling is the records are still available regardless of if we planned for this in the past.

Q&A:

Q: In addition to getting a baseline of certain site, is there an ability to tell a story with the data you collect? Can you identify some of the uses back then (maybe 1700s)? From a public engagement and outreach perspective what do you think the uses are?

A: That is something we have been thinking about. Another project that is part of Matthews thesis is using sediment cores that were originally collected to reconstruct the history of LIS and looking at the molluscs that were preserved in those cores going back to 1600s and part that is under discussion is how to tell the story to connect to public.

Q: Recall hearing about a regime shift in the 1970s, that was highlighted through some work in Stony Brook hope that reference helps. I think what you are doing is very helpful for a sentinel monitoring workgroup and I think of sentinel monitoring more than climate change.

A: Thank you. You were not misremembering there was a potential connection between changes in benthos in the 1970s and changes in available oxygen. In the middle of the 1900s there was also a shift in productivity because there was a shift in diatoms. And yes, these are things we would like to be more involved in.

Q: What are the advantages and challenges of using EPA NCCA data for your work?

A: A major advantage is the 5-year hold time. Therefore, we can go 5 years back and we have a direct comparison between live and death assemblages because they were grab samples. One limitation is the limited replicate samples.

Q: We funded the NCCA to continue in 2025 therefore if there is something we should tweak/seek it would be good to know. We don't know a lot about how our reductions in hypoxia impact organisms and the more we can do that the better.

Q: Have we overlaid historical abundance with regions weather? Could you discern something related to this?

A: Yes, that is certainly something that can be explored. We do often overlay precipitation records since salinity is major factor that affects oyster growth, so that is something being looked at for the Florida study highlighted. In terms of temporal resolution, we are currently working on a paper that explores that.

### Meeting Close Out\Next Steps

Kate opened the floor for member updates. None were shared.



2024 Calendar was shared.

## Meeting Closeout



2024 Meeting Schedule

**Summer: August 20<sup>th</sup>**

**Fall: November 12<sup>th</sup>**

**All meetings are virtual and are from 10am-12pm.**

**Habitat Restoration & Stewardship Meeting, Wed 29<sup>th</sup> 9-12PM**

**August Meeting Agenda**

**Reminder to submit your comments on CCMP revision to [LISoundPlan2025@gmail.com](mailto:LISoundPlan2025@gmail.com) or through the [revision webpage](#).**

May 21, 2024

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Stay tuned for agendas meeting updates and materials for feedback.

Habitat Restoration & Stewardship meeting is very relevant for our team, so this meeting was specifically called out for our teams' consideration.

Typically, in August we review our workplan, but this may be a little different this year due to the CCMP revision however, we do want to keep this fresh in your mind and reflect on this past year too.

[CCMP revision website and continue to share your thoughts](#). We anticipate the August meeting will have updates on this process as well.

Q: How are the public meetings going?

A: Kate was present at two in New Haven and was pleased with the amount of conversation that these events brought to the table and from a variety of levels of awareness, it was not all people already engaged in this process. Esther concurred with that experience relative to the virtual engagement sessions.

**Meeting Adjourned at 11:44 AM**