Hypoxia Collaborative Team

Thursday, January 6, 2022
2:00 PM – 3:00 PM

Meeting Materials:
https://www.chesapeakebay.net/what/event/hypoxia_collaborative_team_january_2022_meeting

This meeting was recorded for internal use to assure the accuracy of meeting notes.

Actions

- ✓ Mark Trice will check in with Tom Parham and confirm over email their agreement on going forward with the current set of recommendations, with the addition of a set of mobile arrays.
- ✓ The group will meet again prior to the Feb. 17th Management Board meeting to confirm the numbers.

Attendance

Amy Goldfischer (CRC), Peter Tango (USGS), Justin Shapiro (CRC), Bruce Vogt (NOAA), Cindy Johnson (VDEQ), Jay Lazar (NOAA), Aaron Bever (AQEA), Jeremy Testa (UMCES), Larry Sanford (UMCES), Mark Trice (MD DNR), Piero Mazzini (VIMS), Kevin Schabow (NOAA)

Minutes

2:00 PM Welcome, Introductions & Announcements – Peter Tango (USGS) CBP

Peter Tango (USGS) announced that Day 2 of Fisheries GIT meeting is tomorrow, 1/7.

Bruce Vogt (NOAA) commented that we're starting to see more connections between the modeling world and living resources. For example, Aaron Bever's (AQEA) physical modeling is popping up in many places. It's nice to see synergies between physical modeling and living resources outcomes.

Peter Tango outlined today's goal: to bring the group up to speed, review the presentation from last month, and highlight proposed costs. He reminded the group of the 3 themes: unassessed criteria, explaining management response, other outcome needs, and that he is looking to get consensus on the 11 array network, then later circling back on refining costs.

2:15 PM Review and provide feedback on 11-array network proposal for the PSC monitoring review

Peter Tango provided a recap of the Principal Staff Committee (PSC) monitoring review process and the sampling design considerations going into the recommendations for the PSC, finishing with a review of the current state of the recommendations for an 11-array network. Then he opened it up for discussion.

Jay Lazar (NOAA) commented that in the context of going from fair to good, when you talk about all the different reasons we're interested for example model validation, segment delisting, habitat etc., what kind of answer would we provide if the answer was we don't care about model validation etc., we just care about going from fair to good, does that change the number? Are we at 11 because of all those other things?

Peter responded that going back to the EPA document the recommended level was to have one vertical water column sensor at all 156 stations where long-term water quality monitoring exists. The good assessment represents some subset of stations in a variety of habitats that address all essential criteria. Three is not getting all the habitats. If we build out to tributaries and small set of instruments that can be moved into other habitats, we are meeting the minimum definition for subset and addressing scales of habitat info that's been missing in the open water habitat. The minimum it takes to move up a level is what we're suggesting. You can always add more. We're getting the information at the scales we need, able to address other habitats, and addressing a subset of the 156 locations.

Jeremy Testa (UMCES) commented asking what do we have in our back pocket to express the justification for this. Would it help to suggest that all of the infrastructure that's being used in the common program in Maryland and Virginia be coupled to this to get the most out of it? Making new investments but we have these past investments that could be co-deployed. Shallow off the dock coupled with deeper water profilers. What's the rationale for why we suggest 2 and where we suggest 2? Do we need them in and out of the deeper area in Lower Potomac that's not historically well monitored? Are we putting them in the mainstem and lower tributaries past long term stations? Do you have a sense of the financial ask here and how realistic it is/how it might be received?

Peter responded that we haven't strongly portrayed the connection we can make to the existing common resources to analytical power. That's a good item to add to our justification when we talk about the value of existing infrastructure that will still have importance because of the habitats they represent and connecting those two. A decade ago the near shore and off shore sites at 30 day level produced averages that were comparable. There's history to analysis that looked at 30 day averages to the habitat being similar in near shore and offshore, but once we tried to resolve 1 day there was greater diversity in history of expression. It adds a piece to the value of what people are going to be doing in modeling and assessment world. Regarding the deeper stations, we haven't explored if 2 arrays would be of value and therefore 2 in each of those lower tributary areas put in as a placeholder. This is open to discussion if folks feel we should argue for 1 or 2. Don't know if we can fulfil that today but should continue the discussion. Highlighting on the finance side, based on the types of investments that are anticipated based on the infrastructure bills and what people are expecting to come from EPA on monitoring investment, that's one place where there's strong support for the number we're putting forward. It's a legitimate level of resource request that can be supported. It's within the realm of reason. Even without the PSC review this would be a timely and helpful recommendation.

Mark Trice (MD DNR) commented asking has anyone who's doing the calculation of the delisting and DO assessment talked about how they'll use continuous data? The actual continuous monitoring data, not sure how much that's actually getting used vs the calibration data that's taken when we visit the site.

Peter replied that folks are expecting that the 4D interpolator will be able to take that data and give us the scales of analysis that are necessary. We're looking at the case study build out of that with Elgin here this month. It's being worked on, but you're right that we have little experience with the short duration

criteria assessment other than what Tish Robertson (VDEQ) is doing in Virginia, especially her work especially on chlorophyll criteria with continuous data and dissolved oxygen (DO). Peter asked Cindy Johnson (VDEQ) if they used that data and Cindy replied that they did use that data.

Peter noted this is maybe a good topic to highlight for next Criteria Assessment Protocol Workgroup (CAP WG) and bring in the 4D folks.

Larry Sanford (UMCES) commented, what strikes me is that you're proposing a minimum, bare bones program here. To me, 2 arrays per tributary are best used laterally. Lateral variability is key to understanding why these high frequency signals are coming out and 2 is the bare minimum. I would emphasize that in presentations. Look at the 156 that people suggested. If when you're picking places, putting them where the long-monitoring stations were makes a lot of sense, so we're not talking about new locations. Partly because of the value of the periodic calibration data. I don't think 2 per tributary is anything but the bare minimum. Adding a sensor on a dock would be an easy way to make it 3 instead of 2.

Peter responded that when shallow water program got going they traded out a 400k/year zooplankton program to kick off the shallow water program, then they added 100k, so started out with 500k. I wouldn't say by giving us a target that it's going to be the absolute. Maybe it's of value to say here's the bare minimum, if folks feel we can justify 2 or 4 or 6 more as a target, if you have money to help us be another level stronger. As per Jeremy's suggestion and what Lee McDonald was comfortable considering, this bare minimum seems to fit in with what I understand from one agency. But we have multiple agencies online. If 2 or 4 or 6 sites would make a significant difference. By virtue of hypoxia collaborative we're looking at partnerships. Mid-Atlantic Regional Association Coastal Ocean Observing System (MARACOOS) may have another instrument there. Not expecting it to be within one agency but within one agency it's investable at the level we're talking about.

Aaron Bever (AQEA) commented that we have to answer the question of 1 vs 2 in the tributaries. If you only have 1, then we're all back to the assumption that all the conditions around that are the same. We know that's not true. Even just going from 1 to 2 gives you some of that spatial dimension. You can learn a lot about what the differences are spatially and what's causing those differences. 2 would feed more into the 4D interpolator than simply one at one spot.

Jeremy Testa commented in the chat, I could see making the case that 2 arrays could allow for a deeper station that could characterize the deep channel and deep water habitats while a paired shallow array could characterize the shallow water, such that all habitats within a water quality segment could be simultaneously assessed.

Peter commented that if there was discussion if you had an extra $x that you can invest does that mean something like the lower tributaries should have 4 so you get longitudinal and latitudinal, is that something that we should discuss? Maybe something we can consider over the next month if someone says we can invest a little more.

Aaron Bever commented, with Larry's comment about adding something to a dock, is that a way to link it into the con-mon? Does that somewhat link to a little bit of a lateral?

Peter said yes, I can picture on the lower Potomac, one of the nearshore sensors when there was a big event it was captured I think it could be captured higher up. The nearshore sensors have shown their value in terms of picking up significant hydrodynamic events. Leveraging that seems really important.

Jeremy Testa commented that maybe it's not in our mission to do this but I'm assuming there's a clear plan and setup for how this new information can be used to enhance criteria assessment. Of course, more high frequency data is needed to do these shorter term criteria assessments. It would help make the case more if that was laid out. Deciding if it's 2, 4, 5 could be specific to what segment or types of segments this would be employed in. Some segments may be fine with 1, for others a diamond shape would be necessary.

Peter commented that having a set of arrays that could be moved around such that if we need to test that idea about particular areas and their sensitivity for short periods we could fulfill a greater density to do the assessment. Instead of asking for more in those particular locations, have flexibility built in. Depending on diversity of what's needed at a particular segment. Regarding getting to actual analysis, we have to go back to what Gary & Rich did in 2010 when they were looking at evaluating umbrella criteria. When they were saying that 1 day and 7 day might be accomplished by 7 day minimum. Part of fishing bay work that MD DNR is proposing is what a full assessment looks like for a given segment across all criteria. Case study; take data and cover all temporal scales of interest.

Bruce Vogt (NOAA) commented thinking about mobile arrays and the value of having that flexibility. We have these mainstem and tributary specific paired arrays in place. Having 3 mobile ones allows us to look at variability in those sites and potentially other places. Seems like they could add value to areas we're suggesting are more static. Beyond research or interest. Earlier wondering if we should add 1 to Potomac or Rappahannock or is it better to have 3 mobile arrays to add to places where we're already suggesting long term stations. Does the group think that the 3 mobile arrays provide that flexibility & value for understanding variability more or would it be better to put 2 of those at a specific site?

Larry Sanford said years ago we had a program at UMCES looking at hotspots in the bay. Real value in mobile arrays to look at some of those spots where we expect either major ecological variability or where it might be difficult to separate physical/chemical/biological variability. The region of the Rappahannock shoals out on the mainstem where there's a big hydrologic control is a major control point and point at which low DO is limited. There's turbidity, upwelling region below the bay bridge where the low DO disappears because it mixes with surface layer water. I like the idea of having a mobile array where you can target specific areas where you're not sure about the dynamics and variability.

Jeremy Testa commented agreement. Another example: maybe there's a place that was poorly monitored. Maybe it was put in such a place that it might be capturing oxygen that gets low but around it, it doesn't. Just that deep center channel spot that was monitored but only represents a small part of the system. Places like Severn where there's a decent amount of oxygen in the water but needs to be monitored more intensely.

Mark Trice commented in terms of mobile arrays we've talked in the past about putting some of these at existing station locations. There's also value in putting them in non-station locations especially if we want to validate the new 4D interpolator; we can say how well is the interpolator estimating what we see at a non-station area.

Peter commented there does seem to be high value in having these as flexible use instruments for understanding a variety of locational needs and different habitats. With bare minimum requirements and hopefully using flexible instruments we can enhance the ability to assess a certain area and it's variability. Peter conducted a vote on whether we can put this recommendation out there.

Votes were: Mark said he'd like to double check with Tom Parham before confirming and will follow up in an email. Larry said yes, Jeremy said yes, although he asked who's maintaining these and putting them out? And he commented would also be happy if it's bumped up to 12. Aaron said yes, Cindy said yes, Piero Mazzini (VIMS) said yes and added he really liked the idea of mobile arrays. Mark will follow up via email after consulting Tom.

Jay Lazar commented we've got some known costs for what each array would look like – 40k per array to include telemetry and moorings and annual use. However, cost unknowns remain. Some of those are amount of damage that occurs in any given year, the number of maintenance trips (we'll have a better idea after this year at least in one geography), efficiencies gained via geography, equipment resilience (how these sensors perform over time and what the replacement timeframe is), level of redundance (tried to address via Chesapeake Bay Interpretive Buoy System (CBIBS) platforms, we target 50% redundancy with CBIBS – those known costs can be extrapolated). The initial upfront cost is straightforward, annual operations and maintenance will have a bigger range. We shouldn't be shy going to the committee to say upfront we should be looking at a million dollars. We wouldn't want to lowball it and find ourselves in a pinch later on. We'll be working with you and everyone else to fine tune it. Vertical resolution is an additional factor. What can be interpolated between the number of sensors we have or if those need to change.

Peter commented that we'll come back before the February Management Board meeting to align the numbers. He said the cost is a realistic target in light of other monitoring needs we're talking about in other dimensions of the program.

Peter Tango closed out the meeting by thanking everyone and adjourning.