

Changing Submerged Aquatic Vegetation (SAV) Communities and Impacts on Blue Crabs:
Potential Ecosystem and Fisheries Impacts of Climate Change - NC Sea Grant funded project

January 19, 2022 – Stakeholder Meeting

In attendance:

- Ann Deaton – N.C. Division of Marine Fisheries
- Brandon Puckett – N.C. Coastal Reserve
- Brian Boutin – The Nature Conservancy
- Dean Carpenter – Albemarle-Pamlico National Estuary Partnership
- Dan Zapf – N.C. Division of Marine Fisheries
- Gloria Putnam – North Carolina Sea Grant
- Jessie Jarvis – UNC Wilmington
- Martin Posey – UNC Wilmington
- Mike Wheeler – UNC Wilmington
- Scott Baker – North Carolina Sea Grant
- Trish Murphy – N.C. Division of Marine Fisheries
- Troy Alphin – UNC Wilmington
- Whitney Jenkins – N.C. Coastal Reserve

Unable to attend:

- George Easterly – UNC Wilmington
- Doug Cross – Seafood Packing Industry Representative
- Joe Facendola – N.C. Division of Marine Fisheries
- Mike Blanton – Blue Crab Fishermen
- Sam Romano – Blue Crab Fishermen/Seafood Packing Industry Representative
- Todd Miller – North Carolina Coastal Federation

Meeting Notes

SAV project updates – Mike

- Looking at how epiphytes effect stress on *Halodule wrightii*
- Lab experiments, completed all processing, analyzing data
- CERF and benthic ecology meeting presentations
- Accumulation of osmolytes
- Sea Grant work – collect data monthly, May-Nov, just completing lab processing of that data
- Identifying lessons learned – good at picking out different seagrass sites, will use those lessons learned moving forward

Blue crab project updates – Martin for George

- Field sampling done in November

- 375 juvenile BC from drop trap sampling – was most successful technique, but labor intensive
- Conducting basic exploratory analysis
- Recording associate fauna when sampling BC – sweep nets and beam trawls, less successful for BC, but more successful for nekton
- Have included unvegetated areas in sampling. There is a clear pattern, higher abundance of BC in vegetated areas
- Not catching high number of larger crabs, young of year coming in July-Aug
- Seen patterns in lab that match field. Using smaller tanks with fewer crabs per tank in lab, otherwise the juvenile crabs will start to chew on each other

Review survey results – Jessie (Exposure, Sensitivity, Adaptive capacity)

- Final score/EVI = (Ranking * certainty score)
- High final score = area to focus on; Low certainty = need more information

SAV Graphs

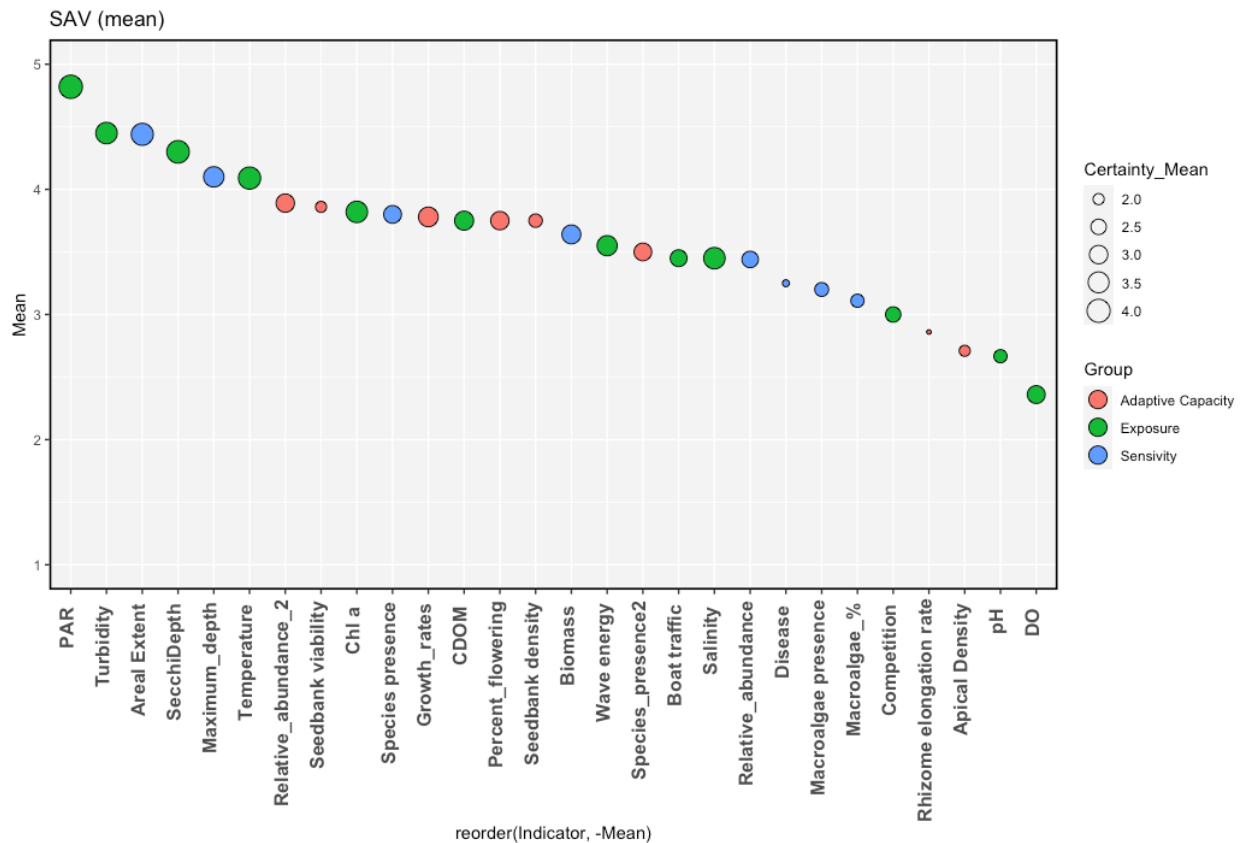


Figure 1. Mean ranking of potential seagrass EVI for NC meadows. The x-axis has indicators placed in order by mean rank from highest to lowest score (low score = less impact). Circles are color coded by EVI type (green = exposure, blue = sensitivity, pink = adaptive capacity). Circle width denotes the certainty in the variable rankings with larger circles reflecting greater certainty.

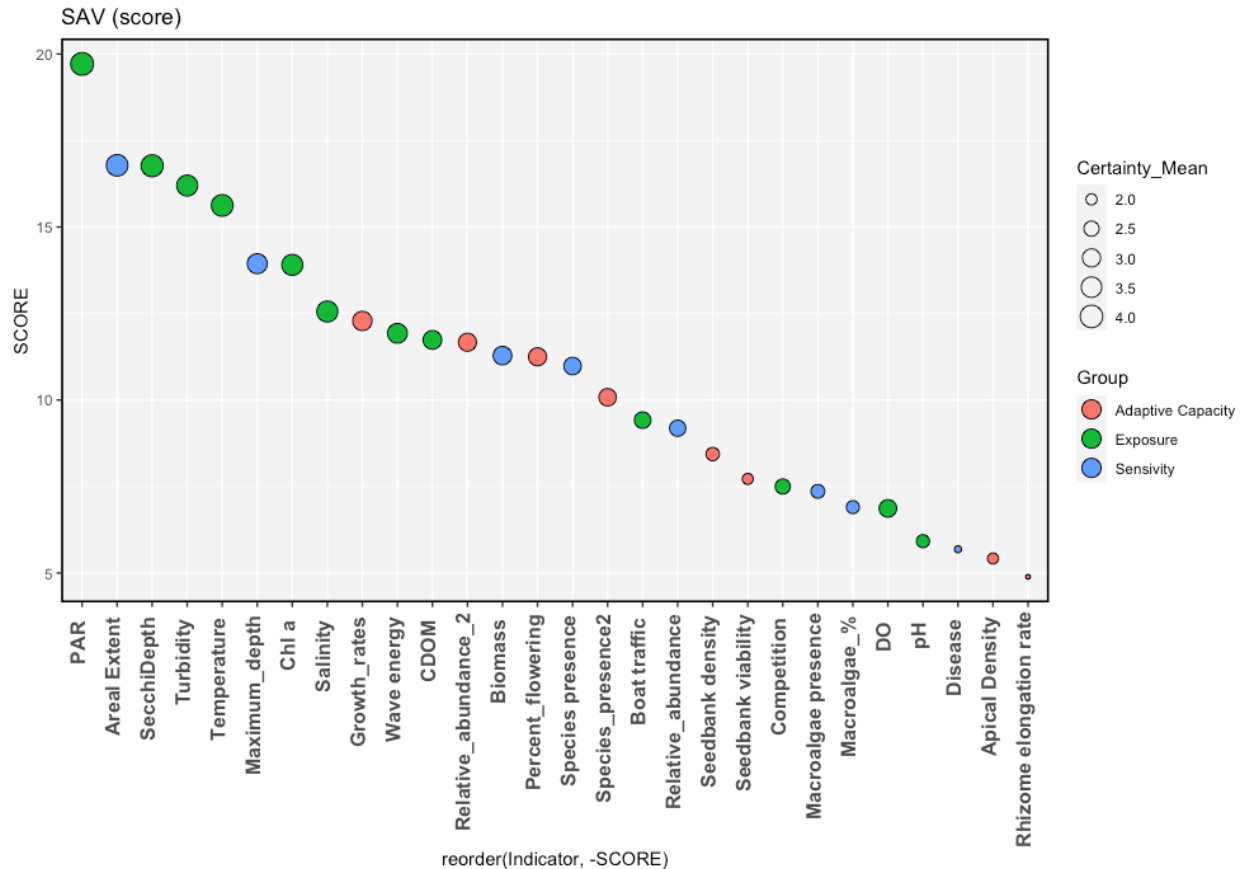


Figure 2. Mean final score (ranking x certainty) of potential seagrass EVI for NC meadows. The x-axis has indicators placed in order by mean rank from highest to lowest score (low score = less impact). Circles are color coded by EVI type (green = exposure, blue = sensitivity, pink = adaptive capacity). Circle width denotes the certainty in the variable rankings with larger circles reflecting greater certainty.

- Seedbank viability: high ranking but low certainty = area to focus on
- Water quality seems to be highest rank
- **Brandon:** show variability around the mean in the graphs
- **Scott:** 1) does this graph look different than they thought it would? 2) are points in the middle of the graph significantly different from each other? Need some stats done?
- **Martin:** PAR/Secchi/Turbidity/Temperature may be all covariants/seasonally
- **Anne:** Biomass varies seasonally within the year, so not as important as thought? Density matters for different fish. Seedbank viability different for different species
- **Brian:** Adaptive capacity group not ranked as high – lots of nuance in there
- **Jessie:** EVI's, the more you try to generalize the less effective they are
- **Trish:** Areal extent/maximum depth is a reflection of water clarity, so makes sense that these are grouped. Was getting confused on whether she was answering it correctly (5 and 1 confusion)

- **Gloria:** hard to figure out how to think about it and what the impact is. Surprised that boating wasn't ranked higher. Challenges when thinking about individual items.
- **Anne:** There are tiers. Areal extent is a reflection of a lot of things. Group by higher level tiers and then subcategories?
- **Trish:** Would cluster analysis tell us anything?
- **Scott:** Are there a lot of variables that are not routinely measured? How about the feasibility of doing something/collecting these data? High ranking, high certainty, but very difficult to collect data on?

Blue Crabs Graphs

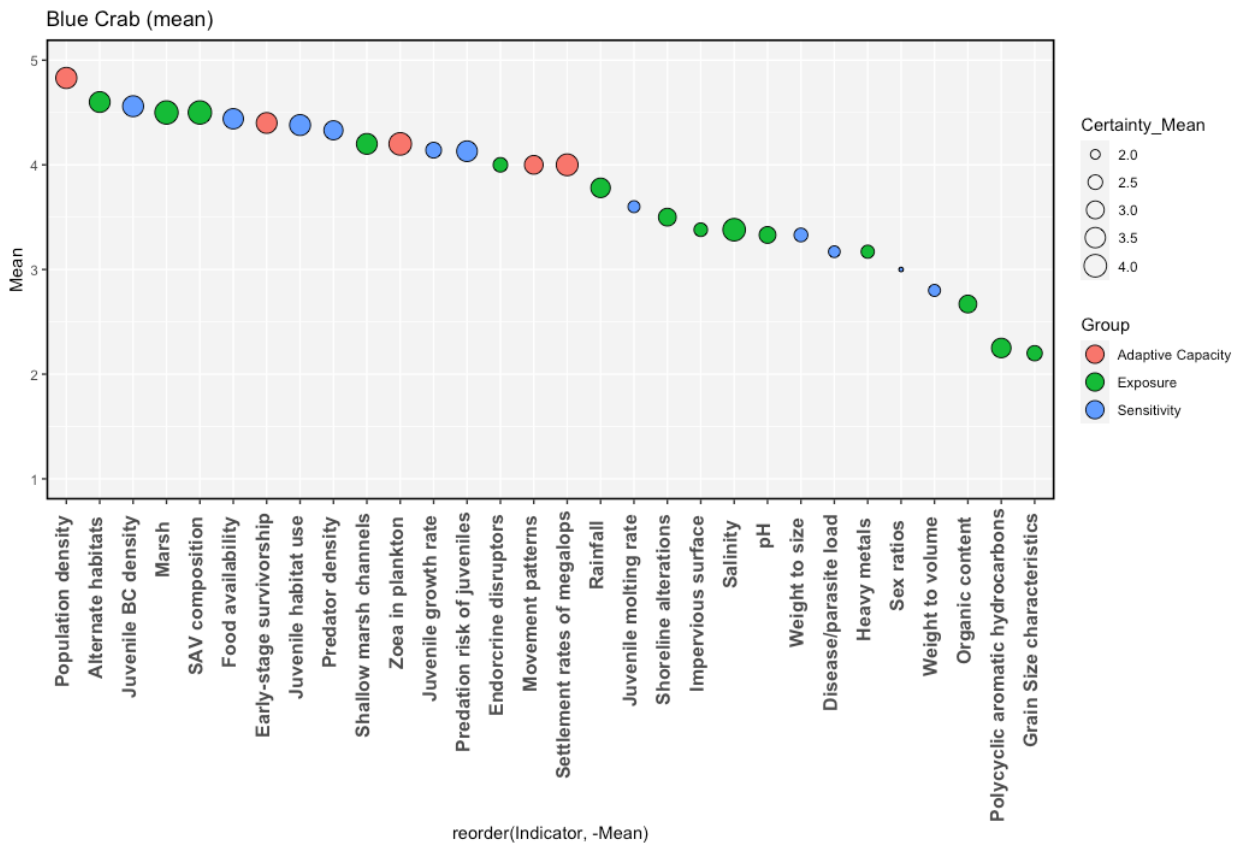


Figure 3. Mean ranking of potential juvenile blue crab EVI for NC meadows. The x-axis has indicators placed in order by mean rank from highest to lowest score (low score = less impact). Circles are color coded by EVI type (green = exposure, blue = sensitivity, pink = adaptive capacity). Circle width denotes the certainty in the variable rankings with larger circles reflecting greater certainty.

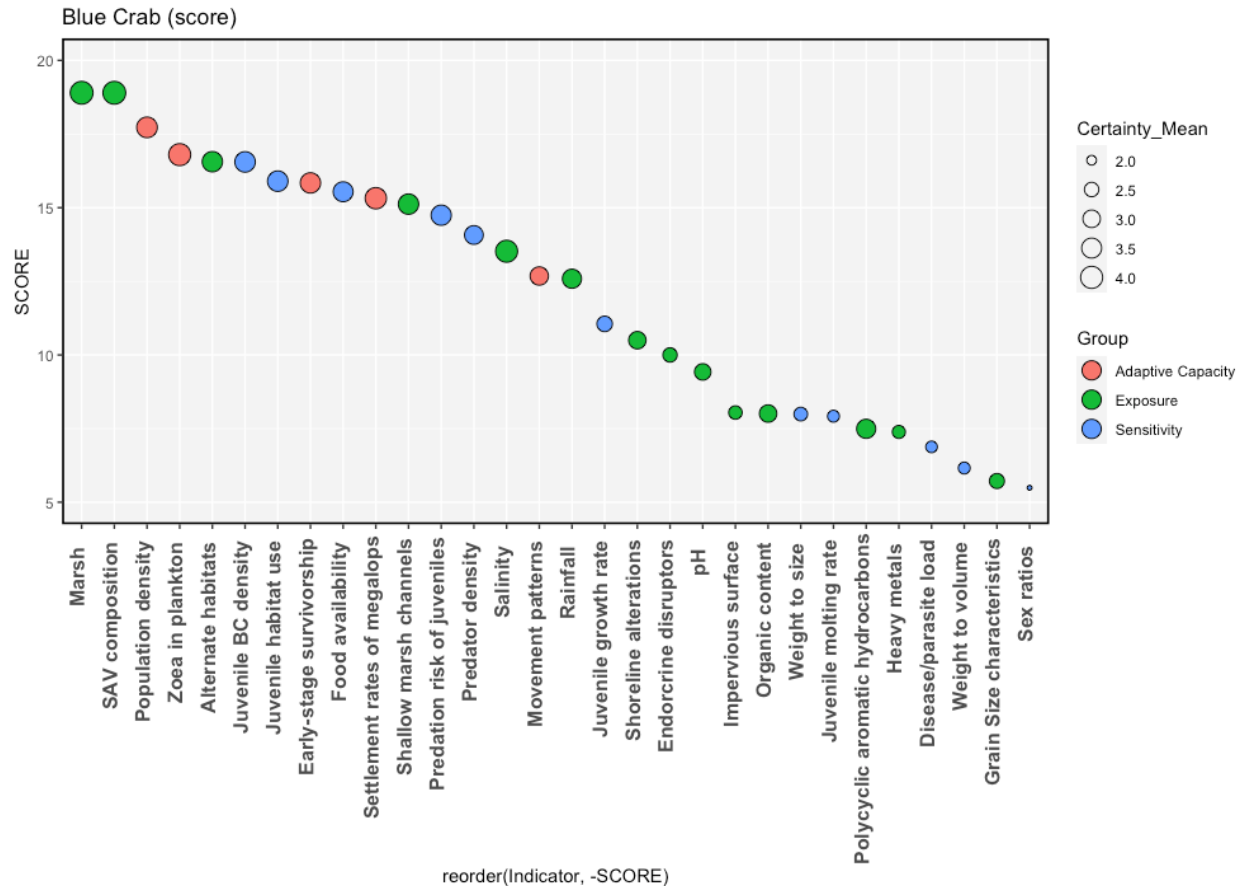


Figure 4. Mean final score (ranking x certainty) of potential juvenile blue crab EVI for NC meadows. The x-axis has indicators placed in order by mean rank from highest to lowest score (low score = less impact). Circles are color coded by EVI type (green = exposure, blue = sensitivity, pink = adaptive capacity). Circle width denotes the certainty in the variable rankings with larger circles reflecting greater certainty.

- **Martin:** Major groupings in terms of what's important: 1) Early-stage characteristics/juvenile BC survival/growth are clustered, 2) Habitat, 3) Bottom up/Top down factors
- **Brandon:** Salinities may depend on life stage, so may not be as important
- **Scott:** Found this exercise difficult as a non-expert generalist. Would be good to get crabbers or DMF advisors to do this.
- **Jessie:** Make it clearer and send out to a broader group, then compare to this initial survey. Difference in opinions across different stakeholders.
- **Anne:** Would have thought Impervious surface to be higher.
- **Brandon:** Collapse some of these into broader groups, unless you need the specificity
- **Martin:** Thoughts on the adults on the fisheries effect (adults can be a predator on juveniles). Brandon: thinks of it as positive feedback, more adults = larger spawning stock.
- **Jessie:** Regroup and simplify the topics based on the clusters/collinearity in this survey.

- **Gloria:** Imperviousness depends on where the impervious surface is located. Can we make it more clear on how to think about individual items?
- **Troy:** Nuanced factors (predator density/risk of predation). Two entirely different measurements. Do we need both of these? Which of the topics are redundant?

Next steps/action items: get variance around the mean, simplify the topics in the survey based on collinearity in this survey, send out new modified survey to broader audience. Add a component for feasibility for data collection?

- Next meeting in April. A workshop in the Fall to talk about the survey results
- Project ends at the end of the calendar year (not the grant). Four meetings a year, so 3 more with one being a workshop
- Group some categories together, send out to this group to see if this makes it easier to deal with