Continued Coordination of the Mid-Atlantic Coastal Acidification Network (MACAN) - Supplemental Information for 2022 - 2024

MACAN has established a work plan that supports the following goals:

- Answering fundamental questions about the intensity, frequency, and location of ocean and coastal acidification events.
- Understanding the causes of acidification events, whether from atmospheric sources of carbon, land-based pollution, or other drivers.
- Working to engage with managers, elected officials, industry representatives, and the public to understand and develop recommendations to reduce the anthropogenic sources of acidification.
- Serving as an information hub and exchange among research, industry, and resource managers focusing on waters and impacted species from south of Long Island to the southern waters off Virginia.
- Working with partners and regional entities to fulfill needs of the region where objectives align

The following activities will be accomplished through fiscal year 2024.

Activity 1: Host annual webinar series

- **Description:** Webinar topics will change annually based upon feedback gained through MACAN stakeholder needs, topics of interest on the Ocean Acidification Information Exchange, and insight from MACAN Steering Committee members and/or working groups.
- **Goal:** MACAN's annual webinar series will educate stakeholders, promote scientific research, and support information exchange among partners and stakeholders regarding ocean and coastal acidification in the Mid-Atlantic. MACAN will collaborate with other CANs, MARACOOS, and network members, as the opportunities arise, on webinars and other outreach opportunities.
- **Outcomes:** Increased awareness of acidification and related topics, improved knowledge of acidification activities in other regions, and inter-agency, cross-jurisdictional collaboration.
    - Host 3-5 webinars per year that consistently engage 40-120 stakeholders per webinar, depending on the topic, from sectors including but not limited to: state agencies, federal agencies, fisheries industry, and formal and informal educators.
    - Foster partnerships and collaboration with external partners including but not limited to other Coastal Acidification Networks (CANs), research institutions, and the OA Alliance on webinar planning and dissemination. (See also, Activity 4.)

Activity 2: Hold quarterly meetings with the Steering Committee to share funding opportunities and discuss areas for potential coordination/collaboration amongst MACAN members.

- **Description: MACAN** Steering Committee members include a diverse group of experts that set MACAN's priorities and provide direction on how to accomplish MACAN's goals and objectives.
- **Goal**: Provide a forum for experts from across the region and sectors to connect (who may otherwise not have a reason to collaborate) around the shared outcome of regional coordination of ocean and coastal acidification research, policy, and outreach.
- **Outcomes:**
    - Hold at least 4 Steering Committee meetings per year (quarterly), as well as convene Steering Committee members ad-hoc as opportunities arise.
    - Share updates on the Regional Ocean and Coastal Acidification Monitoring Inventory and other MACAN projects with Steering Committee members and receive guidance on data synthesis, spatial data products, and next steps.

Activity 3: Conduct a regional ocean and coastal acidification monitoring inventory to identify sensors currently in use and recommend strategic locations to leverage existing or add new infrastructure for ocean and coastal acidification measurements.

- **Description:** MACAN has identified a need for more coordinated coastal and ocean acidification monitoring in the Mid-Atlantic region. In 2019, a MACAN work group was established to develop considerations for ocean and coastal acidification monitoring in the Mid-Atlantic region - from estuary to open ocean - in order to improve understanding of the carbonate chemistry variability and change in the region. The work group developed a series of acidification monitoring maps showing the locations of past and present acidification monitoring in the Mid-Atlantic, and also published a peer-reviewed paper entitled, *"Scientific considerations for acidification monitoring in the U.S. Mid-Atlantic Region"* by Goldsmith et al. 2019. This paper articulated elements that individual monitoring efforts should consider in order to have consistent acidification data in the region.

  MACAN seeks to build upon the Goldsmith et al 2019 effort by conducting an inventory of monitoring assets that are currently deployed, observations that have been previously collected, and how the data are being used by the research community, stakeholders, and decisionmakers. MACAN envisions the monitoring assets inventory to be a resource to help inform sensor choice based on the measurements and environment they are best suited for, to help create consistency between methods to allow for data comparison, and to identify what, where, and how data is being distributed and used. The monitoring inventory will improve regional knowledge of assets and gaps and allow for better regional collaboration on research, policy, and educational efforts.
- **Goal**: The Mid-Atlantic Regional Coastal and Ocean Acidification Monitoring Inventory will identify locations of existing water quality and devoted acidification monitoring assets in the region, as well as information on existing QA/QC processes for each site and data management protocols. Additionally, it is MACAN's goal to update and revise this information periodically as monitoring sites change.
- **Outcomes**:
  - Identification of opportunities where existing water quality monitoring assets could be leveraged for assessing OA metrics.
  - Update the existing OA monitoring maps on the Data Portal (which currently show monitoring efforts as of 2017) and integrate real-time data into MARACOOS OceansMap as QA/QC and future funding and methodologies allow.
  - Gain stakeholder feedback on what new OA spatial data products could be pursued by MACAN given capacity and resources.

Activity 4: Coordinate with partners, including the NOAA Ocean Acidification Program, other CANs, states within the region, and the OA Alliance.

- **Description:** Coordination with other CANs occurs through the calls coordinated by NOAA OAP as well as independent outreach led by MACAN. MACAN also coordinates regularly with the OA Alliance, particularly because the majority of the Mid-Atlantic states have created or are pursuing OA Action Plans.
- **Goal:** Foster and build relationships with other CANs as well as other partners to coordinate, where appropriate, on issues that span regions, consider best practices for implementing work plans, discuss lessons learned, and synchronize language and promotional materials for educational purposes.
- **Outcomes**:
  - Engage at least one other CAN on organizing and delivering at least one webinar during the MACAN annual webinar series (see Activity 1).

Activity 5: Support the NOAA Coastal Community Vulnerability Assessment Effort

- **Description**: MACAN will continue to respond to requests for review from NOAA on the Mid-Atlantic chapter of the Coastal Community Vulnerability Assessment. Continuing to engage in this effort to help synchronize national efforts with local needs and help with messaging and outreach to stakeholders and local decision makers. Once the assessment report becomes public, MACAN will work with NOAA to appropriately disseminate the report.
- **Goal:** Facilitate review and dissemination by the MACAN Steering Committee, Science Work Group, and other partners of the Coastal Community Vulnerability Assessment's Mid-Atlantic chapter when requested by NOAA.
- **Outcomes:**
    - MACAN will generate a two page Executive Summary of the Mid-Atlantic chapter, which will be published on the MACAN website and through other partner channels.
    - The review will help ensure that the Assessment encompasses the Mid-Atlantic region's priorities related to Ocean and Coastal Acidification, and includes a comprehensive list of ongoing monitoring efforts in the region.

Activity 6: Develop outreach materials

- **Description:** MACAN's Outreach Work Group has developed an Outreach Work Plan that includes the following objectives: (1) Refine and disseminate the Mid-Atlantic Ocean and Coastal Acidification Toolbox for middle school to early college teachers and Informal Educators in the Mid-Atlantic that was created in 2021; (2) Continue to communicate advances in ocean and coastal acidification research and policy to the MACAN membership using a bi-monthly Constant Contact email "news and updates" and via its website (see also, Activity 7); (3) Enhance industry outreach and engagement around ocean and coastal acidification, including marine carbon dioxide removal (mCDR) topics; (4) Connect community scientists with opportunities for ocean and/or coastal acidification monitoring; (5) produce and disseminate several 2-4 minute videos on coastal and ocean acidification; and (6) MACAN will create social media pages on Facebook, Twitter, and Instagram.
- **Goal:** Educate a diverse range of stakeholders including managers, elected officials, industry representatives, students and their teachers, and the public about ocean and coastal acidification in the region, as well as how to get involved with monitoring and mitigating acidification.
- **Outcomes:**
    - Create a resource page on MACAN's website to provide a one-stop shop for educational resources and training opportunities.
    - Write an "Interview with an OA Scientist" feature for MACAN's website tailored to the Gr. 6-12 audience.
    - Incorporate additional outreach needs identified in NOAA's OA Education Implementation Plan and state OA Action plans into future MACAN outreach work plans.
    - Educational videos for high school and/or early college students and teachers, will enhance public awareness about basic concepts of coastal and ocean acidification, research and projects in the Mid-Atlantic region, and career opportunities in the field.
    - Maintaining a social media presence will enhance MACAN's ability to communicate basic science and outreach materials.

Activity 7: Revisit and enhance the MACAN website.

- **Description:** In order to efficiently act as the regional information hub for ocean acidification our website needs regular updating and attention to meet the changing needs in the region.

- **Goal:** Update the MACAN website to better reflect the information requested by stakeholders, including events (webinars, workshops), research and educational tools, impacts to cultural resources, and state OA action planning updates.
- **Outcomes:**
    - Capture website metrics with Google Analytics, including monthly data on number of visitors, pages most frequently visited to better inform the creation of content.
    - The website content will be updated with the most recent and relevant science, policy, and outreach information.
    - The website graphics will be refreshed and accessible captions will be added for seeing-impaired individuals, in alignment with Federal best-practices
    - New content will be added as it becomes available

Activity 8: Host In-person Workshop: Mid-Atlantic Ocean and Coastal Acidification State of the Science

- **Description:** A workshop will be developed to bring MACAN members together to share new research, identify opportunities for collaboration, build partnerships, and identify additional ways for MACAN to address key stakeholder concerns and needs regarding impacts to estuarine, coastal, and ocean species and ecosystems in the Mid-Atlantic. A workshop agenda and speaker list will be developed, and an appropriate venue secured for approximately 30 attendees in-person and 100 virtual participants.
- **Goal**: The goal of the workshop is to 1) gather information about monitoring gaps in support of the IWG-OA monitoring prioritization effort; 2) discuss next steps for supporting mCDR challenges; and 3) gain perspectives from around the region on how best to implement state OA action plans.
- **Outcomes:**
    - A list of priority monitoring sites that will be further assessed after the meeting to narrow down the top location(s) in each state (five locations)
    - A collective recommendation on how to advance the use of NBS based pH measurements in estuarine systems (statistical assessment of uncertainty compared to the instrument uncertainty) that were identified in the monitoring inventory (see activity 3).

Activity 9: Development of an OCA "hotspot" layer on the Portal

- **Description:** By identifying "hotspot" locations in the Mid-Atlantic that are at a high risk for, and vulnerable to, acidification events by integrating and analyzing regional carbonate chemistry data, including glider and ship data, this task will build a better understanding of where and how Mid-Atlantic nearshore ecosystems will be impacted by ocean acidification.
- **Goal:** The goal of this project is to identify locations at risk or vulnerable to acidification, which will help inform managers and decision makers who can take actions to mitigate or remediate.
- **Outcomes:**
    - A greater understanding of at-risk locations in coastal and ocean waters
    - A new spatial data product on the Portal with a link from the MACAN website
    - A new decision-making tool for the Mid-Atlantic

Activity 10: Development of workforce career mentorship program for students from underrepresented populations

- **Description:** MACAN will work with the Steering Committee and other research and outreach partners to develop a Fellowship program that will place students from underrepresented populations with a mentor. The program will be available to

undergraduate and graduate students, who will be chosen based on a competitive process determined and scoped by the MACAN Steering Committee.

- **Goal:** The Fellowship will increase diversity, equity, inclusion, and accessibility to underrepresented groups in acidification-oriented research and outreach careers.
- **Outcomes:**
    - Students will complete a capstone project with a deliverable final product that relates their interests and advances any of MACAN's work plan activities.
    - This pilot program will act as a future framework for other fellowship and mentor opportunities.