



Listserv User Survey

SURVEY GOALS

One of MACAN's primary goals is to create an active network of regional stakeholders to share information about the science, policy, and economic and ecological impacts of estuarine, coastal, and ocean acidification. By drawing on their collective expertise, network partners can work collaboratively to develop coordinated strategies and mechanisms to monitor, mitigate, and adapt to acidification. To date, MACAN has hosted two webinar series, produced interactive monitoring maps and a website, and created working groups to develop MACAN's website, define research priorities, and develop a plan for coordinated monitoring in the region.

As a relatively new organization, MACAN is seeking ways to increase member engagement in the network. A needs assessment survey was administered in October 2018 to help us evaluate the usefulness of the listserv in providing information about acidification, determine the value of our webinar series to listserv members, and identify opportunities MACAN can provide to engage network members throughout the Mid-Atlantic region.

SURVEY TECHNIQUE

The online survey (Appendix 1) was emailed out to MACAN's 216 members through MACAN's listserv. Two reminders were emailed following the initial survey announcement. Responses were collected via survey monkey over a one month period. Twenty-six members (12%) of the listserv responded.

SURVEY RESULTS

Why Are Members Interested in Ocean Acidification?

Understanding the reasons why MACAN's members are interested in acidification is key to engaging members in both dialogue and action. The first survey question asked listserv members to describe why they are interested in coastal and ocean acidification in the Mid-Atlantic region. Open-ended responses were categorized by keyword for analysis and visualized via a word cloud.

Why Are You Interested in Ocean Acidification?	Number of Respondents
Job-Related/Research Focus	8
Impacts to Natural Resources/Fisheries	8
Not Well Understood	4
Monitoring and Data Collection	3
Mitigation Planning	2
Seafood Impacts	2
Need for Public Education to Affect Policy Decisions	1
Care about Environment	1

The most frequent reason associated with a member’s interest is that they have a job or a research focus that requires them to keep informed and up-to-date about acidification (n=8). For example, one member replied that *“As a resource manager for the state’s shellfish program, I try to stay informed about emerging threats to shellfish habitat and resources.”*

Learning more about the impacts of acidification on coastal resources and fisheries was also a common theme in the open-ended responses (n=8). Respondents want to know more about the ecological impacts of acidification and how it could affect species distribution. Several respondents noted that acidification is not well understood in the region (n=4), but could potentially impact local economies and the seafood industry. Interest in public education, restoration planning, and data needs for decision-making were also mentioned in open-ended responses.



Selected quotes from survey respondents (See Appendix 2 for full list):

“We [the National Estuarine Research Reserves] currently operate long-term, high frequency monitoring at coastal estuaries and nearshore waters. It makes sense to tie these data into current and developing coastal acidification monitoring networks and studies.”

“I am working to elevate the use of natural features as a climate resiliency strategy and would like to incorporate oysters into future restoration projects, but I am concerned about how acidification will impact oyster survival or resiliency.”

“It is becoming an issue of increasing importance to local stakeholders, but one that we still know relatively little about.”

Listserv Demographics

MACAN has over 200 members subscribed to the listserv, but only a small percentage of its members are posting information to the listserv or are actively involved in our work groups. To create better opportunities for engagement, we wanted to learn more about the composition of our membership and their reasons for joining the listserv. When asked to select their affiliation, the majority of survey respondents were either government employees (42%) or affiliated with university or academic institutions (34%). Several non-profit organizations were also represented. Only one member from the aquaculture industry responded, but we plan to roll out specific industry stakeholder surveys soon to address this information need.

Q: What is Your Affiliation?

ANSWER CHOICES	RESPONSES	
Government Employee	42.31%	11
University or Academic Institution	34.62%	9
Non-Profit Organization	11.54%	3
Other (please specify)	7.69%	2
Aquaculture Industry	3.85%	1
Commercial Fisherman	0.00%	0
Seafood Industry (e.g. Retailer, Wholesaler, Processor, etc)	0.00%	0
Recreational Fishing Industry (e.g. Bait and Tackle Sales, Guide Service, Charter Boat Operator, etc)	0.00%	0
K-12 Educator	0.00%	0
Informal Educator	0.00%	0
TOTAL		26

Other responses included:

- National Estuarine Research Reserve (NERR)
- Marine Ecologist and Educator

When respondents were asked why they joined the listserv, the main reasons they selected from the list were: 1) to become more familiar with acidification, and 2) to network with others in the Mid-Atlantic region. Finding out about upcoming conferences or MACAN-sponsored events was a secondary reason for joining. Only about half of the respondents used the listserv to learn about acidification mitigation, adaptation, or upcoming funding opportunities. For those that selected other reasons for joining, their interest lies in forming new collaborations and learning more about stakeholder perspectives.

Q: Why Did You Join The MACAN Listserv? Check All That Apply

ANSWER CHOICES	RESPONSES	
To become more familiar with ocean acidification in the Mid-Atlantic Region	84.62%	22
To network with others interested in ocean acidification in the Mid-Atlantic Region	73.08%	19
To find out about upcoming conferences or events on ocean acidification	69.23%	18
To be kept informed about upcoming and past MACAN events	69.23%	18
To learn about ways to mitigate or adapt to ocean acidification in the Mid-Atlantic Region	50.00%	13
To find out about funding opportunities for ocean acidification research or outreach	50.00%	13
Other (please specify)	7.69%	2
Total Respondents: 26		

Listserv: A Valuable Networking Tool for MACAN?

Listsers can be a useful tool for networking, particularly in a community where members are spread out geographically or when the stakeholders are a diverse group of individuals. In order to evaluate whether MACAN's listserv was functioning in this role, we first asked respondents how well the listserv content corresponded with member goals for joining the Network. Of the 26 respondents, 70% (14/20) agreed that the listserv content met their goals for joining the Network. Those that disagreed provided several reasons, most notably, that they weren't receiving enough emails from the listserv to help them become more informed about acidification or network with other members. They felt the listserv was primarily a source of information for webinar announcements and job postings.

When survey respondents were asked to rate how useful the listserv platform was for sharing information with other network members, 65% said it was somewhat useful and 30% said it was very useful for networking purposes. However, a few felt the listserv platform was not the right tool for networking,

"I don't use the listserv for interacting with other members. I see it as a one-way, intermittent communication device – I get some announcements from it, and occasionally I'll help send out an announcement".

Respondents suggested several ways to improve interaction between Network members, including linking to the Ocean Acidification Information Exchange, organizing meet-ups at meetings, or creating a Facebook page.

Webinars: A Successful Tool for Communication?

MACAN has offered two webinar series for Network members and other interested parties, with topics ranging from research priorities and monitoring plan development to citizen science and industry impacts. Some of the webinars have been well-received, generating thoughtful discussion, while others have been lightly attended.

To determine the value of webinars to network members, MACAN first asked members which webinars they had attended and how they used the information that was presented. Among survey respondents, webinar attendance was very high. Seventy-seven percent had attended a webinar (n=18) over the past two years. On average, respondents attended 4 of the 10 webinars MACAN offered. The most popular webinar topic among survey respondents was *Monitoring Effects in Estuaries and the Coastal Shelf in the Mid-Atlantic*, with 72% of respondents attending. Webinars on industry impacts and natural resources were moderately attended by survey respondents.

Q. Which Webinars Have You Attended?

ANSWER CHOICES	RESPONSES	
Monitoring Effects in Estuaries and the Coastal Shelf in the Mid-Atlantic	72.22%	13
Modeling Changes in the Chesapeake Bay	50.00%	9
Developing Research Priorities in the Mid-Atlantic	50.00%	9
Perspectives from the Commercial Shellfish Industry	44.44%	8
Impacts to Ecology in the Mid-Atlantic	38.89%	7
MACAN Citizen Science Webinar	38.89%	7
MACAN Monitoring Plan	38.89%	7
Perspectives from Natural Resource Management	33.33%	6
EBM Tools Webinar: Managing Global Acidification on a Regional Scale	27.78%	5
How Tuesday: Coastal Ocean and Acidification Maps	22.22%	4
Total Respondents: 18		

In open-ended responses, members described how they used the information presented in the webinars they attended. One respondent said the webinars helped give context for communication of their science. Several discussed how the webinars informed their research ideas and helped them connect with presenters, i.e. industry, for follow-up. The most direct impact came from the National Estuarine Research Reserve (NERR) monitoring program, where they have “continued to communicate with participants, discussed plans to expand the current NERR monitoring program, and initiated monitoring in new locales.” The networking value of webinars expressed in these open-ended responses also correlates with previous survey

question results, where respondents stated that most of their networking happens through the webinars, rather than the listserv platform.

Improving Member Participation in Webinars

Acknowledging the value of webinars for networking on acidification-related issues, it's also important to identify ways to encourage participation among those who have not yet attended a webinar. We asked a series of questions about how respondents find out about webinars, what factors might prevent members from participating in the webinars, whether topics were relevant to their interests, and what topics might be more engaging in future webinar series.

The listserv is the primary source of information about upcoming webinars. Over 60% (11/18) of survey respondents learned about webinars via listserv announcements. Respondents also heard about webinars through participation in the white paper leading to the webinar, word of mouth, other webinars they attended, MACAN's website, or MARCO's calendar, but generally, these modes of communication were much less effective at alerting members to upcoming webinars.

For the 23% of respondents who had not yet attended a webinar, the primary reason was time constraints. Forty-two percent of respondents replied that the scheduled time for webinars (1-2pm) is not convenient. However, more than 50% of respondents indicated they watched recordings of the webinars at a later date if they were unable to attend at the given time.

Timing of webinar announcements and general lack of interest also factor into participation rates. One respondent said they did not hear about the webinars in time, another replied that they had only received emails about a few of the webinars. Several respondents suggested that the webinar topics were not of interest. However, technical issues with registration or discomfort with the webinar technology did not appear to be a barrier to listserv member participation in the webinars. Very few problems were reported with the webinar technology platform.

Barriers to Webinar Participation
Inconvenient Time of Day (7/12)
Not Enough Notice/Reminders (3/12)
Lack of Interest in Topic (2/12)

When asked what would make members more likely to participate in a webinar in the future, more than 50% of respondents said scheduling at a more convenient time (7/12) would help increase their participation. One respondent recommended staggering the times webinars are offered to create some flexibility around standing meeting obligations. Several also suggested sending a reminder the day before the webinar.

One respondent also recommended recording the webinar so they could watch at a later time. MACAN already provides this service via the website, but may need to communicate this more clearly to listserv members. Emailing an announcement to the listserv after the webinar has been posted on MACAN's website could improve member awareness about webinars.

In particular, one respondent requested more information on the water perspectives and stakeholder concerns.

“Science and chemistry is almost always going to be presented in these, and that’s fine, but I’m more interested in what the user groups (industry, managers, oyster restoration groups, etc.) make of the results. Getting their reaction would be very interesting.”

Listserv member suggestions for future webinar topics include:

- Blue Carbon/Blue Budget
- Decision Support Tools
- Biological and/or Ecological Impacts of Acidification
- Effects on Physiology, or Shell Development, or Behavior
- How do oyster restoration groups view acidification?
- How do stormwater managers consider estuarine water quality in their work (if at all) when making inherently terrestrially-focused decisions?
- Within the monitoring, the biological (experimental effects) and the modeling communities (as separate webinars per community), reports on methods, equipment, approaches, evaluations (strengths and weaknesses), etc. These would likely be multiple, short presentations for multiple members and more discussion-based.

Several survey respondents indicated they’d be willing to present a webinar on their research activities, programs, technologies, or industry needs related to coastal and ocean acidification.

Work Groups: Need for More?

Work groups provide an opportunity for MACAN’s members to evaluate regional information and monitoring needs and develop guidance or strategies to address them. White papers on regional research priorities and monitoring plans already have been developed through these voluntary collaborations. MACAN wanted to find out if there was any interest in forming an Outreach Work Group or other topical work groups to address acidification information needs.

Survey respondents were very responsive to an Outreach Work Group forming; 68% (15 of 24) had a strong interest in joining this Work Group. Several suggestions for new Work Groups were also given by survey respondents:

- Policy (2/24)
- Citizen Science (1/24)
- Linking CAN’s (1/24)
- Instrumentation (1/24)
- Modeling (1/24)
- Finfish (1/24)
- Research Implementation (1/24)
- Monitoring Implementation (1/24)

Other Events or Activities of Interest to Members

Respondents suggested several Events or Activities MACAN could consider sponsoring that would be of value to their business, research interests, or management needs:

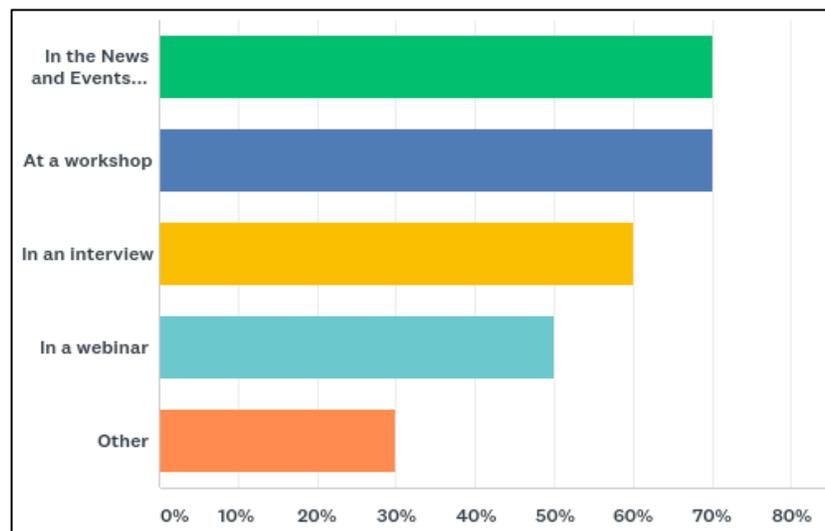
- Have a MACAN presence at NOAA open house/NJ Sea Grant ‘Ocean Fun Day’ at Sandy Hook (May 19, 2019, always the Sunday before memorial day)
- Participation at boat shows to get the word out to the sailing community. They are more environmentally conscious than other {boaters}
- Workshop to determine stakeholder decision points or decisions that acidification data could inform (if that data existed) *Note: This workshop is currently under development by MACAN for May 2019.*
- Workshops
- A small research symposium
- Providing updates on the whole Network's work at various stakeholder group meetings, e.g. a 1-1.5 hour panel presentation/discussion at a fishermen's meeting, or water quality conference, or estuary science symposium

Best Communication Methods for Sharing Information about Acidification Research or Impacts to Industry

Research conducted by MACAN’s members has primarily been shared through webinars, on MACAN’s website, and in listserv announcements. To determine if these were the best methods for communicating about research, we asked listserv members who were interested in presenting research results or the impacts of acidification on their business operations which communication methods they preferred to use. Out of ten responses to this question, the news and events section on

MACAN’s website and workshops were the most favorable choices. Interviews were also of interest. Only about half of the respondents chose webinars, likely due to the fact that several survey respondents had already presented their research in MACAN’s webinar series. Several respondents selected “other” methods for sharing research results, but did not provide specific suggestions for what those methods should include.

Q: If you are interested in sharing information about your research or the impacts of acidification on your business, how would you like to share this information?



KEY SURVEY MESSAGES

Survey respondents are actively engaged in MACAN, but are not reflective of the entire listserv membership. Primarily university or academic affiliates and government employees; few industry stakeholders.

Listserv members joined initially to become more familiar with ocean acidification and for networking opportunities, but several expressed listserv may not be the best tool for this.

Webinars are successful at engaging listserv members and are a more effective networking tool than the listserv platform. Barriers to participation include scheduled time, lack of interest in topic, and need for more reminders via the listserv.

RECOMMENDATIONS

- Upcoming Industry Stakeholder Surveys will complement Listserv Member Survey

- Explore ways to engage with the Ocean Acidification Information Exchange; post OAIE Mid-Atlantic Team link on MACAN's website
- Steering Committee members could arrange informal meetups at scientific meetings, conferences, workshops; consider coordinating with other CAN's
- Continue to share research updates via News and Events section on website
- Explore opportunities for interviews or "Ask a Scientist" videos with researchers and industry stakeholders
- Consider posting a list of member contact information (with their permission) on MACAN's website

- Try staggering webinar times starting with March and April 2019 webinars
- Increase frequency of pre- and post- webinar reminders; include information about when webinar recordings will be available on MACAN website (with link included) for members who can't attend
- Identify industry listservs to distribute webinar announcements more widely
- Periodically ask members for topic ideas
- Consider coordinating webinars with NECAN and SOCAN

Work Groups are an excellent engagement tool. Members have a strong interest in participating in Work Groups.

- Continue to discuss Steering Committee interest in forming Work Groups suggested by members; important to focus on running a few well
- Continue to discuss Work Group leadership and membership. If Work Group is led by a Network member, a Steering Committee member should serve in an advisory/oversight role.
- If Outreach Working Group forms, identify target audience, what type of outreach MACAN is best suited for, and who makes these decisions

Members expressed a desire for MACAN to organize workshops, research symposia, and/or outreach at community events.

- Plans are underway for potential May 2019 workshop
- Review member suggestions
- Identify potential sources of funding
- Identify opportunities for collaboration

Appendix 1

MACAN Listserv User Survey

One of the goals of the Mid-Atlantic Coastal Acidification Network (MACAN) is to create an active network of regional stakeholders to share information about the science, policy, and economic and ecological impacts of coastal and ocean acidification. Drawing on their collective expertise, network partners can work collaboratively to develop coordinated strategies and mechanisms to monitor, mitigate, and adapt to acidification. To date, MACAN has hosted several webinars, produced interactive monitoring maps and a website, and created working groups to define research priorities and develop a plan for coordinated monitoring in the region. Please take this short survey to help MACAN identify additional ways we can increase member participation in the network. The survey should take no more than 10 minutes to complete.

1. Why are you interested in ocean and coastal acidification in the Mid-Atlantic Region?
2. What is your affiliation? (Order will be randomized in survey monkey)
 - Aquaculture Industry
 - University or Academic Institution
 - Commercial Fisherman
 - Government Employee
 - Seafood Industry (e.g. Retail/wholesale, finfish/shellfish, etc)
 - Recreational Fishing Industry (e.g. Charter Boat Captain, Bait Sales, Guide services, etc)
 - K-12 Educator
 - Informal Educator
 - Non-Profit Organization
 - Other (write-in)

MACAN offers a variety of opportunities for our members to participate in the network, including the listserv, webinars, and working groups. Please answer the following questions related to your participation in these opportunities.

LISTSERV

3. Why did you join the MACAN listserv? (Check all that apply)
 - To become more familiar with ocean acidification in the Mid-Atlantic region
 - To network with others interested in ocean acidification in the Mid-Atlantic Region
 - To learn about ways to mitigate or adapt to ocean acidification in the Mid-Atlantic Region
 - To find out about upcoming conferences or events on Ocean Acidification
 - To find out about funding opportunities for ocean acidification research or outreach

- To be kept informed about upcoming and past MACAN events
 - Other (write-in)
4. Has the content posted on the listserv met your goals for joining? Please explain briefly.
 5. How useful is the listserv platform for sharing information with other members in the network?
 - Not At All
 - A little Useful
 - Somewhat Useful
 - Very Useful
 - Extremely Useful
 6. Do you have suggestions about other platforms MACAN could use to improve interaction between network members?

WEBINARS

7. Have you attended any of MACAN's webinars?
8. If yes, which webinars did you participate in?
 - Monitoring Effects in Estuaries and the Coastal Shelf in the Mid-Atlantic
 - Impacts to Ecology in the Mid-Atlantic
 - Perspectives from the Commercial Shellfish Industry
 - Perspectives from Natural Resource Management
 - How Tuesday: Coastal Ocean and Acidification Maps
 - MACAN Citizen Science Webinar
 - Modeling Changes in the Chesapeake Bay
 - MACAN Research Priorities Development
 - MACAN Monitoring Plan Development
9. How did you hear about the webinars you attended?
 - MACAN listserv
 - MACAN website
 - MARCO calendar
 - Word of Mouth
 - Other (write-in)
10. Did you experience any technological difficulties during the webinars you attended?
11. How have you used the information you learned in the webinars you attended?

12. If you have not yet participated in a MACAN webinar, what is the primary reason?
- Not aware of webinars
 - Topic Not of Interest
 - Scheduled Time (1-2 pm) is not Convenient
 - I had difficulty registering for the webinar
 - I'm not comfortable using the webinar platform
 - Other (write-in)
13. If you were unable to attend a webinar that interested you, did you access it at another time on the MACAN website? Yes/No
14. What would make you more likely to attend a webinar in the future?
15. Are there additional topics related to coastal and ocean acidification that you would like to see presented in a webinar?
16. Would you be interested in presenting a webinar on your research activities, programs, technologies, or industry needs related to coastal and ocean acidification? If yes, please provide your contact information and we will follow up shortly!

WORKING GROUPS

17. Which of the following work groups are you currently involved in?
- Website Work Group
 - Monitoring Work Group
 - Research Priorities Work Group
 - Not involved in a work group at this time
18. Are there additional work groups you'd like to see established to further the goals of MACAN?
19. Are you interested in joining the work group you suggested? If yes, please provide your email address so we can follow up with you directly.
20. MACAN may soon be forming an Outreach Work Group. If this work group were to form, are you interested in participating?

ADDITIONAL OPPORTUNITIES TO PARTICIPATE

In the last series of questions, please share your thoughts about additional ways MACAN can facilitate interaction between its members.

21. Are there any events or activities MACAN could sponsor that would be of value to your business, research interests, or management needs?
22. Would you be interested in sharing information about your research or the impacts of ocean acidification on your business or operations with MACAN's members?
If yes, how would you like to share this information? Check all that apply.
- In the News and Events section on the MACAN website
 - In an interview
 - In a webinar
 - At a workshop
 - Other (write-in)

Appendix 2

Q: Why are you interested in coastal and ocean acidification?

As a resource manager for the state's shellfish program, I try to stay informed about emerging threats to shellfish habitat and resources.

We (the National Estuarine Research Reserves) currently operate long-term, high frequency monitoring at coastal estuaries and nearshore waters. It makes sense to tie these data into current and developing coastal acidification monitoring networks and studies.

Highly productive and economically important region for which little prior monitoring and biological assessments of CO2 effects have been conducted

I am an oyster farmer.

To understand what is known and where the gaps and information needs are of stakeholders in the region. I would love to know how and where OA data can better inform decisions in the region.

It is becoming an issue of increasing importance to local stakeholders, but one that we still know relatively little about.

I see acidification as a threat to 1) preserving and returning much of the region's estuarine habitats and ecosystems to a pre-industrial state, and 2) the economically and culturally important seafood industry.

I am working to elevate the use of natural features as a climate resiliency strategy and would like to incorporate oysters into future restoration projects, but I am concerned about how acidification will impact oyster survival or resiliency.

Concerns about natural resources that may be affected by OA such as fisheries species and invertebrates

Impacts to communities, seafood, and the greater economy

To understand shifting ocean species and threats to the fisheries of the Mid-Atlantic

Concern about stresses in the estuarine and coastal environment and their effects on organisms

Because of the potential impact on coastal resources

I am interested in understanding how species will cope with this added environmental stressor and how this will alter their distributions in coastal regions.

It is relatively understudied compared to other regions and due to the dependence of local communities on the coastal ocean/estuary, its effects could be particularly impactful.

I care about the general health and well-being of the environment.

It is important to understand where vulnerabilities lie within the region and strategies to prevent or reduce potential impacts.

Because I am studying acidification effects on fishes from around Long Island.

I'm a coastal wetland scientist.

Ocean Acidification is not receiving the global attention that it should. Public education is of utmost importance in order to bring to bear the political pressure necessary for change to occur.

I run a program focused on OA!

Impacts of climate change on seagrass ecosystems is my primary research interest

I have both a professional and an academic interest in ocean acidification.

My PhD dissertation

Research Opportunities, ecologic impacts, coastal resources impacts, monitoring potential, mitigation options