



# The National Marine Educators Association (NMEA) 2018 Membership Profile

RESEARCH AND  
EVALUATION

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## ABSTRACT

In 2018 a questionnaire was administered to the National Marine Educators Association (NMEA) membership to better understand the composition of its members. The purpose of this survey was to both assist NMEA leadership in engaging in data-driven decision-making when creating programs and serve as a foundation upon which to base and reflect on diversity initiatives. A 2002 membership survey allowed us to gauge changes in some demographic metrics over time. The 2018 survey had a response rate of 61% ( $N = 385$ ). Members predominantly identified as white (82%) and female (70%). They were highly educated (70% held a masters' or doctorate degree) and coastally based (67% lived within 25 miles of the ocean). Since 2002 there has been an increase in the percentage of members identifying as female (60 to 70%) and those indicating they were older than 61 (~10 to 25%). Over this same period members identifying as white decreased (97 to 82%) and the percentage of formal educators in the organization decreased (46 to 33%). Results from the 2018 survey provided additional insight into members' educational training, geographic distribution, organization engagement, and familiarity with the Ocean Literacy Principles. These results can contribute to improved NMEA programming and serve as a benchmark upon which to reflect on changes to the organization's composition over time. We think findings will help all marine educators, regardless of NMEA membership, situate their work in the broader marine education community and may inform other non-profit volunteer organizations how to conduct surveys to better understand their own membership.

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The value of the National Marine Educators Association (NMEA) lies with the work, passion, and influence of its members. The dedication of the membership to “making known the world of water” by advancing the understanding and protection of marine and freshwater ecosystems is demonstrated by the organizations’ focal areas of advancing ocean literacy, cultivating international relationships, engaging student leaders, actively involving diverse and underrepresented communities, promoting understanding of and respect for traditional knowledge, and driving organizational excellence and sustainability. These focal areas are drawn from the organization’s 2019–2021 strategic plan (Henry, 2019) and are detailed online (NMEA).

NMEA was incorporated in 1985. As the organization approaches its 40-year anniversary it is imperative to reflect on the make-up of NMEA so the organization can “proactively strategize for the future” (Henry, 2019: 1). A membership survey is one tool NMEA can use to gauge progress, particularly regarding some of its key focal areas. For example, the key focal area of “actively involving diverse and underrepresented communities” calls for NMEA to broaden participation and diversify both its membership and leadership to become a “more just, equitable, inclusive organization with a membership and board that reflects the demographics of the communities of the United States, and in particular the audiences marine educators serve or strive to serve” (NMEA). NMEA defines diversity as including but not limited to race, ethnicity, gender identity, and socioeconomic background. Collecting information on these diversity characteristics within current NMEA membership allows the organization to monitor demographic changes over time to make improvements to activities and reflect on what constitutes success.

The NMEA membership was last systematically surveyed in 2002. This study is the result of a call by NMEA leadership in 2018 for a membership survey to understand the composition of the organization, the results of which would inform programming by leadership, guide strategic planning, and allow the organization to reflect on member recruitment. We developed and administered a questionnaire to NMEA members to 1) describe the membership composition so the organization could better serve the needs of its community, 2) track the effectiveness of any membership initiatives designed to enhance diversity, and 3) compare membership descriptions between 2002 and 2018 to see how the community had changed over time.

## METHODS

### 2018 MEMBERSHIP SURVEY

Survey questions were developed by the authors and the NMEA leadership team. The questionnaire was pilot tested in summer 2018 and revisions were made based on feedback. The final survey consisted of 22 multiple-choice and open-ended questions (see Supplemental File 1: NMEA Membership Survey). The survey was administered using the online survey platform SurveyMonkey. In October 2018, all NMEA members ( $N = 695$ ) were sent an email with a link to the questionnaire inviting them to (voluntarily) participate. Subsequent reminder emails were sent approximately bi-weekly to those who had not responded. The survey was open for seven weeks from late October to early December 2018. The survey was intended for NMEA members 18 and older; youth members were instructed to not participate. There were at least 61 youth members based on attendance at the 2018 NMEA youth conference. In addition, six email addresses bounced. Thus, we estimate that there were approximately 628 potential adult respondents. The survey had 385 respondents, a response rate of 61%. This is above the average online survey response rate (44%) in education-related fields (Wu, Zhao & Fils-Aime 2022). Anonymized responses were provided to the first author by staff at the NMEA National Office. Quantitative responses were analyzed using descriptive statistics and Pearson correlations. Qualitative responses were coded and quantified by categories. The results of 14 of the questions are detailed below. Items not included were developed for sponsorship purposes (e.g., source of funding for NMEA membership). Survey data used in this manuscript are in ScholarSpace, the open-access digital repository at the University of Hawai‘i at Mānoa ([scholarspace.manoa.hawaii.edu/home](https://scholarspace.manoa.hawaii.edu/home)). This study was considered exempt by the University of Hawai‘i’s Institutional Review Board.

## 2002 COMPARISON SURVEY

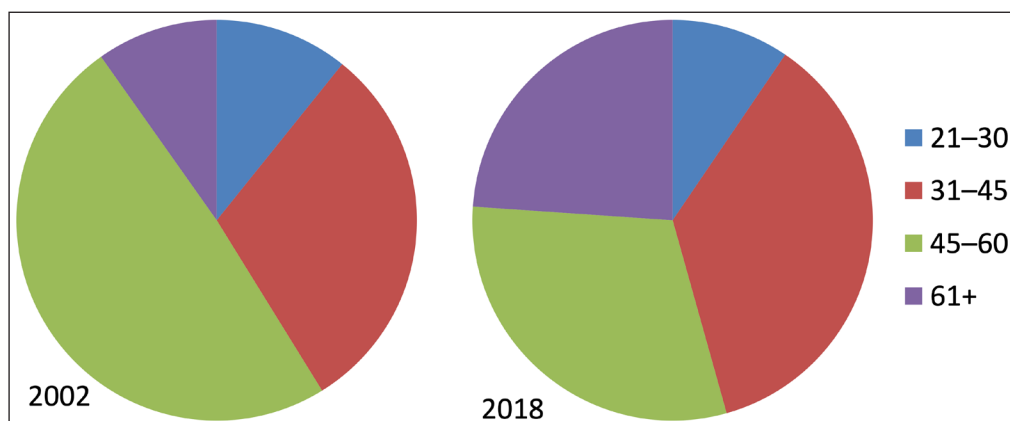
Baseline NMEA membership profile data was collected in December 2002 at the request of the Research, Education, and Marine Operations (REMO) Working Group of the United States Commission on Ocean Policy (Walker, Walters & Allen 2003). The paper-based survey was sent to 1,182 NMEA members, 516 members responded (response rate of 44%). Conducting a membership survey almost 20 years later allowed us to make comparisons in areas covered by similar questions on each questionnaire—for example on gender identity and primary profession. Unfortunately, we could not recover the raw data from the 2002 survey and many of the results were only reported graphically (e.g., in bar charts without raw numbers). In cases where the raw numbers were not identified we estimated them from the graphs, thus the 2002 data is less accurate.

## RESULTS

### GENDER, AGE, AND ETHNIC/RACIAL DIVERSITY

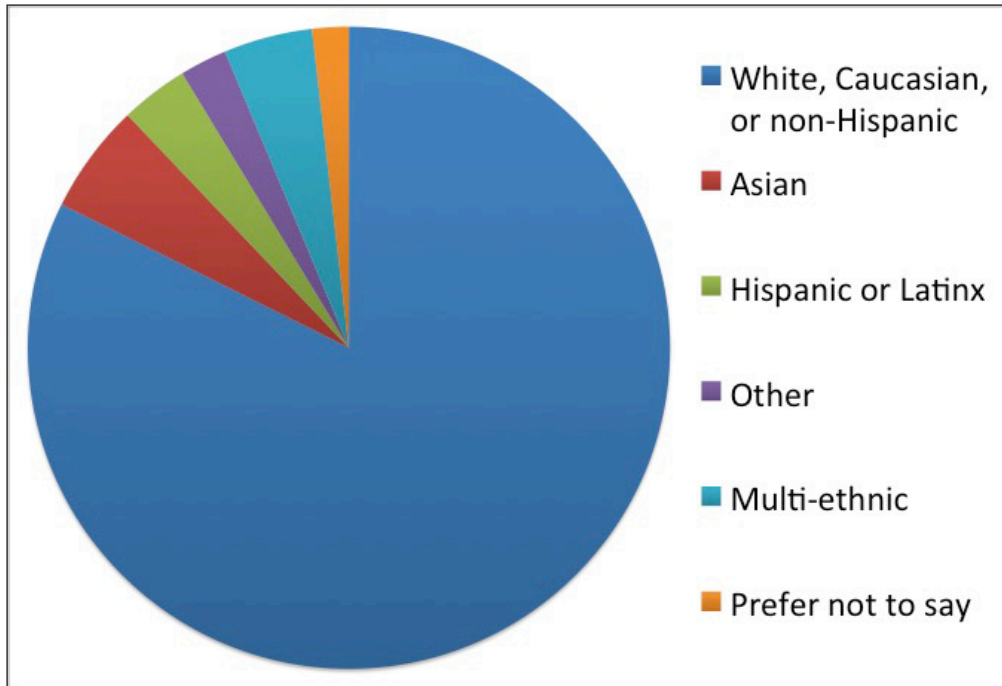
Of 380 respondents in 2018, 70% ( $N = 265$ ) identified as female and 30% ( $N = 114$ ) identified as male. One respondent preferred not to say. The percentage of females in the organization increased 16.7% since 2002, when 60% of respondents identified as female and 40% identified as male.

Respondents were provided age categories to select from (18–20, 21–30, 31–40, 41–50, 51–64, over 65). Over 70% of the 2018 respondents ( $N = 380$ ) indicated they were between 31 and 64 years old, with a fairly even distribution of members in their 30s, 40s, and 50s/early 60s. We adjusted 2018 age categories to correspond to 2002 categories to allow for comparisons (Figure 1). The bin “22–30” in 2002 was assumed to be approximate to the bin “21–30” in 2018. The bin “41–50” in 2018 was divided by two, half of these were assumed to be 41–45. When added to the “31–40” category in 2018 this was equated to the “31–45” category of 2002. The “51–64” 2018 category was divided into three. Two-thirds were added to the remainder of the “41–50” 2018 category (previously halved) to create the “46–60” category from 2002. The final third was added to the “over 65” category to create the “61 +” category of 2002. While this manipulation results in only very rough approximations, we can see the number of members over 61 has increased from approximately 10% in 2002 to almost 25% in 2018. There has been a corresponding decrease in the percent of members in their 30s and 40s since 2002; the percentage of members in their 20s has remained stable.



**Figure 1** Age group ranges of NMEA membership in 2002 and 2018. For consistency with the 2002 data, the 2018 chart does not include the seven members 18–20 and the five members who preferred not to choose an age category. The 2018 categories were adjusted to correspond to 2002 categories and are thus approximations.

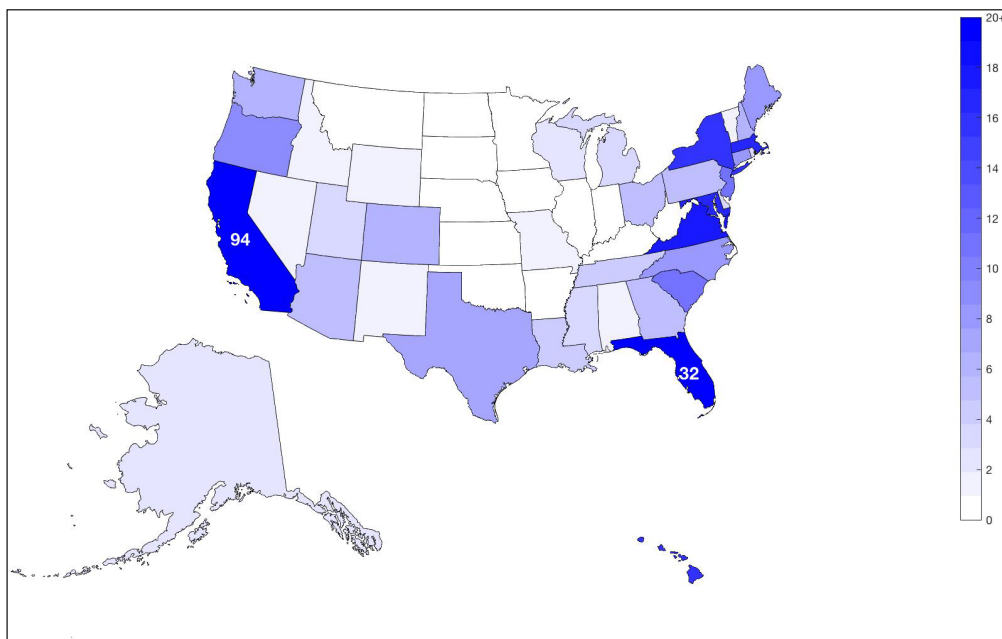
In 2018, respondents ( $N = 380$ ) could select one or more of seven ethnic/racial categories—in addition to self-describing or preferring not to say. The majority of members (82%,  $N = 313$ ) identified as white, Caucasian, or non-Hispanic (Figure 2). Those identifying as Asian made up the second largest category at 6% ( $N = 21$ ). The other categories each made up 5% or less of the membership, including 17 people (5%) who choose more than one category or self-described themselves as multi-ethnic. In 2002, a greater percentage of the membership (97%) identified as Caucasian.



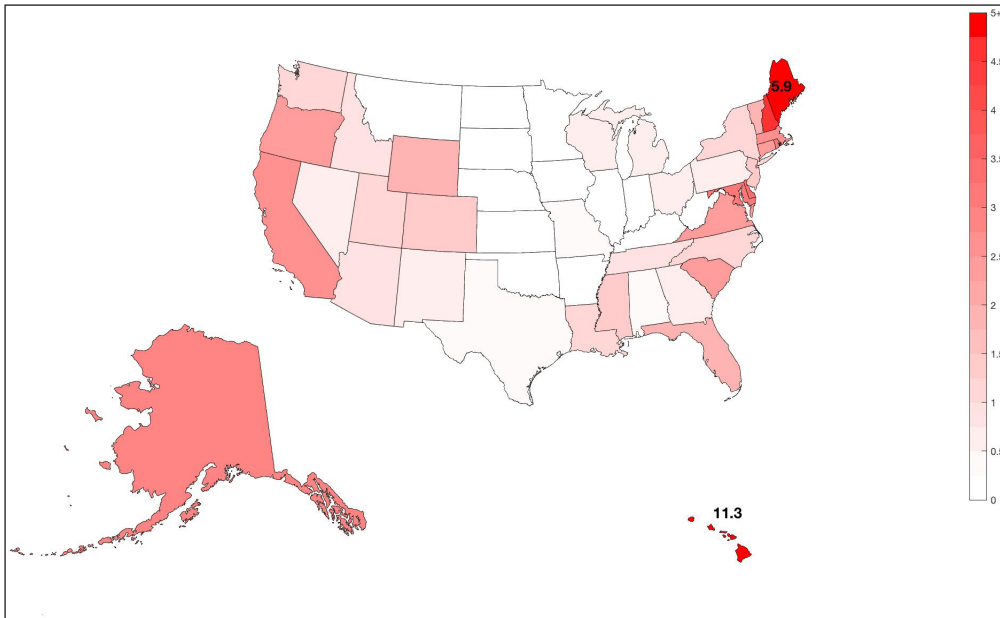
**Figure 2** Ethnic/racial categories of NMEA membership in 2018.

### GEOGRAPHIC DIVERSITY

In 2018, 94% ( $N = 380$ ) of NMEA members lived in the United States, with the rest spread over 12 countries. NMEA had three Chinese and Canadian members and two members from Australia and South Africa. The following countries had one NMEA member reporting residence: Chile, Colombia, Honduras, Ireland, Japan, New Zealand, Philippines, and the United Kingdom. In the United States most members who participated in this survey lived in California ( $N = 94$ ), Florida ( $N = 32$ ), New York ( $N = 16$ ), Virginia ( $N = 18$ ), Massachusetts ( $N = 17$ ), Maryland ( $N = 17$ ), and Hawai'i ( $N = 16$ ) (Figure 3). However, when controlling for the population size of each state, Hawai'i had the most members per million residents (using 2018 US Census estimates, 11.3 members/million residents), followed by the District of Columbia (7.12 members/million), Maine (5.98), and New Hampshire (4.42) (Figure 4). The following 13 states did not have any respondents: Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Minnesota, Montana, Nebraska, North Dakota, Oklahoma, South Dakota, or West Virginia.



**Figure 3** Geographic distribution by state of 2018 NMEA U.S. members. Darker blue indicates states with more members.



**Figure 4** Geographic distribution by state of 2018 NMEA U.S. members controlling for state population size (members/million residents). Darker red indicates more members per million residents.

In 2002, Walker et al. reported that 71% of respondents were “predominantly geographically located coastal[ly]”, with the remainder (29%) “situated geographically inland” (2003). “Coastal” was not defined by Walker et al., so direct comparisons were difficult. In 2018 geographic location, based on zip codes, indicated 83% of the United States based members ( $N = 349$ ) lived less than 100 driving miles from the ocean; 67% ( $N = 229$ ) lived within 25 driving miles of the ocean. This information was calculated using Google maps from the center of the zip code to the closest ocean access.

The geographic diversity of the membership is reflected in regional NMEA chapter affiliations. There are 16 regional chapters of NMEA. Of 282 respondents, the chapters with the greatest percentage of members in 2018 were the Southwest Marine Educators Association (SWMEA) at 21% ( $N = 81$ ) and the Mid-Atlantic Marine Educators Association (MAMEA) at 12% ( $N = 46$ ) (Table 1). Almost 20% of NMEA members ( $N = 73$ ) were either unaffiliated with a chapter or did not know their chapter. Most international members ( $N = 21$ ) would be expected to fall in one of these categories.

REGIONAL CHAPTER	CHAPTER ACRONYM	STATES	MEMBERSHIP PERCENTAGE
Southwest Marine/Aquatic Educators Association	SWMEA	CA, CO, NM, NV, AZ	21.2 ( $N = 81$ )
Mid-Atlantic Marine Educators Association	MAMEA	DE, DC, MD, NC, VA	12.0 ( $N = 46$ )
Florida Marine Science Educators Association	FMSEA	FL, Caribbean	7.6 ( $N = 29$ )
Oceania	OCEANIA	HI, Pacific Islands	4.7 ( $N = 18$ )
Northwest Aquatic and Marine Educators	NAME	AK, OR, WA, British Columbia	4.5 ( $N = 17$ )
New York State Marine Education Association	NYSMEA	NY	4.2 ( $N = 16$ )
Gulf of Maine Marine Education Association	GOMMEA	ME, NH, VT, Canadian Maritimes	4.2 ( $N = 16$ )
Massachusetts Marine Educators	MME	MA	3.9 ( $N = 15$ )
Southern Association of Marine Educators	SAME	AL, LA, MS	3.7 ( $N = 14$ )
South Carolina Marine Educators Association	SCMEA	SC	3.4 ( $N = 13$ )
Southeastern New England Marine Educators	SENEME	CT, RI	3.1 ( $N = 12$ )
New Jersey Marine Education Association	NJMEA	NJ, Eastern PA	2.6 ( $N = 10$ )
Great Lakes Educators of Aquatic and Marine Sciences	GLEAMS	IL, IN, MI, MN, OH, WI, Western PA	2.5 ( $N = 9$ )
Texas Marine Educators Association	TMEA	TX	1.6 ( $N = 6$ )
Tennessee Educators of Aquatic and Marine Science	TEAMS	TN	1.1 ( $N = 4$ )
Georgia Association of Marine Education	GAME	GA	0.8 ( $N = 3$ )
Unaffiliated	N/A	N/A	14.9 ( $N = 57$ )
Do not know	N/A	N/A	4.2 ( $N = 16$ )

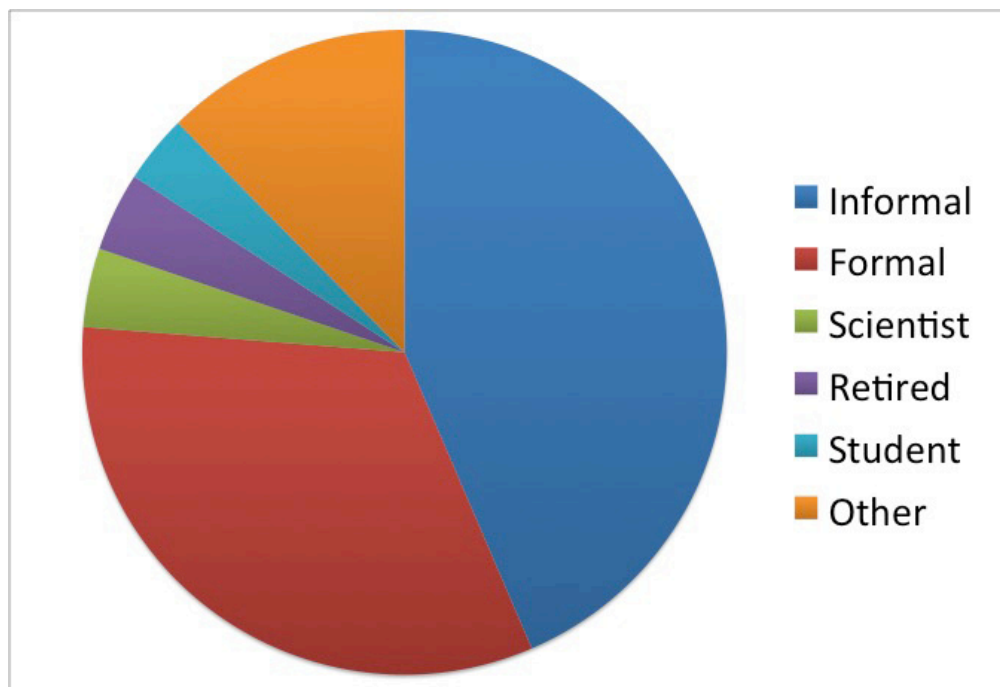
**Table 1** NMEA chapter membership distribution.

## PROFESSIONAL DIVERSITY

Over 70% of the 380 NMEA member respondents in 2018 had a master’s degree ( $N = 217$ , 57%, including MS, MEd, MAT, or MST) or a doctorate degree ( $N = 56$ , 15%, including PhD and EdD). About one-quarter of respondents had a bachelor’s degree 24% ( $N = 92$ ). More of the respondents’ indicated their academic training was in science ( $N = 176$ , 46%) than education ( $N = 124$ , 33%). Approximately 11% ( $N = 40$ ) of NMEA members indicated they had academic training in both science and education. The same percentage (11%) indicated their training was from a different discipline; responses included art education, art history, journalism, communications, nursing, evaluation, theology, business, English, policy, history, finance, film, psychology, landscape architecture, and systems.

NMEA members ( $N = 379$ ) primarily considered themselves informal/non-formal educators (44%,  $N = 165$ ) followed by formal educators (33%,  $N = 124$ ) (Figure 5). Professions in the “other” category (12%,  $N = 47$ ) include 12 people in administration, seven people in communications, and six people that explicitly said they considered themselves equally formal and informal. In addition, “other” professions included: advocacy, evaluator, airline pilot, historian, program manager, writer/author, consultant, speaker, designer, travel consultant, real estate investor, partnership manager, ocean conservation and management planning, and volunteer. The percentage of NMEA defining themselves as formal educators decreased from 2002, when 46% of members considered themselves formal educators and 41% considered themselves informal educators.

The primary employers of NMEA members were reflective of their professions. The most frequently reported employer ( $N = 371$ , 42%) was a school or college (23% PreK–12; 19% college or university), followed by an informal science/cultural/historical institution or organization (16%), and non-profit organization (11%). Sea Grant employed 5% of survey respondents. Approximately 7% of members reported being unemployed or retired. The remaining members reported being employed in government (broadly defined, 9%), in private organizations (4%), or self-employed (4%).



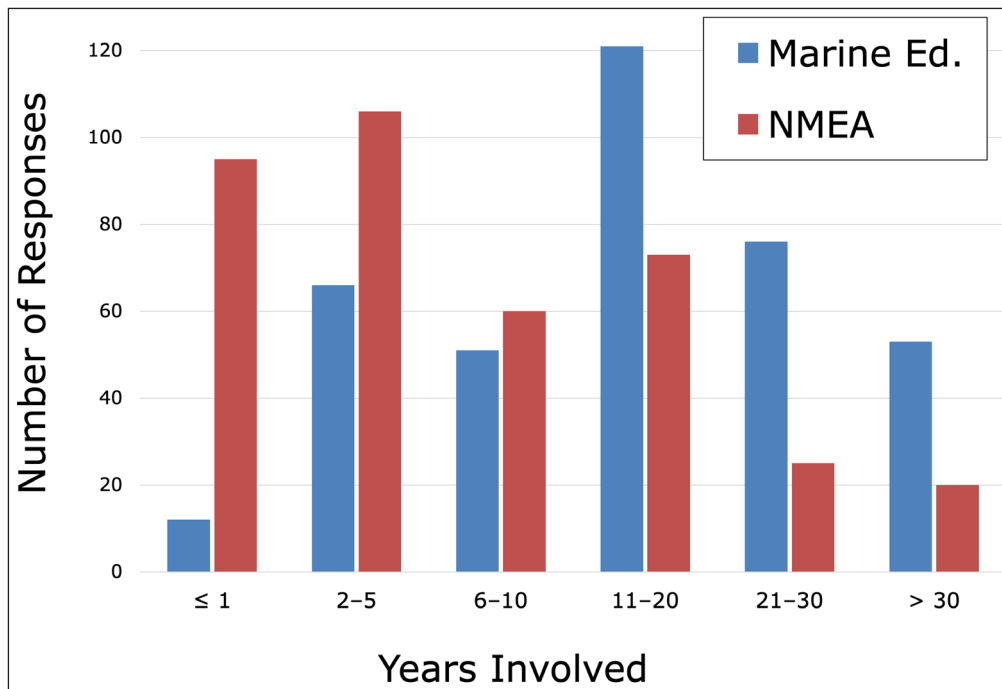
**Figure 5** Primary profession percentages of NMEA members in 2018.

Of those who selected “formal educator” as their primary profession, 121 respondents’ indicated the age of students they taught. These educators were asked to check the ages of all students’ they taught—thus percentages for this category do not add up to 100. Almost all taught students in grades PreK–12 ( $N = 118$ , 98%), although we did not ask in what capacity they were acting as teachers and thus do not know how many of these were full-time classroom instructors. More educators taught high school students (57%,  $N = 69$ ), than students in middle school (22%,  $N = 26$ ) or elementary school (17%,  $N = 20$ ). Over a third of formal educator respondents taught undergraduates ( $N = 34$ , 38%); less taught graduate students ( $N = 13$ , 11%). Over 20% ( $N = 27$ , 22%) of NMEA formal educators taught multiple levels including 10 (8%) who taught in-service teachers. In 2002 60% of formal educator members taught

PreK–12, 25% taught undergraduates, and 15% taught graduate students. However, in 2002 there was no option to select multiple grade levels. In our survey, 12 of those who taught multiple levels taught at the college level.

## ORGANIZATION INVOLVEMENT

Most members ( $N = 379$ ) in 2018 had been involved in marine education for 11–20 years (32%, Figure 6). Over half of NMEA members (53%) were involved in the organization for five years or less—25% of which were in NMEA less than one year (Figure 6). On the other hand, 5% of members had been involved in NMEA for more than 30 years. There was a significant positive correlation between the number of years involved in marine education and the number of years involved in NMEA,  $r(377) = .68, p < .001$ .



**Figure 6** Number of years NMEA members were involved in marine education compared to number of years involved in NMEA.

## Ocean Literacy Principles

A key focus area of the 2019–2021 strategic plan was to advance ocean literacy by promoting the use of the Ocean Literacy Framework (Henry, 2019). To ascertain awareness of this resource we asked current NMEA members the degree to which they were familiar with the Ocean Literacy Principles and Fundamental Concepts (National Oceanic and Atmospheric Administration, 2013). Respondents ( $N = 379$ ) indicated their familiarity with these concepts on a Likert-type scale of 1 to 5 (where 1 = not at all familiar and 5 = very familiar). Although 40% ( $N = 152$ ) of respondents indicated they were very familiar with the Ocean Literacy Principles, approximately 13% of the membership was either not at all familiar ( $N = 24$ ) or only slightly familiar ( $N = 26$ ) with these concepts; the average on the 5-point scale was 3.88 ( $SD = 1.20$ ). There was a significant positive correlation between familiarity with the Ocean Literacy Principles and the number of years involved in NMEA,  $r(377) = .42, p < .001$ .

## DISCUSSION

### SURVEY ANALYSIS

#### Gender, Age, and Ethnic/Racial Diversity

The 2018 NMEA membership questionnaire showed that the organization’s members are reflective of the national demographics of educators. Seventy percent of members identified as female. According to the U.S. Department of Education (DOE), 77% of formal educators were female in 2018. NMEA had a diverse membership age range in 2018. In 2002, NMEA had a similar number of younger members (in their 20s), and fewer older members (over 60). This indicates more seasoned marine science educators are staying engaged in the organization throughout their careers and into retirement. The organization is still relevant to them. As mentors, these

members' organizational and educational experience and knowledge is invaluable to more novice marine educators. Further attracting and retaining marine educators at the start of their careers will be key to the growth of the organization. Future studies may want to investigate how younger educators found NMEA and their early-career needs. Carving pathways for newer members into leadership roles will ensure NMEA remains open to new ideas and ways of thinking that will sustain the organization into the future.

Although NMEA's ethnic/racial diversity had increased since 2002, white members (82%) were disproportionately represented compared to the population of the United States (72% white, [US Census Bureau, 2018](#)). However, the percent of white NMEA members was in line with the percentage of white formal educators in the United States (80%, [US DOE, 2018](#)). The biggest discrepancy in NMEA membership in comparison to national demographics was the absence of Black respondents. In 2018, 12% of the population nationally and 7% of formal educators were Black, but none responded to our survey ([US Census Bureau, 2018](#); [US DOE, 2018](#)). Since this survey, NMEA has formed an Equity and Belonging committee and conference planners have been more intentional about including meetups in the agenda for affinity groups. We hope this survey can be used as a benchmark to gauge the success of these and other initiatives that aim to recruit new members from ethnically diverse and underrepresented communities.

### Geographic Diversity

While it was unsurprising that most NMEA members lived near the coast, some inland states were better represented than others, and some coastal states had fewer members than expected. Of the 13 inland states that had no survey respondents ([Figure 3](#)), only three of them (Illinois, Indiana, and Minnesota) had an associated NMEA chapter at the time of the survey. This result was anticipated, states with no regional chapters would be unlikely to have national members.

Regardless of geographic location—coastal or land-locked—understanding the ocean's influence on us and our influence on the ocean is vital. The ocean affects every aspect of human life—from climate and food security to tourism and economic and social stability. We are inextricably connected to the ocean regardless of where we live. Educators from all regions may struggle to make ocean content relevant to their students and lack the knowledge or ability to elevate it in their own context—especially when working within the constraints of curriculum that underrepresent the ocean both within the United States ([Hoffman & Barstow, 2007](#)) and internationally ([Fauville et al., 2018](#)). But relevancy may be particularly hard to cultivate in students that live further from the ocean. This is unfortunate considering how engaging the ocean has been shown to be as a context for learning ([Lambert, 2001](#)). Understanding the current geographic diversity of NMEA can serve as a baseline from which to measure changes in educator interest in, and systematic support of, marine and aquatic science teaching and learning over time.

Variation in NMEA member geographic diversity may also be reflective of the level of activity and support offered by regional chapters. For example, while we expected Texas, a coastal state, to have a larger number of NMEA members than our survey indicated, the Texas regional chapter is currently inactive. On the other hand, the Great Lakes regional chapter was recently reincorporated (2022); this change in regional activity may be reflected in future membership at the national level. Transferring administration burdens from regional chapters to the national level may also lower local barriers to chapter engagement, particularly for less active regions.

The NMEA regional chapter with the highest number of survey respondents was the Southwest Marine Educators Association (SWMEA), who hosted the national conference in 2018 in California (the state with the highest number of respondents). As many NMEA members reported being involved in the organization for less than a year, new members may have joined expressly to attend the conference. Although our results are just a snapshot in time, we suspect the national membership uptick in the region of the most recent national conference is not sustained. For example, the South Carolina Marine Educators Association (SCMEA), which hosted the national conference in 2017, had only 13 respondents in 2018—more than this number were at the 2017 conference. NMEA may want to consider initiatives, programs, or other scholarship opportunities to encourage members who join at the national level and attend the annual conference to remain involved in subsequent years, even when the conference is not in their local region. On the other hand, reaching out to new national members who are not involved at the regional level may motivate them to be more active locally.



## Professional Diversity

While NMEA members come from a wide variety of professions, the largest majority (>75%) were those involved in formal or informal education. NMEA should continue to ensure that there are professional development opportunities for each of these types of educators—formal and informal—as their needs are related but different. If national membership continues to skew towards more informal than formal educators, NMEA may want to reflect on the timing of national events (e.g., the annual conference). While formal educators are often more flexible in the summer, informal marine science educators are less so as outreach efforts, driven by enhanced access to students during summer school breaks, are concentrated during this season.

Almost all respondents' who identified as formal educators indicated they taught PreK–12 students (98%). Even though a third taught undergraduates, these instructors were also educators, in some capacity, of younger students. The higher number of PreK–12 formal educators teaching high school students may be due to the ability of teachers and schools to offer marine science courses at this level. The needs of educators teaching marine science-focused courses (e.g., high school, college) and those integrating marine science into a more traditional curriculum (e.g., elementary school) are different; these groups may require different entry points for engaging their students in ocean literacy curricula. A potentially untapped resource for this integration may be the numerous members whose teaching spans multiple grade levels as well as those that educate in-service teachers.

In 2018 NMEA members had a large range in the number of years they had been involved in marine education. Understanding the types of professional development support novices and experienced educators are looking for may help craft opportunities that are more explicitly geared towards these groups. Similarly, nearly 50% of members reported that their academic training was in science. These members may be more interested in attending pedagogically-focused professional development while the members whose training was in education (33%) may be more interested in content-focused offerings.

## Ocean Literacy Principles

NMEA has devoted a lot of resources into the development of the Ocean Literacy Framework. The Ocean Literacy Principles are a key component of this framework, and perhaps what NMEA is best known for championing at national and international levels as a resource for teaching and learning about the ocean. The question in the survey on the Ocean Literacy Principles—one Likert-scale item on familiarity—does not allow us to make connections between responses and members' knowledge or understanding of these principles or, more importantly, the concepts embedded within them. To assess knowledge a future study might ask direct content and application questions. Rather, this survey question was crafted to understand NMEA members' familiarity with the Ocean Literacy Principles as a resource—as a tool that exists that can support them in their marine education endeavors.

Although 40% of NMEA member respondents reported they were very familiar with the Ocean Literacy Principles and Fundamental Concepts, we think there is still room for improvement as approximately 13% of the membership was not very familiar with them. This is because of the large number of new member respondents; 58% of those not at all familiar or only slightly familiar with the Ocean Literacy Principles had been NMEA members for less than a year. Each year, new members may need to be introduced to the Ocean Literacy Framework, but those familiar with it need opportunities to further deepen their understanding so they are confident sharing it with colleagues outside of NMEA. Knowledge of the existence of the Ocean Literacy Principles as a teaching and learning tool is variable and should not be assumed of NMEA members.

## STUDY LIMITATIONS

There are two overarching limitations to this study that bind these findings—self-selection and self-report. Completing the questionnaire was voluntary; there is likely a self-selection bias in effect. Respondents represent a motivated sub-group of the NMEA membership rather than a representative sample of all NMEA membership. This may have affected the findings in a variety of ways. For example, longer-term members, who are likely to be older and more experienced educators, may have been more motivated to complete the survey because they were more interested or invested in the results. This group's responses may then be overrepresented in the findings.

A limitation of self-report measures is the likelihood of potential discrepancies between what people say they do or think and what they actually do or think. This questionnaire had mostly demographic items, as opposed to those about behavior or knowledge, thus responses are less likely to have been affected by self-report behavior biases. However, respondents' answers may have been less accurate if they found any questions triggering (e.g., gender identity, age, racial/ethnic categorization) or assigned questions value, for example status in the organization (e.g., years involved in NMEA). The survey question asking about familiarity with the Ocean Literacy Principles was the most sensitive to self-reporting bias as it was the most subjective. Further, respondents may have overestimated their familiarity with this concept due to subject-expectancy effects. If respondents found NMEA valuable, they may have reported their knowledge of the Ocean Literacy Principles to be higher than it was. But while a level of caution should be used when interpreting self-reports, it is worth noting that the outcomes of this survey were not associated with respondents' careers (e.g., supervisory relationships or job evaluations)—limiting the likelihood of purposeful deception.

While it is important to remember that this study of the NMEA member population is a sample, not a census, the survey response rate was high (61%) compared to the average online survey response rate (44% in education-related fields; Wu, Zhao & Fils-Aime 2022). Response rate is often viewed as an important factor in evaluating the quality of a survey study (Hox & De-Leeuw, 1994). The risk of low response rates is that the responses might not adequately represent the targeted population, introducing nonresponse bias (Wu, Zhao & Fils-Aime 2022). The authors attribute the high response rate on this survey to clearly defining the purpose of the survey in email correspondence, keeping the survey short, regularly reminding members to complete the survey, supportive organization leadership, and an invested membership (i.e., topic salience). The high response rate gives more credence to our findings. Thus, while the recommendations in this paper are based on a subset of the NMEA membership, and caution should be used in interpreting results, the high response rate means findings are an important starting point for determining future programming for all members.

## CONCLUSION

In 2002 there were almost 1,200 members in NMEA; in 2018 there were approximately 700. Recruitment, engagement, and retention of members at all levels is important to the future of NMEA. In addition to creating opportunities and improving programming to address current membership needs, we hope these findings can be used to measure the effectiveness of some of the objectives laid out in the 2019–2021 NMEA strategic plan— including advancing ocean literacy, cultivating international relationships, engaging younger members, and actively involving diverse and underrepresented communities.

While we have provided suggestions and recommendations based on the results of this survey. But what the survey data mean, what NMEA can and should do next, and what constitutes success, are discussions and decisions that the organization needs to engage in collectively with all stakeholders. We hope this information serves as a benchmark from which to monitor, evaluate, and reflect on organization composition and activities.

In many respects the 2018 survey is a new baseline, as we were not able to make many direct comparisons to the 2002 survey. To enhance this survey's usefulness to NMEA, we recommend it be administered to members on a regular basis to track the success of the strategic plan and other initiatives. Future surveys should consider adding additional open-ended questions to ascertain more nuanced needs, for example around professional development, to further help NMEA cater to its membership. We hope by sharing the survey and survey data that future NMEA members can easily track and reflect on ongoing changes in membership composition. By more deeply understanding the makeup of its membership NMEA can further enhance its role in advancing marine education and supporting marine and aquatic educators.

## ADDITIONAL FILE

The additional file for this article can be found as follows:

- **Supplemental File 1.** NMEA Membership Survey. DOI: <https://doi.org/10.5334/cjme.84.s1>

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## COMPETING INTERESTS

JP and JW were co-chairs of the NMEA Education Research and Evaluation Committee at the time of survey development, distribution, and analysis. As co-chairs, they sat on the volunteer board of NMEA, which publishes this journal.

## AUTHOR CONTRIBUTIONS

JP and JW both developed and piloted the membership survey. JP led the data analysis and was the primary author of the manuscript.

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