

Mariner Survey

Supporting Statement Part B

Maritime Administration (MARAD)

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SUPPORTING STATEMENT PART B

1. Potential Respondent Universe

The respondent universe consists of two broad categories of U.S. mariners: first, all officer (licensed) and rating (unlicensed) mariners with unlimited credentials and qualifications to sail on oceangoing sealift vessels who have a valid Merchant Mariner Credential (MMC), and second, all officer (licensed) mariners with unlimited credentials and qualifications to sail on oceangoing sealift vessels who have an MMC placed in continuity.¹ The sampling frame containing the respondent universe is the U.S. Coast Guard (USCG)'s Merchant Mariner Licensing and Documentation (MMLD) system, the official listing of mariners who have been issued an MMC.

The MMLD extract used to generate the sample sizes in Table for Item 1 was provided to MARAD by the USCG in 2019. MARAD also received an updated extract in 2025, which was used to select the sample for the Mariner Survey Pretest. However, review of the 2025 extract indicated that it contained substantially fewer mariners with valid MMCs and notable shifts in the relative sizes of several mariner subgroups compared with the 2019 extract. Specifically, the 2025 extract contained 50,978 mariners with a valid MMC compared with 105,079 in the 2019 extract. Compared with the 2019 extract, the 2025 extract also contained proportionately fewer Deck Officers and Able Seafarer Unlimited mariners and proportionately more Engineering Officers and Seafarer/Wiper/Steward's Department (FH) mariners. These differences indicated that the 2025 extract was not sufficiently complete to support reliable estimation of sample sizes for the full survey effort. Accordingly, the 2019 MMLD extract, which provides the most complete and reliable basis currently available for estimating sample sizes, was used for this purpose.

The USCG will provide MARAD with an updated and complete extract prior to implementation of the 2027 Mariner Survey, and the survey sample will be selected from that updated extract. The sampling frame represented by the 2019 MMLD extract includes 107,916 mariners: 105,079 mariners with a valid MMC and 2,837 mariners with an MMC placed in continuity.

The MMLD extract provided to the survey contractor, Strategic Research Group (SRG), contains a complete listing of mariners using the USCG issued Mariner Reference Number which is a unique identifier that supports data integrity and reduces the likelihood of duplicate records. This frame contains only fields deemed necessary for the survey effort, including mariner names and contact information. To further strengthen the accuracy of the frame, SRG will thoroughly screen the fields for strange characters,

¹ In the survey effort, MARAD is including mariners with an MMC placed in continuity, which means that the credential is not active, but it can be renewed if the mariner completes refresher training required by the U.S. Coast Guard. These mariners may be willing to renew their expired credentials by completing the necessary training once they are able to meet the current medical standards. Only licensed mariners are included in this group. Because the population of unlicensed mariners with a valid MMC is substantially larger than the corresponding licensed mariner population, MARAD anticipates that sufficient numbers of currently credentialed unlicensed mariners would likely be available to crew sealift vessels during periods of National Need. Accordingly, unlicensed mariners with an MMC placed in continuity are not included in the survey effort.

incorrect formatting, and obvious errors. A third-party service will conduct a National Change of Address (NCOA) check and append or verify telephone numbers and email addresses whenever possible.

Mariners will be sampled using a stratified random sampling approach. Mariners are stratified by their highest officer endorsement (for licensed mariners) or rating endorsement (for unlicensed mariners). There are eight licensed mariner subpopulations and five unlicensed mariner subpopulations. Future administrations of the survey may incorporate a rotating panel design in which a portion of respondents from prior survey waves may be recontacted in future administrations while new respondents are also sampled from the current mariner population. Such an approach could support analyses of changes over time while limiting respondent burden and maintaining representation of the broader mariner workforce. Specific sampling procedures for future survey administrations will be developed and documented prior to implementation.

Table for item 1 provides the mariner population estimates derived from the 2019 MMLD extract by subgroup for mariners with a valid MMC and mariners with an MMC placed in continuity. The table also provides the corresponding sample sizes for the data collection effort.

For licensed mariners with a valid MMC, the proposed sample sizes are expected to yield results within each subpopulation with a $\pm 5\%$ margin of error at the 95% confidence level, assuming a minimum response rate of 35%. A 35% response rate is considered achievable based on the response rate improvement strategies described in Section B.3. During the pilot test, a response rate of at least 35% was achieved for four of the eight licensed mariner subgroups. MARAD anticipates that response rates for the full survey may improve across the licensed mariner subgroups as a result of additional outreach and survey promotion efforts, including expanded multimode contact strategies and revised follow-up procedures informed by pilot test results.

Based on lower-than-expected response rates among all five subgroups of unlicensed mariners holding a valid MMC found during the pilot test, a more reasonable projection for these subgroups is a minimum 25% response rate, with the goal of achieving estimates within a $\pm 5\%$ margin of error at the 95% confidence level.

Because of the relatively small population sizes of the licensed mariner subgroups with an MMC placed in continuity, the survey will include all eligible mariners within these subgroups rather than selecting a sample.

Table for Item 1: Mariner Population and Sample Sizes for Mariners with a Valid MMC and Mariners with an MMC Placed in Continuity

Mariner Subpopulations	Mariners with Valid MMC		Mariners with MMC placed in Continuity		Total Mariners	
	Population Size	Sample Size	Population Size	Sample Size*	Population Size	Sample Size

Mariner Subpopulations	Mariners with Valid MMC		Mariners with MMC placed in Continuity		Total Mariners	
Deck Officers						
Master	3,236	983	495	495	3,731	1,478
Chief Mate	766	735	121	121	887	856
Second Mate	2,495	955	278	278	2,773	1,233
Third Mate	2,674	963	690	690	3,364	1,653
Engineer Officers						
Chief Engineer	2,225	938	317	317	2,542	1,255
First Assistant Engineer	910	775	117	117	1,027	892
Second Assistant Engineer	1,951	920	195	195	2,146	1,115
Third Assistant Engineer	1,792	906	624	624	2,416	1,530
Unlicensed Mariners						
Able Seafarer Unlimited	11,928	1,492	n/a	n/a	11,928	1,492
Able Seafarer Limited	2,198	1,312	n/a	n/a	2,198	1,312
Able Seafarer Special	5,651	1,440	n/a	n/a	5,651	1,440
QMED	4,262	1,412	n/a	n/a	4,262	1,412
Seafarer/ Wiper/Steward's Department (FH)	64,991	1,528	n/a	n/a	64,991	1,528
Total	105,079	14,359	2,837	2,837	107,916	17,196

* Given the subpopulation sizes, all mariners in the eight subgroups of mariners with an MMC placed in continuity will be invited to complete the survey.

A survey of mariners was conducted in 2002. MARAD partnered with the Bureau of Transportation Statistics to conduct the *2002 Mariner Survey*. Using a mail-out survey with a telephone follow-up for non-responders, a 43% response rate was achieved. The pilot test conducted in 2026 achieved an overall response rate of 36%.

2. Statistical Methodology

The sampling methodology used to conduct the Mariner Survey will be a proportionate stratified sampling design. The mariner population is stratified into 21 subpopulations including 13 groups of mariners with a valid MMC (eight licensed and five unlicensed groups) and eight groups of mariners with an MMC placed in continuity.

For the eight subpopulations of licensed mariners with a valid MMC, the sampling approach is designed to produce estimates with a $\pm 5\%$ margin of error at the 95% confidence level, assuming simple random sampling within strata and a minimum response rate of 35%.

For the five groups of unlicensed mariners with a valid MMC, the sampling approach is designed to produce estimates with a $\pm 5\%$ margin of error at the 95% confidence level, assuming simple random sampling within strata and a minimum response rate of 25%.

These projected margins of error assume simple random sampling within strata and the target response rates.

The formula below was used to calculate the number of completed surveys needed to obtain estimates with the target margin of error and confidence level.

$$\text{Completes Needed} = \frac{N * p(1-p) / \left(\frac{m}{Z}\right)^2}{N - 1 + p(1-p) / \left(\frac{m}{Z}\right)^2}$$

Where:

N = population size

Z = Z-score corresponding to the selected confidence level (1.96 for 95% confidence level used for this survey)

m = margin of error (0.05 for the $\pm 5\%$ margin of error used for this survey)

p = proportion of population selecting a response option. A conservative value of 0.5 is used when calculating the number of completes needed.

The number of sampled mariners required for each subgroup was then calculated by adjusting the number of completes needed based on the expected minimum response rate for that subgroup using the following formula.

$$\text{Completes Needed} = \frac{N * .5(1-.5) / \left(\frac{.05}{1.96}\right)^2}{N - 1 + .5(1-.5) / \left(\frac{.05}{1.96}\right)^2}$$

$$\text{Sample Size Needed} = \frac{\text{Completes Needed}}{\text{Expected Response Rate}}$$

Where:

Sample Size Needed = Number of mariners sampled within the subgroup

Completes Needed = Number of completed surveys required within the subgroup

Expected Response Rate = Assumed minimum subgroup response rate

Expected minimum response rates of 35% were used for licensed mariner subgroups with a valid MMC, 30% for mariners with an MMC placed in continuity, and 25% for unlicensed mariner subgroups with a valid MMC.

For subpopulations in which the calculated sample size exceeds the population size, all eligible mariners within the subpopulation will be invited to participate in the survey. In these cases, sampling error associated with selecting a sample is eliminated; however, other potential sources of survey error, including nonresponse and measurement error, may still exist.

Table for Item 2 below, presents the sample sizes and corresponding number of completed surveys required to achieve the target response rates, margins of error, and confidence levels for each mariner subgroup. For the eight subpopulations of mariners with an MMC placed in continuity (which includes only licensed mariner subgroups), all eligible mariners in these groups will be invited to participate. Accordingly, the “Completes Needed” figures shown in Table B.2.1 for these subgroups reflect the number of completed surveys associated with the target 30% response rate rather than the number needed to achieve a specific margin of error. Because of the relatively small population sizes for these subgroups, the margins of error associated with the resulting estimates will generally exceed $\pm 5\%$ at the 95% confidence level.

Table for Item 2: Sample Sizes and Completes Needed for Each Mariner Subpopulation

Mariner Subpopulations	Mariners with Valid MMC		Mariners with MMC Placed in Continuity		Total Mariners	
	Sample Size	Completes Needed	Sample Size	Completes Needed	Sample Size	Completes Needed
Licensed Mariners						
Deck Officers						
Master	983	344	495	149	1478	493
Chief Mate	735	257	121	37	856	294
Second Mate	955	334	278	84	1233	418
Third Mate	963	337	690	207	1653	544
Engineer Officers						
Chief Engineer	938	328	317	96	1255	424
First Assistant Engineer	775	271	117	36	892	307
Second Assistant Engineer	920	322	195	59	1115	381
Third Assistant Engineer	906	317	624	188	1530	505
Unlicensed Mariners						
Able Seafarer Unlimited	1,492	373	n/a	n/a	1,492	373
Able Seafarer Limited	1,312	328	n/a	n/a	1,312	328

Mariner Subpopulations	Mariners with Valid MMC		Mariners with MMC Placed in Continuity		Total Mariners	
	1,440	360	n/a	n/a	1,440	360
QMED	1,412	353	n/a	n/a	1,412	353
Seafarer/Wiper/Steward's Department (FH)	1,528	382	n/a	n/a	1,528	382
Total	14,359	4,306	2,837	856	17,196	5,162

Because the Mariner Survey uses a stratified sampling design and response rates may vary across mariner subgroups, weighting procedures may be used to improve the representativeness of survey estimates. Initial design weights will reflect the probability of selection within each sampling stratum. Additional nonresponse adjustment weighting may be considered using available sampling-frame variables, including mariner subgroup, MMC status, and other demographic or credential-related characteristics available in the MMLD extract. These adjustments are intended to reduce the potential effects of differential nonresponse and align respondent distributions more closely with the sampled population. The potential impact of weighting adjustments on survey estimates will be evaluated during analysis, and appropriate variance estimation procedures accounting for weighting and stratification will be used.

The Mariner Survey will be conducted biennially. This frequency is intended to minimize respondent burden while still allowing MARAD to monitor changes in the mariner workforce's availability and willingness to serve in a national emergency. The 2027 survey will initiate a recurring data collection effort that will support analyses of changes over time and provide information to support future policy analysis and planning.

3. Methods to Maximize Response Rates

a. Maximize Response Rates

Multiple strategies will be used to maximize response rates for the Mariner Survey. These strategies include minimizing respondent burden, offering both online and mail versions of the survey, using multiple methods of outreach and follow-up, using a sufficiently long field period to allow for repeated follow-up contacts with nonrespondents, and soliciting the support of key stakeholder groups within the maritime community. Details regarding these procedures are provided below.

Several procedures incorporated into the full survey effort were informed by findings from the pilot test. These refinements included revising mail survey formatting and skip instructions, initiating Short Message Service (SMS) text message outreach earlier in the data collection period, restructuring selected survey questions to reduce respondent burden, and adding a reminder postcard mailing between survey packet mailings. The pilot test findings also informed the timing and sequencing of follow-up contact procedures designed to improve participation and reduce survey breakoff.

The current version of the survey reflects multiple revisions intended to reduce respondent burden and improve survey usability. Early drafts of the survey instrument

included approximately 40 questions; the current version includes 18 questions. Revisions made during the survey development and pretesting phases included simplifying question wording and response options, improving survey navigation and skip instructions, and restructuring selected questions to make the survey easier to complete accurately. These revisions are intended to reduce respondent burden, improve comprehension, and increase the likelihood of survey completion. Providing both online and mail versions of the survey allows mariners to complete the survey using the mode most convenient and accessible to them. The online survey may be completed using a computer, tablet, or mobile device. Survey invitation materials will include both a web link and a QR code to facilitate easy access to the online survey.

The survey will be administered in English, which is consistent with U.S. Coast Guard credentialing and operational requirements for merchant mariners serving aboard oceangoing vessels. Accordingly, MARAD does not anticipate language-related barriers to participation for the target population.

Contact information obtained from the MMLD extract will be supplemented, where possible, using commercial contact append services to improve the completeness and accuracy of mailing addresses, email addresses, and telephone numbers.

A personalized email survey invitation will be sent to all mariners for whom a valid email address is available. Additionally, a personalized letter will be sent via regular mail to all sampled mariners with a valid mailing address. The email invitation and mailed letter will describe the purpose of the survey, emphasize the importance of participation, provide contact information for respondent questions, and provide the survey website and the mariner's unique passcode for accessing the online survey. The mailed invitation letter also will include a QR code to facilitate access to the online survey.

Approximately three weeks after the initial invitation letters are sent, a survey packet will be mailed to all mariners who have not completed the online survey and whose mailed invitation was not returned by the U.S. Postal Service as undeliverable. The packet will include a personalized cover letter, the survey questionnaire, and a business reply envelope. The cover letter will again provide the survey website, QR code, and unique passcode in case the respondent prefers to complete the survey online. Approximately three weeks after the first survey packets are mailed, a postcard reminder will be sent to mariners who have not yet returned the mail survey, completed the survey online, or contacted the survey contractor to opt out. The postcard will include brief language encouraging participation, along with the survey website, passcode, and QR code for accessing the online survey. Approximately three weeks after the postcard is sent, a second packet will be mailed to mariners who have not yet returned the mail survey, completed the survey online, or contacted the survey contractor to opt out.

Reminder emails will generally be sent weekly or every other week throughout the data collection period to nonresponding mariners with a valid email address, as

determined from the initial email survey invitation. Reminder emails will cease once a mariner completes the survey, requests no further contact, or the data collection period concludes. The timing of the email reminders will vary across days of the week throughout the field period. In addition, multiple versions of the reminder emails will be used so that the wording and presentation vary over the course of data collection. Reminder emails also will be sent to mariners who have started but have not yet completed the survey. These reminders will thank respondents for beginning the survey and encourage completion.

Mariners also will receive reminder messages via SMS text messaging when a valid mobile telephone number is available. These messages will include a direct link to the online survey. SMS text message reminders will include instructions allowing recipients to opt out of future text communications. Mariners who opt out of SMS reminders will not receive additional text messages related to the survey. SMS outreach procedures will comply with applicable federal and state requirements governing text message communications.

Approximately twelve weeks after the initial survey invitations are distributed, nonresponse telephone prompting will begin. Data collection metrics, including response rates across key mariner subgroups and credential-status groups, will be monitored throughout the field period. Follow-up procedures may be adjusted during data collection to increase participation among groups exhibiting lower-than-expected response rates or elevated risk of nonresponse bias. Telephone prompting will also allow contact with sampled mariners for whom a telephone number is available but a valid email or mailing address is unavailable.

Prior to survey administration, outreach efforts will also be conducted with organizations that regularly interact with merchant mariners, including professional associations, maritime academy alumni associations, credentialing agencies, and labor unions. These efforts are intended to increase awareness of the survey, reinforce the legitimacy of the data collection effort, and encourage voluntary participation among sampled mariners. A one-page survey announcement will be developed for dissemination through websites, newsletters, and other media commonly accessed by mariners.

For online respondents, Question 4, the primary analytic outcome measure, will be programmed as a required item to minimize missing data for the key study outcome while still allowing respondents to discontinue participation at any time. Completion of the six willingness-to-serve scenarios will serve as the primary analytic completion criterion for the full survey effort.

No monetary incentive will be provided for participation in the full survey effort. Although incentives are commonly used in survey research to increase participation, evidence from the Mariner Survey pilot test indicated that response rates sufficient to support the planned analyses could be achieved without the use of incentives, particularly when combined with multimode outreach and repeated follow-up

procedures. In addition, given the large sample size for the full survey effort, a lottery-style incentive structure would likely be required for budgetary reasons, and survey methodology research suggests that lottery incentives are generally less effective than guaranteed incentives in improving participation rates. Accordingly, resources were prioritized toward expanded follow-up procedures, multimode contact efforts, and respondent burden reduction strategies designed to improve participation and data quality.

b. Assessing Nonresponse Bias

While maximizing response rates is important, survey methodology research has demonstrated that response rates alone are not a reliable indicator of the presence or magnitude of nonresponse bias.^{2,3} In some cases, efforts designed solely to increase response rates may not reduce, and may potentially increase, nonresponse bias.^{4,5} Accordingly, the Mariner Survey includes procedures both to maximize participation and to assess the potential for nonresponse bias.

Nonresponse bias analysis will be conducted at both the respondent level and at the item level. At the respondent level, analyses will examine response patterns across available sampling-frame characteristics, including mariner subgroup, Merchant Mariner Credential (MMC) status, and age. Response distributions for respondents will be compared with the sampled population using available frame variables. If evidence of differential nonresponse is identified, weighting adjustments using available sampling-frame characteristics may be developed to align the respondent distribution more closely with the sampled population.

To strengthen the nonresponse bias assessment, additional auxiliary variables will be appended to the sampling frame as available through geocoding and commercially available databases maintained by the sampling vendor. These variables are expected to include demographic, socioeconomic, and geographic characteristics available for both respondents and nonrespondents. The appended variables will be used to evaluate patterns of survey participation, identify potential sources of differential nonresponse, and inform weighting adjustments designed to reduce the potential effects of nonresponse bias on survey estimates.

Several approaches recommended in the stated preference and survey methodology literature will be used to assess the potential for nonresponse bias.^{6,7} Analyses will

² Groves, R. M. 2006. Nonresponse rates and nonresponse bias in household surveys. *Public Opinion Quarterly* 70:646-75.

³ National Research Council. 2013. *Nonresponse in Social Science Surveys: A Research Agenda*. R. Tourangeau and T. J. Plewes, eds. Panel on a Research Agenda for the Future of Social Science Data Collection, Committee on National Statistics, Division of Behavioral and Social Sciences and Education. Washington, DC: National Academies Press.

⁴ Peytchev, A. 2009. Survey breakoff. *Public Opinion Quarterly* 73:74-97.

⁵ Lundquist, P., and C.-E. Särndal. 2013. Aspects of responsive design with applications to the Swedish living conditions survey. *Journal of Official Statistics* 29:557-82.

⁶ Groves. 2006.

⁷ National Research Council. 2013.

compare respondents and nonrespondents using available sampling-frame information and appended auxiliary variables. Results from these analyses may be used to inform weighting adjustments, sensitivity analyses, and interpretation of survey findings.

Information regarding reasons for refusal or nonparticipation will be documented, where feasible, during the data collection period. This data may be used to help assess whether particular factors are associated with survey participation and to inform interpretation of survey findings.

Another approach for evaluating the potential for nonresponse bias involves comparing earlier respondents with later respondents.⁸ This approach is based on the continuum of resistance theory,⁹ which suggests that late respondents may share some characteristics with nonrespondents. Two approaches will be considered. The first approach, commonly known as wave analysis, involves defining response waves based on contact efforts and comparing key outcome variables across waves using chi-square tests or Fisher's Exact tests, where appropriate. The second approach involves examining the relationship between time-to-response and key outcome variables using regression-based methods. Both approaches will be conducted to evaluate the extent to which survey estimates could be affected.

Data from these analyses will be used to evaluate the potential presence and effects of nonresponse bias. In addition to respondent-level analyses, item nonresponse will also be examined for key survey variables. Higher item response rates generally reduce the likelihood that item nonresponse will meaningfully affect survey estimates, whereas lower item response rates may increase the potential for bias depending on the nature and distribution of the missing data. Should analyses indicate the potential for differential nonresponse, weighting adjustments and sensitivity analyses will be considered to evaluate the extent to which survey estimates may be affected. If item nonresponse is determined to meaningfully affect the analytic utility for selected non-key variables, imputation procedures such as hot-deck imputation may be considered.

4. Describe Tests of Procedures or Methods

One of the most essential recommendations from the stated preference literature is to conduct a pretest of the survey instrument prior to fielding. In their comprehensive review of the stated preference literature and studies to date, Johnston et al. (2013)¹⁰ noted that the sufficiency of the survey design components depends on respondents' understanding and perceptions of the scenarios they are being asked to value (or in this case respond to). This insight is particularly important for ensuring that respondents

⁸ Curtin, R., S. Presser, and E. Singer. 2000. The effects of response rate changes on the Index of Consumer Sentiment. *Public Opinion Quarterly* 64:413-28.

⁹ Lin, I.-F., and N. C. Schaeffer. 1995. Using survey participants to estimate the impact of nonparticipation. *Public Opinion Quarterly* 59:236-258.

¹⁰ Johnston, F. R., E. Lancsar, D. Marshall, V. Kilambi, A. Mühlbacher, D. A. Regier, B. W. Bresnahan, B. Kanninen, and J. 2013. Constructing experimental designs for discrete choice experiments: Report of the ISPOR conjoint analysis experimental design good research practices task force. *Value in Health* 16:3-13.

understand scenarios as intended. Two types of pretesting are recommended: qualitative pretesting of survey materials using focus groups, cognitive interviews, or other small-group methods, and quantitative pretesting using pilot studies.^{11,12,13} Both types of pretesting were conducted through OMB 2133-0555.

a. Pretest Component 1: Cognitive Interviews

The first phase of pretesting consisted of cognitive interviews conducted with a small subset of mariners. A total of 23 mariners participated in a cognitive interview and received a \$50 incentive for participation. Cognitive interviews are particularly useful when surveys include stated preference questions because respondents may overestimate or underestimate their likelihood of engaging in a hypothetical behavior, resulting in biased or inaccurate estimates. In the case of the Mariner Survey, there is concern that mariners could overestimate their willingness to volunteer to serve as a paid crew member during a time of National Need. Given the real-world importance of obtaining accurate survey results, it was essential to minimize the potential for hypothetical bias to the greatest extent possible prior to implementation of the full-scale survey effort.

The stated preference literature provides several recommendations for minimizing bias in responses to hypothetical questions. One important consideration is ensuring that respondents fully understand the scenarios they are asked to evaluate. Therefore, the scenarios must be presented in a manner easily comprehended by mariners, using language all mariners understand.^{14,15} As a related issue, in order for mariners to respond accurately, they must have all relevant information.^{16,17} Hypothetical questions about future decisions may yield responses that are not representative of respondents' actual thoughts if such questions fail to specify enough relevant information of the type that respondents use to make decisions.¹⁸ Another important aspect of reducing bias is ensuring that respondents perceive the survey questions as meaningful and give them serious consideration.

Accordingly, the cognitive interviews included probes designed to evaluate whether mariners:

¹¹ Arrow, K., R. Solow, P. R. Portney, E. E. Leamer, R. Radner, and H. Schuman. 1993. Report of the NOAA panel on contingent valuation. *Federal Register* 58:4601-14.

¹² Bateman, I. J., R. T. Carson, B. H. Day, W. M. Hanemann, N. Hanley, T. Hett, M. Jones-Lee, G. Loomes, S. Mourato, E. Özdemiroglu, and D. W. Pearce. 2002. *Economic Valuation with Stated Preference Techniques: A Manual*. Cheltenham: Edward Elgar.

¹³ Champ, P. A., K. Boyle, and T. C. Brown, eds. 2017. *A Primer on Nonmarket Valuation*. Amsterdam: Springer Science & Business Media.

¹⁴ Adamowicz, W., J. Swait, P. Boxall, J. Louviere, and M. Williams. 1997. Perceptions versus objective measures of environmental quality in combined revealed and stated preference models of environmental valuation. *Journal of Environmental Economics and Management* 32:65-84.

¹⁵ Champ et al. 2017.

¹⁶ Bateman et al. 2002.

¹⁷ Arrow et al. 1993.

¹⁸ Willis, G. B. 2005. *Cognitive Interviewing: A Tool for Improving Questionnaire Design*. Thousand Oaks, CA: Sage Publications, Inc.

- understood the terminology, phrases, and response options used throughout the survey;
- found the six willingness-to-volunteer scenarios easy to understand and respond to;
- believed they had sufficient information to respond accurately to the hypothetical scenarios;
- interpreted the scenarios consistently and as intended; and
- gave serious consideration to the questions when formulating their responses.

Additional questions addressed survey instructions, response categories, question formatting, burden associated with completing the survey, and the overall respondent experience.

The interviews were summarized, synthesized, and systematically reviewed to identify common themes, potential misunderstandings, and operational issues. A report was subsequently developed describing the methodology, findings, conclusions, and recommendations arising from the cognitive interviews.

The cognitive interviews did not identify any issues requiring changes to the survey layout, formatting, or procedures for accessing the online survey. Nearly all mariners indicated that they understood the scenarios and gave the questions serious consideration before responding. However, a small number of mariners identified issues related to several other survey items and response options. These issues were addressed through revisions to the wording of the affected items and response categories prior to implementation of the pilot test. These revisions are expected to improve question clarity and strengthen the validity and interpretability of responses collected during the full survey effort.

b. Pretest Component 2: Pilot Test

Following completion of the revisions identified through the cognitive interviews, a pilot test of the online and mail versions of the survey was conducted.

The pilot test was conducted between December 9, 2025, and April 8, 2026, to evaluate survey administration procedures, assess the usability and completeness of available contact information, examine participation patterns across mariner groups and survey modes, evaluate survey functioning, and identify operational or methodological issues that could affect implementation of the full survey effort. The pilot test also provided an opportunity to evaluate respondent burden, survey navigation, data collection procedures, respondent tracking procedures, follow-up activities, and data processing procedures associated with the multimode survey design.

The pilot test sample consisted of 650 mariners selected from the 2025 Merchant Mariner Licensing and Documentation (MMLD) extract. The sample included 500

mariners with a valid Merchant Mariner Credential (MMC) and 150 Licensed mariners with an MMC placed in continuity. The sampling approach used proportionate stratified random sampling across mariner subgroups.

The pilot test evaluated a multimode survey administration approach that included email invitations and reminders, mailed invitations and survey packets, telephone prompting, and Short Message Service (SMS) text message reminders. The pilot test was originally planned as a 70-day data collection effort but was extended to 120 days after MARAD was unable to obtain mariner email addresses from the MMLD extract and additional contact procedures were required.

The pilot test evaluated:

- the completeness, accuracy, and usability of contact information available through the MMLD extract and commercial contact append services;
- response rates across mariner subgroups and MMC status groups;
- participation patterns by survey mode;
- the effectiveness of different respondent contact procedures;
- respondent navigation of skip instructions and grid-format questions;
- item nonresponse and survey breakoff patterns;
- web survey functionality and survey flow;
- respondent burden, including question complexity, survey length, and skip logic navigation;
- write-in responses and indications of question misunderstanding or ambiguity; and
- the functioning of Question 4, the primary survey question measuring willingness to volunteer to serve across six hypothetical scenarios.

Of the 650 sampled mariners, two were determined to be deceased and removed from the sample, leaving 648 eligible mariners. A total of 234 mariners answered at least one survey question, yielding an overall participation rate of 36.1%. Because the primary purpose of the pilot test was methodological evaluation rather than substantive estimation, all partial survey responses were considered useful for assessing survey functioning, navigation, item nonresponse, and breakoff patterns. Most respondents who began the survey completed it, and item nonresponse rates were generally low. The primary source of missing data resulted from online respondents who exited the survey prior to completion.

The pilot test identified several findings relevant to refinement of the survey methodology and survey instrument prior to implementation of the full survey effort. These findings included:

- evidence that SMS text message outreach was an effective method for encouraging participation;
- indications that some mail respondents experienced difficulty following skip instructions and navigating grid-format questions;
- identification of opportunities to reduce respondent burden through question restructuring and revised formatting;
- identification of survey items and response options requiring clarification or refinement;
- evidence that Question 4 functioned largely as intended, with approximately half of respondents varying their responses across the six scenarios, supporting inclusion of differing scenario attributes; and
- confirmation that response rates differed substantially across mariner subgroups, providing empirical information necessary to refine sampling assumptions and outreach strategies for the full survey effort.

Findings from the pilot test directly informed revisions to the survey instrument, survey formatting, respondent contact procedures, and sampling assumptions for the full survey effort. These revisions included:

- moving the willingness-to-serve questions earlier in the survey to reduce breakoff prior to completion of key analytic items;
- revising mail survey formatting and skip instructions to improve respondent navigation;
- restructuring several grid-format questions into simplified response formats to reduce respondent burden and improve survey navigation;
- revising selected question wording and response options to improve clarity and interpretability;
- initiating SMS text message outreach earlier in the data collection period;
- adding a reminder postcard mailing between survey packet mailings; and
- refining sampling assumptions and response-rate targets based on observed subgroup participation patterns.

The pilot test was conducted solely for methodological and instrument refinement purposes. The pilot test was designed to evaluate survey procedures, survey functioning, respondent interpretation of the survey instrument, and operational

aspects of the multimode data collection effort rather than to produce statistically precise substantive estimates for the merchant mariner population. Accordingly, pilot test findings will not be used for programmatic or policy decision-making.

5. Consultation Information

Strategic Research Group (SRG) is the contractor providing survey design, methodology, survey administration, survey analysis, and reporting services for the Mariner Survey to the Maritime Administration (MARAD). The SRG team is led by:

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The MARAD team input to SRG was provided through the designated MARAD Contracting Officer's Representative for the MARAD-SRG Mariner Survey Contract, initially Mr. Jain who retired from federal service effective December 31, 2021. Mr. Matthew Mueller assumed coordinating responsibilities which were subsequently transferred to Mr. Matthew Edwards who left MARAD in December 2025 and Mr. Kevin

Lau assumed his responsibilities. Mr. Jain has continued to provide consulting support as needed.

DOCUMENTS INCLUDED IN APPENDIX 1

- 1.a. Copies of Statutes and Executive Orders Requiring the Data Collection
- 1.b. Mariner Survey Questionnaire (Web Version)
- 1.c. Mariner Survey Questionnaire (Mail Version)
- 1.d. Summary of Merchant Mariner Risk and Compensation Factors
- 1.e. Summary of Available Historical Revealed Data from Past Major Mariner Mobilizations