

Needs Assessment of New Jersey Waterfront Business Owners

Report of Findings November 2013



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Executive Summary

Key Findings

The New Jersey Sea Grant Consortium (NJS GC) conducted an assessment of waterfront business owners in early fall of 2013 as part of its education and outreach campaign related to climate change impacts. The Needs Assessment was conducted electronically using Survey Monkey, a Web-based survey platform, and the first phase targeted marina owners and operators from 460 marinas in New Jersey. The survey response rate was just above 13%.

1. This audience may not be fully informed about the full range and scope of potential impacts from climate change and may perceive a disconnect between the issues of climate change and sea level rise:
 - Seventy-five percent of respondents expressed some degree of concern about climate change; two responses, “a little concerned” and “somewhat concerned” accounted for over 50% of all responses.
 - Two thirds of the individuals who reported no concern about climate change ultimately selected one or more potential impacts of concern in the very next survey question.
 - Respondents differentiate between—and are more concerned about—potential direct impacts (e.g. loss or damage of private property) versus potential indirect impacts of climate change.
 - Eighty-five percent of respondents reported some degree of concern about sea level rise; a number of individual respondents expressed relatively more concern about sea level rise than about climate change.
2. There is an unmet demand for easily accessible information about potential impacts from climate change among this audience:
 - Data reflect a disparity between the proportion of respondents who expressed concern about sea level rise and the proportion who reported having a reasonable (or better) understanding of projected rates of relative sea level rise.
 - A high percentage of respondents (around 60%) reported having some knowledge of the projected rates of relative sea level rise over the next 50 years but reported having not yet considered, or acted upon, potential considerations for their business.
 - Around 80% of respondents either agreed or agreed strongly with the statement, “I would like more information about how sea level rise may affect my business.”
 - Only half of the respondents who indicated that they would like more information about the effects of sea level rise agreed with the statement, “I know where to go for authoritative information about potential sea level rise impacts in New Jersey.”
3. This audience takes a relatively passive approach overall to acquiring information about potential impacts from climate change and instead relies heavily on mediated sources of information rather than on primary data.
 - Eighty-seven percent of respondents reported relying on one of four outlets as their primary source for information about potential impacts from climate change: Television and/or radio news, marine industry trade publications, internet, and newspapers.
 - Respondents indicated minimal reliance on conferences and symposiums or scientific (peer reviewed) journals and on engineers and/or consultants or industry peers for information about this issue.
 - Of the potential resources listed for use by respondents, those based on primary scientific information (e.g. peer reviewed scientific journals, conferences or symposiums) were the only ones that did not receive a positive average rating.
 - Respondents indicated slight preference for materials delivered via email as opposed to those available for download through the New Jersey Sea Grant Consortium (NJS GC) website.



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of The United States

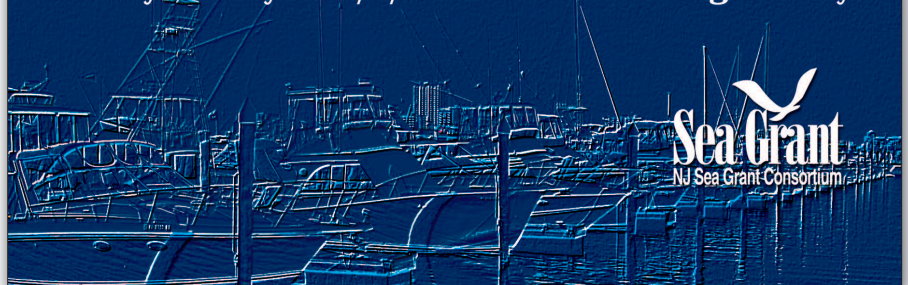
4. There is a pervasive Do-It-Yourself (DIY) ethos and reliance on personal experience among the audience that will influence their receptiveness to information and technical assistance.
 - Multiple respondents cited their own observations as their primary source for information about potential impacts from climate change.
 - Self-assessment tools for evaluating relative vulnerability to storm related and/or sea level rise impacts were among the highest rated of the resources listed.
5. This audience is already familiar with NJSGC as a source of technical information and resources.
 - Sixty-seven percent of respondents reported having used resources or having received technical assistance provided by NJSGC; assistance with the Clean Marina Program certification and grant funding for installation of pumpout systems are the most widely utilized offerings among this audience.
 - The National Oceanic and Atmospheric Administration (NOAA) and NJSGC websites are the two sites on which respondents who do seek information about potential impacts from climate change rely most heavily.
 - Despite the availability of high quality resources on the website, marina owners and operators do not rely heavily on the Jacques Cousteau National Estuarine Research Reserve (JCNERR) website for information about climate change; NJSGC might explore partnership opportunities to adapt or expand JCNERR resources related to climate change to target marina owners and operators.
6. Respondents prefer digital formats for delivery of information.
 - Internet-based resources were the only two of the options listed for which the mode of the responses was above a neutral ranking.
 - The utility of interactive, Internet-based maps received notably higher average ratings than static maps portraying the same information.
7. Marina owners and operators recognize the need to bolster the resilience of their operations and are resigned to both the inevitability of another intense storm and to doing what they can to mitigate their vulnerability to it; this finding may reflect the influence of respondents' experience during Hurricane Sandy.
 - Around 78% of respondents indicated that their experience during Superstorm Sandy prompted them to take action (including development of a plan) to prepare for future storm events.
 - Over 25% of respondents indicated that they have developed or enhanced an existing response plan of some sort.
 - Numerous respondents indicated that they have purchased a generator and/or reinforced, replaced, and/or modified existing facilities.

FINAL REMINDER

Dear Marina Owner/Operator,

***The New Jersey Sea Grant Consortium
would appreciate 10 minutes of your time to
complete an anonymous, on-line survey:***

SurveyMonkey.com/s/NJSGCClimateChangeSurvey



Select Recommendations for Program Implementation

- It may be useful to collect additional data to determine the predominant types and construction of the storage facilities present, as these may represent one of the primary points of vulnerability for this particular business sector.
- Clarifying the basis for the difference in respondents' concern about the potential effects of climate change in general and sea level rise specifically will be crucial to optimizing NJSGC's efforts to deliver new information and technical assistance related to these issues.
- Given the complementary directives of the JCNERR and NJSGC, co-promotion of both entities' resources may be of mutual benefit.
- The Marine Trades Association of New Jersey (MTA/NJ) is a key program partner for NJSGC in disseminating information to marina owners and operators.
- NJSGC may wish to target consulting engineers as a key secondary audience (either directly or through partnerships with other providers) for outreach efforts related to the potential effects of sea level rise.
- NJSGC may wish to collect additional data to explore the root of this audience's ubiquitous low reliance on primary science data. Specifically, it may be useful to discern whether this is an issue of accessibility or whether this finding reflects a preference for direct and empirical information over that which is perceived to be academic.
- In designing outreach products and technical assistance tools for this audience, NJSGC must be mindful of this audience's DIY ethos and preference for self-service.
- NJSGC and its partners might consider producing and disseminating tools and services in support of planning activities, such as preparedness checklists and/or templates for storm response and recovery plans.
- NJSGC may be in a position to coordinate public/private partnerships to install demonstration projects with alternative technologies that would appeal to this audience's strong preference for empirical evidence.

1.0 INTRODUCTION

Projections describing the impacts of climate change vary widely. However, scientists agree that climate change over the next century is imminent despite efforts to reduce greenhouse gases. Waterfront properties and associated businesses are particularly vulnerable to the effects of climate change, especially sea level rise and increased frequency and intensity of storms. They will also be affected by some potentially positive impacts of climate change, such as warmer weather and a longer summer season.

New Jersey is nearly surrounded by tidally influenced estuarine or oceanic waters. Seventeen of its twenty-one counties border these waters. Those counties are home to nearly 9 million people. New Jersey's economy is highly dependent upon its waterfront property and the natural resources they provide. Waterfront properties annually generate nearly \$67.5 billion, with \$39 billion generated through ports commerce, \$22 billion through coastal tourism and \$6.5 billion through fisheries, recreational boating and aquaculture. Waterfront property provides substantial economic benefits and countless recreational opportunities. Therefore, it is imperative to continuously educate property owners and associated business on advancements of potential impacts associated with climate

change, and when and how to plan for these changes.

As part of the National Sea Grant Coastal Communities Climate Adaptation Initiative (CCCCAI), NJSGC is developing and implementing an education and outreach campaign designed to promote long term planning that will educate waterfront property owners and associated businesses about the need to gain an understanding of climate change and consider the potential impacts associated with it when planning for the future. This will be accomplished by providing basic information on the topic, and presenting potential negative and positive impacts to demonstrate the economic and environmental benefits of advance preparation. In an effort to develop an education and outreach campaign that will be both effective and well received, NJSGC surveyed marina owners and operators in early fall 2013 to gain an understanding of the knowledge this community of practice has on the subject of climate change and how they prefer to receive information. The information collected from this survey was used to compile this report and continue the development of the education and outreach products related to potential impacts of climate change.

2.0 METHODS

The Needs Assessment Survey was conducted electronically in Survey Monkey, a Web-based survey platform. A link to the survey was delivered via email to a total of 74 marina owners and operators for whom an email address was available in NJSGC's database; each of these individuals received three separate emails over a six week period inviting their participation. A total of 460 marina owners and operators from 460 discrete facilities, representing all major marina operations on the New Jersey coast (including those to whom the survey link was delivered electronically) received post cards (via first class mail) on three separate occasions over the same six week period that detailed the survey and provided the Web address through which it was accessible.

In crafting the Needs Assessment, NJSGC referenced the "Assessment of Superstorm

Sandy's Damage to Recreational Marine Businesses in New Jersey" that was instituted by the MTA/NJ in 2013. NJSGC also referenced a 2011 report by the JCNERR entitled "An Analysis of End User Preferences for Climate Change Related Information and Data," which was based on a November, 2010 survey of coastal decision makers. Lisa Auermuller, Watershed Coordinator at the JCNERR, also provided a review of the NJSGC Needs Assessment survey instrument.

The survey response rate was just above 13%. Descriptive statistical techniques were applied as appropriate during data analysis. On the basis of guidance from NJSGC as to their broader objectives for program development, heavy emphasis was placed on value added interpretation of responses and response patterns.

3.0 FINDINGS AND DISCUSSION

3.1 Characterization of New Jersey Marinas

Roughly two-thirds of the 61 respondents indicated that there are tanks of some type located on their marina property. Of the respondents whose property includes tanks, most have more than one type of tank, as these 40 respondents provided a total of 73 discrete responses when asked to select all of the types of tanks that are present on their property (see Table 1). The data suggest that most tanks present on marinas are above ground, as 89 percent (65 of 73 discrete responses) of the selections made by respondents were of the above-ground variety (including the two write-in responses: “above ground propane” and “above ground heating oil”). Above ground fuel tanks and above ground waste oil appear to be the two most common types of tanks (both selected by about two-thirds of respondents); below ground fuel tanks and above ground wastewater were each selected by about 20% of respondents (8 and 9 respondents out of 40, respectively). Three individuals (7.5%) indicated that their operations include above ground antifreeze tanks, and as noted above, two individuals wrote in additional

types of above ground tanks.

Of the 40 respondents, none reported having both above ground and below ground fuel tanks. Two of the respondents indicated the presence of four different types of tanks on the property, and six respondents indicated the presence of three different types of tanks. To the extent that a diversity of tank types reflects a diversity of services, and assuming that the diversity of services provided correlates to the size of the operation, these data suggest that a majority of respondents to Question 1 are from small to medium sized operations. This conclusion is consistent with the distribution of respondents: of the 43 respondents (70%) who identified the marina with which they are affiliated, the distribution between small, medium, and large marinas was roughly even (per general categorization by NJSGC staff). Assuming a similar distribution among the 19 respondents who didn’t list their affiliation, around two-thirds or more respondents were from small to medium operations.

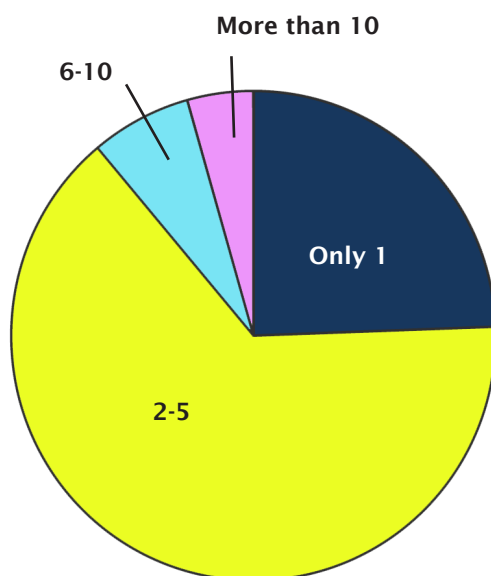
**Table I (Q1a):
What types of
tanks are
located on
the marina
property?**

Answer Options	Response Percent	Response Count
Above ground fuel	67.5%	27
Above ground waste oil	60.0%	24
Above ground wastewater	22,5%	9
Below ground fuel	20.0%	8
		3
Other		2
answered question		40
skipped question		22

Approximately three quarters of the sixty-one respondents to Question 2 reported that there are structures present on their marina property. Of the 45 individuals who reported the presence of structures, about two-thirds reported between two and five individual structures. Around 25%

(11 of 45 individuals) reported the presence of only one structure, while three individuals reported between six and ten structures, and two respondents reported the presence of more than ten structures (see Figure 1).

Figure 1 (Q2a): How many individual (detached) structures (including temporary structures, such as sheds housing vessel waste management equipment) are located on the marina property?



When asked what types of structures are present on their properties, the 40 respondents provided 116 discrete selections (see Table 2). *Both Service shop (mechanical repair) and Office/administrative* were selected by over half of respondents (65% and 57.5%, respectively). Just fewer than 50% of respondents (19 of 40 individuals) reported the presence of a pump



out/vessel waste management facility. *Ship's store/retail outfitters (dry goods only)* was selected by roughly one third of the 40 respondents. The data suggest that restaurants and bait and tackle stands with seawater systems are present at relatively few marinas, as only five of 40 respondents indicated their presence at their facilities. Over half of respondents wrote in additional structure types; around one quarter of the 40 respondents reported some type of storage facility (rack or shed) on the marina property. Fueling docks and associated structures and restroom facilities were the two other most common write-in responses (three individual respondents each).

Given the relatively high incidence of storage facilities reported, it may be useful to further elucidate (through follow up data collection) the predominant types and construction of the storage facilities present, as these may represent one of the primary points of vulnerability for this particular business sector.

Table 2 (Q2b): What types of individual (detached) structures (including temporary structures, such as sheds housing vessel waste management equipment) are located on the marina property?

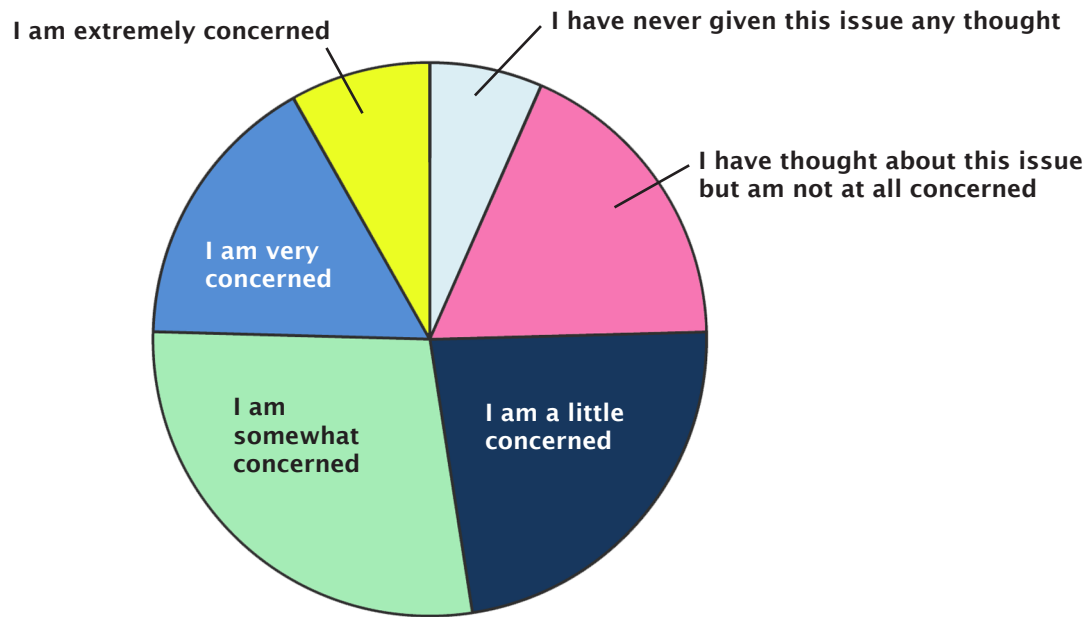
Answer Options	Response Percent	Response Count
Service shop (mechanical repair)	65.0%	26
Office/administrative	57.5%	23
Pump out/vessel waste management facility	47.5%	19
Ship's store/retail outfitters (dry goods only)	35.0%	14
Restaurant	12.5%	5
Bait and tackle stand (seawater system)	12.5%	5
Other		24
<i>answered question</i>		40
<i>skipped question</i>		22

3.2 Respondents' Awareness and Sentiments About Climate Change

Seventy-five percent of respondents expressed some degree of concern about climate change (see Figure 2). Two responses, "a little concerned" and "somewhat concerned" accounted for over 50% of all responses; "somewhat concerned" was the single most popular singular response (27%, or 17 of 61 respondents). The data assume a nearly perfect normal distribution,

wherein approximately equal numbers of respondents (4 or 5 out of 61) reported that they "have never given this issue any thought" or "am extremely concerned" and roughly equal numbers of respondents (10 or 11 out of 61) reported that they "have thought about this issue but am not at all concerned" or "am very concerned."

Figure 2 (Q3): How concerned are you about climate change?



When asked which potential impacts from climate change they are most concerned about, only five percent of respondents (three individuals) reported that they were not concerned with any of the potential impacts listed (see Table 3). This finding is noteworthy when compared to the 25% of respondents who reported either never having given climate change any thought (6.6%) or not being at all concerned despite having thought about the issue (18%). The fact that 11 of the 15 individuals who reported no concern about climate change ultimately selected one or more potential impacts of concern in the very next

survey question, suggests that this audience may not be fully informed about the full range and scope of potential impacts. Of these 11 respondents, three were the individuals who reported having never given the issue any thought and the remaining eight were, in fact, individuals who reported being not at all concerned despite having thought about the issue. *(Note: one of the individuals who reported not being at all concerned despite having thought about the issue opted not to respond to the subsequent question about specific potential impacts of concern.)*

Of the ten potential impacts of climate change presented in the survey, five from the list were identified as issues of primary concern by over 50% of respondents (between 31 and 51 individuals):

- Loss or damage of private property from storms and/or sea level rise
- Erosion of shoreline/coast from storms and/or sea level rise
- Changes in the frequency and/or intensity of extreme weather events
- Loss or damage of public infrastructure from storms and/or sea level rise
- Loss of natural habitats from storms and/or sea level rise



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By comparison, each of the other five potential impacts were selected by between 23% and 30% of respondents (between 14 and 18 individuals):

- *Changes in rainfall patterns impacting fresh water availability*
- *Changes in rainfall patterns impacting food availability*
- *Spread of new or existing invasive species*
- *Saltwater intrusion into freshwater resources from sea level rise*
- *Changes in the prevalence of communicable diseases*

The tight clustering of notably lower response totals around these five options suggests a marked and consistent difference in respondents' sentiments about what can be characterized as potential direct impacts (e.g. *loss or damage of*

private property or changes in the frequency and/or intensity of storms) versus potential indirect impacts (e.g. *loss of freshwater resources from saltwater intrusion or changes in rainfall patterns*) impacts of climate change.

Table 3 (Q4): Which potential climate impacts are you most concerned about?

Answer Options	Response Percent	Response Count
Loss or damage of private property from storms and/or sea level rise	85.0%	51
Erosion of shoreline/coast from storms and/or sea level rise	78.3%	47
Changes in the frequency and/or intensity of extreme weather events	65.0%	39
Loss or damage of public infrastructure from storms and/or sea level rise	56.7%	34
Loss of natural habitats from storms and/or sea level rise	51.7%	31
Changes in rainfall patterns impacting fresh water availability	30.0%	18
Changes in rainfall patterns impacting food availability	28.3%	17
Spread of new or existing invasive species	28.3%	17
Saltwater intrusion into freshwater resources from sea level rise	25.0%	15
Changes in the prevalence of communicable diseases	23.3%	14
I am not concerned about any of these potential impacts from climate	5.0%	3
Other		3
<i>answered question</i>		60
<i>skipped question</i>		2

In responding to Question 5, eighty-five percent of the 60 respondents reported some degree of concern about sea level rise (see Figure 3), which is exactly the same percentage of respondents who selected this topic as one of the potential impacts about which they were most concerned (Question 4). As was the case with the data about respondents' level of concern with climate

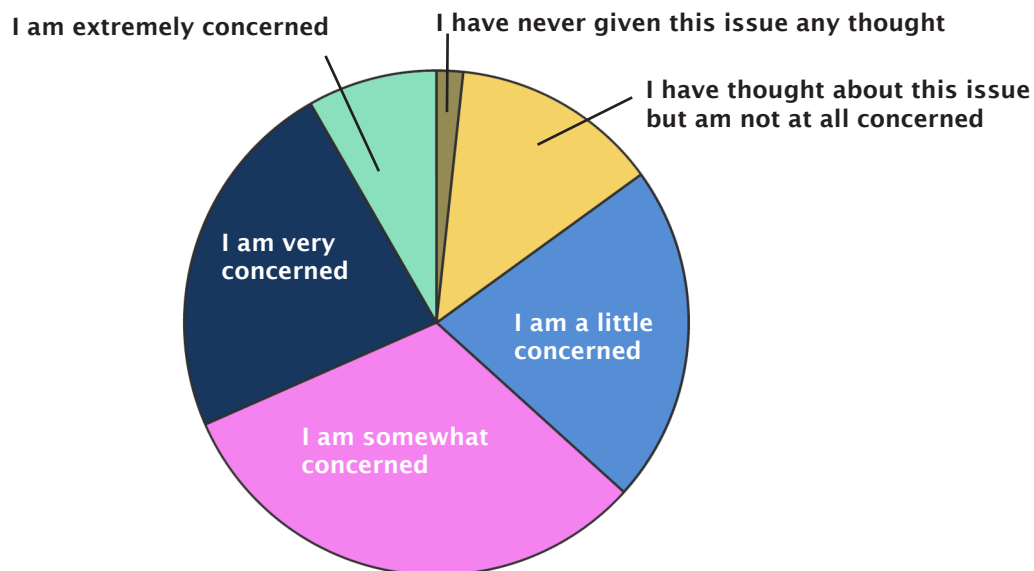
change, data about respondents' concern with sea level rise assumes a roughly normal distribution but is notably skewed toward sentiments of greater concern. Individual respondents' degree of concern about climate change corresponded closely to their degree of concern about sea level rise, with notable exceptions on the margins of the data curve:

- Nearly half of 14 respondents who reported being "a little concerned" about climate change expressed a stronger degree of concern about sea level rise.
- Two of the four individuals who reported never having given any thought to the issue of climate change expressed some degree of concern about sea level rise.
- About one third of the 11 individuals who reported not being at all concerned about climate change despite having thought about the issue reported some degree of concern about sea level rise.

These findings suggest a perceived disconnect between the issues of climate change and sea level rise among this audience. Clarifying the basis for this perception—whether derived from a lack of understanding of the relationship between

climate change and sea level rise, a difference in perceived relevance at the local level, or on some other factors—will be crucial to optimizing NJSGC's efforts to deliver new information and technical assistance related to these issues.

Figure 3 (Q5): How concerned are you about the impacts of sea level rise?



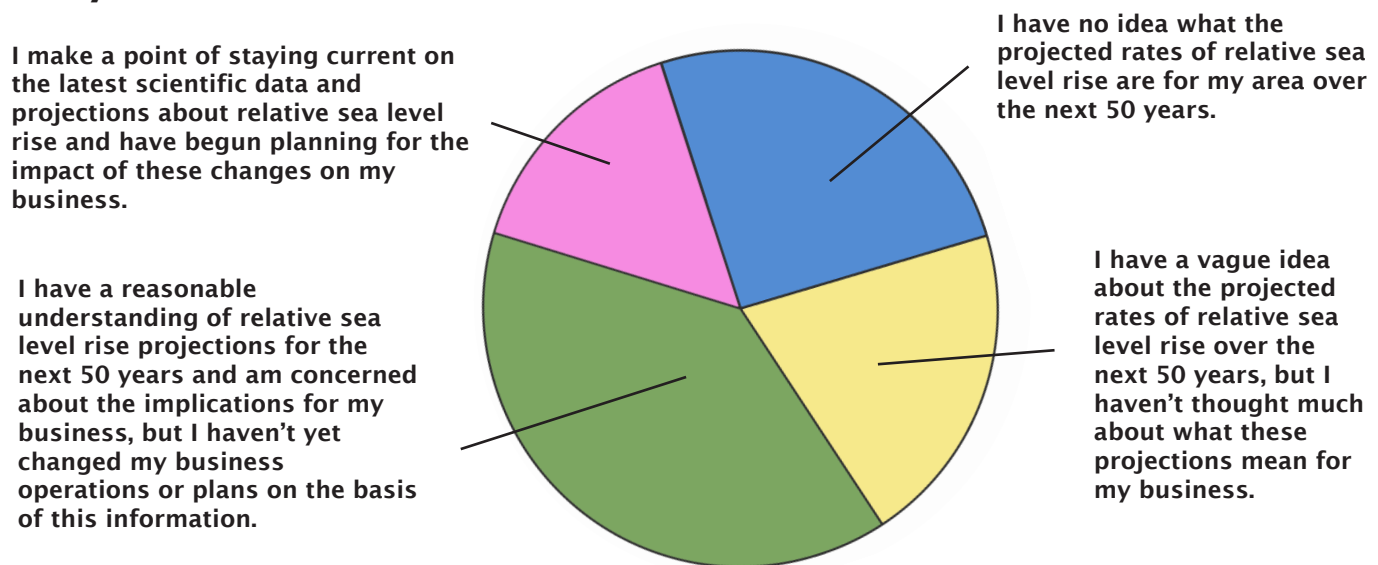
When asked to select the statement that best reflects their awareness about current and projected rates of relative sea level rise in their area, one quarter of respondents indicated that they "have no idea what the projected rates of relative sea level rise are for their area over the next 50 years" (see Figure 4). The greatest number of respondents (39%) selected: "I have a reasonable understanding of relative sea level rise

projections for the next 50 years and am concerned about the implications for my business, but I haven't yet changed my business operations or plans on the basis of this information." Only 15% (9 individuals) reported that they "make a point of staying current on the latest scientific data and projections about relative sea level rise and have begun planning for the impact of these changes on my business."

The disparity between the proportion of respondents who expressed concern about sea level rise and the proportion who reported having a reasonable (or better) understanding of projected rates of relative sea level rise speaks to an unmet demand for easily accessible information. Likewise, the high percentage of respondents (around 60%) who reported having

some knowledge of the projected rates of relative sea level rise over the next 50 years but who have not yet considered or acted upon potential considerations, for their business, suggests an unfilled need for technical assistance in identifying and planning for the specific impacts that sea level rise may have on this sector.

Figure 4 (Q6): Which of the following statements best reflects your awareness about current and projected rates of relative sea level rise for your area?



3.3 Respondents' Need for (and Current Sources of) Information About Climate Change

Eighty-seven percent of respondents reported relying on one of four outlets as their primary source for information about potential impacts from climate change, including sea level rise and changes in the intensity and frequency of severe weather (see Figure 5):



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- Television and/or radio news (26% respondents)
- Marine industry trade publications (24% of respondents)
- Internet (20% of respondents)
- Newspapers (17%)

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Neither conferences and symposiums nor scientific (peer reviewed) journals were identified by a single respondent as their primary source of information. Likewise, neither engineers and/or consultants nor industry peers appear to be utilized as primary sources of information on this subject, as they were selected by only one and three individuals, respectively.

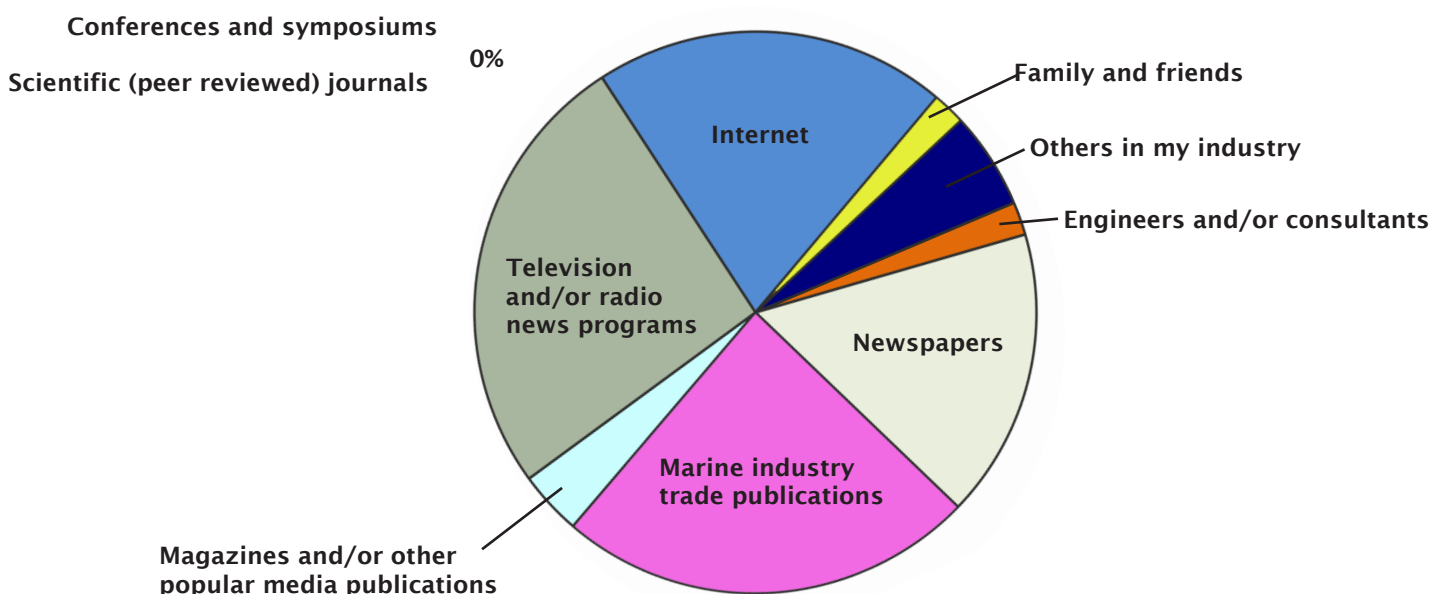
These findings—particularly the ranking of internet sources below television/radio news and industry trade publications—suggest that respondents take a relatively passive approach overall to acquiring information about potential impacts from climate change and that they rely heavily on mediated sources of information rather than on primary data. These results also confirm the importance of the role that the MTA/NJ, which is the primary marine industry trade organization serving this audience, plays as a conduit for information to this audience. These findings speak to the Association's value as a program partner for NJSGC in disseminating information to this audience.

The seven write-in responses ranged from citation of specific magazines (e.g. National Geographic and Audubon) to a college course on climate change. One respondent explicitly identified reports from the MTA/NJ and NJSGC. Two individuals offered comments that reflect a sense of independence and self-reliance that may be pervasive across the sector:

- "I live on the water and constantly watch nature around me."
- "(I) have owned the marina for 48 years and have noticed the difference in water level over the years."

In refining any education and outreach strategy targeting this sector of coastal business owners, it will be critical for NJSGC and its partners to recognize this DIY ethos and reliance on personal experience. One potential strategy for addressing this consideration could be incorporation of regional, empirical evidence of changing environmental conditions, where such data and case studies are available.

Figure 5 (Q7): What is your primary source of information about potential impacts from climate changes, including sea level rise and changes in the intensity and frequency of severe weather?



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When asked from which internet resources they currently obtain information about potential impacts from climate change, including sea level rise and the intensity and frequency of severe weather, nearly half of the 55 respondents reported that they “use Internet resources but do not pursue information about potential impacts from climate changes” (see Table 4). This finding supports the conclusion that respondents assume a relatively passive approach to acquiring information about potential impacts from climate change.

The NOAA website and the NJSGC website are the two sites on which respondents who do seek information about potential impacts from climate change rely most heavily (36% and 24%,

respectively, of all respondents to the question or 77% and 45%, respectively, of the 29 respondents who indicated that they do pursue this information).

Despite being a local service provider that provides high quality region-specific resources, the JCNERR website appears to be underutilized by these marina owners and operators. This finding presumably reflects the JCNERR’s focus on target audiences other than marina owners and operators, however, given the complementary directives of the JCNERR and NJSGC, co-promotion of both entities’ resources may be of mutual benefit. Likewise, there may be strong potential for partnering to adapt or expand JCNERR’s resources for NJSGC’s priority audiences.

Table 4 (Q8): From which Internet resources do you currently obtain information about potential impacts from climate changes, including sea level rise and changes in the intensity and frequency of severe weather?

Answer Options	Response Percent	Response Count
I use Internet resources but do not pursue information about potential impacts from climate change	47.3%	26
National Oceanic and Atmospheric Administration (noaa.gov/climate.html)	36.4%	20
New Jersey Sea Grant Consortium (NJSeaGrant.org)	23.6%	13
Rutgers Climate and Environmental Change Initiative (climatechange.rutgers.edu)	14.5%	8
Environmental Protection Agency (epa.gov/climatechange)	12.7%	7
I do not use Internet resources for information of any sort	9.1%	5
Jacques Cousteau National Estuarine Research Reserve (jcnerr.org/education/coastaltraining/climatechange.html)	1.8%	1
Other		3
<i>answered question</i>		55
<i>skipped question</i>		7

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Sixty-seven percent of respondents reported having used resources or having received technical assistance provided by NJS GC (see Table 5). Of the 36 individuals who specified what types of technical assistance they've received, 72% indicated that they'd received technical assistance with the Clean Marina Program certification. A nearly equal percentage reported having received grant funding for installation of pumpout systems. Three other types of assistance were identified by around 58% of respondents: *Technical assistance with development of vessel wash wastewater systems, Participation in a Clean Marina Certification Workshop, and Technical assistance with regulatory questions or compliance.* The type of technical assistance reportedly utilized by the fewest respondents—*Grant funding for installation of BMPs or other aspects of regulatory compliance*—was still identified by 30% of those who reported having received some sort of technical assistance from NJS GC, indicating that all eight of the major program offerings targeted at this audience are well received.

Given the popularity of technical assistance with the Clean Marina Program certification, NJS GC may wish to explore, through targeted follow-up data collection, strategies for enhancing participation in Clean Marina Program Certification Workshops so as to enhance the efficiency with which information and assistance about participation in the Clean Marina Program might be delivered. Feedback gathered through this needs assessment about this target audience's preferences for the format and delivery of information may help in optimizing those workshops. Further, given that only about two thirds of those who received technical assistance with the Clean Marina Program certification reported having received promotion by NJS GC, NJS GC might enhance efforts to alert program participants of the option of having their operations promoted by NJS GC and/or might explore additional avenues through which to promote participating marinas so as to enhance the appeal of this service to would-be program participants, thereby potentially bolstering program enrollment.



Table 5 (Q9a): Which resources or types of technical assistance (about any topic) provided by New Jersey Sea Grant Consortium have you used?

Answer Options	Response Percent	Response Count
Technical assistance with Clean Marina Program certification	72.2%	26
Grant funding for installation of pumpout systems	69.4%	25
Technical assistance with development of vessel wash wastewater systems	58.3%	21
Participation in a Clean Marina Program Certification Workshop	58.3%	21
Technical assistance with regulatory questions or compliance	55.6%	20
Technical assistance with developing stormwater management plans and/or implementing Best Management Practices (BMPs)	47.2%	17
Grant funding for installation of BMPs or other aspects of regulatory compliance	30.6%	11
<i>answered question</i>		36
<i>skipped question</i>		26

Respondents were asked to rate the degree to which they agreed with each of five statements about sea level rise by selecting a value from a Likert Scale (see Table 6). Forty-one of 53 respondents either agreed (4 out of 5) or agreed strongly (5 out of 5) with the statement, “I would like more information about how sea level rise may affect my business;” this was the only statement of those presented for which the average ranking was above neutral (3 out of 5). Only half of the respondents who indicated that they would like more information about the effects of sea level rise agreed with the statement, “I know where to go for authoritative information about potential sea level rise impacts in New Jersey.” Considered together, these findings provide compelling evidence of an unfilled need among this audience for region-specific information about the potential impacts of sea level rise and thus validate NJS GC’s decision to expend its service offerings in this realm.

Overall, respondents indicated that they are not hearing a sense of urgency about sea level rise from others in their industry, from local and/or state leaders that influence them, or from the engineers that provide consulting services in their marina. While around 25% of respondents indicated that they were hearing a sense of urgency from others in their industry and/or from local and/or state leaders that influence them, only around seven percent (4 of 53 individuals) indicated that they were hearing a sense of urgency from the engineers who provide consulting services at their operations. This finding highlights a key secondary audience—consulting engineers—that NJS GC may wish to target (either directly or through partnerships with other providers) with outreach efforts related to the potential effects of sea level rise.

Table 6 (Q10): Please indicate the degree to which you agree with the following statements.

Answer Options	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly Agree	Rating Average	Response Count
I would like more information about how sea level rise may affect my business	2	1	9	29	12	3.91	53
I know where to go for authoritative information about potential sea level rise impacts in New Jersey	4	12	17	20	0	3.00	53
I'm hearing a sense of urgency about sea level rise from others in my industry	8	7	23	15	0	2.85	53
I'm hearing a sense of urgency about sea level rise from local and/or state leaders that influence me	6	12	22	13	0	2.79	53
I'm hearing a sense of urgency about sea level rise from the engineers that provide consulting services at my marina	8	12	25	3	1	2.53	49
answered question							53
skipped question							9

3.4 Respondents' Preferences for Information, Tools and Technical Assistance

Respondents were asked to rate the utility of various resources in planning for storm preparation and/or recovery (see Table 7). With the exception of:

- *White papers (multi-page) summarizing state-of-the-art scientific information about storm tracking and modeling*
- *PowerPoint presentations including graphics and bulleted narrative summarizing state-of-the-art scientific information about storm tracking and modeling*
- *Static maps of updated FEMA flood zones*

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all of the resources listed received a positive average rating (above 3 out of 5). The only two resources for which the mode of the responses was above a neutral ranking (either 4 or 5 out of 5) were Internet-based (*Interactive, Internet-based maps depicting storm surge and/or wind velocity zones in your area under various storm scenarios* and *List of Internet-based storm tracking tools and resources*); the finding suggests that Internet-based products and means of communication are of high utility to this audience and may indicate that respondents' relatively low reliance on the Internet for information about potential impacts from climate change (Question 7) principally reflects a lack of active pursuit of this type of information rather than an overall lack of access or reliance on the Internet in general.

As further evidence of this conclusion, respondents indicated that interactive, *internet-based maps depicting storm surge and/or wind velocity zones* and *Interactive, Internet-based maps depicting relative sea level rise* received notably higher average ratings than static maps of portraying the same information.

List of internet-based storm tracking tools and resources received the highest average rating (3.7 out of 5) of the resources listed to aid in the planning for storm preparation and/or recovery and was rated as "extremely useful" by more respondents than any other resource listed. Six of the 17 individuals who rated this resource as "extremely useful" also indicated in a previous question that they use Internet resources but do not pursue information about potential impacts of climate change, which suggests that respondents are differentiating between effects of climate change and the impacts of individual storms. Supplemental targeted data collection might help elucidate respondents' understanding of the relationship between weather and climate and, in particular, the potential effects of climate change on weather patterns. Also of note, two of the five individuals who reported that they do not use Internet resources for information of any sort indicated that a *List of internet-based storm tracking tools and resources* would be at least "somewhat useful."

White papers (multi-page) summarizing state-of-the-art scientific information received the lowest average ranking of the resources listed to aid in planning for storm preparation and/or recovery and those listed to aid in planning for sea level

rise. Likewise, *PowerPoint presentations including graphics and bulleted narrative summarizing state-of-the-art scientific information* were the second lowest ranking option of the resources listed to aid in planning for either storm preparation and/or recovery or sea level rise. Respondents' low opinion of the utility of scientific literature is consistent with their low reported reliance on scientific journals and conferences and symposiums. Targeted, supplemental data collection may be merited to elucidate whether this ubiquitous low reliance on primary science data is due to its inaccessibility (physically and/or intellectually), a fundamental distrust of what is perceived as academic—as opposed to direct and empirical—information, or some other reason.

The relatively high average rating (3.6 out of 5) of *Self-assessment tool for evaluating the relative vulnerability of your business to storm related impacts* and (in a later question in the survey) of *Self-assessment tool for evaluating the relative vulnerability of your business to sea level rise impacts*—which was the highest rated of the nine resources listed for use in planning for sea level rise—can be interpreted as evidence of this audience's independent, DIY ethos. In designing outreach products and technical assistance tools for this audience, NJSGC must be mindful of this audience's preference for self-service. The relatively high interest in vulnerability assessment tools also suggests that this audience recognizes the need to bolster the resilience of their operations, which may reflect the influence of respondents' experience during Hurricane Sandy; around 78% of respondents reported that their experience during Superstorm Sandy prompted them to take action to prepare for future storm events.



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Table 7 (Q11): Please rate the utility of the following resources in planning for storm preparation and/or recovery.

Answer Options	1 Not Useful	2	3 Somewhat Useful	4	5 Extremely Useful	Rating Average	Response Count
List of Internet-based storm tracking tools and resources	4	3	12	12	17	3.73	48
Contact list of emergency support services	3	3	16	12	14	3.65	48
Self-assessment tool for evaluating the relative vulnerability of your business to storm-related impacts	3	3	17	15	13	3.63	51
Interactive, Internet-based maps depicting storm surge and/or wind velocity zones in your area under various storm scenarios	2	3	16	19	8	3.58	48
Tips for fortifying structures to enhance resistance to storm winds	5	5	18	13	8	3.29	49
Static maps depicting storm surge and/or wind velocity zones in your area under various storm scenarios	5	3	24	12	6	3.22	50
Summary sheets (1-page) with bullets and graphics summarizing state-of-the-art scientific information about storm tracking and modeling	4	8	17	12	7	3.21	48
Static maps of updated FEMA flood zones	8	7	18	10	5	2.94	48
PowerPoint presentations including graphics and bulleted narrative summarizing state-of-the-art scientific information about storm tracking and modeling	8	9	17	10	4	2.85	48
White papers (multi-page) summarizing state-of-the-art scientific information about storm tracking and modeling	8	9	18	7	5	2.83	47
<i>answered question</i>							51
<i>skipped question</i>							11

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In rating the utility of various resources in planning for sea level rise, the mode of responses was above neutral (4 or 5 out of 5) for only 2 of the resources listed (see Table 8):

- *Self-assessment tool for evaluating the relative vulnerability of your business to sea level rise impacts*
- *List of resources that offer financial assistance or incentives for planning for sea level rise*

Overall, individual respondent's rating of the utility of *List of resources that offer financial assistance or incentives for planning for sea level rise* was consistent with their self-reported level of concern about the impacts of sea level rise. In other words, there were only a few individuals who indicated that this resource would be "useful" or "extremely useful."



Photo - Reuters

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Table 8 (Q12): Rate the utility of the following resources in planning for sea level rise.

Answer Options	1 Not Useful	2	3 Somewhat Useful	4	5 Extremely Useful	Rating Average	Response Count
Self-assessment tool for evaluating the relative vulnerability of your business to sea level rise impacts	2	7	13	16	9	3.49	47
List of resources that offer financial assistance or incentives for planning for sea level rise	4	4	13	15	8	3.43	44
Interactive, Internet-based maps depicting relative sea level rise in your area under various climate change scenarios	3	5	19	11	7	3.31	45
List of resources that offer tips and/or technical assistance for planning for sea level rise	3	8	15	12	7	3.27	45
List of resources that offer information (including scientific data and projections) about sea level rise	2	8	19	9	7	3.24	45
Summary sheets (1-page) with bullets and graphics summarizing state-of-the-art scientific information about sea level rise	5	8	18	7	7	3.07	45
Static maps depicting relative sea level rise in your area under various climate change scenarios	5	7	22	7	6	3.04	47
PowerPoint presentations including graphics and bulleted narrative summarizing state-of-the-art scientific information about sea level rise	7	12	12	10	4	2.82	45
White papers (multi-page) summarizing state-of-the-art scientific information about sea level rise	6	15	15	4	5	2.71	45
<i>answered question</i>							48
<i>skipped question</i>							14

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When asked about their preferred formats for receiving information, the greatest number of respondents indicated that each of the five formats listed was “acceptable” (see Table 9). Respondents reported strong preference for materials in digital format and indicated slight preference for materials delivered via email as opposed to those available for download through the NJSGC website. This finding may lend credence to the conclusion, suggested earlier in this report, that this audience takes an overall passive approach to acquisition of information about climate change and related impacts.

Of note, the average rating for materials delivered in *Digital format on a CD or DVD* was notably lower (2.8

out of 5) than the average ratings for *Digital format via email* or *Download from the NJSGC website* and was notably lower than the average rating for *Printed materials*. In fact, more than twice as many respondents rated *Digital format on CD or DVD* as less than acceptable (1 or 2 out of 3) than did so for *Printed materials*. Those individuals who indicated that *Printed materials* were “very strongly preferred” tended to rate digital formats on the lower end (1-3 out of 5) of the Likert Scale. *Live presentation in a seminar or workshop format* received the lowest average ranking, receiving a rating of less than acceptable by 44% of respondents.

Table 9 (Q13): Preferred formats for receiving information.

Answer Options	1 Unacceptable	2	3 Acceptable	4	5 Very Strongly Preferred	Rating Average	Response Count
Digital format via email	4	1	20	11	13	3.57	49
Digital format available for download through NJ Sea Grant Consortium website	4	5	15	12	12	3.48	48
Printed materials	2	6	20	10	10	3.42	48
Digital format on CD or DVD	8	11	16	8	4	2.27	47
Live presentation in a seminar or workshop format	10	11	18	5	4	2.63	43
answered question							50
skipped question							12

3.5 Respondents' Reaction to Superstorm Sandy

Over 75% of respondents indicated that their experience during Superstorm Sandy had prompted them to take action (including development of a plan) to prepare for future storm events, and most of these individuals provided specific information about the preparatory actions they've taken (see Appendix A). Over a third of those who listed specific action cited elevation of various facilities and/or elements on their property (presumably within the current footprint of those features). Over 25% of respondents indicated that they have developed, or enhanced an existing, response plan of some sort. Around 15% (5 of 33) of respondents indicated that they purchased a generator, and an equal percentage listed the reinforcing, replacement, and/or modification of existing facilities (e.g. replacing fixed docks with floating docks) to reduce vulnerability to storm events. Three individuals reported having relocated select structures or features to another part of their property, and one respondent referenced having re-evaluated insurance policies.

The preparatory actions reportedly taken by respondents in response to their experience during Sandy reflect a commitment to remaining in place and open for business. None of the respondents alluded to evaluating offsite relocation or retreat alternatives, although, granted, this option is limited for this segment of water-dependent business owners. The tenor of

the responses suggests that individuals' experiences during Sandy were not such that they have begun to question the long-term viability of their operations in the face of the potential for increased storm intensity and frequency. Rather, respondents seem both resigned to the inevitability of another intensive storm and seem equally as resigned to doing what they can to mitigate their vulnerability to it. Given the high proportion of respondents who have already undertaken planning activities, NJSGC and its partners might consider producing and disseminating tools and services in support of planning activities, such as preparedness checklists and/or templates for storm response and recovery plans.

While additional shoreline armoring will be subject to the U.S. Army Corps of Engineers regulatory process, marina owners' interest in this strategy suggests that there may be an opportunity for NJSGC and its partners to help identify alternative, lower impact means of shoreline protection that may be more flexible and adaptable in the face of rising sea level and other climate-related ecological changes. NJSGC may be in a position to coordinate public/private partnerships to install demonstration projects with alternative technologies that would appeal to this audience's strong preference for empirical evidence.

4.0 Conclusion

The needs assessment implemented by NJSGC in the fall of 2013 was a targeted and thorough assessment of marina owners' and operators' awareness and attitude regarding potential effects of climate change. It yielded findings that should prove to be of great use as NJSGC develops an education and outreach strategy and associated products and programs to help business owners in the coastal zone prepare for these effects. The survey instrument developed for this needs assessment should be easily adapted to

accommodate needs assessments of other segments of the coastal business community in New Jersey and beyond.

The high resolution of the findings generated from this effort reaffirms the importance of capturing the specific needs and preferences of target audiences—and of the discrete segments of those audiences—to maximize the efficacy of any program offering or product development.

Appendix A: Preparatory actions taken by survey respondents after Superstorm Sandy in order to prepare for future storm events

- Elevation of everything.
- When making repairs after the storm, we took into consideration and made adjustments for higher tides and winds and used different materials that are stronger and can withstand higher wind speeds. We also reinforced our floating docks.
- Build higher pilings and remove all boats to ground above the flood zone.
- Re-evaluate my insurance policies.
- Raise the docks a foot higher. Replaced old pilings.
- Updated our storm prep checklists, reevaluated fuel and waste tank locations and installed containment systems.
- We wrote a disaster plan to deal with high tides and winds for the future.
- A plan for moving office equipment to higher areas, removing carpet, now have different flooring, grading property to effect better storm water run off.
- Retaining poles for floating docks are higher. Electric panels/outlets are higher New building will be built with flooding in mind.
- Installed back-up generator connections.
- Taller pilings, preparing for higher tides.
- Elevating structures on marina property. Securing vessels in storm conditions.
- Relocating important equipment to higher ground to avoid unnecessary losses.
- Installed floating docks.
- Securing of boats, movement of stock, etc.
- Raising height of electrical equipment or planning for quick disconnect.
- New bulkheads and generator.
- Elevating electrical hookups, anchoring sheds, plans for break water.
- Backed up 500 feet of bulkhead with rip rap.
- Rebuilding entire infrastructure due to Superstorm Sandy damage. New bulkhead, docks, pilings are being designed to minimize future damage.
- Higher bulkheading.
- In the recovery/rebuild phase, we have raised things above the high water mark from "SANDY". Computers, etc., more than 24 inches off the floor. All, Sea-Doo personal watercraft blocked for the winter a little higher, building pallet racks to store machines well above the ground.
- Installing longer pilings. Begin converting stationary docks to floaters. Being certain to have adequate commercial grade generators on hand. Where possible, plan to raise vulnerable items to a higher level than before.
- Strengthening docks, using water resistant materials, raising expensive equipment.
- Changed our definition of "worst case scenario."
- Complete structure rebuild under current building code requirements.
- Have a better idea of how high a surge can get. Have thought about drain plug in or out of blocked boats & lashing.
- Plan of action to get in touch with customers prior to the storm, plan of preparing the property for the storm, list of documents to take with when evacuating.
- Revised our hurricane preparedness plan; fortified some structures.
- Raised electric outlets, installed waterproof wallboard, installed flood vents, replaced flooring with waterproof material, will pay better attention when a forecast like Sandy comes through.
- Too many to list.
- Started planning to increase bulkhead. Stopped because state and local codes prevent action to be taken.

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